Government of the Kingdom of TONGA

NATIONAL SPECTRUM PLAN

TABLE OF FREQUENCY ALLOCATION

COMMUNICATIONS RADIO SPECTRUM RULES 2019

2021

MINISTRY OF MEIDECC. LEVEL 2, O.G SANFT BUILDING, P.O BOX 1380

Communications
Radio Spectrum Rules 2019

Kingdom of Tonga

National Spectrum Plan

Table of Frequency Allocations

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DEPARTMENT OF COMMUNICATIONS,
MINISTRY OF MEIDECC,
GOVERNMENT OF THE KINGDOM OF TONGA.

Preface

The radio frequency spectrum and the geo-stationary satellite orbit are limited national natural resources, susceptible to harmful interference and are international in character since radio waves cannot be confined to national boundaries. Unlike other natural resources, the radio wave spectrum when used are not consumed but are often denied for a time to other users in the same area. There is therefore a requirement for them to be shared amongst various services, applications, technologies and users, avoiding exclusive access wherever possible. It is essential that this scarce resource should be used efficiently and economically so that equitable access is available to all users in an interference-free radio environment. Utilisation of these resources follows the laws of physics and is governed by international treaties, notably, the Constitution and convention and the Radio Regulations of the International Telecommunication Union (ITU), taking into account sovereignty of each country in utilisation whole spectrum in its territory without causing interference to other countries.

For the Kingdom of Tonga and similar to the other countries, national spectrum management involves the application of both administrative and technical procedures to ensure the efficient operation of radiocommunication services. Effective spectrum management, therefore, integrates procedures and science in the process of assigning, licensing and maintaining frequency use in a way that is timely and responsive to all eligible needs. This must be done without compromising national interests, and so that the potential for harmful interference is minimised.

In this plan no ownership of any radio frequency band or specific frequency is conferred on any entity. Indeed, national spectrum planning on this scale does not relieve user organisations from carefully planning the frequency usage of their own networks and managing mutual interference. Rather, it assists them to do it on a sound technical and legal foundation. The plan indicates how the spectrum is notionally divided into bands that can be used by defined radiocommunication service types which can in turn be used for certain applications. The plan serves to guide the regulator and the user community about how radio frequencies will be allocated to radiocommunication services in this country, as a legal basis for frequency assignment and licensing.

This is a review of the 2014 and 2015 Spectrum Plan, with reference to the ITU Region 3 international frequency allocation table and will continue to evolve in line with the provisions of the ITU Radio Regulations for the Asia Pacific Region in the context of Region 3. These international regulations will take account of global technical and market developments. The Spectrum Regulator of Tonga will from time to time supplement this with national footnote provisions that relate to the particular requirements of this country. Brought together in this document, this information will form the legal foundation for the use of the radio frequency spectrum within the Kingdom.

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Preamble
COMMUNICATIONS ACT 2015 PART VIII and COMMUNICATIONS RADIO SPECTRUM RULES 2019

The Preamble contains basic Regulations governing radio frequency spectrum in the Kingdom of Tonga. The texts collected from original legislations with no change.

COMMUNICATIONS ACT 2015

PART VIII - TECHNICAL REGULATION

DIVISION 3 - RADIO FREQUENCY SPECTRUM MANAGEMENT

85 Regulator to manage radio frequency spectrum

(1) The Regulator shall be responsible for the control, planning, administration, management and licensing of the radio frequency spectrum in the Kingdom.

(2) In performing its functions under this Division, the Regulator shall ensure that the management of radio frequency spectrum in the Kingdom:
- (a) is carried out in a manner that is non-discriminatory and economically efficient; and
- (b) is in accordance with the standards and regulations of the International Telecommunications Union and other international and regional treaties, commitments, protocols, and standards as agreed to or adopted by the Kingdom.

(3) Without limiting its obligations under section 85(2), in performing its functions under sections 87 to 88, the Regulator shall take into account:
- (a) the objects of the Act;
- (b) the impact of the National Spectrum Plan and National Frequency Allocation Table on existing and future use of the radio frequency spectrum; and
- (c) the orderly and efficient use of the radio frequency spectrum.

86 National Spectrum Plan

(1) The Regulator shall develop, and at least once every 2 years update, a plan to be known as the National Spectrum Plan.

(2) The National Spectrum Plan developed by the Regulator under subsection (1) shall set out the Regulator's plan for managing the radio frequency spectrum over a period of at least 5 years including:
- (a) the policy for how different parts of radio frequency spectrum are used or allocated;
- (b) any proposed changes to how parts of the radio frequency spectrum are used or allocated (including the details of the changes and relevant timelines); and
- (c) the identification of any part of the radio frequency spectrum that is valuable state resource.

(3) The National Spectrum Plan developed or updated by the Regulator shall be subject to the approval by declaration of the Minister.

(4) Before developing or updating the National Spectrum Plan, the Regulator shall carry out a consultation under section 23.

(5) The National Spectrum Plan shall be maintained by the Regulator and published by the Regulator on its website.

87 Determination of the National Frequency Allocation Table

(1) The Regulator shall develop a document known as the National Frequency Allocation Table in order to manage the use of the radio frequency spectrum.

(2) The National Frequency Allocation Table shall be maintained by the Regulator and published by the Regulator on its website.

88 Contents of the National Table of Frequency Allocations

The National Frequency Allocation Table developed by the Regulator under section 87 shall state how the radio frequency spectrum may be used and may include but shall not be limited to:

(a) the existing and planned frequency allocations;
(b) the existing and planned frequency reservations; and
(c) any other matter as may be required by the Minister.

89 Radio spectrum rules

(1) The Regulator shall make rules about the radio frequency spectrum specifying:
  (a) the categories of radio spectrum licences that may be issued in relation to spectrum blocks or particular frequencies;
  (b) the circumstances in which a radiocommunications device is exempt from a radio spectrum licence;
  (c) the process for submitting an application for a radio spectrum licence;
  (d) the criteria for who is eligible to submit an application;
  (e) application fees to be paid to the Regulator (if any);
  (f) any rules about the use of radio frequency spectrum or particular parts of radio frequency spectrum, including any interference requirements;
  (g) any licence conditions and technical standards that apply to particular radio spectrum licences or particular devices;
  (h) any licence fees that are payable for radio spectrum licences;
  (i) the circumstances in which radio spectrum licences can be surrendered, suspended, revoked or amended; and
  (j) the processes for determining any disputes about radio frequency spectrum interference.

(2) The rules under sub-section (1) may also specify:
  (a) a fair and transparent method of issuing radio spectrum licences for valuable state resources, which may include a competitive process;
  (b) any rules or processes for the assignment of radio frequency spectrum to a licensee as part of the licence transition process specified in section 187; and
  (c) any other matter relating to radio spectrum that the Regulator considers necessary or convenient for or in connection with the performance of its functions under this Division.

(3) The Regulator shall ensure that any fees prescribed under the rules made under sub-section (1) shall be:
  (a) where the fee is for the allocation of a valuable state resource by means of a competitive process — the amount payable as a result of the competitive process; and
  (b) otherwise, a fixed amount published by the Regulator on its website or any other form the Regulator thinks fit.

(4) Before making rules under this section, the Regulator shall carry out a consultation under section 23.

90 Radio spectrum licences

(1) A person shall not:
  (a) establish, operate or use a radiocommunications service;
  (b) install, operate or use any radio transmitting equipment; or
  (c) establish, operate or use any apparatus or radiocommunication service in any place or on board any ship or aircraft registered in the Kingdom, without a radio spectrum licence granted by the Regulator in accordance with the radio spectrum rules, except where the use is permitted under the radio spectrum rules.

(2) Where a person applies for a licence to own, operate or use communications facilities or provide communications services and the operation of the relevant network facilities and the provision of the communications services requires access to radio frequency spectrum:
  (a) that person shall apply for a radio spectrum licence at the same time as the application for a network operator licence; and

(b) the Regulator shall consider both applications together and may refuse to issue the network operator licence if the applicant does not comply with the requirements for a radio spectrum licence.

91 Assignments of radio frequency spectrum

(1) The Regulator shall ensure that any assignment of radio frequency spectrum in a radio spectrum licence is in accordance with the National Spectrum Plan, the National Frequency Allocation Table and any radio spectrum rules.

(2) The Regulator shall establish and maintain a register of all assignments of radio frequency spectrum to licensees.

DIVISION 4 - MANAGEMENT OF SATELLITE ORBITAL SLOTS

92 Management of satellite orbital slots

(1) The Minister (or one or more persons nominated by the Minister) shall assume and be responsible for the overall management and allocation of the Government's orbital satellite slot interests.

(2) The nominated person under sub-section (1) may be the Regulator.

COMMUNICATIONS RADIO SPECTRUM RULES 2019

COMMUNICATIONS ACT 2015

IN EXERCISE of the powers conferred by section 89 of the Communications Act 2015, makes the following Rules —

1 Short Title and Commencement

(1) This Rule may be cited as the Communications Radio Spectrum Rules 2019.

(2) These Rules shall come into force on the date it is published in the Gazette or otherwise in accordance with section 10(e) of the Interpretation Act (Cap.1).

2 Interpretation

Subject to subsection (2), unless the context otherwise requires, terms used in these Rules have the same meaning as in the Communications Act 2015.

In these Rules, unless the context otherwise requires —

"Act" means the Communications Act 2015;

"aircraft" includes an airship, a glider and a balloon;

"days" means business days;

"existing licensee" means the holder of an existing radiocommunication licence;

"existing radiocommunication licence" means radiocommunication licences issued before the coming into force of these Rules which, by their terms, are intended to operate after that date and includes -

(a) licences granted by the Minister under the Radiocommunication Act 1930; and
(b) the grant of rights to use particular spectrum bands that were assigned by way of Individual Licences issued by the Minister under section 20 of the old and repealed Communication Act 2000 prior to the commencement of these Rules.

"harmful interference" means any emission, radiation or induction which-

(a) endangers the functioning of a radio navigation service or other safety service; or
(b) seriously degrades, obstructs or repeatedly interrupts a radiocommunications service operating in accordance with the Act and these Rules;

"ITU Convention" means the Constitution and Convention of the International Telecommunication Union signed on 22 December 1992 as amended from time to time;

"licensee" means the holder of a radio spectrum licence;

"radiocommunication" means any transmission emission or reception of signs, signals, impulses, writing, images, sounds, data or information of any kind by means of electromagnetic waves in the radio spectrum;

"radiocommunications service" means a service intended for the provision of radiocommunications;

"radio equipment" means equipment that emits radio frequency energy and which is required for the transmission of radio signals;

"Radio Regulations" means the Radio Regulations published by the International Telecommunication Union in pursuance of recommendations of the World Radio Conferences, as amended from time to time, and includes the appendices to those Radio Regulations and any additional Regulations;

"receiver" means an electronic device that receives incoming modulated radio waves and converts them into the original signals;

"ship" includes every kind of vessel or floating or submerged craft of any size, not being a ship that is permanently moored;

"station" means one or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunications service;

"transmitter" means an electronic device that generates and amplifies a carrier wave, modulates it with a meaningful signal derived from speech or other sources, and radiates the resulting signal from an antenna;

"type approved" means type approved pursuant to the Communications Technical Rules 2018;

"use" in relation to a station or radio equipment, includes repair or adjust.

NOTE- The following terms are defined in the Act-

- communications service;
- competitive process;
- network operator;
- network operator licence;
- Regulator;
- valuable state resource.

PART II – SPECTRUM LICENSING

DIVISION 1 – GENERAL

3 Administration of radio spectrum licensing

In issuing, refusing to issue, varying, suspending or cancelling a radio spectrum licence to any person the Regulator shall comply with the procedures and requirements specified in these Rules.

4 Types of radio spectrum licences

The categories of radio spectrum licences are specified in Schedule 1.

NOTE- Under section 90(1) of the Act, a radio spectrum licence is required to-

(a) establish, operate or use a radiocommunications service;
(b) install, operate or use any radio transmitting equipment; or
(c) establish, operate or use any apparatus or radiocommunication service in any place or on board any ship or aircraft registered in the Kingdom.

5 Licence exempt spectrum use

(1) The use and ownership of the radio equipment listed in Schedule 2 is exempt from spectrum licensing provided that -

(a) the use of the equipment is within the frequency bands specified for such purposes in the National Frequency Allocation Table;
(b) the use of the equipment is consistent with the relevant technical restrictions specified in Schedule 3;
(c) the equipment is type approved; and
(d) the ownership and use of the equipment does not cause interference to licensed radio equipment authorised by the Regulator.

(2) The ownership and operation of radio equipment that is exempt from spectrum licensing is not protected from interference. The owners and operators of such equipment must accept any interference that may be caused by other radio equipment operating under these Rules or from licensed radio equipment.

6 Fees

(1) The fees payable in respect of a radio spectrum licence issued on an administrative basis shall be -

(a) the fee amounts specified in Schedule 1;

(b) invoiced by the Regulator on the date of issue or renewal of the licence and thereafter annually on the anniversary of the date or issue or renewal; and
(c) paid by the licensee to the Regulator no later than 20 days of the date of invoice; and
(d) paid by cash or a cheque drawn on a business account, delivered to a payment intake point as notified by the Regulator from time to time.

NOTE- Under the transitional arrangements in subsections 29(9–10) of these Rules, the first invoice for spectrum fees under section 7 will not be rendered or payable until 1st July 2019 in relation to cellular block assignments, fixed links block assignments, or land mobile block assignments that have been made by the Regulator in replacement of existing radiocommunication licences anytime from the date of commencement of these Rule to the 30th June 2019.

(2) The fees payable in respect of a radio spectrum licence issued through a competitive process shall be the amount payable as a result of the competitive process.

7 Register of radio spectrum licences

For the purposes of section 91 of the Act, the register of radio frequency spectrum assignments shall record-
(a) all radio communications licences issued, renewed or transferred;
(b) any variations to those licences; and
(c) any authorisations or variations lodged pursuant to rule 14.

DIVISION 2 – ISSUE OF LICENSES ON AN ADMINISTRATIVE BASIS

8 Licence eligibility

(1) Subject to subsection (2), the following persons are eligible to apply for and hold a radio spectrum licence, or to act pursuant to a radio spectrum licence-
(a) a company as defined under the Companies Act 1995;
(b) a natural person who is a citizen of the Kingdom and of at least 18 years of age;
(c) a partnership, one of the members of which is a citizen of the Kingdom and of at least 18 years of age;
(d) a charitable trust, incorporated society, or other body organised under a law of the Kingdom that has capacity to contract;
(e) a government school, recognised school or registered school under the Education Act 2013;
(f) an entity listed in Schedule 1 of the Public Service Act 2002; or

(2) In the case of -
(a) an Aircraft Radio Station licence, an applicant must also be an authorised representative of the person in legal possession of an aircraft registered in the Kingdom;

NOTE- The Regulator will liaise with the Director of Civil Aviation in the Ministry of Infrastructure before issuing an Aircraft Radio Station licence to confirm the eligibility of the applicant, and also after issuing a licence to confirm that the installation of the radio equipment meets relevant safety requirements.

(b) a Cellular Block Assignment licence, an applicant must also be network operator or have a decision pending on an application to the Regulator for a network operator licence;
(c) a Ground Based Aeronautical Station licence, an applicant must also be an authorised representative of an airfield in the Kingdom;

NOTE- The Regulator will liaise with the Director of Civil Aviation in the Ministry of Infrastructure before issuing a Ground Based Aeronautical Station licence to confirm the eligibility of the applicant, and also after issuing a licence to confirm that the installation of the radio equipment meets relevant safety requirements.

(d) a Ship Radio Station licence, an applicant must also be an authorised representative of a vessel registered in the Kingdom;

NOTE- As Tonga is a signatory to the International Convention for the Safety of Life at Sea (SOLAS), merchant / commercial vessels registered in the Kingdom must conform with Global Maritime Distress Safety System (GMDSS) equipment requirements.

NOTE- Vessels that are not registered in the Kingdom do not require a radio spectrum licence issued by the Regulator while they are in Tongan waters provided that they hold a relevant licence issued by the national regulatory authority in the country where they are registered.

(e) Radio Amateur licence, an applicant must also hold an Restricted Radio Operator Certificate of Proficiency issued by the Tonga Maritime Polytechnic Institute or other recognized operator certificate of proficiency to be confirmed by the Regulator prior to application.

9 Process of submitting an application

(1) An application for a radio spectrum licence must-
(a) be in written or electronic form;
(b) be in the form specified by the Regulator;
(c) contain -
(i) the particulars of the applicant;
(ii) the information specified in the application form;
(iii) sufficient supporting information to demonstrate the applicant's need for a radio spectrum licence;
(iv) sufficient supporting information to demonstrate the applicant's ability to install and operate the proposed ratio equipment within the technical constraints that would be specified in such a licence and without causing undue interference to other licensees; and
(v) such other information as may be required by the Regulator.

(2) The Regulator may request from the applicant -
(a) any information required but not provided under subsection (1); and

(b) such further information which the Regulator considers relevant to its decision whether to issue the licence.

10 Procedure for processing licence applications

(1) The Regulator shall -
(c) process applications for radio spectrum licences in the order received; and
(d) endeavour to complete its processing of the application for a radio spectrum licence and make a decision to grant or refuse the application within 20 days of receipt of all relevant information.

(2) The Regulator may advise the applicant in writing within the period of 20 days from receipt of all relevant information that the Regulator will take longer than 20 days to determine the application. Such advice should indicate the estimated additional time required and the reason for the extended period of consideration of the application.

(3) If the Regulator decides to grant an application for a radio spectrum licence, the Regulator will give the applicant-
(e) an invoice for the purposes of section 7; and
(f) a written copy of its licence upon payment of the invoice within the time specified in section 7.

(4) If the Regulator has not provided the applicant with advice of the kind set out in subsection (2) then after the expiry of 20 days from the receipt of all relevant information the application shall be deemed to have been refused by the Regulator.

11 Matters to consider for a licence application

Before deciding whether to grant or refuse an application for a radio spectrum licence, the Regulator shall consider-
(a) whether the applicant is eligible to apply for and hold a radio spectrum licence;
(b) whether radiocommunication from the radio equipment authorised under the radio spectrum licence would have the potential to cause harmful interference to any other radio equipment authorised under any other radio spectrum licence;
(c) whether or not the spectrum proposed to be used by the licensee has been declared a valuable state resource;
(d) the applicable licence conditions;
(e) whether the applicant has the ability to install and operate the radio equipment within the technical constraints that would be specified in the radio spectrum licence;

(f) any minimum standards of proficiency required of the applicant; and
(g) such other matters as the Regulator considers relevant.

12 Duration and renewal of a radio spectrum licence

(1) A radio spectrum licence shall remain in force for the period specified in Schedule 1 from the date of issue or renewal unless the licence is surrendered, suspended or revoked.
(2) A licensee that wishes to renew its radio spectrum licence shall-
(a) submit an application for renewal to the Regulator not later than 40 days before the expiry of the licence;
(b) confirm that the details contained in the licence are still valid, and
(c) submit such information that the Regulator may require.
(3) Before deciding whether to grant or refuse the application for renewal of a radio spectrum licence, the Regulator shall consider the matters specified in section 12.
(4) If the Regulator does not receive an application for renewal pursuant to subsection (2) then, upon the expiry of the radio spectrum licence, the frequency or frequencies that were specified in the expired licence -
(a) will be quarantined from assignment and spectrum licensing for a period of 60 days; and
(b) shall not be assigned or licensed to any person for the duration of the quarantine period other than the person to whom the frequency or frequencies were previously assigned.
(5) If the person to whom a particular frequency was previously assigned wishes to be reassigned that same frequency as provided for under subsection (4)(b), then-
(a) that person must submit an application for a radio spectrum licence in accordance with section 10;
(b) the Regulator may extend the duration of the quarantine period by a maximum of 20 days; and
(c) the Regulator shall process the application pursuant to sections 11 and 12.

13 Transfer of a radio spectrum licence

(1) A licensee may, with the prior written consent of the Regulator, transfer a radio spectrum licence to another person provided that-
(a) the licensee has paid all applicable licence fees that are due and payable before the proposed date of transfer; and
(b) the person to whom the radio spectrum licence is to be transferred-
(i) is eligible to apply for and hold a radio spectrum licence;
(ii) has the ability to install and operate the radio equipment within the technical constraints specified in the radio spectrum licence; and
(iii) has the minimum standards of proficiency that may be required of holders of such licences.
(2) The person to whom a radio spectrum licence is transferred shall assume responsibility for the fulfilment of all obligations and responsibilities that apply to the holder of that licence.

DIVISION 3 – ISSUE OF LICENCES THROUGH A COMPETITIVE PROCESS

14 Valuable state resources

In the event that the Minister determines that demand for access to a particular part or parts of the spectrum exceeds, or is likely to exceed, the available spectrum, then the Regulator will-
(a) develop, through public consultation, a fair and transparent method by which the Regulator will issue one or more licences of that spectrum; and
(b) amend these Rules so that the licensing process is set out herein at least 30 days before the licensing process is to commence.

NOTE- Section 89 of the Act provides for the Regulator to specify in these Rules an alterative method for issuing spectrum licences (such as by way of auction, tender, commercial negotiations or other market-based allocation) if the Regulator considers that demand for a particular part or parts of the spectrum is likely to exceed supply.

PART III – LICENCE CONDITIONS

15 Standard conditions of a radio spectrum licence

(1) A radio spectrum licence is subject to the following conditions-

(a) the licensee must comply with -

(i) the Act, these Rules, the conditions of its radio spectrum licence, and all other applicable regulations, rules, declarations, standards and other secondary instruments made by the Regulator under the Act or these Rules;

(ii) all directions given to it by the Regulator in relation to the licensee's use of spectrum;

(iii) the requirements of all relevant international conventions including the International Convention for the Safety of Life at Sea and the ITU Convention and the recommendations made under that convention;

(b) the licensee shall pay all applicable fees and levies as and when they fall due;

(c) the licensee shall ensure that any radio equipment that is used or operated under its radio spectrum licence-

(i) is type approved;

(ii) is used and operated in accordance with the requirements, terms, conditions and limitations specified in its radio spectrum licence;

(iii) does not exceed the specified output powers, emission parameters or geographic unit specified in the licence without the prior written approval of the Regulator; and

(iv) is used and operated only by trained and certified operators;

(d) the licensee shall take all necessary steps to ensure that -

(i) no harmful interference is caused and to eliminate any such interference;

(ii) the operation of any radio equipment causing harmful interference ceases until such time as the interference has been eliminated;

(e) the licensee shall ensure that non-ionising radiation emissions from the radio equipment operated by the licensee are within the limits specified by the guidelines and radiation emission standards adopted and published by International Commission on Non-Ionizing Radiation Protection or its successors;

(f) the licensee shall not make any material change to an approved site or station except with the prior written consent of the Regulator;

(g) the licensee shall coordinate with other radio spectrum licensees within the same geographic area before deploying or using any radio equipment to minimise the potential for inference;

(h) the licensee shall maintain accurate up to date records of the technical parameters of the radio equipment, and location of each station deployed under its licence and shall make those records available to the Regulator for inspection upon request;

(i) the licensee shall allow any person authorised in writing by the Regulator to have access to and inspect the licensee's radio equipment, installations and associated documentation to enable the Regulator to ensure that the radio equipment is being used in accordance with the terms and conditions of the licence.

(2) For the avoidance of doubt, nothing in these terms and conditions absolves a licensee from any requirement in the Act or other law to obtain any approvals, consents, licences, permissions or authorisations that may be necessary for complying with the national regulatory framework.

16 Additional conditions of a radio spectrum licence

(1) Subject to subsection (2), the Regulator may specify the following conditions in a radio spectrum licence - -

(a) the frequency, bandwidth, and type of emission that may be used by the licensee;

NOTE- The Regulator may define the frequency that may be used by the licensee by specifying a centre frequency and associated bandwidth, or a frequency range, or a frequency block.

NOTE- Aeronautical and maritime licence frequency bands are internationally agreed and set out in the International Telecommunication Union's Radio Regulations.

(b) the precise geographic co-ordinates where the licensee may deploy radio equipment;
(c) the maximum allowed transmitter power at a site;
(d) the purpose for which radio equipment may be used by the licensee;
(e) any other technical parameters that may be deemed necessary by the Regulator.

(2) A licensee that has been assigned a frequency block-
(a) may deploy any radio equipment at any site within its designated segment of spectrum and geographic area;
(b) may decide how it will manage the deployment of radio equipment within its designated segment of spectrum and geographic area;
(c) may decide the nature of the communications services that it wishes to deliver by radio communication within its designated segment of spectrum and geographic area;
(d) may decide which technology it wishes to use; and
(e) responsible for managing the potential for interference to other radio spectrum licensees utilising adjacent frequencies.

NOTE- The Regulator will only assign a frequency block under the following types of radio spectrum licence-

Cellular Block Assignment, Fixed Links Block Assignment, and Land Mobile Block Assignment.

17 Variation of licence conditions

(1) A radio spectrum licence may be varied during its term in either of the following ways -
(a) as agreed in writing between the Regulator and the licensee following a written application by the licensee; or
(b) subject to subsection (3), by the Regulator in its sole discretion.

(2) Before deciding whether to grant or refuse an application under subsection (1)(a), the Regulator shall consider the matters specified in section 12.

(3) Prior to varying a licence under subsection (1)(b), the Regulator shall -
(a) issue a written notice to the licensee setting out-
(i) the reasons for the proposed variation; and
(ii) the details of the proposed variation
(b) provide a period of at least 30 days during which the licensee may make a written submission to the Regulator in response to the notice;
(c) consider any submission made by the licensee pursuant to subsection (3)(b) (2)(b); and
(d) issue a written declaration to the licensee setting out the details and effective date of the variation.

(4) If the Regulator varies a licence pursuant to subsection (1)(b), the Regulator shall -
(a) provide a copy of the amended licence to the licensee; and
(b) record the variation in the register of spectrum assignments.

PART IV – LICENCE SUSPENSION AND REVOCATION

18 Suspension or revocation of a licence

(1) The Regulator may, by notice in writing, suspend or revoke a radio spectrum licence in any of the following circumstances-
(a) the licensee has failed to comply with any of the provisions of the Act or these Rules;
(b) the licensee is in breach of any conditions of its licence;
(c) the licensee fails to pay the applicable licence fee by the due date;
(d) the licensee has ceased to fulfil the eligibility requirements set out in section 9;
(e) the licensee -
(i) enters into receivership or liquidation;
(ii) takes any action for its voluntary winding-up or dissolution;
(iii) enters into any scheme of arrangement; or
(iv) the subject of any order that is made by a competent court or tribunal for its compulsory winding-up or dissolution;

(f) where the Regulator considers that it would be in the public interest to do so, including the public interest in the efficient utilisation of spectrum.

(2) Before suspending or revoking a licence under subsection (1), the Regulator shall -
(a) notify the licensee in writing of the proposed action specifying its reasons; and
(b) give the licensee at least 30 days within which to -
(i) rectify the circumstances giving rise to the Regulator's right to suspend or revoke the radio spectrum licence; and
(ii) make submissions to the Regulator in relation to the proposed action; and
(c) take into account -
(i) whether the licensee has rectified the circumstances giving rise to the Regulator's right to suspend or revoke the licence; and
(ii) any submissions made by the licensee; and
(iii) whether the proposed action is appropriate with regard to the objects of the Act.

(3) Subject to subsection (4), no suspension or revocation of a licence shall take effect until the Regulator has -
(a) complied with the obligations specified in subsection (2); and
(b) notified the licensee of its decision and the date on which the suspension or revocation shall be effective.

(4) Notwithstanding subsection (2) and (3), the Regulator may immediately -
(a) suspend or revoke a licence if the licensee requests the Regulator in writing to do so;
(b) suspend a licence if the licensee fails to pay the applicable licence fee by the due date; or
(c) a licence to the extent required in the case of any emergency involving harmful interference or safety of life or property.

(5) The period of a radio spectrum licence continues to run during a period of suspension.

(6) The suspension or revocation of a licence under these Rules -
(a) does not affect any obligation of the licensee to do an act, or refrain from doing an act under the Act, where the obligation arose before the suspension or revocation of the licence;
(b) may, at the discretion of the Regulator, result in a prorated refund of radio spectrum licence fees paid by the licensee under section 7.

(7) A suspension of a licence under this rule may -
(a) be for a specified period;
(b) continue until the fulfilment of a specified condition; or
(c) continue until the Regulator determines otherwise.

(8) The Regulator shall, as soon as practicable, publish its reasons for suspending or revoking the licence.

PART V – INTERFERENCE

19 Radio equipment causing interference

Subject to the terms of its radio spectrum licence, a licensee shall -
(a) operate radio equipment in such a manner as not to cause harmful interference to any radio equipment operated under any radio spectrum licence; and
(b) comply with a direction of the Regulator in that regard.

20 Interference disputes

(1) In the case of an interference dispute the Regulator will confirm whether the licensees that are party to the dispute are operating within the terms and conditions of their radio spectrum licences.

(2) If the Regulator determines that both parties are operating within the terms and conditions or their radio spectrum licences, the Regulator will encourage the parties to attempt to reach a mutually agreed solution.

(3) If a conciliator is not agreed between the Parties within 7 days, the Regulator may appoint a conciliator for the purpose of facilitating an agreement pursuant to subsection (2) -

(a) on such terms and conditions as the Regulator may determine and specify in the instrument of appointment; and
(b) at the expense of the parties to the dispute.

(4) If the Regulator believes that a negotiated solution pursuant to subsection (2) is unlikely, the Regulator will -
(a) amend the radio spectrum licence, in accordance with section 18, of the licensee that is party to the dispute who was issued its radio spectrum licence most recently; and
(b) assign, at no cost, an alternative frequency or set of frequencies to that licensee.

NOTE- For the purposes of subsection (4)(a) the dates of issue of radio spectrum will be the date when the spectrum was first issued to the relevant licensee or to any other licensee who has transferred the frequency assignment under section 14.

PART VI - COMPLIANCE AND ENFORCEMENT

21 Information gathering power

(1) The Regulator may by written notice order a licensee to give the Regulator, within the period and in the manner specified in the notice, information that in the Regulator's opinion is necessary for its effective control, planning, administration, management or licensing of the radio frequency spectrum.
(2) A licensee ordered to provide information under subsection (1) shall-
(a) comply with the written order; and
(b) ensure that the information provided pursuant to the written order is true, accurate and complete.

22 Access and inspection powers

Where the Regulator has a reasonable cause to believe that any radio equipment or electrical or other equipment or machinery is causing or is likely to cause harmful interference to radio equipment, the Regulator, or its authorised representative, may at all reasonable times enter -
(a) any place on or at which; or
(b) any vessel, aircraft or vehicles in or on which; the equipment or machinery is or is believed to be and inspect or test it.

23 Power to issue directions

(1) Where the Regulator has a reasonable cause to believe that any radio equipment or electrical or other equipment or machinery is causing or is likely to cause harmful interference to radio equipment or to radiocommunications services that are supplied under a radio spectrum licence, the Regulator may by written notice direct a licensee to take specified action or refrain from taking specified action.
(2) A licensee given a direction under subsection (1) shall comply with the direction.

24 Modification, restriction and closedown of a radio spectrum licence

The Regulator, or its authorised representative, may require that particular radio equipment, or any part of the radio equipment, be modified, restricted in use, or temporarily or permanently removed from use immediately or on expiry of a specified period -
(a) if in the opinion of the person a breach in the terms of the licence has occurred or is occurring;
(b) if the use of the radio equipment is causing or contributing to undue interference to the use of other authorised radio equipment; or
(c) in the event of a national emergency being declared.

25 Interference from licence exempt radio equipment

If the use of radio equipment that is exempt from spectrum licensing under section 6 causes interference to radiocommunications services that are supplied under a radio spectrum licence, the

Regulator may direct the operator or user of the radio equipment that is causing the interference to-

(a) change frequency;
(b) reduce power; or
(c) cease operation.

PART VII – TRANSITIONAL PROVISIONS

26 Saving of existing radiocommunication licences

(1) Subject to subsection (2), each existing radiocommunication licence shall remain valid and in force in accordance with its terms until that existing licence-
   (a) expires;
   (b) is replaced by one or more radio spectrum licences issued under these Rules; or
   (c) is surrendered by way of a written notice to the Regulator.

(2) A grant of rights to use particular spectrum bands that was assigned by way of an Individual Licence issued by the Minister under section 20 of the old and repealed Communications Act 2000 prior to the commencement of these Rules will remain valid only while that Individual Licence itself remains valid and in force.

27 Identification of replacement licence types for existing licensees

Within 60 days of the commencement of these Rules, the Regulator shall-

(a) inform each existing licensee of the process through which replacement radio spectrum licences will be issued; and
(b) give each existing licensee an opportunity to inspect and, if necessary, correct the particulars of the replacement radio spectrum licence or licences that the Regulator proposes will replace the existing radiocommunication licence.

NOTE- Certain types of radio equipment and spectrum use that used to require a radiocommunication licence will no longer require a licence. Therefore, some types of existing radiocommunication licence will not need to be replaced with a radio spectrum licence issued under these Rules.

28 Procedures for replacing existing radiocommunication licences

(1) Subject to subsection (2), and where necessary, an existing radiocommunication licence will be replaced by one or more radio spectrum licences issued by the Regulator under these Rules following a request under subsections (3) or (4) from the relevant licensee.

(2) Notwithstanding any other provisions of these Rules, an existing licensee must satisfy the eligibility criteria in section 9 in order to be issued with one or more radio spectrum licences in replacement of an existing radiocommunication licence.

(3) If a licensee wishes to have an existing radiocommunication licence replaced with one or more radio spectrum licences, the licensee must complete and submit the relevant application form, accompanied by any attachments that may be specified in that application form.

(4) The Regulator shall deem a licensee to have requested the replacement of its existing radiocommunication licence with one or more radio spectrum licences if-
   (a) the existing radiocommunication licence is a grant of rights to use particular spectrum bands that was assigned by way of an Individual Licence issued by the Minister under section 20 of the old and repealed Communication Act 2000 prior to the commencement of these Rules; and
   (b) the licensee requests the Regulator to replace its Individual Licence with a network operator licence or registration as a service provider pursuant to section 187 of the Act.

(5) Subject to subsection (6), the Regulator shall endeavour to complete processing of a request for a replacement licence within 30 days of receipt of all relevant information.

(6) In the event of any discrepancy between the Regulator's records and the information supplied by an existing licensee as part of its request for a replacement licence under subsection (3) or (4), the Regulator will-
   (a) inform the licensee of the discrepancy;

(b) defer processing of the requested licence replacement until the identified discrepancy is resolved; and
(c) endeavour to clarify the discrepancy and complete the requested replacement of the existing radiocommunication licence as soon as practicable.

(7) Other than confirming that an existing licensee meets the licence eligibility criteria in section 9, the Regulator shall give no consideration to the criteria in section 12 when processing a request for a replacement licence.

(8) A radio spectrum licence issued by the Regulator in replacement of an existing radiocommunication licence will be-
(a) recorded in the register of spectrum assignments for the purposes of section 91(2) of the Act; and
(b) for the period specified for that licence type in Schedule 1, with such period beginning on the date of issue of the replacement licence.

NOTE- This may have the effect of extending an existing licensee's spectrum assignment and usage rights beyond that provided for under the terms of its existing radiocommunication licence.

(9) Spectrum fees will not be applied under section 7 until 1st July 2019 to the following types of radio spectrum licences that are issued by the Regulator in replacement of an existing radiocommunication licence-
(a) cellular block assignment;
(b) fixed links block assignment; and
(c) land mobile block assignment.

(10) For the purpose of the application or spectrum fees under section 7, the date of issue of replacement radio spectrum licences of the type specified in subsection (9) that are issued-
(a) anytime between the commencement of these Rules and the 30th June 2019 will be taken to be the 1st July 2019;
(b) on or after the 1st July 2019 will be the date of which the replacement licence is issued to the licensee.

Made at Nuku'alofa this **28th** day of **June** 2019.

Paula Ma'u

Chief Executive Officer

Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change, and Communications

SCHEDULE 1

RADIO SPECTRUM LICENCE TYPES AND FEES

Service category	Ref.	Licence type	Duration of licence (years)	Annual fee (TOP) (exclusive of consumption tax)
Aeronautical	1	Aircraft radio station	5	$100
	2	Ground based aeronautical station	5	$500
Broadcasting	3	FM radio station Transmitter	5	$500
	4	AM radio station transmitter	5	$500
	5	Digital television station transmitter	5	$1000
Cellular	6	Cellular block assignment	15	Per Bandwidth
Fixed links	7	Point-to-point link	5	$300
	8	High frequency point-to-point link	5	$150
	9	Point-to-multipoint Link	5	Per Bandwidth
	10	Fixed links block assignment	15	Per Bandwidth
Land mobile	11	Base station	5	$50
	12	Land mobile block assignment	15	Per Bandwidth
Maritime	13	Ship radio station	5	$50
	14	Coastal station	5	$200
Radio Amateur	15	Radio amateur	5	$50
	16	Repeater station	5	$50
Satellite	17	Satellite earth station	5	$5,000
	18	Transportable satellite earth stations	5	$100
	19	VSAT terminal*	5	$200

* A VSAT terminal licence is required for terminals only if it is to be used in a frequency band shared with fixed links (e.g. 5725 – 5850 MHz)

The annual fee for radio spectrum licences that assign a frequency block is determined by the following formula-

Annual licence fee = BV x BW x CF x GEO x FBF

Where-

BV = Base Value (in TOP), which will be set and notified by the Regulator from time to time at a level that enables recovery through the spectrum licence fee regime of the necessary proportion of the Regulator's costs;

BW = Bandwidth (in MHz), which is the amount of bandwidth assigned to the licensee under the radio spectrum licence;

CF = Coverage Factor, which is a value between 1 and 5 that is determined by the regulator to differentiate between radio spectrum licences for individual links or transmitters and those intended to provided national coverage;

GEO = Geographical Factor, which is a value between 0.1 and 2.0 that is determined by the Regulator to reflect whether the spectrum assignment relates to a high density (1.0) or low density (0.1) area within the Kingdom; and

FBF = Frequency Band Factor, which is a value between 0.1 and 2.0 that is determined by the Regulator to distinguish between the potential value of different portions of the radio frequency spectrum.

SCHEDULE 2

LICENCE EXEMPT RADIO EQUIPMENT

Item no.	Equipment
1	Cordless telephones
2	Mobile terminals and other terminals for GSM, UMTS, LTE, digital broad-band mobile networks and terrestrial systems used to provide electronic communications services
3	Terminals for use for mobile satellite communications that operate under a network licence and are controlled by the mobile satellite operator
4	Citizen's Band (CB) telephones
5	Wireless LAN and broadband access equipment
6	Telecommand (remote control) equipment for use with model aircraft
7	Low power alarms for security and safety and social alarms
8	Equipment for detecting movement and providing alerts
9	Radio Frequency Identification devices (RFID)
10	Ultra Wideband (UWB) devices
11	Wireless microphones, in-ear monitoring equipment and talk-back equipment
12	Low power medical implants
13	On-site paging systems
14	PMR 446 (analogue and digital) equipment
15	VSAT terminals for fixed satellite communications operating via satellites utilising frequencies reserved for fixed satellite services
16	Mobile satellite earth stations operating in the band 14 – 14.5 GHz on board an aircraft controlled by the mobile satellite operator
17	Earth stations on mobile platforms for fixed satellite communications in the band 29.5 – 30 GHz controlled by the mobile satellite operator
18	Earth stations on board vessels in the Ku band controlled by the mobile satellite operator
19	Earth station receive only
20	Low power FM transmitters
21	Road transport and traffic telematics

SCHEDULE 3

TECHNICAL RESTRICTIONS FOR LICENSE EXEMPT RADIO EQUIPMENT

Item	Class of transmitter	Permitted operating frequency band (MHz) (lower limit exclusive, upper limit inclusive)	Maximum EIRP	Limitations
1	All transmitters	0.000–0.014	200 µW	
2	All transmitters	0.014–0.01995	50 µW	
3	All transmitters	0.02005–0.07	7.5 µW	
4	All transmitters	0.07–0.16	3 µW	
5	All transmitters	1. 0.16–0.285 2. 0.325–0.415	500 nW	
6	All transmitters	3.025–3.155	7.5 nW	
7	All transmitters	3.5–3.7	30 pW	
8	All transmitters	1. 3.7–3.95 2. 4.438–4.65	7.5 nW	
9	All transmitters	13.553–13.567	100 mW	
10	All transmitters	24–24.89	10 mW	
11	All transmitters	26.957–27.283	1 W	1. Separation of the operating frequency from the centre frequency of any adjacent citizen band radio channel must be at least 5 kHz. 2. The emission bandwidth must not exceed 10 kHz.
12	All transmitters	1. 29.7–29.72 2. 30–30.0625 3. 30.3125–31 4. 36.6–37 5. 39–39.7625 6. 40.25–40.66	100 mW	
13	All transmitters	40.66–41	1 W	

14	All transmitters	54–56	2.5 mW	
15	All transmitters	1. 70–70.24375 2. 77.29375–77.49375 3. 150.7875–152.49375 4. 173.29375–174	100 mW	
16	All transmitters	1. 225–242 2. 244–267 3. 273–303.95 4. 304.05–328.6 5. 335.4–399.9	10 µW	
17	All transmitters	433.05–434.79	25 mW	
18	All transmitters	915–928	3 mW	
19	All transmitters	2400–2483.5	10 mW	
20	All transmitters	5725–5875	25 mW	
21	All transmitters	1. 10500–10550 2. 24000–24250 3. 61000–61500	100 mW	
22	Wireless audio transmitters and auditory assistance transmitters	88–108	10 µW	1. Emission must be frequency modulated and have a maximum bandwidth of 180 kHz. 2. Transmission in a radio channel must not originate in the licence area of a radio broadcasting station (including a repeater or translator station) operating in the same channel.
23	Wireless audio transmitters	174–230	3 mW (~1.82 mW ERP)	1. Emission must be frequency modulated and have a maximum bandwidth of 330 kHz. 2. Transmission in a TV channel must not originate in the licence area of a TV broadcasting station (including a repeater or translator station) operating in the same channel.

				3. When transmitting in an unused TV channel, and in the coverage area of a TV broadcasting station (including a repeater or translator station) operating in an adjacent TV channel, the channel centre frequency of the wireless audio transmitter must be at least 200 kHz above the upper edge of the adjacent TV channel, or 400 kHz below the lower edge of the adjacent TV channel.
24	Wireless audio transmitters	520–820	100 mW (~60.95 mW ERP)	1. Emission must be frequency modulated and have a maximum bandwidth of 330 kHz. 2. Transmission in a broadcasting services bands channel must not originate in the coverage area of a broadcasting station or a datacasting service station (including a repeater or translator station) operating in the same channel. 3. The origin of a transmission in a broadcasting services bands channel must be such that the resulting field strength at the nearest boundary of the coverage area of a broadcasting station or a datacasting service station using the channel does not exceed 30 dBuV/m. 4. When transmitting in an unused broadcasting services bands channel, and in the coverage area of a broadcasting station or a datacasting service station (including a repeater or translator station) operating in an adjacent channel, the channel centre frequency of the wireless audio transmitter must be at least 400 kHz above the upper edge of the adjacent channel, or 400 kHz below the lower edge of the adjacent channel.
25	Biomedical Telemetry transmitters	174–230	10 µW	

26	Biomedical Telemetry transmitters	520-668	11 mW	Transmission in a TV channel must not originate in the licence area of an analogue TV broadcasting station (including a repeater or translator station) operating in the same channel.
27	Telecommand or telemetry transmitters	472.0125–472.1125	100 mW	
28	Telecommand or telemetry transmitters	1. 0.07–0.119 2. 0.135–0.160	10 mW	
29	Telecommand or telemetry transmitters	0.119–0.135	1.5 W	
30	Telecommand or telemetry transmitters	1. 2400–2450 2. 5725–5795 3. 5815–5875	1 W	
31	Telecommand or Telemetry transmitters	5795–5815	2 W	
32	Auditory assistance transmitters	3.155–3.4, with a carrier frequency of- (a) 3.175 MHz; or (b) 3.225 MHz; or (c) 3.275 MHz; or (d) 3.325 MHz.	60 µW	
33	Auditory assistance transmitters	1. 41–42, with a carrier frequency of- (a) 41.55 MHz; or (b) 41.65 MHz; or (c) 41.75 MHz; or (d) 41.85 MHz; or (e) 41.95 MHz 2. 43–44, with a carrier frequency of-	1.3 mW	

		(a) 43.05 MHz; or (b) 43.15 MHz; or (c) 43.25 MHz; or (d) 43.35 MHz; or (e) 43.45 MHz.		
34	Radiofrequency identification transmitters	1. 1.77–2.17 2. 2.93–3.58 3. 7.2–10.01	100 pW	
35	Radiofrequency identification transmitters	1. 13.553–13.567 2. 918–926 3. 2400–2450 4. 5725–5795 5. 5815–5875 6. 24000–24250	1 W	
36	Radiofrequency identification transmitters	5795–5815	2 W	
37	Radiofrequency identification transmitters *Note*- ISO/IEC 180006c (RFID Gen. 2) refers to an inter national standard published by the International Organization for Standardization (ISO). The international standard is included in a document titled *Information Technology — Radio Frequency identification for item management — Part 6- Parameters for air Interface communications at*	920–926	4 W	1. A transmitter mentioned in this item must comply with ISO/IEC 18000-6c (RFID Gen. 2). 2. Emissions in the band below 917.75 MHz must be no greater than -37 dBm EIRP. 3. Emissions above 926 MHz must be no greater than -33 dBm EIRP. 4. A transmitter mentioned in this item must not be used unless more than 1 Watt EIRP is necessary to achieve

	860 MHz to 960 MHz. The document is numbered *ISO/IEC 18000-6-2004* and is available on the internet at http: //www.saiglobal.com			satisfactory system performance.
38	Alarm transmitters (including security and personal safety transmitters)	303.60–304.05	100 µW	
39	Home detention monitoring equipment	314.075–314.325	200 µW	In a 10 second period, a single transmission must not exceed 10 milliseconds.
40	Radiodetermination transmitters	24000–24250	1 W	
41	Radiodetermination transmitters	60000–61000	20 mW	
42	Transmitters used for underground communications	1. 31–32 2. 33–34 3. 35–36 4. 37–38 5. 42–43 6. 44–45 7. 70.24375–74.8 8. 75.2–77.29375 9. 77.49375–84.69375 10. 149.25–149.9 11. 150.05–151.39375 12. 152.49375–156 13. 157.45–160.6 14. 160.975–161.475 15. 162.05–173.29375	3.5 nW	The maximum EIRP applies at an above-ground opening associated with the underground communications.

		16. 403–406 17. 406.1–420 18. 450–500.99375 19. 504.99375–510.99375 20. 514.99375–520		
43	Transmitters used for underground communications	1. 0.5265–1.605 2. 87.5–108 3. 174–230 4. 519–820	10 µW	1. The maximum EIRP applies to emissions from an above-ground opening associated with the underground environment. 2. For the augmentation of an above-ground broadcasting service and datacasting service in underground tunnels.
44	In-store DAB repeater transmitters	174-230	10 µW	1. The maximum EIRP applies to emissions measured outside the building. 2. For the augmentation of the co-channel DAB broadcasting services operating in the area.
45	Aquatic animal tracking transmitters	48–49	10 mW	
46	Radiodetermination transmitters operated in radiofrequency-shielded enclosures	1. 5250–7000 2. 8500–10600 3. 24050–26500 4. 75000–85000	75 nW	1. The maximum EIRP applies outside the shielded room enclosure. 2. The transmitter must meet the requirements of European Telecommunications Standards Institute

				(*ETSI*) Standard 302 372-1 as existing from time to time.
47	Personal alarm transmitters	27.500–27.510	100 µW	
48	Transmitters used with personal alarm transmitters operating in the frequency band 27.500–27.510 MHz	27.500–27.510	500 mW	Each transmission must not exceed 4 seconds over a 60 second period.
49	Alarm transmitters	344.8–345.2	1 mW	The average EIRP must not exceed 100 µW- (a) if the length of a pulse train does not exceed 0.1 second — in the length of one complete pulse train; or (b) if the length of a pulse train exceeds 0.1 second — in the 0.1 second period during which the EIRP is at its maximum value; or (c) if a transmitter operates for more than 0.1 second — in the 0.1 second period during which the EIRP is at its maximum value.
50	Radio Local Area Network transmitters used indoors	5150–5250	200 mW (averaged over the entire Transmission burst)	1. If the emission bandwidth is 1 MHz or greater, the spectral density in any 1 MHz is limited to 10 mW EIRP per MHz.

				2. If the emission bandwidth is less than 1 MHz, the spectral density in any 4 kHz is limited to 40 µW EIRP per 4 kHz.
51	Radio Local Area Network transmitters used indoors	5250–5350	200 mW (averaged over the entire transmission burst)	1. If the emission bandwidth is 1 MHz or greater, the spectral density in any 1 MHz is limited to 10 mW EIRP per MHz. 2. If the emission bandwidth is less than 1 MHz, the spectral density in any 4 kHz is limited To 40 µW EIRP per 4 kHz 3. From 1 January 2006 devices operated for the first time must use Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC). If TPC is not used then the maximum EIRP is limited to 100 mW.
52	Digital modulation transmitters	915–928	1 W	1. The radiated peak power spectral density in any 3 kHz is limited to 25 mW per 3 kHz. 2. The minimum 6 dB bandwidth must be at least 500 kHz.
53	Digital modulation transmitters	2400–2483.5	4 W	1. The radiated peak power spectral density in any 3 kHz

				is limited to 25 mW per 3 kHz. 2. The minimum 6 dB bandwidth must be at least 500 kHz.
54	Digital modulation transmitters	5725–5850	4 W	1. The radiated peak power spectral density in any 3 kHz is limited to 25 mW per 3 kHz. 2. The minimum 6 dB bandwidth must be at least 500 kHz.
55	Radio Local Area Network transmitters	1. 5470–5600 2. 5650–5725	1 W (averaged over the entire transmission burst)	1. The maximum radiated mean power density must not exceed 50 mW/MHz EIRP in any 1 MHz band. 2. Must use Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC). If TPC is not implemented, then the maximum EIRP is limited to 500 mW.
56	Radiodetermination transmitters	76000–77000	25 W	
57	Medical implant communications systems transmitters	402–405	25 µW	1. The maximum EIRP applies outside the body. 2. A transmitter mentioned in this item must comply with ETSI EN 301 839-2 (the standard

				is available at www.etsi.org)
58	Medical implant communications systems transmitters	1. 401–402 2. 405–406	25 µW	1. The maximum EIRP applies outside the body. 2. A transmitter mentioned in this item must comply with ETSI EN 302 537-2 (see www.etsi.org).
59	Data communications transmitters used outdoors	59000–63000	150 W	1. Transmitters are limited to land and maritime deployments. 2. Maximum transmitter power must be 20 mW or less. 3. Spurious emissions outside the band must be less than -30dBm/MHz. 4. For outdoor use only.
60	Data communications transmitters used indoors	57000–66000	20 W	1. The average power density of any emission must not exceed 9 uW/cm^2 at a distance of 3m. 2. The peak power density of any emission must not exceed 18 uW/cm^2 at a distance of 3m. 3. Spurious emissions outside the band must be less than -30dBm/MHz.
61	Frequency hopping transmitters	915–928	1 W	A minimum of 20 hopping frequencies must be used.

62	Frequency hopping transmitters	2400–2483.5	500 mW	A minimum of 15 hopping frequencies must be used.
63	Frequency hopping transmitters	2400–2483.5	4 W	A minimum of 75 hopping frequencies must be used.
64	Frequency hopping transmitters	5725–5850	4 W	A minimum of 75 hopping frequencies must be used.
65	Ultra-wideband short-range vehicle radar systems	22000–26500	See Limitations	1. The maximum radiated average power density is -41.3 dBm/MHz EIRP. 2. The maximum broadband radiated peak power density is 0 dBm/50 MHz EIRP. 3. Must meet the requirements of ETSI 302-288-1 as it applies from time to time.
66	Infrared Transmitters	187.5 THz–420 THz	125 mW (output power)	
67	Video sender Transmitters	529–806	12 µW	
68	In-store pricing System Transmitters	0.0366– 0.0402	4.8 W	Indoor use only.
69	Radiodetermination transmitters	77000–81000	315 W	Must meet the requirements of ETSI EN 302 264-1 as it applies from time to time.

70	VSAT terminals using frequencies reserved for fixed satellite services	5725 – 5850 MHz, 14 – 14.25 GHz	≤ 55 dBW	Not for use within specified distance of an airfield runway or control tower
71	Mobile satellite earth stations on board an aircraft	14 – 14.25 GHz	≤ 55 dBW	Not for use within specified distance of an airfield runway or control tower
72	Earth stations on mobile platforms for fixed satellite	29.5 – 30 GHz	≤ 55 dBW	Not for use within specified distance of an airfield runway or control tower
73	Earth stations on board vessels in the Ku band controlled by the mobile satellite operator *Note- Where necessary the Ministry of Infrastructure's Civil Aviation Division will specify the distance from an airfield runway or control tower in which the use of certain classes of transmission may not be used without a radio spectrum licence.*	14 – 14.25 GHz	≤ 55 dBW	Not for use within specified distance of an airfield runway or control tower

Chapter 1*

Terms and definitions

Introduction

1.1 For the purposes of these Regulations, the following terms shall have the meanings defined below. These terms and definitions do not, however, necessarily apply for other purposes. Definitions identical to those contained in the Annex to the Constitution or the Annex to the Convention of the International Telecommunication Union (Geneva, 1992) are marked "(CS)" or "(CV)" respectively.

NOTE – If, in the text of a definition below, a term is printed in italics, this means that the term itself is defined in this Article.

Section I – General terms

1.2 *administration:* Any governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations (CS 1002).

1.3 *telecommunication:* Any transmission, *emission* or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, *radio*, optical or other electromagnetic systems (CS).

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

1.5 *radio waves* or *hertzian waves:* Electromagnetic waves of frequencies arbitrarily lower than 3 000 GHz, propagated in space without artificial guide.

1.6 *radiocommunication: Telecommunication* by means of *radio waves* (CS) (CV).

1.7 *terrestrial radiocommunication:* Any *radiocommunication* other than *space radiocommunication* or *radio astronomy.*

1.8 *space radiocommunication:* Any *radiocommunication* involving the use of one or more *space stations* or the use of one or more *reflecting satellites* or other objects in space.

1.9 *radiodetermination:* The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of *radio waves*.

1.10 *radionavigation: Radiodetermination* used for the purposes of navigation, including obstruction warning.

1.11 *radiolocation: Radiodetermination* used for purposes other than those of *radionavigation*.

1.12 *radio direction-finding: Radiodetermination* using the reception of *radio waves* for the purpose of determining the direction of a *station* or object.

1.13 *radio astronomy:* Astronomy based on the reception of *radio waves* of cosmic origin.

1.14 *Coordinated Universal Time (UTC):* Time scale, based on the second (SI), as described in Resolution **655 (WRC-15)**. (WRC-15)

1.15 *industrial, scientific and medical (ISM) applications* (of radio frequency energy): Operation of equipment or appliances designed to generate and use locally radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of *telecommunications*.

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* : Content of this chapter, including numbering, is identical to ITU Radio Regulations, Article 1

Section II – Specific terms related to frequency management

1.16 *allocation* (of a frequency band): Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space *radiocommunication services* or the *radio astronomy service* under specified conditions. This term shall also be applied to the frequency band concerned.

1.17 *allotment* (of a radio frequency or radio frequency channel): Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more *administrations* for a terrestrial or space *radiocommunication service* in one or more identified countries or geographical areas and under specified conditions.

1.18 *assignment* (of a radio frequency or radio frequency channel): Authorization given by an *administration* for a radio *station* to use a radio frequency or radio frequency channel under specified conditions.

Section III – Radio services

1.19 *radiocommunication service:* A service as defined in this Section involving the transmission, *emission* and/or reception of *radio waves* for specific *telecommunication* purposes.

In these Regulations, unless otherwise stated, any radiocommunication service relates to *terrestrial radiocommunication*.

1.20 *fixed service: A radiocommunication service* between specified fixed points.

1.21 *fixed-satellite service:* A *radiocommunication service* between *earth stations* at given positions, when one or more *satellites* are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the *inter-satellite service*; the fixed-satellite service may also include *feeder links* for other *space radiocommunication services*.

1.22 *inter-satellite service:* A *radiocommunication service* providing links between artificial *satellites*.

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

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

1.24 *mobile service:* A *radiocommunication service* between *mobile* and *land stations*, or between *mobile stations* (CV).

1.25 *mobile-satellite service:* A *radiocommunication service:*

– between *mobile earth stations* and one or more *space stations*, or between *space stations* used by this service; or

– between *mobile earth stations* by means of one or more *space stations*.

This service may also include *feeder links* necessary for its operation.

1.26 *land mobile service:* A *mobile service* between *base stations* and *land mobile stations*, or between *land mobile stations*.

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

1.28 *maritime mobile service:* A *mobile service* between *coast stations* and *ship stations*, or between *ship stations*, or between associated *on-board communication stations*; *survival craft stations* and *emergency position-indicating radiobeacon stations* may also participate in this service.

1.29 *maritime mobile-satellite service:* A *mobile-satellite service* in which *mobile earth stations* are located on board ships; *survival craft stations* and *emergency position-indicating radiobeacon stations* may also participate in this service.

1.30 *port operations service:* A *maritime mobile service* in or near a port, between *coast stations* and *ship stations*, or between *ship stations*, in which messages are restricted to those relating to the operational handling, the movement and the safety of ships and, in emergency, to the safety of persons.

Messages which are of a *public correspondence* nature shall be excluded from this service.

1.31 *ship movement service:* A *safety service* in the *maritime mobile service* other than a *port operations service*, between *coast stations* and *ship stations*, or between *ship stations*, in which messages are restricted to those relating to the movement of ships.

Messages which are of a *public correspondence* nature shall be excluded from this service.

1.32 *aeronautical mobile service:* A *mobile service* between *aeronautical stations* and *aircraft stations*, or between *aircraft stations*, in which *survival craft stations* may participate; *emergency position-indicating radiobeacon stations* may also participate in this service on designated distress and emergency frequencies.

1.33 *aeronautical mobile (R)* service:* An *aeronautical mobile service* reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes.

1.34 *aeronautical mobile (OR)**service:* An *aeronautical mobile service* intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes.

1.35 *aeronautical mobile-satellite service:* A *mobile-satellite service* in which *mobile earth stations* are located on board aircraft; *survival craft stations* and *emergency position-indicating radiobeacon stations* may also participate in this service.

1.36 *aeronautical mobile-satellite (R)* service:* An *aeronautical mobile-satellite service* reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes.

1.37 *aeronautical mobile-satellite (OR)** service:* An *aeronautical mobile-satellite service* intended for communications, including those relating to flight coordination, primarily outside national and international civil air routes.

1.38 *broadcasting service:* A *radiocommunication service* in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, *television* transmissions or other types of transmission (CS).

1.39 *broadcasting-satellite service:* A *radiocommunication service* in which signals transmitted or retransmitted by *space stations* are intended for direct reception by the general public.

In the broadcasting-satellite service, the term "direct reception" shall encompass both *individual reception* and *community reception*.

1.40 *radiodetermination service:* A *radiocommunication service* for the purpose of *radiodetermination*.

1.41 *radiodetermination-satellite service: A radiocommunication service* for the purpose of *radiodetermination* involving the use of one or more *space stations*.

This service may also include *feeder links* necessary for its own operation.

1.42 *radionavigation service:* A *radiodetermination service* for the purpose of *radionavigation*.

1.43 *radionavigation-satellite service:* A *radiodetermination-satellite service* used for the purpose of *radionavigation*.

This service may also include *feeder links* necessary for its operation.

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* (R): route.

** (OR): off-route.

1.44 *maritime radionavigation service:* A *radionavigation service* intended for the benefit and for the safe operation of ships.

1.45 *maritime radionavigation-satellite service:* A *radionavigation-satellite service* in which *earth stations* are located on board ships.

1.46 *aeronautical radionavigation service:* A *radionavigation service* intended for the benefit and for the safe operation of aircraft.

1.47 *aeronautical radionavigation-satellite service:* A *radionavigation-satellite service* in which *earth stations* are located on board aircraft.

1.48 *radiolocation service:* A *radiodetermination service* for the purpose of *radiolocation*.

1.49 *radiolocation-satellite service:* A *radiodetermination-satellite service* used for the purpose of *radiolocation*.

This service may also include the *feeder links* necessary for its operation.

1.50 *meteorological aids service:* A *radiocommunication service* used for meteorological, including hydrological, observations and exploration.

1.51 *Earth exploration-satellite service:* A *radiocommunication service* between *earth stations* and one or more *space stations*, which may include links between *space stations*, in which:

– information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from *active sensors* or *passive sensors* on Earth *satellites*;

– similar information is collected from airborne or Earth-based platforms;

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

– platform interrogation may be included.

This service may also include *feeder links* necessary for its operation.

1.52 *meteorological-satellite service:* An *earth exploration-satellite service* for meteorological purposes.

1.53 *standard frequency and time signal service:* A *radiocommunication service* for scientific, technical and other purposes, providing the transmission of specified frequencies, time signals, or both, of stated high precision, intended for general reception.

1.54 *standard frequency and time signal-satellite service:* A *radiocommunication service* using *space stations* on earth *satellites* for the same purposes as those of the *standard frequency and time signal service*.

This service may also include *feeder links* necessary for its operation.

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

1.56 *amateur service:* A *radiocommunication service* for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.

1.57 *amateur-satellite service:* A *radiocommunication service* using *space stations* on earth *satellites* for the same purposes as those of the *amateur service*.

1.58 *radio astronomy service:* A service involving the use of *radio astronomy*.

1.59 *safety service:* Any *radiocommunication service* used permanently or temporarily for the safeguarding of human life and property.

1.60 *special service:* A *radiocommunication service*, not otherwise defined in this Section, carried on exclusively for specific needs of general utility, and not open to *public correspondence*.

Section IV – Radio stations and systems

1.61 *station:* One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a *radiocommunication service*, or the *radio astronomy service*.

Each station shall be classified by the service in which it operates permanently or temporarily.

1.62 *terrestrial station:* A *station* effecting *terrestrial radiocommunication*.

In these Regulations, unless otherwise stated, any *station* is a terrestrial station.

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

– with one or more *space stations*; or

– with one or more *stations* of the same kind by means of one or more *reflecting satellites* or other objects in space.

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

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

1.66 *fixed station:* A *station* in the *fixed service*.

1.66A *high altitude platform station:* A *station* located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth.

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

1.68 *mobile earth station:* An *earth station* in the *mobile-satellite service* intended to be used while in motion or during halts at unspecified points.

1.69 *land station:* A *station* in the *mobile service* not intended to be used while in motion.

1.70 *land earth station:* An *earth station* in the *fixed-satellite service* or, in some cases, in the *mobile-satellite service*, located at a specified fixed point or within a specified area on land to provide a *feeder link* for the *mobile-satellite service*.

1.71 *base station:* A *land station* in the *land mobile service*.

1.72 *base earth station:* An *earth station* in the *fixed-satellite service* or, in some cases, in the *land mobile-satellite service*, located at a specified fixed point or within a specified area on land to provide a *feeder link* for the *land mobile-satellite service*.

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

1.74 *land mobile earth station:* A *mobile earth station* in the *land mobile-satellite service* capable of surface movement within the geographical limits of a country or continent.

1.75 *coast station:* A *land station* in the *maritime mobile service*.

1.76 *coast earth station:* An *earth station* in the *fixed-satellite service* or, in some cases, in the *maritime mobile-satellite service*, located at a specified fixed point on land to provide a *feeder link* for the *maritime mobile-satellite service*.

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

1.78 *ship earth station:* A *mobile earth station* in the *maritime mobile-satellite service* located on board ship.

1.79 *on-board communication station:* A low-powered *mobile station* in the *maritime mobile service* intended for use for internal communications on board a ship, or between a ship and its lifeboats and life-rafts

during lifeboat drills or operations, or for communication within a group of vessels being towed or pushed, as well as for line handling and mooring instructions.

1.80 *port station:* A *coast station* in the *port operations service*.

1.81 *aeronautical station:* A *land station* in the *aeronautical mobile service*.

In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea.

1.82 *aeronautical earth station:* An *earth station* in the *fixed-satellite service*, or, in some cases, in the *aeronautical mobile-satellite service*, located at a specified fixed point on land to provide a *feeder link* for the *aeronautical mobile-satellite service*.

1.83 *aircraft station:* A *mobile station* in the *aeronautical mobile service*, other than a *survival craft station*, located on board an aircraft.

1.84 *aircraft earth station:* A *mobile earth station* in the *aeronautical mobile-satellite service* located on board an aircraft.

1.85 *broadcasting station:* A *station* in the *broadcasting service*.

1.86 *radiodetermination station:* A *station* in the *radiodetermination service*.

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

1.88 *radionavigation land station:* A *station* in the *radionavigation service* not intended to be used while in motion.

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

1.90 *radiolocation land station:* A *station* in the *radiolocation service* not intended to be used while in motion.

1.91 *radio direction-finding station:* A *radiodetermination station* using *radio direction-finding*.

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

1.93 *emergency position-indicating radiobeacon station:* A *station* in the *mobile service* the *emissions* of which are intended to facilitate search and rescue operations.

1.94 *satellite emergency position-indicating radiobeacon:* An *earth station* in the *mobile-satellite service* the *emissions* of which are intended to facilitate search and rescue operations.

1.95 *standard frequency and time signal station:* A *station* in the *standard frequency and time signal service*.

1.96 *amateur station:* A *station* in the *amateur service*.

1.97 *radio astronomy station:* A *station* in the *radio astronomy service*.

1.98 *experimental station:* A *station* utilizing *radio waves* in experiments with a view to the development of science or technique.

This definition does not include *amateur stations.*

1.99 *ship's emergency transmitter:* A ship's transmitter to be used exclusively on a distress frequency for distress, urgency or safety purposes.

1.100 *radar:* A *radiodetermination* system based on the comparison of reference signals with radio signals reflected, or retransmitted, from the position to be determined.

1.101 *primary radar:* A *radiodetermination* system based on the comparison of reference signals with radio signals reflected from the position to be determined.

1.102 *secondary radar:* A *radiodetermination* system based on the comparison of reference signals with radio signals retransmitted from the position to be determined.

1.103 *radar beacon (racon):* A transmitter-receiver associated with a fixed navigational mark which, when triggered by a *radar*, automatically returns a distinctive signal which can appear on the display of the triggering *radar*, providing range, bearing and identification information.

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

1.105 *instrument landing system localizer:* A system of horizontal guidance embodied in the *instrument landing system* which indicates the horizontal deviation of the aircraft from its optimum path of descent along the axis of the runway.

1.106 *instrument landing system glide path:* A system of vertical guidance embodied in the *instrument landing system* which indicates the vertical deviation of the aircraft from its optimum path of descent.

1.107 *marker beacon:* A transmitter in the *aeronautical radionavigation service* which radiates vertically a distinctive pattern for providing position information to aircraft.

1.108 *radio altimeter: Radionavigation* equipment, on board an aircraft or *spacecraft*, used to determine the height of the aircraft or the *spacecraft* above the Earth's surface or another surface.

1.108A *meteorological aids land station:* A *station* in the *meteorological aids service* not intended to be used while in motion. (WRC-15)

1.108B *meteorological aids mobile station:* A *station* in the *meteorological aids service* intended to be used while in motion or during halts at unspecified points. (WRC-15)

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

1.109A *adaptive system:* A *radiocommunication* system which varies its radio characteristics according to channel quality.

1.110 *space system:* Any group of cooperating *earth stations* and/or *space stations* employing *space radiocommunication* for specific purposes.

1.111 *satellite system:* A *space system* using one or more artificial earth *satellites*.

1.112 *satellite network:* A *satellite system* or a part of a *satellite system*, consisting of only one *satellite* and the cooperating *earth stations*.

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

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

1.114 *multi-satellite link:* A radio link between a transmitting *earth station* and a receiving *earth station* through two or more *satellites*, without any intermediate *earth station*.

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

1.115 *feeder link:* A radio link from an *earth station* at a given location to a *space station*, or vice versa, conveying information for a *space radiocommunication service* other than for the *fixed-satellite service*. The given location may be at a specified fixed point, or at any fixed point within specified areas.

Section V – Operational terms

1.116 *public correspondence:* Any *telecommunication* which the offices and *stations* must, by reason of their being at the disposal of the public, accept for transmission (CS).

1.117 *telegraphy*[1]: A form of *telecommunication* in which the transmitted information is intended to be recorded on arrival as a graphic document; the transmitted information may sometimes be presented in an alternative form or may be stored for subsequent use (CS 1016).

1.118 *telegram:* Written matter intended to be transmitted by *telegraphy* for delivery to the addressee. This term also includes *radiotelegrams* unless otherwise specified (CS).

In this definition the term *telegraphy* has the same general meaning as defined in the Convention.

1.119 *radiotelegram:* A *telegram*, originating in or intended for a *mobile station* or a *mobile earth station* transmitted on all or part of its route over the *radiocommunication* channels of the *mobile service* or of the *mobile-satellite service*.

1.120 *radiotelex call:* A telex call, originating in or intended for a *mobile station* or a *mobile earth station*, transmitted on all or part of its route over the *radiocommunication* channels of the *mobile service* or the *mobile-satellite service*.

1.121 *frequency-shift telegraphy: Telegraphy* by frequency modulation in which the telegraph signal shifts the frequency of the carrier between predetermined values.

1.122 *facsimile:* A form of *telegraphy* for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form.

1.123 *telephony:* A form of *telecommunication* primarily intended for the exchange of information in the form of speech (CS 1017).

1.124 *radiotelephone call:* A telephone call, originating in or intended for a *mobile station* or a *mobile earth station*, transmitted on all or part of its route over the *radiocommunication* channels of the *mobile service* or of the *mobile-satellite service*.

1.125 *simplex operation:* Operating method in which transmission is made possible alternately in each direction of a *telecommunication* channel, for example, by means of manual control[2].

1.126 *duplex operation:* Operating method in which transmission is possible simultaneously in both directions of a *telecommunication* channel[2].

1.127 *semi-duplex operation:* A method which is *simplex operation* at one end of the circuit and *duplex operation* at the other.[2]

1.128 *television:* A form of *telecommunication* for the transmission of transient images of fixed or moving objects.

1.129 *individual reception* (in the broadcasting-satellite service): The reception of *emissions* from a *space station* in the *broadcasting-satellite service* by simple domestic installations and in particular those possessing small antennas.

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

- by a group of the general public at one location; or
- through a distribution system covering a limited area.

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

1.132 *radiotelemetry: Telemetry* by means of *radio waves*.

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[1] **1.117.1** A graphic document records information in a permanent form and is capable of being filed and consulted; it may take the form of written or printed matter or of a fixed image.

[2] **1.125.1**, **1.126.1** and **1.127.1** In general, *duplex operation* and *semi-duplex operation* require two frequencies in *radiocommunication*; *simplex operation* may use either one or two.

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

1.134 *telecommand:* The use of *telecommunication* for the transmission of signals to initiate, modify or terminate functions of equipment at a distance.

1.135 *space telecommand:* The use of *radiocommunication* for the transmission of signals to a *space station* to initiate, modify or terminate functions of equipment on an associated space object, including the *space station*.

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

Section VI – Characteristics of emissions and radio equipment

1.137 *radiation:* The outward flow of energy from any source in the form of *radio waves*.

1.138 *emission: Radiation* produced, or the production of *radiation*, by a radio transmitting *station*.

For example, the energy radiated by the local oscillator of a radio receiver would not be an emission but a *radiation*.

1.139 *class of emission:* The set of characteristics of an *emission*, designated by standard symbols, e.g. type of modulation of the main carrier, modulating signal, type of information to be transmitted, and also, if appropriate, any additional signal characteristics.

1.140 *single-sideband emission:* An amplitude modulated *emission* with one sideband only.

1.141 *full carrier single-sideband emission:* A *single-sideband emission* without reduction of the carrier.

1.142 *reduced carrier single-sideband emission:* A *single-sideband emission* in which the degree of carrier suppression enables the carrier to be reconstituted and to be used for demodulation.

1.143 *suppressed carrier single-sideband emission:* A *single-sideband emission* in which the carrier is virtually suppressed and not intended to be used for demodulation.

1.144 *out-of-band emission: Emission* on a frequency or frequencies immediately outside the *necessary bandwidth* which results from the modulation process, but excluding *spurious emissions*.

1.145 *spurious emission: Emission* on a frequency or frequencies which are outside the *necessary bandwidth* and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic *emissions*, parasitic *emissions*, intermodulation products and frequency conversion products, but exclude *out-of-band emissions*.

1.146 *unwanted emissions:* Consist of *spurious emissions* and *out-of-band emissions*.

1.146A *out-of-band domain* (of an emission): The frequency range, immediately outside the *necessary bandwidth* but excluding the *spurious domain*, in which *out-of-band emissions* generally predominate. *Out-of-band emissions*, defined based on their source, occur in the out-of-band domain and, to a lesser extent, in the *spurious domain*. *Spurious emissions* likewise may occur in the out-of-band domain as well as in the *spurious domain*. (WRC-03)

1.146B *spurious domain* (of an emission): The frequency range beyond the *out-of-band domain* in which *spurious emissions* generally predominate. (WRC-03)

1.147 *assigned frequency band:* The frequency band within which the *emission* of a *station* is authorized; the width of the band equals the *necessary bandwidth* plus twice the absolute value of the *frequency tolerance*. Where *space stations* are concerned, the assigned frequency band includes twice the maximum Doppler shift that may occur in relation to any point of the Earth's surface.

1.148 *assigned frequency:* The centre of the frequency band assigned to a *station*.

1.149 *characteristic frequency:* A frequency which can be easily identified and measured in a given *emission*.

A carrier frequency may, for example, be designated as the characteristic frequency.

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

1.151 *frequency tolerance:* The maximum permissible departure by the centre frequency of the frequency band occupied by an *emission* from the *assigned frequency* or, by the *characteristic frequency* of an *emission* from the *reference frequency*.

The frequency tolerance is expressed in parts in 10^6 or in hertz.

1.152 *necessary bandwidth:* For a given *class of emission*, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.

1.153 *occupied bandwidth:* The width of a frequency band such that, below the lower and above the upper frequency limits, the *mean powers* emitted are each equal to a specified percentage $\beta/2$ of the total *mean power* of a given *emission*.

Unless otherwise specified in an ITU-R Recommendation for the appropriate *class of emission*, the value of $\beta/2$ should be taken as 0.5%.

1.154 *right-hand* (clockwise) *polarized wave:* An elliptically- or circularly-polarized wave, in which the electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a right-hand or clockwise direction.

1.155 *left-hand* (anticlockwise) *polarized wave:* An elliptically- or circularly-polarized wave, in which the electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a left-hand or anticlockwise direction.

1.156 *power:* Whenever the power of a radio transmitter, etc. is referred to it shall be expressed in one of the following forms, according to the class of *emission*, using the arbitrary symbols indicated:

– *peak envelope power* (*P*X or *p*X);

– *mean power* (*P*Y or *p*Y);

– *carrier power* (*P*Z or *p*Z).

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

For use in formulae, the symbol *p* denotes power expressed in watts and the symbol *P* denotes power expressed in decibels relative to a reference level.

1.157 *peak envelope power* (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions.

1.158 *mean power* (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions.

1.159 *carrier power* (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle taken under the condition of no modulation.

1.160 *gain of an antenna:* The ratio, usually expressed in decibels, of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power flux-density at the same distance. When not specified otherwise, the gain refers to the direction of maximum *radiation*. The gain may be considered for a specified polarization.

Depending on the choice of the reference antenna a distinction is made between:

a) absolute or isotropic gain (G_i), when the reference antenna is an isotropic antenna isolated in space;

b) gain relative to a half-wave dipole (G_d), when the reference antenna is a half-wave dipole isolated in space whose equatorial plane contains the given direction;

c) gain relative to a short vertical antenna (G_v), when the reference antenna is a linear conductor, much shorter than one quarter of the wavelength, normal to the surface of a perfectly conducting plane which contains the given direction.

1.161 *equivalent isotropically radiated power (e.i.r.p.):* The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna *(absolute or isotropic gain)*.

1.162 *effective radiated power (e.r.p.)* (in a given direction)*:* The product of the power supplied to the antenna and its *gain relative to a half-wave dipole* in a given direction.

1.163 *effective monopole radiated power (e.m.r.p.)* (in a given direction)*:* The product of the power supplied to the antenna and its *gain relative to a short vertical antenna* in a given direction.

1.164 *tropospheric scatter:* The propagation of *radio waves* by scattering as a result of irregularities or discontinuities in the physical properties of the troposphere.

1.165 *ionospheric scatter:* The propagation of *radio waves* by scattering as a result of irregularities or discontinuities in the ionization of the ionosphere.

Section VII – Frequency sharing

1.166 *interference:* The effect of unwanted energy due to one or a combination of *emissions*, *radiations*, or inductions upon reception in a *radiocommunication* system, manifested by any performance degradation, misinterpretation, or loss of information which could be extracted in the absence of such unwanted energy.

1.167 *permissible interference*[3]*:* Observed or predicted *interference* which complies with quantitative *interference* and sharing criteria contained in these Regulations or in ITU-R Recommendations or in special agreements as provided for in these Regulations.

1.168 *accepted interference*[3]*: Interference* at a higher level than that defined as *permissible interference* and which has been agreed upon between two or more *administrations* without prejudice to other *administrations*.

1.169 *harmful interference: Interference* which endangers the functioning of a *radionavigation service* or of other *safety services* or seriously degrades, obstructs, or repeatedly interrupts a *radiocommunication service* operating in accordance with Radio Regulations (CS).

1.170 *protection ratio* (R.F.): The minimum value of the wanted-to-unwanted signal ratio, usually expressed in decibels, at the receiver input, determined under specified conditions such that a specified reception quality of the wanted signal is achieved at the receiver output.

1.171 *coordination area:* When determining the need for coordination, the area surrounding an *earth station* sharing the same frequency band with *terrestrial stations*, or surrounding a transmitting *earth station* sharing the same bidirectionally allocated frequency band with receiving *earth stations*, beyond which the level of *permissible interference* will not be exceeded and coordination is therefore not required. (WRC-2000)

1.172 *coordination contour:* The line enclosing the *coordination area*.

1.173 *coordination distance:* When determining the need for coordination, the distance on a given azimuth from an *earth station* sharing the same frequency band with *terrestrial stations*, or from a transmitting *earth station* sharing the same bidirectionally allocated frequency band with receiving *earth stations*, beyond

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[3] **1.167.1**and**1.168.1** The terms "permissible interference" and "accepted interference" are used in the coordination of frequency assignments between *administrations*.

which the level of *permissible interference* will not be exceeded and coordination is therefore not required. (WRC-2000)

1.174 *equivalent satellite link noise temperature:* The noise temperature referred to the output of the receiving antenna of the *earth station* corresponding to the radio frequency noise power which produces the total observed noise at the output of the *satellite link* excluding noise due to *interference* coming from *satellite links* using other *satellites* and from terrestrial systems.

1.175 *effective boresight area* (of a steerable satellite beam): An area on the surface of the Earth within which the boresight of a *steerable satellite beam* is intended to be pointed.

There may be more than one unconnected effective boresight area to which a single *steerable satellite beam* is intended to be pointed.

1.176 *effective antenna gain contour* (of a steerable satellite beam): An envelope of antenna gain contours resulting from moving the boresight of a *steerable satellite beam* along the limits of the *effective boresight area*.

Section VIII – Technical terms relating to space

1.177 *deep space:* Space at distances from the Earth equal to, or greater than, 2×10^6 km.

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

1.179 *satellite:* A body which revolves around another body of preponderant mass and which has a motion primarily and permanently determined by the force of attraction of that other body.

1.180 *active satellite:* A *satellite* carrying a *station* intended to transmit or retransmit *radiocommunication* signals.

1.181 *reflecting satellite:* A *satellite* intended to reflect *radiocommunication* signals.

1.182 *active sensor:* A measuring instrument in the *earth exploration-satellite service* or in the *space research service* by means of which information is obtained by transmission and reception of *radio waves*.

1.183 *passive sensor:* A measuring instrument in the *earth exploration-satellite service* or in the *space research service* by means of which information is obtained by reception of *radio waves* of natural origin.

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

1.185 *inclination of an orbit* (of an earth satellite): The angle determined by the plane containing the *orbit* and the plane of the Earth's equator measured in degrees between 0º and 180º and in counter-clockwise direction from the Earth's equatorial plane at the ascending node of the *orbit*. (WRC-2000)

1.186 *period* (of a satellite): The time elapsing between two consecutive passages of a *satellite* through a characteristic point on its *orbit*.

1.187 *altitude of the apogee* or *of the perigee:* The altitude of the apogee or perigee above a specified reference surface serving to represent the surface of the Earth.

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

1.189 *geostationary satellite:* A *geosynchronous satellite* whose circular and direct *orbit* lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a *geosynchronous satellite* which remains approximately fixed relative to the Earth. (WRC-03)

1.190 *geostationary-satellite orbit:* The *orbit* of a *geosynchronous satellite* whose circular and direct *orbit* lies in the plane of the Earth's equator.

1.191 *steerable satellite beam:* A *satellite* antenna beam that can be re-pointed.

Chapter 2*

Nomenclature

Section I – Frequency and wavelength 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[1]. (WRC-15)

Band number	Symbols	Frequency range (lower limit exclusive, upper limit inclusive)	Corresponding metric subdivision
4	VLF	3 to 30 kHz	Myriametric waves
5	LF	30 to 300 kHz	Kilometric waves
6	MF	300 to 3 000 kHz	Hectometric waves
7	HF	3 to 30 MHz	Decametric waves
8	VHF	30 to 300 MHz	Metric waves
9	UHF	300 to 3 000 MHz	Decimetric waves
10	SHF	3 to 30 GHz	Centimetric waves
11	EHF	30 to 300 GHz	Millimetric waves
12		300 to 3 000 GHz	Decimillimetric waves

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

NOTE 2: Prefix: k = kilo (10^3), M = mega (10^6), G = giga (10^9).

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. **2.1**.

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 at the prime meridian, the prime meridian corresponding to zero degrees geographical longitude. (WRC-15)

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* Content of this chapter, including numbering, is identical to ITU Radio Regulations, Article 2

1 **2.1.1** In the application of the Radio Regulations, the Radiocommunication Bureau uses the following units:
kHz for frequencies up to 28 000 kHz inclusive
MHz for frequencies above 28 000 kHz up to 10 500 MHz inclusive
GHz for frequencies above 10 500 MHz.

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 ITU Radio Regulations Appendix **1**.

Chapter 3*

Technical characteristics of stations

3.1 The choice and performance of equipment to be used in a station and any emissions therefrom 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 unwanted emissions in the spurious domain specified in Appendix **3**. (WRC-12)

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 relevant ITU-R Recommendations. (WRC-12)

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.

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* : Content of this chapter, including numbering, is identical to ITU Radio Regulations, Article 3

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.

Chapter 4*

Assignment and use of frequencies

4.1 Member States shall endeavour to limit the number of frequencies and the spectrum 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 Member States 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.

4.4 Administrations of the Member States shall not assign to a station any frequency in derogation of either the Table of Frequency Allocations in this Chapter or the other provisions of these Regulations, except on the express condition that such a station, when using such a frequency assignment, shall not cause harmful interference to, and shall not claim protection from harmful interference caused by, a station operating in accordance with the provisions of the Constitution, the Convention and 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 Member States 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 Member States recognize that among frequencies which have long-distance 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.

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* : Content of this chapter, including numbering, is identical to ITU Radio Regulations, Article 4

4.12 To reduce requirements for frequencies in the bands between 5 MHz and 30 MHz and thus to prevent harmful interference to long-distance 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.

4.15A (SUP - WRC-12)

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** and **51**, 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**). (WRC-07)

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.

4.23 Transmissions to or from high altitude platform stations shall be limited to bands specifically identified in Article **5**. (WRC-12)

4.24 Space research systems intended to operate in deep space may also use the space research service (deep space) allocations, with the same status as those allocations, when the spacecraft is near the Earth, such as during launch, early orbit, flying by the Earth and returning to the Earth. (WRC-15)

Chapter 5*

Frequency allocations

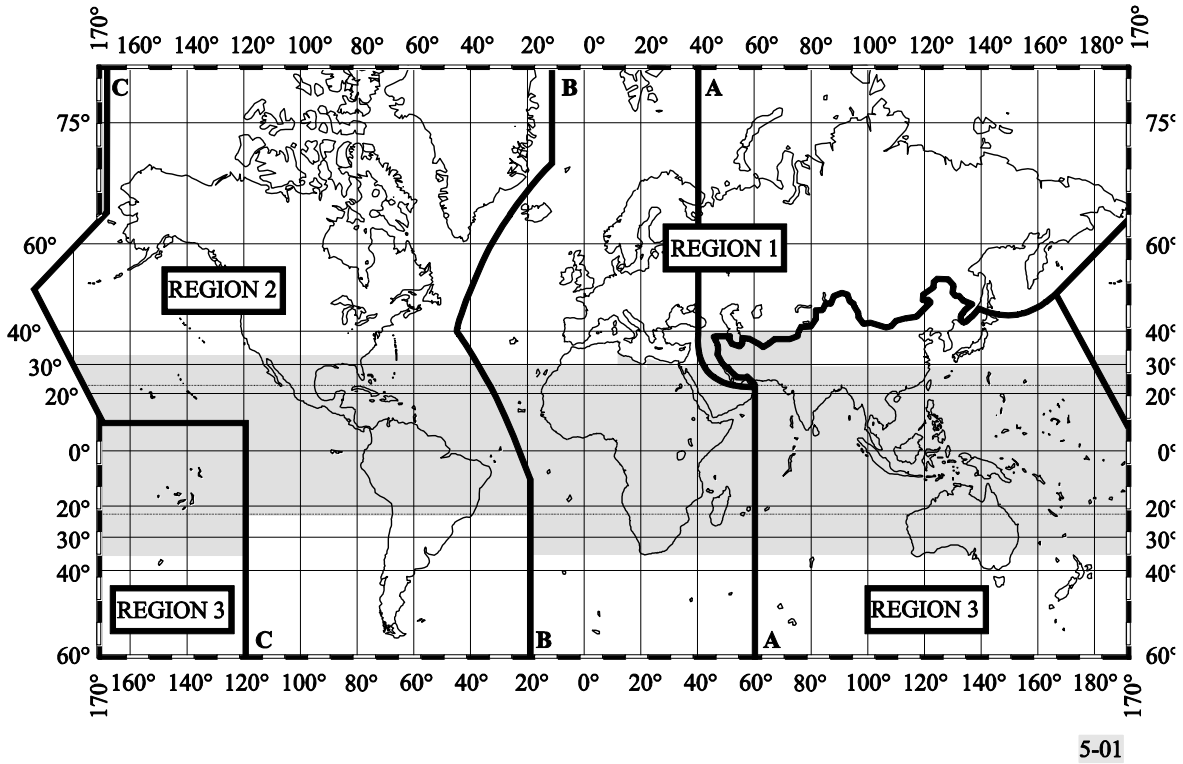
Introduction

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 six working languages being as follows:

Frequency distribution to	French	English	Spanish	Arabic	Chinese	Russian
Services	Attribution (attribuer)	Allocation (to allocate)	Atribución (atribuir)	توزيع (يوزع)	划分	распределение (распределять)
Areas or countries	Allotissement (allotir)	Allotment (to allot)	Adjudicación (adjudicar)	تعيين (يعين)	分配	выделение (выделять)
Stations	Assignation (assigner)	Assignment (to assign)	Asignación (asignar)	تخصيص (يخصص)	指配	присвоение (присваивать)

Section I – Regions and areas

5.2 For the allocation of frequencies the world has been divided into three Regions[1] as shown on the following map and described in Nos. **5.3** to **5.9**:



The shaded part represents the Tropical Zones as defined in Nos. **5.16** to **5.20** and **5.21**.

* : Except explanatory text in section III*bis*, content of this chapter, including numbering, is identical to ITU Radio Regulations, Article 5

1 **5.2.1** It should be noted that where the words "regions" or "regional" are without a capital "R" in these Regulations, they do not relate to the three Regions here defined for purposes of frequency allocation.

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, the Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russian Federation 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, the Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russian Federation. 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.

5.10 For the purposes of these Regulations, the term "African Broadcasting Area" means:

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

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

5.13 *c)* islands in the Atlantic Ocean east of line B defined in No. **5.8** of these Regulations, situated between the parallels 40° South and 30° North.

5.14 The "European Broadcasting Area" is bounded on the west by the western boundary of Region 1, on the east by the meridian 40° East of Greenwich and on the south by the parallel 30° North so as to include the northern part of Saudi Arabia and that part of those countries bordering the Mediterranean within these limits. In addition, Armenia, Azerbaijan, Georgia and those parts of the territories of Iraq, Jordan, Syrian Arab Republic, Turkey and Ukraine lying outside the above limits are included in the European Broadcasting Area. (WRC-07)

5.15 The "European Maritime Area" is bounded to the north by a line extending along parallel 72° North from its intersection with meridian 55° East of Greenwich to its intersection with meridian 5° West, then along meridian 5° West to its intersection with parallel 67° North, thence along parallel 67° North to its intersection with meridian 32° West; to the west by a line extending along meridian 32° West to its intersection with parallel 30° North; to the south by a line extending along parallel 30° North to its intersection with meridian 43° East; to the east by a line extending along meridian 43° East to its intersection with parallel 60° North, thence along parallel 60° North to its intersection with meridian 55° East and thence along meridian 55° East to its intersection with parallel 72° North.

5.16 1) The "Tropical Zone" (see map in No. **5.2**) is defined as:

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

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

5.19 i) The area contained between the meridians 40° East and 80° East of Greenwich and the parallels 30° North and 40° North;

5.20 ii) that part of Libya north of parallel 30° North.

5.21 2) In Region 2, the Tropical Zone may be extended to parallel 33° North, subject to special agreements between the countries concerned in that Region (see Article **6**).

5.22 A sub-Region is an area consisting of two or more countries in the same Region.

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 a 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 the 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 or stations in a service may operate in a specific frequency band subject to not causing harmful interference to another service or to another station in the same service, this means also that the service which is subject to not causing harmful interference cannot claim protection from harmful interference caused by the other service or other station in the same service. (WRC-2000)

5.43A 1*bis*) Where it is indicated in these Regulations that a service or stations in a service may operate in a specific frequency band subject to not claiming protection from another service or from another station in the same service, this means also that the service which is subject to not claiming protection shall not cause harmful interference to the other service or other station in the same service. (WRC-2000)

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
Column Regions 1 to 3

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 more than one of the allocated services, or to the whole of the allocation concerned. (WRC-2000)

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.

Section III*bis* – Description of the Table of Frequency Allocations
Columns National Allocations and Usage

User Categories:

Column "National Allocations" does not identify the category of users who allowed (after obtaining of a spectrum license) to operate stations of all or specified radiocommunication service(s) within that frequency band in the territory of the Kingdom of Tonga.

Footnotes:

ITU-R Region 3 footnotes under each frequency band were analyzed and the relevant footnotes were repeated under the corresponding bands in the second column (column National Allocations). Footnotes that contain the name of "Tonga" were also underlined in this column and the corresponding changes to the Region 3 allocation were introduced in the Table. Furthermore, few number of footnotes under TONxx -format created to represent national position on related allocations. The text of all footnote (international and national) is provided after the Table.

Usage column:

This column provides wide range of information related to the applications of services within each frequency band, including:

- Describing frequency band plan, as far as possible;
- Highlighting major information that are inside the text of footnotes;
- Giving some technical conditions;
- Identification of frequency band to applications;
- Etc.

Section IV – Table of Frequency Allocations
(See No. ITU RR 2.1)
8.3-110 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
Below 8.3 (Not allocated) 5.53 5.54	**Below 8.3** (Not allocated) 5.53 5.54	-
8.3-9 METEOROLOGICAL AIDS 5.54A 5.54B 5.54C	**8.3-9** METEOROLOGICAL AIDS 5.54A 5.54C	1. Passive use only under MetAid
9-11.3 METEOROLOGICAL AIDS 5.54A RADIONAVIGATION	**9-11.3** METEOROLOGICAL AIDS 5.54A RADIONAVIGATION	1. Passive use only under MetAid 2. SRD inductive applications 3. Medical implant SRD
11.3-14 RADIONAVIGATION	**11.3-14** RADIONAVIGATION	1. SRD inductive applications 2. Medical implant SRD
14-19.95 FIXED MARITIME MOBILE 5.57 5.55 5.56	**14-19.95** FIXED MARITIME MOBILE 5.57	1. SRD inductive applications 2. Coastal radiotelegraph and teleprinter 3. Medical implant SRD
19.95-20.05 STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)	**19.95-20.05** STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)	1. SRD inductive applications 2. Medical implant SRD
20.05-70 FIXED MARITIME MOBILE 5.57 5.56 5.58	**20.05-70** FIXED MARITIME MOBILE 5.57	1. SRD inductive applications 2. Coastal radiotelegraph and teleprinter 3. Medical implant SRD
70-72 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57 5.59	**70-72** RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57	1. SRD inductive applications 2. Coastal radiotelegraph and teleprinter 3. Complimentary fixed station to maritime mobile 4. LORAN systems 5. Medical implant SRD
72-84 FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60	**72-84** FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60	1. SRD inductive applications 2. Coastal radiotelegraph and teleprinter 3. Complimentary fixed station to maritime mobile 4. LORAN systems 5. Medical implant SRD
84-86 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57 5.59	**84-86** RADIONAVIGATION 5.60 Fixed Maritime mobile 5.57	1. SRD inductive applications 2. Coastal radiotelegraph and teleprinter 3. Complimentary fixed station to maritime mobile 4. LORAN systems 5. Medical implant SRD
86-90 FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60	**86-90** FIXED MARITIME MOBILE 5.57 RADIONAVIGATION 5.60	1. SRD inductive applications 2. Coastal radiotelegraph and teleprinter 3. Complimentary fixed station to maritime mobile 4. Medical implant SRD
90-110 RADIONAVIGATION 5.62 Fixed 5.64	**90-110** RADIONAVIGATION 5.62 Fixed 5.64	1. LORAN-C en-route hyperbolic aeronautical radionavigation system 2. SRD inductive applications 3. Medical implant SRD

110-285 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
110-112 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	**110-112** FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	1. LORAN-C system 2. SRD inductive applications 3. Medical implant SRD
112-117.6 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.65	**112-117.6** RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64	1. LORAN systems 2. SRD inductive applications 3. Medical implant SRD
117.6-126 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	**117.6-126** FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	1. RFID in 125-135 kHz 2. SRD inductive applications 3. Medical implant SRD
126-129 RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64 5.65	**126-129** RADIONAVIGATION 5.60 Fixed Maritime mobile 5.64	1. RFID in 125-135 kHz 2. SRD inductive applications 3. Medical implant SRD
129-130 FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	**129-130** FIXED MARITIME MOBILE RADIONAVIGATION 5.60 5.64	1. RFID in 125-135 kHz 2. SRD inductive applications 3. Medical implant SRD
130-135.7 FIXED MARITIME MOBILE RADIONAVIGATION 5.64	**130-135.7** FIXED MARITIME MOBILE RADIONAVIGATION 5.64	1. RFID in 125-135 kHz 2. SRD inductive applications 3. Medical implant SRD
135.7-137.8 FIXED MARITIME MOBILE RADIONAVIGATION Amateur 5.67A 5.64 5.67B	**135.7-137.8** FIXED MARITIME MOBILE RADIONAVIGATION Amateur 5.67A 5.64 5.67B	1. SRD inductive applications 2. Medical implant SRD
137.8-160 FIXED MARITIME MOBILE RADIONAVIGATION 5.64	**137.8-160** FIXED MARITIME MOBILE RADIONAVIGATION 5.64	1. SRD inductive applications (up to 148.5 kHz) 2. Medical implant SRD
160-190 FIXED Aeronautical radionavigation	**160-190** FIXED Aeronautical radionavigation	1. Aeronautical Non-Directional radio Beacon (NDB) (RR. App.12) 2. Non-specific SRD and medical implants
190-200 AERONAUTICAL RADIONAVIGATION	**190-200** AERONAUTICAL RADIONAVIGATION	1. Aeronautical Non-Directional radio Beacon (NDB) (RR App.12) 2. Medical implant SRD
200-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	**200-285** AERONAUTICAL RADIONAVIGATION Aeronautical mobile	1. L-type non-directional aeronautical radio beacon (NDB) 2. Medical implant SRD

285-505 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
285-325 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73	**285-325** AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73	1. L-type non-directional aeronautical radio beacon (NDB) 2. Maritime Radio beacons (RR No. App.12) 3. Medical implant SRD
325-405 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	**325-405** AERONAUTICAL RADIONAVIGATION Aeronautical mobile	1. L-type non-directional aeronautical radio beacon (NDB) 2. Maritime Radio beacons (RR No. App.12) 3. Medical implant SRD
405-415 RADIONAVIGATION 5.76 Aeronautical mobile	**405-415** RADIONAVIGATION 5.76 Aeronautical mobile	1. Maritime Direction Finding radionavigation system. 2. L-type Non-directional aeronautical radio Beacon (NDB) 3. Medical implant SRD
415-472 MARITIME MOBILE 5.79 Aeronautical radionavigation 5.77 5.80 5.78 5.82	**415-472** MARITIME MOBILE 5.79 Aeronautical radionavigation 5.77 5.82	1. Narrow Band Radiotelegraphy and DSC application in maritime mobile (RR Articles 51 and 52) 2. L-type Non-directional aeronautical radio Beacon (NDB) 3. Medical implant SRD
472-479 MARITIME MOBILE 5.79 Amateur 5.80A Aeronautical radionavigation 5.77 5.80 5.80B 5.82	**472-479** MARITIME MOBILE 5.79 Amateur 5.80A Aeronautical radionavigation 5.77 5.80B 5.82	1. L-type Non-directional aeronautical radio Beacon (NDB) 2. Ship stations working frequencies on 454 kHz and 468 kHz (RR Article 52) 3. Medical implant SRD
479-495 MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.77 5.80 5.82	**479-495** MARITIME MOBILE 5.79 5.79A Aeronautical radionavigation 5.77 5.82	1. Narrow Band Radiotelegraphy and (DSC) application in maritime mobile (RR Articles 51 and 52) 2. Maritime safety information (MSI), NAVTEX 3. L-type Non-directional aeronautical radio Beacon (NDB) 4. Ship stations working frequency on 480 kHz (RR Article 52) 5. Medical implant SRD
495-505 MARITIME MOBILE 5.82C	**495-505** MARITIME MOBILE 5.82C	1. International NAVDAT and international distress and calling frequency for Morse radiotelegraphy (RR Articles **31** and **52,** and App. **13)** 2. Medical implant SRD

505-2 194 kHz

Allocation to services Region 3	National Allocations	Usage
505-526.5 MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Land mobile	**505-526.5** MARITIME MOBILE 5.79 5.79A 5.84 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Land mobile	1. Narrow Band Radiotelegraphy and DSC application in maritime mobile (Articles 51 and 52) 2. International NAVTEX system (518 kHz) 3. Aeronautical Radio Beacons 4. Secondary land mobile applications in simplex operation mode in 505-535 kHz 5. Medical implant SRD
526.5-535 BROADCASTING Mobile 5.88	**526.5-535** BROADCASTING Mobile 5.88	1. Voice broadcasting (120 nine kHz channels) 2. Medical implant SRD (up to 600 kHz) 3. Transport SRD 4. Secondary mobile applications in simplex operation mode in 505-535 kHz, only subject to coordination with broadcasting
535-1 606.5 BROADCASTING	**535-1 606.5** BROADCASTING	
1 606.5-1 800 FIXED MOBILE RADIOLOCATION RADIONAVIGATION 5.91	**1 606.5-1 800** FIXED MOBILE RADIOLOCATION RADIONAVIGATION	1. NBDP telegraphy and DSC applications in maritime mobile service by coastal stations (RR Articles 51 and 52) 2. Transport SRD 3. long-range fixed and mobile applications in simplex operation mode
1 800-2 000 AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION Radiolocation 5.97	**1 800-2 000** AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION Radiolocation 5.97	1. long-range fixed and mobile application in simplex operation mode 2. Loran system 3. Transport SRD
2 000-2 065 FIXED MOBILE	**2 000-2 065** FIXED MOBILE	1. Long-range fixed and mobile applications in simplex operation mode
2 065-2 107 MARITIME MOBILE 5.106	**2 065-2 107** MARITIME MOBILE 5.106	1.Fixed station subject to 5.106
2 107-2 170 FIXED MOBILE	**2 107-2 170** FIXED MOBILE	1. Long-range fixed and mobile applications in simplex operation mode
2 170-2 173.5 MARITIME MOBILE	**2 170-2 173.5** MARITIME MOBILE	1. Maritime applications
2 173.5-2 190.5 MOBILE (distress and calling) 5.108 5.109 5.110 5.111	**2 173.5-2 190.5** MOBILE (distress and calling) 5.108 5.109 5.110 5.111	1. DSC on 2187.5 kHz 2. Radio telephony international distress and calling on 2182 kHz 3. NBDP telegraphy international distress on 2174.5 kHz 4. SAR radiocommunication service on 2182 kHz (RR Appendix 19)
2 190.5-2 194 MARITIME MOBILE	**2 190.5-2 194** MARITIME MOBILE	1. A maritime Radiocommunication channel for NBDP or SSB radiotelephony by coastal station transmitter (Articles 51 and 52)

2 194-3 400 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
2 194-2 300 FIXED MOBILE 5.112	**2 194-2 300** FIXED MOBILE	1. In making assignments to stations in the fixed and mobile services, the special requirements of the maritime mobile service should be met. 2. Maritime mobile applications (RR Articles 51 and 52)
2 300-2 495 FIXED MOBILE BROADCASTING 5.113	**2 300-2 495** FIXED MOBILE BROADCASTING 5.113	1. Long-range fixed and mobile applications in simplex operation mode 2. SSB Radiotelephony transmission by inter-ship correspondence 3. Broadcasting subject to RR Article 23 below 30° North
2 495-2 501 STANDARD FREQUENCY AND TIME SIGNAL (2 500 kHz)	**2 495-2 501** STANDARD FREQUENCY AND TIME SIGNAL (2 500 kHz)	1. See **RR** Article **26** and ITU-R Recommendation TF series
2 501-2 502 STANDARD FREQUENCY AND TIME SIGNAL Space Research	**2 501-2 502** STANDARD FREQUENCY AND TIME SIGNAL Space Research	1. See **RR** Article **26** and ITU-R Recommendation TF series
2 502-2 505 STANDARD FREQUENCY AND TIME SIGNAL	**2 502-2 505** STANDARD FREQUENCY AND TIME SIGNAL	1. See **RR** Article **26** and ITU-R Recommendation TF series
2 505-2 850 FIXED MOBILE	**2 505-2 850** FIXED MOBILE	1. Long-range fixed and mobile applications in duplex operation mode in 2.505-2.65 MHz / 2.705-2.85 MHz and in simplex operation mode in 2.65-2.705 MHz 2. Maritime mobile applications (RR Articles **51** and **52**)
2 850-3 025 AERONAUTICAL MOBILE (R) 5.111 5.115	**2 850-3 025** AERONAUTICAL MOBILE (R) 5.111 5.115	1. Application of this band is in accordance to Allotment plan (RR App. **27**) 2. SAR on 3023 kHz (RR Article **31**& App. **13)**
3 025-3 155 AERONAUTICAL MOBILE (OR)	**3 025-3 155** AERONAUTICAL MOBILE (OR)	1. Application of this band is in accordance to Allotment plan (RR App. **26**)
3 155-3 200 FIXED MOBILE except aeronautical mobile (R) 5.116 5.117	**3 155-3 200** FIXED MOBILE except aeronautical mobile (R) 5.116	1. Long-range fixed and mobile applications in simplex operation mode 2. NBDP in maritime mobile service (RR Articles **51** and **52**) 3. Inductive SRDs 4. Low power wireless hearing aids
3 200-3 230 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.116	**3 200-3 230** FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113 5.116	1.Long-range fixed and mobile applications in simplex operation mode 2. Inductive SRDs 3. Low power wireless hearing aids
3 230-3 400 FIXED MOBILE except aeronautical mobile BROADCASTING 5.113 5.116	**3 230-3 400** FIXED MOBILE except aeronautical mobile BROADCASTING 5.113 5.116	1.Long-range fixed and mobile applications in simplex operation mode 2. Maritime mobile is explained in the (RR Articles **51** and **52**) 3. Inductive SRDs 4. Low power wireless hearing aids

3 400-4 750 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
3 400-3 500 AERONAUTICAL MOBILE (R)	**3 400-3 500** AERONAUTICAL MOBILE (R)	1. Aeronautical radiotelephony and data transmission (RR allotment plan in App. **27**)
3 500-3 900 AMATEUR FIXED MOBILE	**3 500-3 900** AMATEUR FIXED MOBILE	1. 80 meters amateur frequency band (only within the bands 3500-3550 kHz and 3600-3850 kHz) 2. Long range fixed and mobile applications
3 900-3 950 AERONAUTICAL MOBILE BROADCASTING	**3 900-3 950** AERONAUTICAL MOBILE BROADCASTING	1. Broadcasting service under RR Resolution 517 (WRC-15) 2. Non-allotted aeronautical mobile application
3 950-4 000 FIXED BROADCASTING 5.126	**3 950-4 000** FIXED BROADCASTING 5.126	1. Broadcasting service under RR Resolution 517 (WRC-15) 2. Long range fixed application in simplex operation mode
4 000-4 063 FIXED MARITIME MOBILE 5.127 5.126	**4 000-4 063** FIXED MARITIME MOBILE 5.127 5.126	1. SSB radiotelephony application in ship stations (Sub-Section **C-1**, RR App. **17**) 2. Long range fixed application in simplex operation mode
4 063-4 438 MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 5.128	**4 063-4 438** MARITIME MOBILE 5.79A 5.109 5.110 5.130 5.131 5.132 5.128	1. Coastal stations NAVTEX on 4209.6 kHz (alternative to 518 kHz) 2. DSC international distress signal (RR Article **31**) 3. NBDP telegraphy international distress signal on 4177.5 kHz 4. Meteorological & navigational warning signal using NBDP 5. MSI on 4210 kHz 6. More detailed information in available in RR App. **17** 7. Non-GMDSS safety and distress on 4125 kHz supplementary to 2182 kHz and SAR (RR App. **13**)
4 438-4 488 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	**4 438-4 488** FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	1. Long range fixed and mobile except aeronautical mobile applications in simplex operation mode 2. Radiolocation service is only for oceanographic radars in this band (in accordance with RR Resolution **612** (**Rev.WRC-12**) 3. Ship station duplex operation with coast station (sub-section C-1, RR App.**17**)
4 488-4 650 FIXED MOBILE except aeronautical mobile	**4 488-4 650** FIXED MOBILE except aeronautical mobile	1. Long range fixed and mobile applications in simplex operation mode 2. Ship station duplex operation with coast station (sub-section C-1, RR App.**17**)
4 650-4 700 AERONAUTICAL MOBILE (R)	**4 650-4 700** AERONAUTICAL MOBILE (R)	1. Radiotelephony, Telegraph and data transmission (allotment plan given in RR App. **27**)
4 700-4 750 AERONAUTICAL MOBILE (OR)	**4 700-4 750** AERONAUTICAL MOBILE (OR)	1. Radiotelephony, Telegraph and data transmission (allotment plan given in RR App. **26**)

4 750-5 680 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
4 750-4 850 FIXED BROADCASTING 5.113 Land mobile	**4 750-4 850** FIXED BROADCASTING 5.113 Land mobile	1. Long range fixed and land mobile applications in simplex operation mode 2. Tropical zone broadcasting with carrier power not exceeding 50 kW. In any case coordination is necessary (RR Article **23**)
4 850-4 995 FIXED LAND MOBILE BROADCASTING 5.113	**4 850-4 995** FIXED LAND MOBILE BROADCASTING 5.113	1. Long range fixed and land mobile applications in simplex operation mode 2. Tropical zone broadcasting with carrier powernot exceeding 50 kW. In any case coordination is necessary (RR Article **23**)
4 995-5 003 STANDARD FREQUENCY AND TIME SIGNAL (5 000 kHz)	**4 995-5 003** STANDARD FREQUENCY AND TIME SIGNAL (5 000 kHz)	1. See **RR** Article **26** and ITU-R Recommendation TF series
5 003-5 005 STANDARD FREQUENCY AND TIME SIGNAL Space research	**5 003-5 005** STANDARD FREQUENCY AND TIME SIGNAL Space research	1. See **RR** Article **26** and ITU-R Recommendation TF series
5 005-5 060 FIXED BROADCASTING 5.113	**5 005-5 060** FIXED BROADCASTING 5.113	1. Long range fixed application in simplex operation mode 2. Tropical zone broadcasting with carrier power not exceeding 50 kW. In any case coordination is necessary (RR Article **23**)
5 060-5 250 FIXED Mobile except aeronautical mobile	**5 060-5 250** FIXED Mobile except aeronautical mobile	1. Long range fixed and mobile (land mobile and maritime mobile) applications in duplex operation mode in 5.26-5.3515 MHz / 5.06-5.1515 MHz
5 250-5 275 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	**5 250-5 275** FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	1. Long range fixed and mobile (land mobile and maritime mobile) applications in duplex operation mode in 5.26-5.3515 MHz / 5.06-5.1515 MHz and in simplex operation mode in 5.1515-5.26 MHz 2. Radiolocation service is only for oceanographic radars in this band (in accordance with RR Resolution **612** (**Rev.WRC-12**)
5 275-5 351.5 FIXED MOBILE except aeronautical mobile	**5 275-5 351.5** FIXED MOBILE except aeronautical mobile	1. Long range fixed and mobile (land mobile and maritime mobile) applications in duplex operation mode in 5.26-5.3515 MHz / 5.06-5.1515 MHz
5 351.5-5 366.5 FIXED MOBILE except aeronautical mobile Amateur 5.133B	**5 351.5-5 366.5** FIXED MOBILE except aeronautical mobile Amateur 5.133B	1. Long range fixed and mobile (land mobile and maritime mobile) applications in simplex operation mode 2. Amateur stations on secondary basis subject to a maximum radiated power less than 15 W (e.i.r.p.)
5 366.5-5 450 FIXED MOBILE except aeronautical mobile	**5 366.5-5 450** FIXED MOBILE except aeronautical mobile	1. Long range fixed and mobile (land mobile and maritime mobile) applications in simplex operation mode
5 480-5 680 AERONAUTICAL MOBILE (R) 5.111 5.115	**5 480-5 680** AERONAUTICAL MOBILE (R) 5.111 5.115	1. Application of this band is in accordance to Allotment plan (RR App.**27**) 2. SAR on 5 680 kHz may also be used by maritime mobile service engaged in coordinated search and rescue operations (RR Article **31**& App. **13**)

5 680-7 400 kHz

Allocation to services by ITU **Region 3**	**National Allocations**	**Usage**
5 680-5 730 AERONAUTICAL MOBILE (OR) 5.111 5.115	**5 680-5 730** AERONAUTICAL MOBILE (OR) 5.111 5.115	1. Application of this band is in accordance to Allotment plan (RR App. **26**) 2. SAR on 5 680 kHz may also be used by maritime mobile service engaged in coordinated search and rescue operations (RR Article **31**&App.s**13** and **15**)
5 730-5 900 FIXED Mobile except aeronautical mobile (R)	**5 730-5 900** FIXED Mobile except aeronautical mobile (R)	1. Long range fixed and mobile (except aeronautical mobile (R)) applications in simplex operation mode
5 900-5 950 BROADCASTING 5.134 5.136	**5 900-5 950** BROADCASTING 5.134 5.136	1. Broadcasting service in accordance to RR App. **12**
5 950-6 200 BROADCASTING	**5 950-6 200** BROADCASTING	1. HF broadcasting
6 200-6 525 MARITIME MOBILE 5.109 5.1105.130 5.132 5.137	**6 200-6 525** MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137	1. The channel assignment plan of this band is given in RR App. **17** 2. International DSC on 6312 kHz (RR Article **31**) 3. DSC on 6312.5 kHz paired with 6331 kHz (RR App. **17**) 4. NBDP for International distress on 6268 kHz 5. RTP-COM frequency on 6215 kHz. This frequency is also supplementary for 2182 kHz 6. MSI on 6314 kHz (RR App. **17**)
6 525-6 685 AERONAUTICAL MOBILE (R)	**6 525-6 685** AERONAUTICAL MOBILE (R)	1. Application of this band is in accordance to Allotment plan (RR App. **27**)
6 685-6 765 AERONAUTICAL MOBILE (OR)	**6 685-6 765** AERONAUTICAL MOBILE (OR)	1. Application of this band is in accordance to Allotment plan (RR App. **26**)
6 765-7 000 FIXED MOBILE except aeronautical mobile (R) 5.138	**6 765-7 000** FIXED MOBILE except aeronautical mobile (R) 5.138	1. Long range fixed and mobile (except aeronautical mobile (R)) applications in simplex mode 2. ISM in 6765-6795 kHz 3. Non-specific SRD 4. Inductive SRD in the ISM band
7 000-7 100 AMATEUR AMATEUR-SATELLITE	**7 000-7 100** AMATEUR AMATEUR-SATELLITE	1. 40 meters amateur frequency band
7 100-7 200 AMATEUR 5.141B	**7 100-7 200** AMATEUR 5.141B	1. 40 meters amateur frequency band
7 200-7 300 BROADCASTING	**7 200-7 300** BROADCASTING	1. HF broadcasting
7 300-7 400 BROADCASTING 5.134 5.143 5.143A 5.143C	**7 300-7 400** FIXED 5.143 5.143A BROADCASTING 5.134 Land mobile 5.143 5.143A	1. HF broadcasting 2. Low power coordinated primary fixed and secondary land mobile application in 7300-7450 kHz (5.143 and 5.143A) in simplex operation mode 3. Transport SRD

7 400-9 500 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
7 400-7 450 BROADCASTING 5.143A 5.143C	**7 400-7 450** FIXED 5.143A BROADCASTING Land mobile 5.143A	1. HF broadcasting 2. Low power coordinated primary fixed and secondary land mobile application in 7.3-7.45 MHz (5.143A) in simplex operation mode
7 450-8 100 FIXED MOBILE except aeronautical mobile (R) 5.144	**7 450-8 100** FIXED MOBILE except aeronautical mobile (R) 5.144	1. Long range fixed and mobile (except aeronautical mobile (R)) applications in duplex mode in 7.85-8.1 MHz / 7.45-7.7 MHz and in simplex mode in 7.7-7.85 MHz 2. Inductive and transport SRDs
8 100-8 195 FIXED MARITIME MOBILE	**8 100-8 195** FIXED MARITIME MOBILE	1. SSB Radiotelephony application in ship and coast stations (Sub-Section C-2, RR App.**17**) 2. Long range fixed and maritime mobile applications in 8100-8195 kHz in simplex operation mode 3. Inductive and transport SRDs
8 195-8 815 MARITIME MOBILE 5.109 5.110 5.132 5.145 5.111	**8 195-8 815** MARITIME MOBILE 5.109 5.110 5.132 5.145 5.111	1. Assignable frequencies is in RR App.**17** 2. International distress and calling (DSC) on 8414.5 kHz (RR Article **31**) 3. NBDP for International distress on 8376.5 kHz (RR Article **31**) 4. SAR operations (RR Article **31**& App. **13)** (non-GMDSS safety and distress) by survival craft station on 8364 kHz 5. RTP-COM on 8291 kHz (RR App.s**13** & **15**) 6. International MSI on 8416.5 kHz using NBDP (RR App. **17**) 7. DSC on 8415 kHz paired with 8436.5 kHz (RR App. **17**) 8. Inductive and transport SRDs
8 815-8 965 AERONAUTICAL MOBILE (R)	**8 815-8 965** AERONAUTICAL MOBILE (R)	1. Application of this band is in accordance to Allotment plan, RR App. **27** 2. Transport SRD
8 965-9 040 AERONAUTICAL MOBILE (OR)	**8 965-9 040** AERONAUTICAL MOBILE (OR)	1. Application of this band is in accordance to Allotment plan, RR App. **26** 2. Transport SRD
9 040-9 305 FIXED	**9 040-9 305** FIXED	1. Long range fixed application in simplex operation mode 2. Transport SRD
9 305-9 355 FIXED Radiolocation 5.145A	**9 305-9 355** FIXED Radiolocation 5.145A	1. Long range fixed application in simplex operation mode 2. Radiolocation service is only for oceano-graphic radars in this band (in accordance with RR Resolution **612** (**Rev.WRC-12**) 3. Transport SRD
9 355-9 400 FIXED	**9 355-9 400** FIXED	1. Long range fixed application in simplex operation mode 2. Transport SRD
9 400-9 500 BROADCASTING 5.134 5.146	**9 400-9 500** FIXED 5.146 BROADCASTING 5.134	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Long range fixed application in simplex operation mode 3. Transport SRD

9 500-12 050 kHz

Allocation to services by ITU **Region 3**	**National Allocations**	**Usage**
9 500-9 900 BROADCASTING 5.147	**9 500-9 775** BROADCASTING	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Transport SRD
	9 775-9 900 FIXED 5.147 BROADCASTING	1. HF broadcasting 2. Long range fixed application in simplex operation mode 3. Transport SRD
9 900-9 995 FIXED	**9 900-9 995** FIXED	1. Long range fixed application in simplex operation mode 2. Transport SRD
9 995-10 003 STANDARD FREQUENCY AND TIME SIGNAL (10 000 kHz) 5.111	**9 995-10 003** STANDARD FREQUENCY AND TIME SIGNAL (10 000 kHz) 5.111	1. See **RR** Article **26** and ITU-R Recommendation TF series 2. Search and rescue operations concerning manned space vehicles in 10 003 kHz± 3 kHz 3. Transport SRD
10 003-10 005 STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111	**10 003-10 005** STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111	1. See **RR** Article **26** and ITU-R Recommendation TF series 2. Search and rescue operations concerning manned space vehicles in 10 003 kHz± 3 kHz 3. Transport SRD
10 005-10 100 AERONAUTICAL MOBILE (R) 5.111	**10 005-10 100** AERONAUTICAL MOBILE (R) 5.111	1. Aeronautical radiotelephony and data transmission (RR allotment plan in App. **27**) 2. Search and rescue operations concerning manned space vehicles in 10 003 kHz± 3 kHz 3. Transport SRD
10 100-10 150 FIXED Amateur	**10 100-10 150** FIXED Amateur	1.Long range fixed application 2. The 30 meters amateur band 3. Transport SRD
10 150-11 175 FIXED Mobile except aeronautical mobile (R)	**10 150-11 175** FIXED Mobile except aeronautical mobile (R)	1. Long range fixed and mobile (except aeronautical mobile (R)) applications in duplex mode in 10.8-11.175 MHz/ 10.15-10.525 MHz and in simplex operation mode in 10.525-10.8 MHz 2. Inductive SRD in 10.2-11 MHz and transport SRD
11 175-11 275 AERONAUTICAL MOBILE (OR)	**11 175-11 275** AERONAUTICAL MOBILE (OR)	1.Application of this band is in accordance to Allotment plan (RR App. **26**) 2. Transport SRD
11 275-11 400 AERONAUTICAL MOBILE (R)	**11 275-11 400** AERONAUTICAL MOBILE (R)	1. Aeronautical radiotelephony and data transmission (RR allotment plan in App. **27**) 2. Transport SRD
11 400-11 600 FIXED	**11 400-11 600** FIXED	1. Long range fixed application in simplex operation mode 2. Transport SRD
11 600-11 650 BROADCASTING 5.134 5.146	**11 600-11 650** FIXED 5.146 BROADCASTING 5.134	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Long range fixed application in simplex operation mode in exceptional cases 3. Transport SRD
11 650-12 050 BROADCASTING 5.147	**11 650-11 700** FIXED 5.147 BROADCASTING	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Long range fixed application in simplex mode in exceptional cases 3. Transport type SRD
	11 700-12 050 BROADCASTING	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Transport and RFID type SRD

12 050-13 800 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
12 050-12 100 BROADCASTING 5.134 5.146	**12 050-12 100** FIXED 5.146 BROADCASTING 5.134	1. Long range fixed application in exceptional cases in simplex operation mode 2. Transport and RFID type SRD
12 100-12 230 FIXED	**12 100-12 230** FIXED	1. Long range fixed application in simplex operation mode 2. Transport and RFID type SRD
12 230-13 200 MARITIME MOBILE 5.109 5.110 5.132 5.145	**12 230-13 200** MARITIME MOBILE 5.109 5.110 5.132 5.145	1. Assignable frequencies is in RR App. **17** 2. International distress and calling (DSC) on 12577 kHz (RR Article **31**) 3. NBDP for International distress on 12520 kHz (RR Article **31**) 4. RTP-COM on 12290 kHz (RR Article **31**& App. **13** and **15**) 5. MSI using NBDP on 12579 kHz (RR App.**17**) 6. Medical implant, transport & RFID type SRD
13 200-13 260 AERONAUTICAL MOBILE (OR)	**13 200-13 260** AERONAUTICAL MOBILE (OR)	1.Application of this band is in accordance to Allotment plan (RR App. **26**) 2.Medical implant, transport and RFID type SRD
13 260-13 360 AERONAUTICAL MOBILE (R)	**13 260-13 360** AERONAUTICAL MOBILE (R)	1. Aeronautical radiotelephony and data transmissi (RR allotment plan in App. **27**) 2.Medical implant, transport and RFID type SRD
13 360-13 410 FIXED RADIO ASTRONOMY 5.149	**13 360-13 410** FIXED RADIO ASTRONOMY 5.149	1. Long range fixed application in simplex operation mode 2. Continuum measurements (ITU-R Rec. RA.314) 3. Medical implant, transport & RFID type SRD
13 410-13 450 FIXED Mobile except aeronautical mobile (R)	**13 410-13 450** FIXED Mobile except aeronautical mobile (R)	1. Long range fixed and mobile (except aeronautical mobile (R)) applications in simplex operation mode 2.Medical implant, transport & RFID type SRD
13 450-13 550 FIXED Mobile except aeronautical mobile (R) Radiolocation 5.132A	**13 450-13 550** FIXED Mobile except aeronautical mobile (R) Radiolocation 5.132A	1.Long range fixed and mobile (except aeronautical mobile (R)) applications in simplex operation mode 2. Radiolocation service is only for oceanographic radars in this band (in accordance with RR Resolution **612** (**Rev.WRC-12**) 3. Medical implant, transport & RFID type SRD
13 550-13 570 FIXED Mobile except aeronautical mobile (R) 5.150	**13 550-13 570** FIXED Mobile except aeronautical mobile (R) 5.150	1. Long range fixed and mobile (except aeronautical mobile (R)) applications in simplex operation mode 2. ISM applications in the band 13553 – 13567 kHz 3. Non-specific, RFID, inductive, medical implant and transport SRD applications
13 570-13 600 BROADCASTING 5.134 5.151	**13 570-13 600** FIXED 5.151 BROADCASTING 5.134 MOBILE except aeronautical mobile (R) 5.151	1. Long range fixed and mobile except aeronautical mobile (R) applications in exceptional cases in simplex operation mode 2. Medical implant, transport and RFID type SRD
13 600-13 800 BROADCASTING	**13 600-13 800** BROADCASTING	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Medical implant, transport & RFID type SRD

13 800-16 200 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
13 800-13 870 BROADCASTING 5.134 5.151	**13 800-13 870** FIXED 5.151 MOBILE except aeronautical mobile (R) 5.151	1. Long range fixed and mobile except aeronautical mobile (R) applications in exceptional cases in simplex operation mode 3. Medical implant, transport and RFID type SRD
13 870-14 000 FIXED Mobile except aeronautical mobile (R)	**13 870-14 000** FIXED Mobile except aeronautical mobile (R)	1. Long range fixed and mobile except aeronautical mobile (R) applications in exceptional cases in simplex operation mode 2. Medical implant, transport and RFID type SRD
14 000-14 250 AMATEUR AMATEUR-SATELLITE	**14 000-14 250** AMATEUR AMATEUR-SATELLITE	1. 20 meters amateur frequency band 2. Medicalimplant, transport and RFID type SRD
14 250-14 350 AMATEUR 5.152	**14 250-14 350** AMATEUR 5.152	1. 20 meters amateur frequency band 2. Medicalimplant, transport and RFID type SRD
14 350-14 990 FIXED Mobile except aeronautical mobile (R)	**14 350-14 990** FIXED Mobile except aeronautical mobile (R)	1. Long range fixed and mobile except aeronautical mobile (R) application in duplex mode in 14.35-14.59 MHz / 14.75-14.99 MHz and in simplex operation mode in 14.59-14.75 MHz 2. Medical implant transport and RFID type SRD
14 990-15 005 STANDARD FREQUENCY AND TIME SIGNAL (15 000 kHz) 5.111	**14 990-15 005** STANDARD FREQUENCY AND TIME SIGNAL (15 000 kHz) 5.111	1. See **RR** Article **26** and ITU-R Recommendation TF series 2. Search and rescue operations concerning manned space vehicles in 14 993 kHz± 3 kHz 3. Medical implant and transport SRD
15 005-15 010 STANDARD FREQUENCY AND TIME SIGNAL Space research	**15 005-15 010** STANDARD FREQUENCY AND TIME SIGNAL Space research	1. See **RR** Article **26** and ITU-R Recommendation TF series 2. Search and rescue operations concerning manned space vehicles in 14 993 kHz± 3 kHz 3. Medical implant and transport SRD
15 010-15 100 AERONAUTICAL MOBILE (OR)	**15 010-15 100** AERONAUTICAL MOBILE (OR)	1.Application of this band is in accordance to Allotment plan (RR App. **26**) 2. Medical implant and transport SRD
15 100-15 600 BROADCASTING	**15 100-15 600** BROADCASTING	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Medical implant and transport SRD
15 600-15 800 BROADCASTING 5.134 5.146	**15 600-15 800** FIXED 5.146 BROADCASTING 5.134	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Long range fixed application in exceptional cases in simplex operation mode 3. Medical implant and transport SRD
15 800-16 100 FIXED 5.153	**15 800-16 100** FIXED 5.153	1. Long range fixed application in duplex mode in 16.2-16.36 MHz / 15.8-15.96 MHz 2. Long range fixed application in simplex operation mode in 15.96-16.2 MHz 3. Medical implant and transport SRD
16 100-16 200 FIXED Radiolocation 5.145A	**16 100-16 200** FIXED Radiolocation 5.145A	1. Long range fixed application in simplex operation mode in 15.96-16.2 MHz 2. Radiolocation service is only for oceanographic radars in this band (in accordance with RR Resolution **612** (**Rev.WRC-12**) 3. Medical implant and transport SRD

16 200-18 900 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
16 200-16 360 FIXED	**16 200-16 360** FIXED	Long range fixed application in duplex mode in 16.2-16.36 MHz / 15.8-15.96 MHz 2. Medical implant and transport SRD
16 360-17 410 MARITIME MOBILE 5.109 5.110 5.132 5.145	**16 360-17 410** MARITIME MOBILE 5.109 5.110 5.132 5.145	1. Assignable frequencies is in RR App. **17** 2. International distress and calling (DSC) on 16804.5 kHz paired with 16903 kHz (RR Article **31**) 3. NBDP for International distress on 16695 kHz (RR Article **31**) 4. RTP-COM frequency on 16420 kHz. (RR Article **31**&App.s**13** and **15**) 5. International MSI using NBDP on 16680.5 kHz (RR Appendix **17**) 6. Medical implant and transport SRD
17 410-17 480 FIXED	**17 410-17 480** FIXED	1. Long range fixed application in simplex operation mode in the band 17.41 – 17.55 MHz 2. Medical implant and transport SRD
17 480-17 550 BROADCASTING 5.134 5.146	**17 480-17 550** FIXED 5.146 BROADCASTING 5.134	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Long range fixed application in exceptional cases in simplex operation mode in the band 17.41 – 17.55 MHz 3. Medical implant and transport SRD
17 550-17 900 BROADCASTING	**17 550-17 900** BROADCASTING	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Medical implant and transport SRD
17 900-17 970 AERONAUTICAL MOBILE (R)	**17 900-17 970** AERONAUTICAL MOBILE (R)	1.Application of this band is in accordance to Allotment plan (RR App. **27**) 2. Medical implant and transport SRD
17 970-18 030 AERONAUTICAL MOBILE (OR)	**17 970-18 030** AERONAUTICAL MOBILE (OR)	1.Application of this band is in accordance to Allotment plan (RR App. **26**) 2. Medical implant and transport SRD
18 030-18 052 FIXED	**18 030-18 052** FIXED	1. Long range fixed application in simplex operation mode in 18.03 – 18.068 MHz 2. Medical implant and transport SRD
18 052-18 068 FIXED Space research	**18 052-18 068** FIXED Space research	1. Long range fixed application in simplex operation mode in 18.03 – 18.068 MHz 2. Medical implant and transport SRD
18 068-18 168 AMATEUR AMATEUR-SATELLITE	**18 068-18 168** AMATEUR AMATEUR-SATELLITE	1. 17 meters amateur frequency band 2. Medicalimplant and transport SRD
18 168-18 780 FIXED Mobile except aeronautical mobile	**18 168-18 780** FIXED Mobile except aeronautical mobile	1. Long range fixed and mobile except aeronautical mobile applications in duplex operation mode in 18.618-18.78 MHz / 16.168-18.33 MHz and in simplex operation mode in 18.33–18.618 MHz 2. Medical implant and transport SRD
18 780-18 900 MARITIME MOBILE	**18 780-18 900** MARITIME MOBILE	1. Assignable frequencies is in RR App. **17** 2. DSC on 18898.5 kHz paired with 19703.5 kHz (RR App. **17**) 3. Medical implant and transport SRD

18 900-23 000 kHz

Allocation to services by ITU **Region 3**	**National Allocations**	**Usage**
18 900-19 020 BROADCASTING 5.134 5.146	**18 900-19 020** FIXED 5.146	1. Long range fixed application in exceptional cases in simplex operation mode in 18.9 – 19.02 MHz 2. Medical implant and transport SRD
19 020-19 680 FIXED	**19 020-19 680** FIXED	1. Long range fixed application in duplex operation mode in 19.59-19.68 MHz / 19.02-19.11 MHz and in simplex operation mode in 19.11–19.59 MHz 2. Medical implant and transport SRD
19 680-19 800 MARITIME MOBILE 5.132	**19 680-19 800** MARITIME MOBILE 5.132	1. Assignable frequencies is in RR App. **17** 2. MSI on 19680.5 kHz 3. Medical implant and transport SRD
19 800-19 990 FIXED	**19 800-19 990** FIXED	1. Long range fixed application in simplex operation mode in 19.8 – 19.99 MHz 2. Medical implant and transport SRD
19 990-19 995 STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111	**19 990-19 995** STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111	1. See **RR** Article **26** and ITU-R Recommendation TF series 2. Search and rescue operations concerning manned space vehicles in 19 993 kHz± 3 kHz 3. Medical implant and transport SRD
19 995-20 010 STANDARD FREQUENCY AND TIME SIGNAL (20 000 kHz) 5.111	**19 995-20 010** STANDARD FREQUENCY AND TIME SIGNAL (20 000 kHz) 5.111	1. See **RR** Article **26** and ITU-R Recommendation TF series 2. Search and rescue operations concerning manned space vehicles in 14 993 kHz± 3 kHz 3. Medical implant and transport SRD
20 010-21 000 FIXED Mobile	**20 010-21 000** FIXED Mobile	1. Long range fixed and mobile applications in duplex operation mode in 20.71-21 MHz / 20.01-20.3 MHz and in simplex operation mode in 20.3–20.71 MHz 2. Medical implant and transport SRD
21 000-21 450 AMATEUR AMATEUR-SATELLITE	**21 000-21 450** AMATEUR AMATEUR-SATELLITE	1. The 15 meters amateur band 2. Transport SRD
21 450-21 850 BROADCASTING	**21 450-21 850** BROADCASTING	1. Broadcasting service is subject to the procedure of RR Article **12** 2. Transport SRD
21 850-21 870 FIXED	**21 850-21 870** FIXED	1. Long range fixed applications in simplex operation mode in 21.85 – 21.87 MHz 2. Transport SRD
21 870-21 924 FIXED 5.155B	**21 870-21 924** FIXED 5.155B	1. The fixed service for provision of services related to aircraft flight safety (5.155B) 2. Transport SRD
21 924-22 000 AERONAUTICAL MOBILE (R)	**21 924-22 000** AERONAUTICAL MOBILE (R)	1.Application of this band is in accordance to Allotment plan (RR App. **27**) 2. Transport SRD
22 000-22 855 MARITIME MOBILE 5.132 5.156	**22 000-22 855** MARITIME MOBILE 5.132	1. Assignable frequencies is in RR App. **17** 2.MSI on 22376 kHz 3. Transport SRD
22 855-23 000 FIXED	**22 855-23 000** FIXED	1. Long range fixed application in simplex mode 2. Transport SRD

23 000-25 670 kHz

Allocation to services by ITU Region 3	National Allocations	Usage
23 000-23 200 FIXED Mobile except aeronautical mobile (R)	**23 000-23 200** FIXED Mobile except aeronautical mobile (R)	1. Long range fixed and mobile except aeronautical mobile (R) applications in simplex mode
23 200-23 350 FIXED 5.156A AERONAUTICAL MOBILE (OR)	**23 200-23 350** FIXED 5.156A AERONAUTICAL MOBILE (OR)	1. Non-planned aeronautical mobile (OR) applications 2. The fixed service is limited to provision of services related to aircraft flight safety (5.156A)
23 350-24 000 FIXED MOBILE except aeronautical mobile 5.157	**23 350-24 000** FIXED MOBILE except aeronautical mobile 5.157	1. Long range fixed applications in duplex operation mode in 24.35-24.89 MHz / 23.35-23.89 MHz and in, simplex operation mode in 23.89-24.35 MHz 2. The maritime mobile service is limited to inter-ship radiotelegraphy
24 000-24 450 FIXED LAND MOBILE	**24 000-24 450** FIXED LAND MOBILE	1. Long range fixed and land mobile applications in duplex operation mode in 24.35-24.89 MHz / 23.35-23.89 MHz and in simplex operation mode in 23.89-24.35 MHz
24 450-24 600 FIXED LAND MOBILE Radiolocation 5.132A	**24 450-24 600** FIXED LAND MOBILE Radiolocation 5.132A	1. Long range fixed and land mobile applications in duplex operation mode in 24.35-24.89 MHz / 23.35-23.89 MHz 2. Radiolocation service is only for oceanographic radars in this band (in accordance with RR Resolution **612** (**Rev.WRC-12**)
24 600-24 890 FIXED LAND MOBILE	**24 600-24 890** FIXED LAND MOBILE	1. Long range fixed and land mobile applications in duplex operation mode in 24.35-24.89 MHz / 23.35-23.89 MHz
24 890-24 990 AMATEUR AMATEUR-SATELLITE	**24 890-24 990** AMATEUR AMATEUR-SATELLITE	1. The 12 meters amateur band
24 990-25 005 STANDARD FREQUENCY AND TIME SIGNAL (25 000 kHz)	**24 990-25 005** STANDARD FREQUENCY AND TIME SIGNAL (25 000 kHz)	1. See **RR** Article **26** and ITU-R Recommendation TF series
25 005-25 010 STANDARD FREQUENCY AND TIME SIGNAL Space research	**25 005-25 010** STANDARD FREQUENCY AND TIME SIGNAL Space research	1. See **RR** Article **26** and ITU-R Recommendation TF series
25 010-25 070 FIXED MOBILE except aeronautical mobile	**25 010-25 070** FIXED MOBILE except aeronautical mobile	1. Long range fixed and mobile except aeronautical mobile applications in simplex operation mode
25 070-25 210 MARITIME MOBILE	**25 070-25 210** MARITIME MOBILE	1. Assignable frequencies is given in RR App. **17**
25 210-25 550 FIXED MOBILE except aeronautical mobile	**25 210-25 550** FIXED MOBILE except aeronautical mobile	1. Long range fixed and mobile except aeronautical mobile applications
25 550-25 670 RADIO ASTRONOMY 5.149	**25 550-25 670** RADIO ASTRONOMY 5.149	1. Continuum measurements (ITU-R Rec. RA.314)

25.67-38.25 MHz

Allocation to services by ITU **Region 3**	**National Allocations**	**Usage**
25 670-26 100 BROADCASTING	**25 670-26 100** BROADCASTING	1. Broadcasting service is subject to the procedure of RR Article **12**
26 100-26 175 MARITIME MOBILE 5.132	**26 100-26 175** MARITIME MOBILE 5.132	1. Assignable frequencies is given in RR App.s **17** and **25** 2. MSI on 26100.5 kHz (RR App.s**15** and **17**)
26 175-26 200 FIXED MOBILE except aeronautical mobile	**26 175-26 200** FIXED MOBILE except aeronautical mobile	1. Long range fixed and mobile except aeronautical mobile applications in duplex operation mode in 26.675-26.96 MHz / 26.175-26.46 MHz
26 200-26 350 FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	**26 200-26 350** FIXED MOBILE except aeronautical mobile Radiolocation 5.132A	1. Long range fixed and mobile except aeronautical mobile applications in duplex operation mode in 26.675-26.96 MHz / 26.175-26.46 MHz 2. Radiolocation service is only for oceanographic radars in this band (in accordance with RR Resolution **612** (**Rev.WRC-12**)
26 350-27 500 FIXED MOBILE except aeronautical mobile 5.150	**26 350-27 500** FIXED MOBILE except aeronautical mobile 5.150	1. Long range fixed and mobile except aeronautical mobile applications in duplex operation mode in 26.675-26.96 MHz / 26.175-26.46 MHz and in simplex operation mode in 26.46 – 26.675 MHz and in 24.41-28 MHz 2. ISM applications in 26 957-27 283 kHz 3. SRD for Model radio control, inductive, transport and non-specific applications 4. CB 26.96-27.41 MHz
27.5-28 METEOROLOGICAL AIDS FIXED MOBILE	**27.5-28** FIXED MOBILE	1. Long range fixed and mobile applications 2. Uncommon band for meteorological aids application due to interference from fixed and mobile applications
28-29.7 AMATEUR AMATEUR-SATELLITE	**28-29.7** AMATEUR AMATEUR-SATELLITE	1. The 10 meters amateur band
29.7-30.005 FIXED MOBILE	**29.7-30.005** FIXED MOBILE	1. Long range fixed and mobile applications in simplex operation mode 2. Radio microphones and other similar SRDs
30.005-30.01 SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH	**30.005-30.01** SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH	1. Long range fixed and mobile applications in simplex operation mode in 30.005 – 41.205 MHz 2. Radio microphones and other similar SRDs
30.01-37.5 FIXED MOBILE	**30.01-37.5** FIXED MOBILE	1. Long range fixed and mobile applications including PMR in simplex operation mode in 30.005 – 41.205 MHz 2. Model radio control and radio microphones and other similar SRDs
37.5-38.25 FIXED MOBILE Radio astronomy 5.149	**37.5-38.25** FIXED MOBILE Radio astronomy 5.149	1. Long range fixed and mobile applications including PMR in simplex operation mode in 30.005 – 41.205 MHz 2. Continuum measurements (ITU-R Rec. RA.314) 3. Radio microphones and other similar SRDs

38.25-47 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
38.25-39.5 FIXED MOBILE	**38.25-39.5** FIXED MOBILE	1. Long range fixed and mobile applications including PMR in simplex operation mode in 30.005 – 41.205 MHz 2. Radio microphones and other similar SRDs
39.5-39.986 FIXED MOBILE RADIOLOCATION 5.132A	**39.5-39.986** FIXED MOBILE RADIOLOCATION 5.132A	1. Long range fixed and mobile applications including PMR in simplex operation mode in 30.005 – 41.205 MHz 2. Radiolocation service is only for oceanographic radars in this band (see RR Resolution **612** (**Rev.WRC-12**)) 3. Radio microphones and other similar SRDs
39.986-40 FIXED MOBILE RADIOLOCATION 5.132A Space research	**39.986-40** FIXED MOBILE RADIOLOCATION 5.132A Space research	1. Long range fixed and mobile applications including PMR in simplex operation mode in 30.005 – 41.205 MHz 2. Radiolocation service is only for oceanographic radars in this band (see RR Resolution **612** (**Rev.WRC-12**)) 3. Radio microphones and other similar SRDs
40-40.02 FIXED MOBILE Space research	**40-40.02** FIXED MOBILE Space research	1. Long range fixed and mobile applications including PMR in simplex operation mode in 30.005 – 41.205 MHz 2. Radio microphones and other similar SRDs
40.02-40.98 FIXED MOBILE 5.150	**40.02-40.98** FIXED MOBILE 5.150	1. Long range fixed and mobile applications including PMR in simplex operation mode in 30.005 – 41.205 MHz 2. ISM applications in 40.66 – 40.70 MHz 3. SRD for Model radio control and non-specific applications 4. Radio microphones and other similar SRDs
40.98-41.015 FIXED MOBILE Space research 5.160 5.161	**40.98-41.015** FIXED MOBILE Space research	1. Long range fixed and mobile applications including PMR in simplex operation mode in 30.005 – 41.205 MHz 2. Radio microphones and other similar SRDs
41.015-42 FIXED MOBILE 5.161 5.161A	**41.015-42** FIXED MOBILE	1. Long range fixed and mobile applications including PMR in simplex operation mode in 30.005 – 41.205 MHz and duplex operation mode in 45.205-49 MHz/41.205-45 MHz 2. Radio microphones and other similar SRDs
42-42.5 FIXED MOBILE 5.161	**42-42.5** FIXED MOBILE	1. Long range fixed and mobile applications including PMR in duplex operation mode in 45.205-49 MHz/41.205-45 MHz 2. Radio microphones and other similar SRDs
42.5-44 FIXED MOBILE 5.160 5.161 5.161A	**42.5-44** FIXED MOBILE	1. Long range fixed and mobile applications including PMR in duplex operation mode in 45.205-49 MHz/41.205-45 MHz 2. Radio microphones and other similar SRDs
44-47 FIXED MOBILE 5.162 5.162A	**44-47** FIXED MOBILE	1. Long range fixed and mobile applications including PMR in duplex operation mode in 45.205-49 MHz/41.205-45 MHz and in simplex mode in 45-45.205 MHz 2. Radio microphones and other similar SRDs

47-117.975 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
47-50 FIXED MOBILE BROADCASTING 5.162A	**47-50** FIXED MOBILE BROADCASTING TON01	1. Long range fixed and mobile applications including PMR in duplex operation mode in 45.205-49 MHz/41.205-45 MHz and in simplex mode in 49-50 MHz 2. Onsite paging 47 – 47.25 MHz 3. Low power community audio broadcasting 4. Radio microphones and other similar SRDs
50-54 AMATEUR 5.162A 5.167 5.167A 5.168 5.170	**50-54** AMATEUR	1. 6 meter amateur band
54-68 FIXED MOBILE BROADCASTING 5.162A	**54-68** FIXED MOBILE BROADCASTING TON01	1. Long range fixed and mobile applications in simplex operation in 54.00625-70 MHz 2. Low power community audio broadcasting
68-74.8 FIXED MOBILE 5.149 5.176 5.179	**68-74.8** FIXED MOBILE 5.149	1. Long range fixed and mobile applications in simplex operation in 54.00625-70 MHz and in duplex operation mode in 70 – 74.8 MHz / 80-84.8 MHz
74.8-75.2 AERONAUTICAL RADIONAVIGATION 5.180 5.181	**74.8-75.2** AERONAUTICAL RADIONAVIGATION 5.180	1. ILS marker radio beacons (ground-air). Further details are available in ICAO Annex 10, volume 1, chapter 3, sections 3.1.7 and 3.6)
75.2-75.4 FIXED MOBILE 5.179	**75.2-75.4** FIXED MOBILE	1. Long range fixed and mobile applications in duplex operation mode in 75.2 – 77.9875 MHz / 85.2 – 87.9875 MHz
75.4-87 FIXED MOBILE 5.182 5.183 5.188	**75.4-87** FIXED MOBILE	1. Long range fixed and mobile applications in duplex operation mode in: - 70–74.8 MHz / 80–84.8 MHz - 75.2–77 MHz / 85.2–87 MHz and in simplex operation mode in: - 77-79.9875 MHz - 84.8 – 85.2 MHz
87-100 FIXED MOBILE BROADCASTING **100-108** BROADCASTING 5.192 5.194	**87-108** BROADCASTING TON01	1. VHF FM analog sound broadcasting with 100 kHz channel spacing
108-117.975 AERONAUTICAL RADIONAVIGATION 5.197A	**108-117.975** AERONAUTICAL RADIONAVIGATION 5.197A	1. ILS localizer in the band 108– 111.975 MHz. Further details are available in ICAO Annex 10, volume 1, chapter 3, sections 3.1.7 and 3.6) 2. Short range VOR (TVOR) and en-route VOR. 3. Ground based augmentation system (GBAS) as precision approach facility to ILS

117.975-137.825 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
117.975-137 AERONAUTICAL MOBILE (R) 5.111 5.200 5.201 5.202	**117.975-137** AERONAUTICAL MOBILE (R) 5.111 5.200	1. Air-ground and air-air voice communication in 117.975 – 121.45 MHz and 121.55 – 137.0 MHz (ICAO Annex 10, volume III, Part II, chapter 2) 2. AERO-SAR on 121.5 MHz (RR Article **31** & App. **13)**(non-GMDSS safety and distress) by survival craft station. 3. EPIRB in interaction with SAR operation 4. Aeronautical mobile-satellite (R) on a secondary basis in the band 117.975–136MHz 5. Auxiliary frequency 123.1 MHz to the 121.5 MHz, where required, (RR App. **13**)
137-137.025 SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.207 5.208	**137-137.025** SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.208	1. Weather observation by GSO and Non-GSO satellites in the band 137 – 138 MHz 2. VHF point to point and point to multipoint radio links 3. Simplex operation mode PMR in the band 137 – 138 MHz in land mobile service 4. Non-GSO mobile satellite service (subject to coordination)
137.025-137.175 SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 5.204 5.207 5.208	**137.025-137.175** SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 5.208	1. Weather observation by GSO and Non-GSO satellites in the band 137 – 138 MHz 2. VHF point to point and point to multipoint radio links 3. Simplex operation mode PMR in the band 137 – 138 MHz in land mobile service 4. Non-GSO mobile satellite service (subject to coordination)
137.175-137.825 SPACE OPERATION (space-to-Earth) 5.203C 5.209A METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.204 5.207 5.208	**137.175-137.825** SPACE OPERATION (space-to-Earth) 5.203C 5.209A METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 5.208	1. Weather observation by GSO and Non-GSO satellites in the band 137 – 138 MHz 2. VHF point to point and point to multipoint radio links 3. Simplex operation mode PMR in the band 137 – 138 MHz in land mobile service 4. Non-GSO mobile satellite service (subject to coordination)

137.825-150.05 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
137.825-138 SPACE OPERATION (space-to-Earth) 5.203C METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 5.204 5.207 5.208	**137.825-138** SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.209 5.208	1. Weather observation by GSO and Non-GSO satellites in the band 137 – 138 MHz 2. VHF point to point and point to multipoint radio links 3. Simplex operation mode PMR in the band 137 – 138 MHz in land mobile service 4. Non-GSO mobile satellite service (subject to coordination)
138-143.6 FIXED MOBILE Space research (space-to-Earth) 5.207 5.213	**138-143.6** FIXED MOBILE Space research (space-to-Earth)	1. Fixed and mobile applications in: - duplex operation mode in 140.8375 – 141.9875 MHz / 138.0125 – 139.15 MHz - duplex operation mode in 142 – 143.9 MHz / 148 – 149.9 MHz - simplex operation mode in 139.15-140.8375 MHz
143.6-143.65 FIXED MOBILE SPACE RESEARCH (space-to-Earth) 5.207 5.213	**143.6-143.65** FIXED MOBILE SPACE RESEARCH (space-to-Earth)	1. Fixed and mobile applications in duplex operation mode in 142 – 143.9 MHz / 148 – 149.9 MHz
143.65-144 FIXED MOBILE Space research (space-to-Earth) 5.207 5.213	**143.65-144** FIXED MOBILE Space research (space-to-Earth)	1. Fixed and mobile applications in: - duplex operation mode in 142 – 143.9 MHz / 148 – 149.9 MHz - simplex operation mode in 143.9–144 MHz
144-146 AMATEUR AMATEUR-SATELLITE 5.216	**144-146** AMATEUR AMATEUR-SATELLITE	1. The 2 meters amateur band
146-148 AMATEUR FIXED MOBILE 5.217	**146-148** AMATEUR FIXED MOBIL	1. Fixed and mobile applications in: - duplex operation mode in 150.5–150.49375 MHz / 146–146.44375 MHz Simplex operation mode in 146.44375-148 MHz 2. 147.3375-147.5 MHz for Land SAR Management
148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.218A 5.219 5.221	**148-149.9** FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.209 5.218 5.218A 5.219 5.221	1. Fixed and mobile applications in duplex operation mode in 142 – 143.9 MHz / 148 – 149.9 MHz 2. Use of this band by MSS is limited to non-voice non-GSO systems
149.9-150.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.220	**149.9-150.05** MOBILE-SATELLITE (Earth-to-space) 5.209 5.220	1. Use of this band by MSS is limited to non-voice non-GSO satellite systems

150.05-161.7875 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
150.05-154 FIXED MOBILE 5.225	**150.05-154** FIXED MOBILE 5.225	1. Fixed and mobile applications in: - duplex operation mode in 150.05–150.49375 MHz / 146–146.44375 MHz - simplex operation mode in 150.49375 – 151.4375 MHz - simplex operation mode in 153 – 156.4875 MHz - duplex operation mode in 151.4375 – 153 / 157.4375 – 159 MHz
154-156.4875 FIXED MOBILE 5.225A 5.226	**154-156.4875** FIXED MOBILE 5.226	1. VHF maritime mobile applications (RR App. **18**) 2. Fixed and mobile applications in simplex operation mode in 153 – 156.4875 MHz
156.4875-156.5625 MARITIME MOBILE (distress and calling via DSC) 5.111 5.226 5.227	**156.4875-156.5625** MARITIME MOBILE (distress and calling via DSC) 5.111 5.226 5.227	1. DSC on 156.525 kHz for distress, safety and calling 2. 156.675 MHz for SAR Management coordination, Air, Sea and Ground
156.5625-156.7625 FIXED MOBILE 5.226	**156.5625-156.7625** FIXED MOBILE 5.226	1. Safety of navigation communication for ship stations on 156.650 MHz 2. VHF maritime mobile applications (RR Articles **31**and App. **18**)
156.7625-156.7875 MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	**156.7625-156.7875** MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	1. VHF maritime mobile applications (RR Articles **31**and App. **18**)
156.7875-156.8125 MARITIME MOBILE (distress and calling) 5.111 5.226	**156.7875-156.8125** MARITIME MOBILE (distress and calling) 5.111 5.226	1. International distress, safety and calling frequency on 156.8 MHz (RR Article **31** & App. **15**)
156.8125-156.8375 MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	**156.8125-156.8375** MARITIME MOBILE Mobile-satellite (Earth-to-space) 5.111 5.226 5.228	1. VHF maritime mobile service (RR Articles **31**and App. **18**)
156.8375-157.1875 FIXED MOBILE 5.226	**156.8375-157.1875** FIXED MOBILE 5.226	1. VHF maritime mobile service (RR Articles **31**and App. **18**)
157.1875-157.3375 FIXED MOBILE Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226	**157.1875-157.3375** FIXED MOBILE Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226	1. VHF maritime mobile service (RR Articles **31** and App. **18**)
157.3375-161.7875 FIXED MOBILE 5.226	**157.3375-161.7875** FIXED MOBILE 5.226	1. VHF maritime mobile service from band start up to 157.4375 MHz and in 160.6125 – 160.9625 MHz and in 161.4875 – 162.0375 MHz (RR Articles **31**and App. **18**) 2. Fixed and land mobile applications in: -Duplex operation mode PMR in the band 151.4375 – 153 MHz / 157.4375 – 159 MHz - simplex operation mode 159–160.6125MHz - simplex operation mode in 160.9625 – 161.4875 MHz

161.7875-230 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
161.7875-161.9375 FIXED MOBILE Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226	**161.7875-161.9375** FIXED MOBILE Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC 5.226	1. VHF maritime mobile band in 161.4875 – 162.0375 MHz (RR Article **52** and App. **18**)
161.9375-161.9625 FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226	**161.9375-161.9625** FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226	1. VHF maritime mobile band in 161.4875 – 162.0375 MHz (RR Article **52** and App. **18**)
161.9625-161.9875 MARITIME MOBILE Aeronautical mobile (OR) 5.228E Mobile-satellite (Earth-to-space) 5.228F 5.226	**161.9625-161.9875** MARITIME MOBILE Aeronautical mobile (OR) 5.228E Mobile-satellite (Earth-to-space) 5.228F 5.226	1. VHF maritime mobile band in 161.4875 – 162.0375 MHz (RR Article **52** and App. **18**) 2. AIS frequency on 161.975 MHz (App.s **15** & **18**)
161.9875-162.0125 FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226	**161.9875-162.0125** FIXED MOBILE Maritime mobile-satellite (Earth-to-space) 5.228AA 5.226	1. VHF maritime mobile band in 161.4875 – 162.0375 MHz (RR Article **52** and App. **18**)
162.0125-162.0375 MARITIME MOBILE Aeronautical mobile (OR) 5.228E Mobile-satellite (Earth-to-space) 5.228F 5.226	**162.0125-162.0375** MARITIME MOBILE Aeronautical mobile (OR) 5.228E Mobile-satellite (Earth-to-space) 5.228F 5.226	1. VHF maritime mobile band in 161.4875 – 162.0375 MHz (RR Article **52** and App. **18**) 2. AIS frequency on 162.025 MHz (App.s **15** & **18**)
162.0375-174 FIXED MOBILE 5.226 5.230 5.231	**162.0375-174** FIXED MOBILE 5.226	1. Fixed and mobile applications in: - duplex operation mode in 168.0375 -170.5 MHz / 162.0375 – 164,5 MHz - duplex operation mode in 170.5 – 173 MHz /164.5 -167 MHz - duplex operation mode in 173 -174 MHz / 167 – 168 MHz 2. Non-specific, radio assistive learning and Radio metering SRDs 3. Radio assistive learning SRD
174-223 FIXED MOBILE BROADCASTING 5.233 5.238 5.240 5.245	**174-230** BROADCASTING	1. TV band III based on 7 MHz channel spacing 2. DAB channels 3. Radio microphones and radio assistive SRD
223-230 FIXED MOBILE BROADCASTING AERONAUTICAL RADIONAVIGATION Radiolocation 5.250	5.240	

230-322 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
230-235 FIXED MOBILE AERONAUTICAL RADIONAVIGATION 5.250	**230-235** FIXED MOBILE AERONAUTICAL RADIONAVIGATION	1. Fixed and mobile applications in simplex operation mode in 230-235MHz
235-267 FIXED MOBILE 5.111 5.254 5.256 5.256A	**235-267** FIXED MOBILE 5.111 5.254 5.256	1. Fixed and mobile applications in: - duplex operation mode in 239– 241 MHz / 235 – 237 MHz, 246 – 246.95 MHz / 242 – 242.95 MHz, 253– 255 MHz / 249 – 251 MHz, 257 – 260 MHz / 261 – 264 MHz, 269 – 272 MHz / 264 – 267 MHz - simplex operation mode in 237 – 239 MHz, 241 – 242 MHz, 243.05 – 244.9875 MHz, 246.95 – 249 MHz, 251 – 253 MHz, 255 – 257 MHz and 260 – 261 MHz, 2. Aero-SAR in 242.95 – 243.05 MHz. Equipment for survival purposes by survival craft stations and space vehicles on 243 MHz 3. VHF CB in 244.9875 – 246 MHz, eighty 12.5 kHz channels
267-272 FIXED MOBILE Space operation (space-to-Earth) 5.254 5.257	**267-272** FIXED MOBILE Space operation (space-to-Earth) 5.254 5.257	1. Fixed and mobile applications in: - duplex operation mode in 269 – 272 MHz / 264– 267 MHz, 272 – 274 MHz / 267 – 269 MHz
272-273 SPACE OPERATION (space-to-Earth) FIXED MOBILE 5.254	**272-273** SPACE OPERATION (space-to-Earth) FIXED MOBILE 5.254	1. Fixed and mobile applications in: - duplex operation mode in 267 – 269 MHz / 272 – 274 MHz
273-312 FIXED MOBILE 5.254	**273-312** FIXED MOBILE 5.254	1. Fixed and mobile applications in: - duplex operation mode in 267 – 269 MHz / 272 – 274 MHz, 284 – 290.5 MHz / 276 – 282.5 MHz, 292 – 300 MHz / 300 – 308 MHz, 319 – 327 MHz / 311 – 319 MHz - simplex operation mode in 274 – 276 MHz, 282.5 – 284 MHz, 290.5 – 292 MHz, 308 – 311 MHz
312-315 FIXED MOBILE Mobile-satellite (Earth-to-space) 5.254 5.255	**312-315** FIXED MOBILE Mobile-satellite (Earth-to-space) 5.254 5.255	1. Fixed and mobile applications in duplex operation mode in 319 – 327 MHz / 311 – 319 MHz
315-322 FIXED MOBILE 5.254	**315-322** FIXED MOBILE 5.254	1. Fixed and mobile applications in duplex operation mode in 319 – 327 MHz / 311 – 319 MHz

322-401 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
322-328.6 FIXED MOBILE RADIO ASTRONOMY 5.149	**322-328.6** FIXED MOBILE RADIO ASTRONOMY 5.149	1. Fixed and mobile applications in duplex operation mode in 319 – 327 MHz / 311 – 319 MHz 2. Simplex operation mode PMR in 327 – 328.6 MHz in land mobile service
328.6-335.4 AERONAUTICAL RADIONAVIGATION 5.258	**328.6-335.4** AERONAUTICAL RADIONAVIGATION 5.258	1. Limited to instrument landing (ILS) system in glide path (ICAO, Annex 10, Volume 1, Chapter 3)
335.4-387 FIXED MOBILE 5.254	**335.4-387** FIXED MOBILE 5.254	1. Fixed and mobile applications in: - duplex operation mode in 335.4 – 342.4 MHz / 345.4 – 352 MHz, 357 – 358 MHz /352– 353 MHz, 361-363 MHz / 353-355 MHz, 372 – 380 MHz / 364 – 372 MHz, 388.2-393.2 MHz / 381.2-386.2 MHz - simplex operation mode in 342-345.4 MHz, 355-357 MHz, 358 – 361 MHz, 363 – 364 MHz, 380 – 381.2 MHz
387-390 FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255	**387-390** FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255 TON02	1. Fixed and mobile applications in: - duplex operation mode in 381.2-384.2 MHz / 388.2-391.2 MHz -simplex operation mode in 384.2–388.2 MHz 2. PPDR in the band 380 – 399.9 MHz in accordance with TON02
390-399.9 FIXED MOBILE 5.254	**390-399.9** FIXED MOBILE 5.254 TON02	1. Fixed and mobile application in: - duplex operation mode in 381.2-384.2 MHz / 388.2-391.2 MHz, 397.2 – 399.9 MHz / 391.2 – 393.9 MHz -simplex operation mode in 393.9–397.2MHz 2. PPDR in the band 380 – 399.9 MHz in accordance with TON02
399.9-400.05 MOBILE-SATELLITE (Earth-to-space) 5.209 5.220 5.260A 5.260B	**399.9-400.05** MOBILE-SATELLITE (Earth-to-space) 5.209 5.220 5.260A 5.260B	1. Non-GSO mobile satellite applications (subject to coordination)
400.05-400.15 STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) 5.261 5.262	**400.05-400.15** STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) 5.261	1. 400.1 MHz (See **RR** Article **26** and ITU-R Recommendation TF series)
400.15-401 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth) 5.262 5.264	**400.15-401** METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208A 5.208B 5.209 SPACE RESEARCH (space-to-Earth) 5.263 Space operation (space-to-Earth) 5.264	1. Collection of meteorological data for weather forecasts and severe storm prediction, collection of ozone level data. 2. Direct data readout from balloon-borne radiosonde 3. Direct data readout from descending dropsonde 4. Ranging signal reception at balloon-borne receive

401-420 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
401-402 METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile 5.264A 5.264B	**401-402** METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile 5.264A 5.264B	1. Collection of meteorological data for weather forecasts and severe storm prediction, collection of ozone level data. 2. Direct data readout from balloon-borne radiosonde 3. Direct data readout from descending dropsonde 4. Ranging signal reception at balloon-borne receive 5. Ultra low power SRD medical implant in 401 – 406 MHz and 402 – 405 MHz 6. Low power fixed and mobile applications in simplex operation mode in 401–406 MHz
402-403 METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile 5.264A 5.264B	**402-403** METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile 5.264A 5.264B	1. Collection of meteorological data for weather forecasts and severe storm prediction, collection of ozone level data 2. Direct data readout from balloon-borne radiosonde 3. Direct data readout from descending dropsonde 4. Ranging signal reception at balloon-borne receive 5. Ultra low power SRD medical implant in 401 – 406 MHz and 402 – 405 MHz 6. Low power fixed and mobile applications in simplex operation mode in 401–406 MHz
403-406 METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile 5.265	**403-406** METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile 5.265	1. Collection of meteorological data for weather forecasts and severe storm prediction, collection of ozone level data 2. Direct data readout from balloon-borne radiosonde 3. Direct data readout from descending dropsonde 4. Ranging signal reception at balloon-borne receive 5. Ultra low power SRD medical implant in 401 – 406 MHz and 402 – 405 MHz 6. Low power fixed and mobile applications in simplex operation mode in 401–406 MHz
406-406.1 MOBILE-SATELLITE (Earth-to-space) 5.265 5.266 5.267	**406-406.1** MOBILE-SATELLITE (Earth-to-space) 5.265 5.266 5.267	1. Low power satellite emergency position-indicating radiobeacons, EPIRB (RR Article **31** and, App.s **13** and **15**)
406.1-410 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.265	**406.1-410** FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 5.149 5.265	1. Fixed and mobile applications in duplex operation mode in 412-418 MHz/406-412 MHz 2. The frequency range 406.1 – 430 MHz designated for Region 3 PPDR
410-420 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268	**410-420** FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) 5.268	1. Fixed and mobile applications in: - duplex operation mode in 412-418 MHz/406-412 MHz, 418-420 MHz / 428-430 MHz, 425.5-427.5 MHz / 420.5-422.5-MHz 2. The frequency range 406.1 – 430 MHz designated for Region 3 PPDR

420-459 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
420-430 FIXED MOBILE except aeronautical mobile Radiolocation	**420-430** FIXED MOBILE except aeronautical mobile Radiolocation	1. Fixed and mobile applications in: - duplex operation mode in 418-420 MHz / 428-430 MHz, 425.5-427.5 MHz / 420.5-422.5-MHz - simplex operation mode in 420-420.5 MHz, 422.5-425.5 MHz and 427.5 – 428 MHz 2. The frequency range 406.1 – 430 MHz designated for Region 3 PPDR.
438-440 RADIOLOCATION Amateur 5.271 5.276 5.278 5.279	**438-440** RADIOLOCATION Amateur	1. ULP-WMCE SRD in 430 – 440 MHz
440-450 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.286	**440-450** FIXED MOBILE except aeronautical mobile Radiolocation 5.286	1. Fixed and mobile application in simplex operation mode in 444-446 MHz 2. DGPS in simplex operation mode in 444 – 444.2 MHz 3. PMR446 in 446 – 446.2 MHz 4. The frequency range 440 – 470 MHz designated for Region 3 PPDR. 5. Telemetry (SCADA) systems in duplex operation mode in the band 446.2 – 450 MHz / 440.2 – 444 MHz
450-455 FIXED MOBILE 5.286AA 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E	**450-455** FIXED MOBILE 5.286AA 5.209 5.286 5.286A	1. Fixed and mobile applications in duplex operation mode in 460-465 MHz / 450-455 MHz 2. Future FD-IMT in 460-465 MHz / 450-455 MHz 3. The frequency range 440 – 470 MHz designated for Region 3 PPDR
455-456 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	**455-456** FIXED MOBILE 5.286AA 5.209 5.286A	1. Fixed and mobile applications in duplex operation mode in 465-470 MHz / 455-460 MHz 2. The frequency range 440 – 470 MHz designated for Region 3 PPDR
456-459 FIXED MOBILE 5.286AA 5.271 5.287 5.288	**456-459** FIXED MOBILE 5.286AA 5.287	1. Fixed and mobile applications in duplex operation mode in 465-470 MHz / 455-460 MHz 2.On board vessel communications 457.5125 – 457.5875 MHz paired with 467.5125–467.5875 MHz as provided in Rec. ITU-R M.1174 3. The frequency range 440 – 470 MHz designated for Region 3 PPDR
459-460 FIXED MOBILE 5.286AA 5.209 5.271 5.286A 5.286B 5.286C 5.286E	**459-460** FIXED MOBILE 5.286AA 5.209 5.286A	1. Fixed and mobile applications in duplex operation mode in 465-470 MHz / 455-460 MHz 2. The frequency range 440 – 470 MHz designated for Region 3 PPDR

460-890 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
460-470 FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.288 5.289 5.290	**460-470** FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.289	1. Fixed and mobile applications in duplex operation mode in 465-470 MHz / 455-460 MHz 2. Future FD-IMT in 460-465 MHz / 450-455 MHz 3. The frequency range 440 – 470 MHz designated for Region 3 PPDR
470-585 FIXED MOBILE 5.296A BROADCASTING 5.291 5.298	**470-478** FIXED MOBILE	1. Fixed and mobile applications in simplex operation mode in 470-478 MHz 2. 80 CB channels in 476.4 – 477.415 MHz 3. CB emergency repeater on 477.275/476.525 MHz (TX/RX: CH35/5)
585-610 FIXED MOBILE 5.296A BROADCASTING RADIONAVIGATION 5.149 5.305 5.306 5.307	**478-614** FIXED MOBILE BROADCASTING	1. Digital TV channel 22 to 38 on 8 MHz channel spacing 2. Radio microphones and other similar SRDs in 470 – 786 MHz
610-890 FIXED MOBILE 5.296A 5.313A 5.317A BROADCASTING	**614-698** FIXED MOBILE BROADCASTING	1. TV channels 39 to 48 2. Future FD-IMT systems in the band 617-652 MHz / 693-698 MHz 3. Radio microphones and other similar SRDs in 470 – 786 MHz
5.149 5.305 5.306 5.307 5.320	**698-890** FIXED MOBILE 5.313A 5.317A 5.320 TON03	1. FD-IMT in 753 – 758 MHz / 698 – 703 MHz, 758 – 803 MHz / 703 – 748 MHz, 806 – 821 MHz / 847 – 862 MHz, 925 – 960 MHz / 880–915MHz 2. Complementary IMT downlink in the band 748 – 753 MHz in condition not to making interference to 758 – 803 MHz / 703 – 748 MHz 3. PPDR in 821–824 MHz / 866 – 869 MHz 4. Transport FD in 918 – 925 MHz / 873 – 880 MHz 5. Radio microphones and other similar SRDs in 470 – 786 MHz 6. Non-IMT IoT in 863 – 869 MHz subject to not claiming protection from PPDR in 821 – 824 MHz / 866-869 MHz 7. Non-specific SRD in 863 – 876 MHz 8. Alarm application SRD in 868.6–869.7MHz 9. Tracking, Tracing and Data Acquisition; and TTT (Transport and Traffic Telematics) types SRD in 870-875.6 MHz

890-1 350 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
890-942 FIXED MOBILE 5.317A BROADCASTING Radiolocation 5.327	**890-960** FIXED MOBILE 5.317A	1. FD-IMT in 925 – 960 MHz / 880 – 915 MHz 2. Transport FD in 918 – 925 MHz / 873 – 880 MHz 3. Non-IMT IoT in 915 – 918 MHz 4. Non-specific SRD in 915 – 921 MHz
942-960 FIXED MOBILE 5.317A BROADCASTING 5.320	5.320 TON03	
960-1 164 AERONAUTICAL MOBILE (R) 5.327A AERONAUTICAL RADIONAVIGATION 5.328 5.328AA	**960-1 164** AERONAUTICAL MOBILE (R) 5.327A AERONAUTICAL RADIONAVIGATION 5.328 5.328AA	1. Airborne electronic aids to air navigation with direct association of ground-based facilities 2. DME 3. TACAN 4. SSR 5. JTIDS and MIDS 6. ACAS supplementing SSR
1 164-1 215 AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.328A	**1 164-1 215** AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.328A	1. DME 2. TACAN 3. SSR 4. JTIDS and MIDS 5. GALILO satellite-navigation system E5a on 1176.45 MHz and E5b-carrier on 1207.14 MHz 6. GPS L5 link
1 215-1 240 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) 5.330 5.331 5.332	**1 215-1 240** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) 5.332	1. GPS L2-signal transmission on 1227.6 MHz 2. Active airborne sensors in the band 1.215 – 1.3 GHz in earth exploration-satellite service 3. Low power fixed and mobile applications in exceptional case subject to coordination
1 240-1 300 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.330 5.331 5.332 5.335A	**1 240-1 300** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.332 5.335A	1. Active airborne sensors in the band 1.215 – 1.3 GHz in earth exploration-satellite service 2. Amateur-satellite service in the band 1.26 – 1.27 GHz subject to not causing harmful interference and limited to Earth-to-space direction 3. GLONASS L2 signal 4. Wind profile radars 5. GALILO satellite-navigation system in the band 1.26 – 1.3 GHz (E6 carrier) 6. Low power fixed and mobile applications in exceptional case subject to coordination
1 300-1 350 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 RADIONAVIGATION-SATELLITE (Earth-to-space) 5.149 5.337A	**1 300-1 350** RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 RADIONAVIGATION-SATELLITE (Earth-to-space) 5.149 5.337A	1. Primary radar stations on the ground 1.215 – 1.4 GHz

1 350-1 530 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
1 350-1 400 RADIOLOCATION 5.338A 5.149 5.334 5.339	**1 350-1 400** RADIOLOCATION 5.338A 5.149 5.339	1. Spectral line observation in the band 1330 – 1400 MHz in radioastronomy service 2. Non-GSO fixed satellite service feeder links in the band 1390 – 1392 MHz 3. GPS L3 link
1 400-1 427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	**1 400-1 427** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	1. Passive sensors in the earth exploration-satellite 2. Continuum measurements (ITU-R Rec. RA.314) 3. VLBI observation (HI-line) in radio astronomy service 4. All emissions are prohibited in this band
1 427-1 429 SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.341C 5.338A 5.341	**1 427-1 429** SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.341C 5.338A 5.341 TON03	1. The band 1427 – 1518 MHz designated to IMT systems under fixed and/or mobile service in future. 2. Existing operations would be continued only until the band allocated by Ministry OF MEIDECC for IMT purpose
1 429-1 452 FIXED MOBILE 5.341C 5.343 5.338A 5.341	**1 429-1 452** FIXED MOBILE 5.341C 5.338A 5.341 TON03	1. The band 1427 – 1518 MHz designated to IMT systems under fixed and/or mobile service in future 2. Existing operations would be continued only until the band allocated by Ministry OF MEIDECC for IMT purpose
1 452-1 492 FIXED MOBILE 5.346A BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.345	**1 452-1 492** FIXED MOBILE 5.346A ROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.345 TON03	1. The band 1427 – 1518 MHz designated to IMT systems under fixed and/or mobile service in future 2. Existing operations would be continued only until the band allocated by Ministry OF MEIDECC for IMT purpose
1 492-1 518 FIXED MOBILE 5.341C 5.341	**1 492-1 518** FIXED MOBILE 5.341C 5.341 TON03	1. The band 1427–1518 MHz designated to IMT systems under fixed and/or mobile service in future 2. Existing operations would be continued only until the band allocated by Ministry OF MEIDECC for IMT purpose
1 518-1 525 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.351A 5.341	**1 518-1 525** FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.351A 5.341	-
1 525-1 530 SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Mobile 5.349 5.341 5.351 5.352A 5.354	**1 525-1 530** SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Mobile 5.341 5.351 5.354	1. End-user terminals of space radiocommunication providing either data or both voice and data communications 2. One of the candid bands for satellite component of IMT systems 3. Using this band (excluding exceptional circumstances) is forbidden to terrestrial based feeder links. 4. Use of this band by mobile-satellite service is subject to coordination. 5. Secondary mobile applications subject to coordination with primary users

1 530-1 613.8 MHz

Allocation to services by ITU **Region 3**	**National Allocations**	**Usage**
1 530-1 535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354	**1 530-1 535** SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.353A Earth exploration-satellite Fixed Mobile 5.341 5.351 5.354	1. End-user terminals of space radiocommunication providing either data or both voice and data communications 2. One of the candid bands for satellite component of IMT systems 3. Using this band (excluding exceptional circumstances) is forbidden to terrestrial based feeder links. 4. Use of this band by mobile-satellite service is subject to coordination 5. Secondary fixed and mobile applications subject to coordination with primary users 6. GMDSS in accordance with RR App.**15**
1 535-1 559 MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.355 5.356 5.357 5.357A 5.359	**1 535-1 559** MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 5.341 5.351 5.353A 5.354 5.356 5.357 5.357A	1. End-user terminals of space radiocommunication systems providing either data or both voice and data communications. 2. Using this band, except in the band 1544 – 1545 MHz and other exceptional circumstances is forbidden to terrestrial based feeder links. 3. Use of this band by mobile-satellite service is subject to coordination. 4. GMDSS and Distress and safety operations in maritime mobile-satellite service 5.See 5.357 and 5.357A 6. Passive research
1 559-1 610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.328B 5.329A 5.341	**1 559-1 610** AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.208B 5.328B 5.329A 5.341	1. GPS L1 link on 1575.42 MHz 2. GLONASS L1 link in the band 1602.5625 – 1615.5 MHz 3. GALILO L1 link in the band 1559 – 1591 MHz
1 610-1 610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	**1 610-1 610.6** MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372	1. Airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities. 2. Satellite personal communication systems (S-PCS)
1 610.6-1 613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.149 5.341 5.355 5.359 5.364 5.366 5.367 5.368 5.369 5.372	**1 610.6-1 613.8** MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 5.149 5.341 5.364 5.366 5.367 5.368 5.372	1. Airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities. 2. Satellite personal communication systems (S-PCS)

1 613.8-1 668 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
1 613.8-1 621.35 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B Radiodetermination-satellite (Earth-to-space) 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.372	**1 613.8-1 621.35** MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 5.208B Radiodetermination-satellite (Earth-to-space) 5.341 5.364 5.365 5.366 5.367 5.368 5.372	1. Airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities. 2. Satellite personal communication systems (S-PCS) 3. Using of mobile-satellite service in this band is subject to coordination
1 621.35-1 626.5 MARITIME MOBILE-SATELLITE (space-to-Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) except maritime mobile satellite (space-to-Earth) Radiodetermination-satellite (Earth-to-space) 5.208B 5.341 5.355 5.359 5.364 5.365 5.366 5.367 5.368 5.369 5.372	**1 621.35-1 626.5** MARITIME MOBILE-SATELLITE (space-to-Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) except maritime mobile satellite (space-to-Earth) Radiodetermination-satellite (Earth-to-space) 5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.372	-
1 626.5-1 660 MOBILE-SATELLITE (Earth-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.355 5.357A 5.359 5.374 5.375 5.376	**1 626.5-1 660** MOBILE-SATELLITE (Earth-to-space) 5.351A 5.341 5.351 5.353A 5.354 5.357A 5.374 5.375 5.376	1. End-user terminals of space radiocommunication systems providing either data or both voice and data communications. 2. Using this band, except in 1645.5 – 1646.5 MHz and other exceptional circumstances, is forbidden to terrestrial based feeder links. 3. Using mobile-satellite service in this band is subject to coordination 4. GMDSS and Distress and safety operations in maritime mobile-satellite service 5. See **5.357A**
1 660-1 660.5 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY 5.149 5.341 5.351 5.354 5.376A	**1 660-1 660.5** MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY 5.149 5.341 5.351 5.354 5.376A	1. End-user terminals of space radiocommunication systems providing either data or both voice and data communications. 2. Using this band, except in exceptional circumstances, is forbidden to terrestrial based feeder links. 3. Using mobile-satellite service in this band is subject to coordination
1 660.5-1 668 RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A	**1 660.5-1 668** RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379A	1. Continuum measurements in the band 1660 – 1670 MHz (ITU-R Rec. RA.314) 2. Very Long Baseline Interferometry (VLBI) observation in radio astronomy service 3. Passive research

1 668-1 710 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
1 668-1 668.4 MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379 5.379A	**1 668-1 668.4** MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.341 5.379A	1. Using of mobile-satellite service in this band is subject to coordination 2. Continuum measurements in the band 1660 – 1670 MHz (ITU-R Rec. RA.314) 3. Passive research 4. Secondary fixed and mobile (except aeronautical mobile) applications subject to coordination with primary users
1 668.4-1 670 METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY 5.149 5.341 5.379D 5.379E	**1 668.4-1 670** FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.379C RADIO ASTRONOMY 5.149 5.341 5.379D	1. Using of mobile-satellite service in this band is subject to coordination 2. Continuum measurements in the band 1660 – 1670 MHz 3. Direct data readout from balloon-borne radiosonde in the band 1668.4 – 1700 MHz 4. Radiosonde RDF (ITU-R Rec. SA.1262) 5. Use of the band 1 668.4-1 675 MHz in the mobile service is limited to transportable radio-relay systems with e.i.r.p. less than −27 dB(W/4 kHz) in direction of the GSO orbit
1 670-1 675 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.341 5.379D 5.379E 5.380A	**1 670-1 675** FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.341 5.379D 5.380A	1. Using of mobile-satellite service in this band is subject to coordination 2. Worldwide aeronautical public correspondence 3. Direct data readout from balloon-borne radiosonde in the band 1668.4 – 1700 MHz 4. Radiosonde RDF (ITU-R Rec. SA.1262) 5. Use of the band 1 668.4-1 675 MHz in the mobile service is limited to transportable radio-relay systems with e.i.r.p. less than −27 dB(W/4 kHz) in direction of the GSO orbit
1 675-1 690 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341	**1 675-1 690** METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.341	1. Fixed earth stations for reception of raw image data, data collection and spacecraft telemetry from geostationary meteorological satellites (ITU-R Rec. SA.1158) 2. Direct data readout from balloon-borne radiosonde in the band 1668.4 – 1700 MHz 3. Radiosonde RDF (ITU-R Rec. SA.1262)
1 690-1 700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) 5.289 5.341 5.381	**1 690-1 700** METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) 5.289 5.341	1. User stations for direct readout services from GSO MetSat in the band 1690–1698MHz (ITU-R SA.1158) 2. User stations for direct readout services and prerecorded image data at main earth stations from Non-GSO MetSat in the band 1698 – 1710 MHz (ITU-R Rec. SA.1158) 3. Direct data readout from balloon-borne radiosonde in the band 1668.4 – 1700 MHz 4. Radiosonde RDF (ITU-R Rec. SA.1262)
1 700-1 710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341 5.384	**1 700-1 710** FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341	1. User stations for direct readout services and prerecorded image data at main earth stations from Non-GSO MetSat in the band 1698 – 1710 MHz (ITU-R Rec. SA.1158) 2. Radio relay links in the 1.8 GHz and 1.9 GHz bands (ITU-R Rec.s F.701 and F.283) (more than 50 km) distance to meteorological satellite earth stations)

1 710-2 160 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
1 710-1 930 FIXED MOBILE 5.384A 5.388A 5.388B 5.149 5.341 5.385 5.386 5.388	**1 710-1 930** FIXED MOBILE 5.384A 5.388A 5.149 5.341 5.385 5.388 TON03	1. FD-IMT in 1805 – 1880 MHz /1710 – 1785 MHz and 2110 – 2170 MHz / 1920 – 1980 MHz 2. TD-IMT in 1785 – 1805 MHz and 1900 – 1920 MHz 3. Cellular TD – CT in the band 1880 – 1900 MHz 4. MNOs may use HAPS within the licensed bandwidths, subject to coordination with Ministry OF MEIDECC
1 930-1 970 FIXED MOBILE 5.388A 5.388B 5.388	**1 930-1 970** FIXED MOBILE 5.388A 5.388 TON03	1. FD-IMT in 2110 – 2170 MHz / 1920 – 1980 MHz 2. MNOs may use HAPS within the licensed bandwidths, subject to coordination with Ministry OF MEIDECC
1 970-1 980 FIXED MOBILE 5.388A 5.388B 5.388	**1 970-1 980** FIXED MOBILE 5.388A 5.388 TON03	1. FD-IMT in 2110 – 2170 MHz / 1920 – 1980 MHz 2. MNOs may use HAPS within the licensed bandwidths, subject to coordination with Ministry OF MEIDECC
1 980-2 010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389F	**1 980-2 010** FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A	1. Terrestrial component of IMT in 1885 – 2025 MHz 2. Main candid band for satellite component of IMT systems (ITU-R Res. 212)
2 010-2 025 FIXED MOBILE 5.388A 5.388B 5.388	**2 010-2 025** FIXED MOBILE 5.388A 5.388 TON03	1. TD-IMT in 2010 – 2025 MHz 2. MNOs may use HAPS within the licensed bandwidths, subject to coordination with Ministry OF MEIDECC
2 025-2 110 SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392	**2 025-2 110** SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (Earth-to-space) (space-to-space) 5.392	1. Not intended for high density mobile systems 2 UHF point to point and point to multipoint microwave radio link (ITU-R Rec.s F.701, F.283 and F.1098) 3. MDS in fixed service 4. Tactical radio relay systems in the band 2025 – 2070 MHz 5. Broadcasting auxiliary transportable radio relay system
2 110-2 120 FIXED MOBILE 5.388A 5.388B SPACE RESEARCH (deep space) (Earth-to-space) 5.388	**2 110-2 120** FIXED MOBILE 5.388A SPACE RESEARCH (deep space) (Earth-to-space) 5.388 TON03	1. FD-IMT in 2110 – 2170 MHz / 1920 – 1980 MHz 2. MNOs may use HAPS within the licensed bandwidths, subject to coordination with Ministry OF MEIDECC
2 120-2 160 FIXED MOBILE 5.388A 5.388B 5.388	**2 120-2 160** FIXED MOBILE 5.388A 5.388 TON03	1. FD-IMT in 2110 – 2170 MHz / 1920 – 1980 MHz 2. MNOs may use HAPS within the licensed bandwidths, subject to coordination with Ministry OF MEIDECC

2 160-2 500 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
2 160-2 170 FIXED MOBILE 5.388A 5.388B 5.388	**2 160-2 170** FIXED MOBILE 5.388A 5.388 TON03	1. FD-IMT in 2110 – 2170 MHz / 1920 – 1980 MHz 2. MNOs may use HAPS within the licensed bandwidths, subject to coordination with Ministry OF MEIDECC
2 170-2 200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A 5.388 5.389A 5.389F	**2 170-2 200** FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A 5.388 5.389A TON03	1. Main candid band for satellite component of IMT systems 2. Terrestrial component of IMT in 2110 – 2200 MHz 3. Satellite personal communication systems (S-PCS)
2 200-2 290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392	**2 200-2 290** SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392	1. UHF point to point and point to multipoint microwave radio link (ITU-R Rec.s F.701, F.283 and F.1098)
2 290-2 300 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	**2 290-2 300** FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	1. VLBI observation in the band 2.29- 3 GHz (ITU-R RA.479)
2 300-2 450 FIXED MOBILE 5.384A RADIOLOCATION Amateur 5.150 5.282	**2 300-2 400** FIXED MOBILE 5.384A TON03	1. TD-IMT in 2300 – 2400 MHz
	2 400-2 450 FIXED MOBILE RADIOLOCATION Amateur 5.150 5.282	1. ISM applications in 2400 – 2500 MHz 2. Fixed links 3. Non-specific SRD devices in the band 2400 – 2483.5 MHz 4. Radio-LAN (RLAN) and HIPERLAN SRD 5. RFID, CT, transport, UWB, Detecting Movement and Alert
2 450-2 483.5 FIXED MOBILE RADIOLOCATION 5.150	**2 450-2 483.5** FIXED MOBILE RADIOLOCATION 5.150	1. ISM applications in 2400 – 2500 MHz 2. Fixed links 3. Non-specific SRD devices in the band 2400 – 2483.5 MHz 4. Radio-LAN (RLAN) and HIPERLAN SRD 5. RFID, CT, transport, UWB, Detecting Movement and Alert
2 483.5-2 500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.401 5.402	**2 483.5-2 500** FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATION-SATELLITE (space-to-Earth) 5.398 5.150 5.402	1. ISM applications in 2400 – 2500 MHz 2. Fixed links 3. SRDs for Medical Implants and Tracking, Tracing and Data Acquisition

2 500-2 700 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
2 500-2 520 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (space-to-Earth) 5.351A 5.407 5.414 5.414A 5.404 5.415A	**2 500-2 520** FIXED MOBILE except aeronautical mobile 5.384A TON03	1. TD-IMT in 2500 – 2690 MHz or FD-IMT in 2620 – 2690 MHz / 2500 – 2570 MHz and TD-IMT in 2575-2615 MHz
2 520-2 535 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.403 5.414A 5.415A	**2 520-2 535** FIXED MOBILE except aeronautical mobile 5.384A 5.403 5.414A TON03	1. TD-IMT in 2500 – 2690 MHz or FD-IMT in 2620 – 2690 MHz / 2500 – 2570 MHz and TD-IMT in 2575-2615 MHz
2 535-2 655 FIXED 5.410 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.418 5.418A 5.418B 5.418C	**2 535-2 655** FIXED MOBILE except aeronautical mobile 5.384A 5.339 TON03	1. TD-IMT in 2500 – 2690 MHz or FD-IMT in 2620 – 2690 MHz / 2500 – 2570 MHz and TD-IMT in 2575-2615 MHz
2 655-2 670 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.208B 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.420	**2 655-2 670** FIXED MOBILE except aeronautical mobile 5.384A 5.149 5.420 TON03	1. TD-IMT in 2500 – 2690 MHz or FD-IMT in 2620 – 2690 MHz / 2500 – 2570 MHz and TD-IMT in 2575-2615 MHz
2 670-2 690 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) 5.415 MOBILE except aeronautical mobile 5.384A MOBILE-SATELLITE (Earth-to-space) 5.351A 5.419 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149	**2 670-2 690** FIXED MOBILE except aeronautical mobile 5.384A 5.149 TON03	1. TD-IMT in 2500 – 2690 MHz or FD-IMT in 2620 – 2690 MHz / 2500 – 2570 MHz and TD-IMT in 2575-2615 MHz
2 690-2 700 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.422	**2 690-2 700** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	1. Passive sensors (by means of satellite) 2. Continuum measurements in the band 2655 – 2700 MHz (ITU-R Rec. RA.314) 3. All emissions are prohibited in this band

2 700-4 200 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
2 700-2 900 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423	**2 700-2 900** AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423	1. Ground-based 10 cm (S-band) long-range surveillance primary radar and associated airborne transponders in aeronautical radio navigation service 2. Ground-based meteorological radars
2 900-3 100 RADIOLOCATION 5.424A RADIONAVIGATION 5.426 5.425 5.427	**2 900-3 100** RADIOLOCATION 5.424A RADIONAVIGATION 5.426 5.425 5.427	1. Ground-based 10 cm (S-band) long-range surveillance primary radar and associated airborne transponders in aeronautical radio navigation service
3 100-3 300 RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149	**3 100-3 300** RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149	1. Ground-based 10 cm (S-band) long-range surveillance primary radar and associated airborne transponders in aeronautical radio navigation service 2. High power shipboard and airborne radars for searching, tracking and surveillance in the band 3100 – 3400 MHz
3 300-3 400 RADIOLOCATION Amateur 5.149 5.429 5.429E 5.429F	**3 300-3 400** RADIOLOCATION Amateur 5.149 TON04	1. Radiolocation applications are limited to ground-based radar stations toward sea.
3 400-3 500 FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile 5.432 5.432B Radiolocation 5.433 5.282 5.432A	**3 400-3 500** FIXED MOBILE except aeronautical mobile Fixed -satellite (space-to-Earth) 5.282 5.433 TON03	1. TD-IMT in the frequency band 3400 – 3600 MHz 2. Earth stations shall keep 50 km distance from the nearest base station of TD-IMT networks
3 500-3 600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.433A Radiolocation 5.433	**3 500-3 600** FIXED MOBILE except aeronautical mobile Fixed -satellite (space-to-Earth) 5.433 TON03	1. TD-IMT in the frequency band 3400 – 3600 MHz 2. Earth stations shall keep 50 km distance from the nearest base station of TD-IMT networks
3 600-3 700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation 5.435	**3 600-3 700** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation TON03 TON04	1. The point to point systems urged to evacuate the frequency band 3600 – 3800 MHz 2. Radiolocation applications are limited to ground-based radar stations toward sea. 3. Earth stations shall keep 50 km distance from the nearest base station of TD-IMT networks
3 700-4 200 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	**3 700-4 200** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile TON03 TON04	1. The point to point systems urged to evacuate the frequency band 3600 – 3800 MHz 2. Portable products in fixed-satellite service 3. C-band VSAT stations 4. Earth stations shall keep 50 km distance from the nearest base station of TD-IMT networks

4 200-5 030 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
4 200-4 400 AERONAUTICAL MOBILE (R) 5.436 AERONAUTICAL RADIONAVIGATION 5.438 5.437 5.439 5.440	**4 200-4 400** AERONAUTICAL MOBILE (R) 5.436 AERONAUTICAL RADIONAVIGATION 5.438 5.437 5.440	1. On board radio altimeter radar and associated airborne ground proximity warning system. 2. The aeronautical mobile (R) service is reserved exclusively for wireless avionics intra-communication systems 3. Passive sensing in the earth exploration-satellite on a secondary basis
4 400-4 500 FIXED MOBILE 5.440A	**4 400-4 500** FIXED MOBILE	1. Fixed and mobile systems in 4400 – 4500 MHz paired with 4700 – 4800 MHz 2. Microwave radio relay links in the 4.7 GHz band (in accordance with ITU-R F.746 and F.1099 recommendations). For assignment in fixed service refer to Annex 1. 3. SAP/SAB and ENG/OB in the band 4400 – 5000 MHz (temporary application)
4 500-4 800 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE 5.440A	**4 500-4 800** FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE	1. Microwave radio relay links in the 4.7 GHz band (ITU-R Rec. F.746 and F.1099) 2. SAP/SAB and ENG/OB in the band 4400 – 5000 MHz (temporary application) 3. C-band VSAT stations 4. Use of the bands 4.5-4.8 GHz (↓) by the fixed-satellite service shall be in accordance with the provisions of RR App.**30B** 5. Fixed and mobile systems in the band 4400 – 4500 MHz paired with 4700 – 4800 MHz
4 800-4 990 FIXED MOBILE 5.440A 5.441B 5.442 Radio astronomy 5.149 5.339 5.443	**4 800-4 990** FIXED MOBILE 5.442 Radio astronomy 5.149 5.339	1. SAP/SAB and ENG/OB in the band 4400 – 5000 MHz (temporary application) 2. Microwave radio relay links in the 4.7 GHz band (ITU-R Rec. F.746 and F.1099) 3. Region 3 PPDR in the frequency range 4940 – 4990 MHz (ITU RR Resolution 646
4 990-5 000 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive) 5.149	**4 990-5 000** FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive) 5.149	1. Microwave radio relay links in the 4.7 GHz band (ITU-R Rec. F.746 and F.1099) 2. SAP/SAB and ENG/OB in the band 4400 – 5000 MHz (temporary application)
5 000-5 010 AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (Earth-to-space)	**5 000-5 010** AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (Earth-to-space)	1. Internationally standardized aeronautical mobile-satellite service subject to coordination under No. **RR9.21** 2. A planned band for future extension of GPS and Galileo systems in the band 5000 – 5030 MHz
5 010-5 030 AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.443B	**5 010-5 030** AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 5.328B 5.443B	1. Internationally standardized aeronautical mobile-satellite service subject to coordination under No. **RR9.21** 2. A planned band for future extension of GPS and Galileo systems in the band 5000 – 5030 MHz

5 030-5 460 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
5 030-5 091 AERONAUTICAL MOBILE (R) 5.443C AERONAUTICAL MOBILE-SATELLITE (R) 5.443D AERONAUTICAL RADIONAVIGATION 5.444	**5 030-5 091** AERONAUTICAL MOBILE (R) 5.443C AERONAUTICAL MOBILE-SATELLITE (R) 5.443D AERONAUTICAL RADIONAVIGATION 5.444	1. MLS for precision approach and landing in the band 5030 – 5150 MHz 2. Feeder links of fixed-satellite service (Earth-to-space) and non-GSO mobile-satellite systems in the band 5091 – 5150 MHz on a primary basis
5 091-5 150 FIXED-SATELLITE (Earth-to-space) 5.444A AERONAUTICAL MOBILE 5.444B AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION 5.444	**5 091-5 150** FIXED-SATELLITE (Earth-to-space) 5.444A AERONAUTICAL MOBILE 5.444B AERONAUTICAL MOBILE-SATELLITE (R) 5.443AA AERONAUTICAL RADIONAVIGATION 5.444	1. Future MLS for precision approach and landing in the band 5030 – 5150 MHz 2. Feeder links of fixed-satellite service (Earth-to-space) and non-GSO mobile-satellite systems in the band 5091 – 5150 MHz on a primary basis
5 150-5 250 FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B AERONAUTICAL RADIONAVIGATION 5.446 5.447B 5.447C	**5 150-5 250** FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B AERONAUTICAL RADIONAVIGATION 5.447B 5.447C	1. Indoor (controlled outdoor) wireless access system (WAS) including (HIPER) RLANs in mobile service (RR Resolution **229**) 2. Feeder links of non-GSO mobile-satellite systems on a primary basis (subject to coordination under No. RR **9.11A**)
5 250-5 255 EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH 5.447D 5.447E 5.448A	**5 250-5 255** EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH 5.447D 5.448A	1. Indoor wireless access system (WAS) including (HIPER) RLANs in mobile service (RR Resolution **229**) 2. The space research service is limited to active spaceborne sensors 3. WAS including (HIPER)RLANs in mobile service (RR Resolution **229**) 4. Maritime radar and tactical radars in the band 5250 – 5725 MHz
5 255-5 350 EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH (active) 5.447E 5.448A	**5 255-5 350** EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH (active) 5.448A	1. Indoor /outdoor wireless access system (WAS) including (HIPER) RLANs in mobile service (RR Resolution **229**) 2. Maritime and tactical radars in the band 5250.0 - 5725.0 MHz
5 350-5 460 EARTH EXPLORATION-SATELLITE (active) 5.448B RADIOLOCATION 5.448D AERONAUTICAL RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448C	**5 350-5 460** EARTH EXPLORATION-SATELLITE (active) 5.448B RADIOLOCATION 5.448D AERONAUTICAL RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448C	1. The aeronautical radionavigation service is limited to airborne radars and associated airborne beacons 2. Maritime (including VTS) and tactical radars in the band 5250.0 - 5725.0 MHz

5 460-5 925 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
5 460-5 470 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION 5.448D RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448B	**5 460-5 470** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION 5.448D RADIONAVIGATION 5.449 SPACE RESEARCH (active) 5.448B	1. The aeronautical radionavigation service is limited to airborne radars and associated airborne beacons 2. Maritime (including VTS) and tactical radars in the band 5250.0 - 5725.0 MHz
5 470-5 570 EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION SPACE RESEARCH (active) 5.448B 5.450	**5 470-5 570** EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION SPACE RESEARCH (active) 5.448B	1. Indoor wireless access system (WAS) including (HIPER) RLANs in mobile service (RR Resolution **229**) 2. Maritime (including VTS) and tactical radars in the band 5250.0 - 5725.0 MHz
5 570-5 650 MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION 5.450 5.452	**5 570-5 650** MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION 5.452	1. Indoor wireless access system (WAS) including (HIPER) RLANs in mobile service (RR Resolution **229**) 2. Maritime (including VTS) and tactical radars in the band 5250.0 - 5725.0 MHz 3. Ground-based meteorological radars in the band 5 600-5 650 MHz
5 650-5 725 MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION Amateur Space research (deep space) 5.282 5.453	**5 650-5 725** MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION Amateur Space research (deep space) 5.282	1. Point to point and point to multipoint systems in the band 5 670-5 850 MHz 2. Maritime (including VTS) and tactical radars in the band 5250.0 - 5725.0 MHz
5 725-5 830 RADIOLOCATION Amateur 5.150 5.453	**5 725-5 830** FIXED 5.453 RADIOLOCATION Amateur 5.150	1. Point to point and point to multipoint systems in the band 5 725-5 850 MHz 2. Weather and non-civil radars in band 5725 – 5875 MHz 3. ISM application in the band 5 725-5 875 MHz 4. FWA systems (HIPERMAN) in the band 5725 – 5875 MHz under 5. CT;Tracking, Tracing and Data Acquisition; Transport and Traffic Telematics (TTT), detecting movement and alertand Non-specific SRD devices
5 830-5 850 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.453	**5 830-5 850** FIXED 5.453 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150	1. Point to point and point to multipoint systems in the band 5 725-5 850 MHz 2. Weather and non-civil radars in band 5725 – 5875 MHz 3. ISM application in the band 5 725-5 875 MHz 4. CT;Tracking, Tracing and Data Acquisition; detecting movement and alert and Non-specific SRD devices
5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation 5.150	**5 850-5 925** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation 5.150	1. Weather and non-civil radars in band 5725 – 5875 MHz 2. ISM application in the band 5 725-5 875 MHz 3. Tracking, Tracing and Data Acquisition; detecting movement and alert and Non-specific SRD devices 4. DSRC in the band 5850 – 5925 MHz

5 925-7 375 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
5 925-6 700 FIXED 5.457 FIXED-SATELLITE (Earth-to-space) 5.457A MOBILE 5.149 5.440 5.458	**5 925-6 700** FIXED FIXED-SATELLITE (Earth-to-space) 5.457A MOBILE 5.149 5.440 5.458	1. Microwave radio relay links in the 6 GHz and 6.5 GHz bands in accordance with ITU-RRec.sF.383 and F.384 2. ESV in the band 5 925-6 425 MHz (RR Resolution **902**) 3. FSS feeder link in the band 5 925-6 425 MHz
6 700-7 075 FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE 5.458 5.458A 5.458B	**6 700-7 075** FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.441 MOBILE 5.458 5.458A 5.458B	1. Microwave radio relay links in the 6.5 GHz and 7 GHz bands in accordance with ITU-R Rec.s F.384 and F.385 2. Use of the bands 6 725-7 025 MHz (↑) by the fixed-satellite service shall be in accordance with the provisions of RR App.**30B**
7 075-7 145 FIXED MOBILE 5.458	**7 075-7 145** FIXED MOBILE 5.458	1. Microwave radio relay links in the 6.5 GHz and 7 GHz bands in accordance with ITU-R Rec.s F.384 and F.385
7 145-7 190 FIXED MOBILE SPACE RESEARCH (deep space) (Earth-to-space) 5.458	**7 145-7 190** FIXED MOBILE SPACE RESEARCH (deep space) (Earth-to-space) 5.458	1. Microwave radio relay links in the 7.4 GHz bands in accordance with ITU-R Rec. F.385
7 190-7 235 EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A 5.460B FIXED MOBILE SPACE RESEARCH (Earth-to-space) 5.460 5.458	**7 190-7 235** EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A 5.460B FIXED MOBILE SPACE RESEARCH (Earth-to-space) 5.460 5.458	1. Microwave radio relay links in the 7.4 GHz bands in accordance with ITU-R Rec. F.385
7 235-7 250 EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A FIXED MOBILE 5.458	**7 235-7 250** EARTH EXPLORATION-SATELLITE (Earth-to-space) 5.460A FIXED MOBILE 5.458	1. Microwave radio relay links in the 7.4 GHz bands in accordance with ITU-R Rec. F.385
7 250-7 300 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE 5.461	**7 250-7 300** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE 5.461	1. Microwave radio relay links in the 7.4 GHz bands in accordance with ITU-R Rec. F.385 2. MSS in the band 7250 – 7375 MHz on a primary basis subject to coordination under RR No. **9.21**
7 300-7 375 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461	**7 300-7 375** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.461	1. Microwave radio relay links in the 7.4 GHz bands in accordance with ITU-R Rec. F.385 2. MSS in the band 7250 – 7375 MHz on a primary basis subject to coordination under RR No. **9.21**

7 375-8 215 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
7 375-7 450 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB	**7 375-7 450** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB	1. Microwave radio relay links in the 7.5 GHz bands in accordance with ITU-R Rec. F.385 2. GSO maritime mobile-satellite in the frequency band 7 375-7 750 MHz
7 450-7 550 FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461A	**7 450-7 550** FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB 5.461A	1. Microwave radio relay links in the 7.5 GHz bands in accordance with ITU-R Rec. F.385 2. GSO meteorological satellite in the band 7 450-7 550 MHz 3. GSO maritime mobile-satellite in the frequency band 7 375-7 750 MHz
7 550-7 750 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB	**7 550-7 750** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MARITIME MOBILE-SATELLITE (space-to-Earth) 5.461AA 5.461AB	1. Microwave radio relay links in the 7.5 GHz and 8 GHz bands in accordance with ITU-R Rec.s F.385 and F.386 2. GSO maritime mobile-satellite in the frequency band 7 375-7 750 MHz
7 750-7 900 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile	**7 750-7 900** FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 5.461B MOBILE except aeronautical mobile	1. Microwave radio relay links in the 8 GHz bands in accordance with ITU-R Rec. F.386 2. The meteorological-satellite service (↓) is limited to non-geostationary satellite systems
7 900-8 025 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.461	**7 900-8 025** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.461	1. Microwave radio relay links in the 8 GHz bands in accordance with ITU-R Rec.F.386
8 025-8 175 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	**8 025-8 175** EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	1. Microwave radio relay links in the 8 GHz bands in accordance with ITU-R Rec. F.386 2. Aircraft stations shall not start any course of transmission in the band 8025 – 8400 MHz in the aeronautical mobile service
8 175-8 215 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	**8 175-8 215** EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	1. Microwave radio relay links in the 8 GHz bands in accordance with ITU-R Rec. F.386 2. Aircraft stations shall not start any course of transmission in the band 8025 – 8400 MHz in the aeronautical mobile service

8 215-9 300 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
8 215-8 400 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	**8 215-8 400** EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 5.463 5.462A	1. Microwave radio relay links in the 8 GHz bands in accordance with ITU-R Rec. F.386 2. Aircraft stations shall not start any course of transmission in the band 8025 – 8400 MHz in the aeronautical mobile service 3. Space VLBI service for phase transfer and telemetry (ITU-R Rec. SA.1344)
8 400-8 500 FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) 5.465 5.466	**8 400-8 500** FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) 5.465	1. Microwave radio relay links in the 8 GHz bands in accordance with ITU-R Rec. F.386 2. The space research service is limited to deep space in the band 8 400-8 450 MHz 3. Space VLBI service for phase transfer and telemetry (ITU-R Rec. SA.1344)
8 500-8 550 RADIOLOCATION 5.468	**8 500-8 550** RADIOLOCATION	1. Maritime and ground based X-band radars to measure speed and distance in the band 8.5 – 10 GHz
8 550-8 650 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.468 5.469A	**8 550-8 650** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.469A	1. Maritime and ground based X-band radars to measure speed and distance in the band 8.5 – 10 GHz
8 650-8 750 RADIOLOCATION 5.468	**8 650-8 750** RADIOLOCATION	1. Maritime and ground based X-band radars to measure speed and distance in the band 8.5 – 10 GHz
8 750-8 850 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470 5.471	**8 750-8 850** RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470	1. Maritime and ground based X-band radars to measure speed and distance in the band 8.5 – 10 GHz 2. ARNS is limited to airborne Doppler navigation aids
8 850-9 000 RADIOLOCATION MARITIME RADIONAVIGATION 5.472	**8 850-9 000** RADIOLOCATION MARITIME RADIONAVIGATION 5.472	1. Maritime and ground based X-band radars to measure speed and distance in the band 8.5 – 10 GHz 2. MRNS is limited to shore-based radars
9 000-9 200 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 5.471 5.473A	**9 000-9 200** RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 5.473A	1. Ground-based 10 cm (S-band) long-range surveillance primary X-band radar and associated airborne transponders in aeronautical radio navigation service 2. Maritime and ground based radars to measure speed and distance in the band 8.5 – 10 GHz
9 200-9 300 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.474 5.474D	**9 200-9 300** EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.474 5.474D	1. Maritime and ground based X-band radars to measure speed and distance in the band 8.5 – 10 GHz 2. MRNS is limited to shore-based radars in the band 9 200-9 225 MHz 3. SART in the band 9200 – 9500 MHz (RR Article **31** and App. **15**) 4.Radar, detection, movement and alert SRD applications in 9.2 – 9.975 GHz

9 300-10 500 MHz

Allocation to services by ITU Region 3	National Allocations	Usage
9 300-9 500 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION 5.475 SPACE RESEARCH (active) 5.427 5.474 5.475A 5.475B 5.476A	**9 300-9 500** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION 5.475 SPACE RESEARCH (active) 5.427 5.474 5.475A 5.475B 5.476A	1. Maritime and ground based X-band radars to measure speed and distance in the band 8.5 – 10 GHz 2. ARNS is limited to airborne weather radars and ground-based radars 3. SART in the band 9200 – 9500 MHz (RR Article **31** and App. **15**) 4.Radar, detection, movement and alert SRD applications in 9.2 – 9.975 GHz
9 500-9 800 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION SPACE RESEARCH (active) 5.476A	**9 500-9 800** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION SPACE RESEARCH (active) 5.476A	1. Maritime and ground based X-band radars to measure speed and distance in the band 8.5 – 10 GHz 2. Moving target tracking X-band radars 3.Radar, detection, movement and alert SRD applications in 9.2 – 9.975 GHz
9 800-9 900 RADIOLOCATION Earth exploration-satellite (active) Fixed Space research (active) 5.477 5.478A 5.478B	**9 800-9 900** RADIOLOCATION Earth exploration-satellite (active) Fixed Space research (active) 5.478A 5.478B	1. Maritime and ground based X-band radars to measure speed and distance in the band 8.5 – 10 GHz 2. Moving target tracking X-band radars 3. Complementary fixed systems
9 900-10 000 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION Fixed 5.474D 5.477 5.479	**9 900-10 000** EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION Fixed 5.474D 5.479	1. Maritime and ground based X-band radars to measure speed and distance in the band 8.5 – 10 GHz 2. Complementary fixed systems 3. Meteorological-satellite weather radars in the ban 9975 – 10025 MHz on a secondary basis 4. Complementary fixed systems
10 000-10 400 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C FIXED MOBILE RADIOLOCATION Amateur 5.474D 5.479	**10 000-10 400** EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C FIXED MOBILE RADIOLOCATION Amateur 5.474D 5.479	1. FWA in the band 10.15 – 10.65 GHz in accordance with ITU-R Rec.s F.747, F.1568 and F.746 2. Meteorological-satellite weather radars in the ban 9975 – 10025 MHz on a secondary basis
10.4-10.45 FIXED MOBILE RADIOLOCATION Amateur	**10.4-10.45** FIXED MOBILE RADIOLOCATION Amateur	1. FWA in the band 10.15 – 10.65 GHz in accordance with ITU-R Rec.s F.747, F.1568 and F.746 2. Moving target tracking X-band radars 3. Different remote sensing X-band radars, on-board or ground-based 4. 3 cm amateur band
10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.481	**10.45-10.5** RADIOLOCATION Amateur Amateur-satellite	1. Moving target tracking X-band radars 2. Different remote sensing X-band radars, on-board or ground-based 3. 3 cm amateur band

10.5-11.7 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
10.5-10.55 FIXED MOBILE RADIOLOCATION	**10.5-10.55** FIXED MOBILE RADIOLOCATION	1. FWA in the band 10.15 – 10.65 GHz in accordance with ITU-R Rec.s F.747, F.1568 and F.746 2. Moving target tracking X-band radars 3. Different remote sensing X-band radars, on-board or ground-based 4.SRD for detecting movement and alert in the band 10.5 – 10.6 GHz
10.55-10.6 FIXED MOBILE except aeronautical mobile Radiolocation	**10.55-10.6** FIXED MOBILE except aeronautical mobile Radiolocation	1. FWA in the band 10.15 – 10.65 GHz in accordance with ITU-R Rec.s F.747, F.1568 and F.746 2.SRD for detecting movement and alert in the band 10.5 – 10.6 GHz
10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482 5.482A	**10.6-10.68** EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 5.149 5.482 5.482A	1. Fixed and mobile applications in accordance with RR No. **5.482** 2.Very Long Baseline Interferometry (VLBI) observation in the band 10.6 – 10.65 GHz
10.68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.483	**10.68-10.7** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band 2. Very Long Baseline Interferometry (VLBI) observation 3. Continuum measurements in the band 10.6 – 10.7 GHz.
10.7-10.95 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE except aeronautical mobile	**10.7-10.95** FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE except aeronautical mobile	1. Use of the bands 10.7-10.95 MHz (↓) by the fixed-satellite service shall be in accordance with the provisions of RR App.**30B** 2. FWA in the band 10.7 – 11.7 GHz in accordance with ITU-R Rec. F.387 3. VSAT stations, SNG and SIT
10.95-11.2 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile	**10.95-11.2** FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile	1. FWA in the band 10.7 – 11.7 GHz in accordance with ITU-R Rec. F.387 2. VSAT stations, SNG and SIT 3. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution 155) 4. Non-GSO FSS is subject to the RR No. **9.12** for coordination with other non-GSO FSS
11.2-11.45 FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE except aeronautical mobile	**11.2-11.45** FIXED FIXED-SATELLITE (space-to-Earth) 5.441 MOBILE except aeronautical mobile	1. Use of the bands 11.2-11.45 MHz (↓) by the fixed-satellite service shall be in accordance with the provisions of RR App.**30B** 2. FWA in the band 10.7 – 11.7 GHz in accordance with ITU-R Rec. F.387 3. VSAT stations, SNG and SIT
11.45-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile	**11.45-11.7** FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile	1. FWA in the band 10.7 – 11.7 GHz in accordance with ITU-R Rec. F.387 2. VSAT stations, SNG and SIT 3. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution 155) 4. Non-GSO FSS is subject to the RR No. **9.12** for coordination with other non-GSO FSS

11.7-13.65 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492 5.487 5.487A	**11.7-12.2** FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492 5.487 5.487A 5.488	1. One way point to point systems in 11.7 – 12.5 GHz using§3 Annex 2 ITU-R Rec. F.746 2. Broadcasting-satellite receivers according to regional plan or RR App. **30** 3. VSAT stations, SNG and SIT
12.2-12.5 FIXED FIXED-SATELLITE (space-to-Earth) 5.484B MOBILE except aeronautical mobile BROADCASTING 5.484A 5.487	**12.2-12.5** FIXED FIXED-SATELLITE (space-to-Earth) 5.484B MOBILE except aeronautical mobile BROADCASTING 5.484A 5.487	1. One way point to point systems in 11.7 – 12.5 GHz using§3 Annex 2 ITU-R Rec. F.746 2. VSAT stations, SNG and SIT 3. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution 155) 4. DVB-S and DTH 5. Non-GSO FSS is subject to the provisions of No. **9.12** for coordination with other non-GSO FSS
12.5-12.75 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile BROADCASTING-SATELLITE 5.493	**12.5-12.75** FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B MOBILE except aeronautical mobile BROADCASTING-SATELLITE 5.493	1. Point to point systems in 12.2 – 12.7 GHz using§2 Annex 2 ITU-R Rec. F.746 2. VSAT stations, SNG and SIT 3. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution 155) 4. Non-GSO FSS is subject to the provisions of No. **9.12** for coordination with other non-GSO FSS
12.75-13.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth)	**12.75-13.25** FIXED FIXED-SATELLITE (Earth-to-space) 5.441 MOBILE Space research (deep space) (space-to-Earth)	1. Use of the bands 12.75-13.25 MHz (↑) by the fixed-satellite service shall be in accordance with the provisions of RR App.**30B** 2. FWA in the 13 GHz band in accordance with ITU-R Rec. F.497 3. VSAT stations, SNG and SIT
13.25-13.4 EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A 5.499	**13.25-13.4** EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 5.497 SPACE RESEARCH (active) 5.498A	1. Doppler navigation aid in aeronautical radionavigation service in the band 13.25 14 GHz 2. Spectral-line observations in the band 12-16 GHz
13.4-13.65 EARTHEXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.499C 5.499D Standard frequency and time signal-satellite (Earth-to-space) 5.499 5.500 5.501 5.501B	**13.4-13.65** EARTHEXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.499C 5.499D Standard frequency and time signal-satellite (Earth-to-space) 5.501B	1. Doppler navigation aid in aeronautical radionavigation service in the band 13.25 14 GHz 2. SRD equipment for detecting movement and alert in the band 13.4 – 14 GHz

13.65-14.4 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
13.65-13.75 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.499 5.500 5.501 5.501B	**13.65-13.75** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.501B	1. Doppler navigation aid in aeronautical radionavigation service in the band 13.25 14 GHz 2. SRD equipment for detecting movement and alert in the band 13.4 – 14 GHz
13.75-14 FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 5.499 5.500 5.501 5.502 5.503	**13.75-14** FIXED-SATELLITE (Earth-to-space) 5.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 5.502 5.503	1. Doppler navigation aid in aeronautical radionavigation service in the band 13.25 14 GHz 2. SRD equipment for detecting movement and alert in the band 13.4 – 14 GHz 3. SNG 4. Non-GSO FSS is subject to RR No. **9.12** for coordination with other non-GSO FSS
14-14.25 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.484B 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.504C 5.506A Space research 5.504A 5.505	**14-14.25** FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.506A Space research 5.504A	1. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution **155**) 2. ESV in 14 – 14.5 GHz (RR Resolution **902**) 3. Feeder links of broadcasting-satellite service in 14 – 14.5 GHz subject to coordination 4. Non-GSO FSS is subject to RR No. **9.12** for coordination with other non-GSO FSS 5. Ship earth station similar to ESV under condition ITU-R Resolution **902**
14.25-14.3 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.484B 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.508A Space research 5.504A 5.505	**14.25-14.3** FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.506A Space research 5.504A	1. Feeder links of broadcasting-satellite service in 14 – 14.5 GHz subject to coordination 2.. Non-GSO FSS is subject to the provisions of No. **9.12** for coordination with other non-GSO FSS 3. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution 155) 4. Ship earth station similar to ESV under condition ITU-R Resolution **902**
14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radionavigation-satellite 5.504A	**14.3-14.4** FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.506A Radionavigation-satellite 5.504A	1. Feeder links of broadcasting-satellite service in 14 – 14.5 GHz subject to coordination 2. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution 155) 3. Non-GSO FSS is subject to the provisions of No. **9.12** for coordination with other non-GSO FSS 4. Microwave radio relay links in the 14.3 GHz band similar to ITU-R Rec. F.746 examples 5. Ship earth station similar to ESV under condition ITU-R Resolution **902**

14.4-15.43 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
14.4-14.47 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.484B 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Space research (space-to-Earth) 5.504A	**14.4-14.47** FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.506A Space research (space-to-Earth) 5.504A	1. Microwave radio relay links in the 14.3 GHz band similar to ITU-R Rec. F.746 examples 2. Feeder links of broadcasting-satellite service in 14 – 14.5 GHz subject to coordination 3. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution 155) 4. Non-GSO FSS is subject to RR No. **9.12** for coordination with other non-GSO FSS 5. Ship earth station similar to ESV under condition ITU-R Resolution **902**
14.47-14.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B 5.484A 5.506 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A 5.509A Radio astronomy 5.149 5.504A	**14.47-14.5** FIXED FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.506 MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.506A Radio astronomy 5.149 5.504A	1. Feeder links of broadcasting-satellite service in 14 – 14.5 GHz subject to coordination 2. Non-GSO FSS is subject to RR No. **9.12** for coordination with other non-GSO FSS 3. Microwave radio relay links in the 14.3 GHz band similar to ITU-R Rec. F.746 examples 4. Ship earth station similar to ESV under condition ITU-R Resolution **902** 5. Ship earth station similar to ESV under condition ITU-R Resolution **902** 6. Spectral-line observations for formaldehyde line (H_2CO) on 14.488 GHz
14.5-14.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.509B 5.509C 5.509D 5.509E 5.509F 5.510 MOBILE Space research 5.509G	**14.5-14.75** FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research 5.509G	1. Microwave radio relay links in the 15 GHz band in accordance to ITU-R Rec. F.636 2.FSS (↑) in 14.5-14.8 GHz is limited to feeder links for the broadcasting-satellite service 3. Space VLBI service in the band 14.5 – 15.35 GHz
14.75-14.8 FIXED FIXED-SATELLITE (Earth-to-space) 5.509B 5.509C 5.509D 5.509E 5.509F 5.510 MOBILE Space research 5.509G	**14.75-14.8** FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research 5.509G	1. Microwave radio relay links in the 15 GHz band in accordance to ITU-R Rec. F.636 2.FSS (↑) in 14.5-14.8 GHz is limited to feeder links for the broadcasting-satellite service 3. Space VLBI service in the band 14.5 – 15.35 GHz
14.8-15.35 FIXED MOBILE Space research 5.339	**14.8-15.35** FIXED MOBILE Space research 5.339	1. Microwave radio relay links in the 15 GHz band in accordance to ITU-R Rec. F.636 2. Space VLBI service in the band 14.5 – 15.35 GHz
15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.511	**15.35-15.4** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band 2. Spectral-line observation for the study of the formaldehyde line (H_2CO) and of quasars
15.4-15.43 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION	**15.4-15.43** RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION	1. ALS 2. General purpose radars (MPR) used in aircrafts 3. Airborne RSME 4. Primary radar particularly ASDE (for 1 to 4 see ITU-R Rec. S.1340)

15.43-18.1 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
15.43-15.63 FIXED-SATELLITE (Earth-to-space) 5.511A RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511C	**15.43-15.63** FIXED-SATELLITE (Earth-to-space) 5.511A RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION 5.511C	1. ALS 2. General purpose radars (MPR) used in aircrafts 3. Airborne RSME 4. Primary radar particularly ASDE 5. Non-GSO MSS feeder link as FSS (↑) (for 1 to 4 see ITU-R Rec. S.1340)
15.63-15.7 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION	**15.63-15.7** RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION	1. ALS 2. General purpose radars (MPR) used in aircrafts 3. Airborne RSME 4. Primary radar particularly ASDE (for 1 to 4 see ITU-R Rec. S.1340)
15.7-16.6 RADIOLOCATION 5.512 5.513	**15.7-16.6** RADIOLOCATION	1. ASDE 2. Airborne radars with different functions including forward looking and terrain tracking
16.6-17.1 RADIOLOCATION Space research (deep space) (Earth-to-space) 5.512	**16.6-17.1** RADIOLOCATION Space research (deep space) (Earth-to-space)	1. ASDE 2. Airborne radars with different functions including forward looking and terrain tracking
17.1-17.2 RADIOLOCATION 5.512	**17.1-17.2** RADIOLOCATION	1. ASDE 2. Airborne radars with different functions including forward looking and terrain tracking 3. SRD data transmission and HiperLAN and radars for Detecting Movement and Alert in 17.1–17.3GHz
17.2-17.3 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.512 5.513A	**17.2-17.3** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.513A	1. ASDE 2. Airborne radars with different functions including forward looking and terrain tracking 3. SRD data transmission and HiperLAN and radars for Detecting Movement and Alert in 17.1–17.3 GHz
17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 Radiolocation 5.514	**17.3-17.7** FIXED-SATELLITE (Earth-to-space) 5.516 Radiolocation	1. Short-range microwave FWA systems 2. GSO FSS in 17.3 – 18.1 GHz is limited to feeder links of broadcasting-satellite service (RR App. **30A**) 3. Non-GSO FSS in 17.3 – 18.1 GHz subject to coordination with other non-GSO FSS under RR No. **9.12**
17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A (Earth-to-space) 5.516 MOBILE	**17.7-18.1** FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A (Earth-to-space) 5.516 MOBILE	1. Microwave radio relay links in the 18 GHz band (17.7 – 19.7 GHz) in accordance to ITU-R Rec. F.595 2 GSO FSS in 17.3 – 18.1 GHz is limited to feeder links of broadcasting-satellite service (RR App. **30A**) 3. Non-GSO FSS in 17.3 – 18.1 GHz subject to coordination with other non-GSO FSS under RR No. **9.12**

18.1-20.2 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
18.1-18.4 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A (Earth-to-space) 5.520 MOBILE 5.519	**18.1-18.4** FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A (Earth-to-space) 5.520 MOBILE METEOROLOGICAL-SATELLITE (space-to-Earth) 5.519	1. Microwave radio relay links in the 18 GHz band (17.7 – 19.7 GHz) in accordance to ITU-R Rec. F.595 2. Non-GSO FSS is subject to RR No. **9.12** for coordination with other non-GSO FSS 3.GSO FSS in 18.1 – 18.4 GHz is limited to feeder links of broadcasting-satellite service 4. Meteorological satellite is limited to GSO satellites 5. VLBI observation on 18.343 GHz for Cyclopropenylidene (C_3H_2) (ITU-R Rec. RA.479)
18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A MOBILE	**18.4-18.6** FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A MOBILE	1. Microwave radio relay links in the 18 GHz band (17.7 – 19.7 GHz) in accordance to ITU-R Rec. F.595 2. Non-GSO FSS is subject to the provisions of No. **9.12** for coordination with other non-GSO FSS
18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.517A 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A	**18.6-18.8** EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.517A 5.522B MOBILE except aeronautical mobile Space research (passive) 5.522A	1. Microwave radio relay links in the 18 GHz band (17.7 – 19.7 GHz) in accordance to ITU-R Rec. F.595 2. Emissions of fixed service and FSS in this band with other conditions are provided in No.s**5.522A** and **5.522B**
18.8-19.3 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.517A 5.523A MOBILE	**18.8-19.3** FIXED FIXED-SATELLITE (space-to-Earth) 5.517A 5.523A MOBILE	1. Microwave radio relay links in the 18 GHz band (17.7 – 19.7 GHz) in accordance to ITU-R Rec. F.595
19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.517A 5.523B 5.523C 5.523D 5.523E MOBILE	**19.3-19.7** FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.517A 5.523B 5.523C 5.523D 5.523E MOBILE	1. Microwave radio relay links in the 18 GHz band (17.7 – 19.7 GHz) in accordance to ITU-R Rec. F.595 2. FSS (↑) is limited to feeder links for non-GSO systems in the MSS
19.7-20.1 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A Mobile-satellite (space-to-Earth) 5.524	**19.7-20.1** FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A Mobile-satellite (space-to-Earth)	1. HDFSS (↓) via satellite receives in the band 19.7 – 20.2 (RR Resolution **143**) 2. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution **155**) 3. Non-GSO FSS is subject to RR No. **9.12** for coordination with other non-GSO FSS 4. FSS in motion subject to RR Resolution **156**
20.1-20.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A MOBILE-SATELLITE (space-to-Earth) 5.524 5.525 5.526 5.527 5.528	**20.1-20.2** FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A MOBILE-SATELLITE (space-to-Earth) 5.525 5.526 5.527 5.528	1. HDFSS (↓) via satellite receives in the band 19.7 – 20.2 (RR Resolution **143**) 2. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution **155**) 3. Non-GSO FSS is subject to RR No. **9.12** for coordination with other non-GSO FSS 4. FSS in motion subject to RR Resolution **156**

20.2-23.6 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) 5.524	**20.2-21.2** FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth)	1. Ka-band downlink FSS and MSS VSATs
21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)	**21.2-21.4** EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)	1. Microwave fixed wireless system in the 23 GHz band (21.2 – 23.6 GHz) in accordance to the arrangements and examples in ITU-R Rec. F.637 2. Temporary service ancillary to broadcasting and program making (SAB/SAP)
21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 5.208 5.530A 5.530B 5.531	**21.4-22** FIXED MOBILE BROADCASTING-SATELLITE 5.208B 5.530A 5.530B	1. Microwave point to point system in the 23 GHz band (21.2 – 23.6 GHz) in accordance to the arrangements and examples in ITU-R Rec. F.637 2. Future High-definition television (HDTV) BSS in accordance with RR Resolution **555**
22-22.21 FIXED MOBILE except aeronautical mobile 5.149	**22-22.21** FIXED MOBILE except aeronautical mobile 5.149	1. Microwave fixed wireless system in the 23 GHz band (21.2 – 23.6 GHz) in accordance to the arrangements and examples in ITU-R Rec. F.637
22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532	**22.21-22.5** EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) 5.149 5.532	1. Microwave fixed wireless system in the 23 GHz band (21.2 – 23.6 GHz) in accordance to the arrangements and examples in ITU-R Rec. F.637 2. Temporary service ancillary to broadcasting and program making (SAB/SAP) 3. VLBI observation on 22.235 GHz (Water vapor (H_2O)) 4. Continuum measurement (ITU-R Rec. RA.314)
22.5-22.55 FIXED MOBILE	**22.5-22.55** FIXED MOBILE	1. Microwave fixed wireless system in the 23 GHz band (21.2 – 23.6 GHz) in accordance to the arrangements and examples in ITU-R Rec. F.637
22.55-23.15 FIXED INTER-SATELLITE 5.338A MOBILE SPACE RESEARCH (Earth-to-space) 5.532A 5.149	**22.55-23.15** FIXED INTER-SATELLITE 5.338A MOBILE SPACE RESEARCH (Earth-to-space) 5.532A 5.149	1. Microwave fixed wireless system in the 23 GHz band (21.2 – 23.6 GHz) in accordance to the arrangements and examples in ITU-R Rec. F.637 2. Temporary service ancillary to broadcasting and program making (SAB/SAP) 3. Spectral line observations in 22.6 – 23.55 GHz in radio astronomy service
23.15-23.55 FIXED INTER-SATELLITE 5.338A MOBILE	**23.15-23.55** FIXED INTER-SATELLITE 5.338A MOBILE	1. Microwave fixed wireless system in the 23 GHz band (21.2 – 23.6 GHz) in accordance to the arrangements and examples in ITU-R Rec. F.637 2. Spectral line observations in 22.6 – 23.55 GHz in radio astronomy service
23.55-23.6 FIXED MOBILE	**23.55-23.6** FIXED MOBILE	1. Microwave fixed wireless system in the 23 GHz band (21.2 – 23.6 GHz) in accordance to the arrangements and examples in ITU-R Rec. F.637

23.6-25.5 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
23.6-24 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	**23.6-24** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band 2. Spectral-line observation for the study of the Ammonia (NH_3) three lines in 23.694 GHz, 23.870 GHz and 23.723 GHz (ITU-R Rec. RA.314)
24-24.05 AMATEUR AMATEUR-SATELLITE 5.150	**24-24.05** AMATEUR AMATEUR-SATELLITE 5.150	1. 12 mm amateur band 2. ISM applications in the band 24 – 24.25 GHz 3. Non-specific SRD devices in the band 24 – 24.25 GHz
24.05-24.25 RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150	**24.05-24.25** RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150	1. Primary radars and ASDE 2. Various types of automotive SRD radars in 24.075 – 26.65 GHz 3. Various types of LPR, detecting movement and Alert and non-specific SRDs in 24.05 – 27 GHz
24.25-24.45 FIXED MOBILE 5.338A 5.532AB RADIONAVIGATION	**24.25-24.45** FIXED MOBILE 5.338A 5.532AB RADIONAVIGATION TON03 TON04	1. Millimetre-wave TD-IMT in 24.25-27.5 GHz 2. Various types of automotive SRD radars in 24.075 – 26.65 GHz 3. Various types of LPR and detecting movement and Alert SRDs in 24.05–27 GHz 4. Microwave radio relay links in the 24.25 – 29.5 GHz in accordance to arrangement in ITU-R Rec. F.748, wherever not interfering with IMT
24.45-24.65 FIXED INTER-SATELLITE MOBILE 5.338A 5.532AB RADIONAVIGATION 5.533	**24.45-24.65** FIXED INTER-SATELLITE MOBILE 5.338A 5.532AB RADIONAVIGATION 5.533 TON03 TON04	1. Millimetre-wave TD-IMT in 24.25-27.5 GHz 2. Various types of automotive SRD radars in 24.075 – 26.65 GHz 3. Various types of LPR and detecting movement and Alert SRDs in 24.05 – 27GHz 4. Microwave radio relay links in the 24.25 – 29.5 GHz in accordance to arrangement in ITU-R Rec. F.748, wherever not interfering with IMT
24.65-24.75 FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE 5.338A 5.532AB 5.533	**24.65-24.75** FIXED FIXED-SATELLITE (Earth-to-space) 5.532B INTER-SATELLITE MOBILE 5.338A 5.532AB 5.533 TON03 TON04	1. Millimetre-wave TD-IMT in 24.25-27.5 GHz 2. Microwave radio relay links in the 24.25 – 29.5 GHz in accordance to arrangement in ITU-R Rec. F.748, wherever not interfering with IMT 3. Various types of LPR and detecting movement and Alert SRDs in 24.05 – 27GHz
24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE 5.338A 5.532AB	**24.75-25.25** FIXED FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE 5.338A 5.532AB TON03 TON04	1. Millimetre-wave TD-IMT in 24.25-27.5 GHz 2. Microwave radio relay links in the 24.25 – 29.5 GHz in accordance to arrangement in ITU-R Rec. F.748, wherever not interfering with IMT 3. Various types of LPR and detecting movement and Alert SRDs in 24.05– 27 GHz
25.25-25.5 FIXED 5.534A INTER-SATELLITE 5.536 MOBILE 5.338A 5.532AB Standard frequency and time signal-satellite (Earth-to-space)	**25.25-25.5** FIXED 5.534A INTER-SATELLITE 5.536 MOBILE 5.338A 5.532AB Standard frequency and time signal-satellite (Earth-to-space) TON03 TON04	1. Millimetre-wave TD-IMT in 24.25-27.5 GHz 2. Microwave radio relay links in the 24.25 – 29.5 GHz in accordance to arrangement in ITU-R Rec. F.748, wherever not interfering with IMT 3. Various types of LPR and detecting movement and Alert SRDs in 24.05– 27GHz

25.5-29.5 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
25.5-27 ARTH EXPLORATION-SATELLITE (space-to Earth) 5.536B FIXED 5.534A INTER-SATELLITE 5.536 MOBILE 5.338A 5.532AB SPACE RESEARCH (space-to-Earth) 5.536C Standard frequency and time signal-satellite (Earth-to-space) 5.536A	**25.5-27** EARTH EXPLORATION-SATELLITE (space-to Earth) FIXED 5.534A INTER-SATELLITE 5.536 MOBILE 5.338A 5.532AB SPACE RESEARCH (space-to-Earth) Standard frequency and time signal-satellite (Earth-to-space) 5.536A TON03 TON04	1. Millimetre-wave TD-IMT in 24.25-27.5 GHz 2. Microwave radio relay links in the 24.25 – 29.5 GHz in accordance to arrangement in ITU-R Rec. F.748, wherever not interfering with IMT 3. Various types of LPR and detecting movement and Alert SRDs in 24.05–27GHz
27-27.5 FIXED 5.534A FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 5.537 MOBILE 5.338A 5.532AB	**27-27.5** FIXED 5.534A FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 5.536 5.537 MOBILE 5.338A 5.532AB TON03 TON04	1. Millimetre-wave TD-IMT in 24.25-27.5 GHz 2. Microwave radio relay links in the 24.25 – 29.5 GHz in accordance to arrangement in ITU-R Rec. F.748, wherever not interfering with IMT
27.5-28.5 FIXED 5.537A FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.539 MOBILE 5.538 5.540	**27.5-28.5** FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.539 MOBILE 5.538 5.540	1. Non-GSO FSS is subject to the provisions of No. **9.12** for coordination with other non-GSO FSS 2. Microwave radio relay links in the 24.25 – 29.5 GHz in accordance to arrangement in ITU-R Rec. F.748, wherever not interfering with IMT in 24.25-27.5 GHz 3. HDFSS (↑) via satellite receives in the band 28.45 – 28.94 (RR Resolution **143**)
28.5-29.1 FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.523A 5.539 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540	**28.5-29.1** FIXED FIXED-SATELLITE (Earth-to-space) 5.484A 5.516B 5.517A 5.523A 5.539 MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540	1. Non-GSO FSS is subject to the provisions of No. **9.12** for coordination with other non-GSO FSS 2. Microwave radio relay links in the 24.25 – 29.5 GHz in accordance to arrangement in ITU-R Rec. F.748, wherever not interfering with IMT in 24.25-27.5 GHz 3. HDFSS (↑) via satellite receives in the band 28.45 – 29.1 (RR Resolution **143**)
29.1-29.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.517A 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540	**29.1-29.5** FIXED FIXED-SATELLITE (Earth-to-space) 5.517A 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540	1. Microwave radio relay links in the 24.25 – 29.5 GHz in accordance to arrangement in ITU-R Rec. F.748, wherever not interfering with IMT in 24.25-27.5 GHz 2. HDFSS (↑) via satellite receives in the band 29.46 – 30 (RR Resolution **143**)

29.5-31.8 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
29.5-29.9 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540 5.542	**29.5-29.9** FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 Earth exploration-satellite (Earth-to-space) 5.541 Mobile-satellite (Earth-to-space) 5.540	1. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution **155**) 2. Non-GSO FSS is subject to the provisions of No. **9.12** for coordination with other non-GSO FSS 3. HDFSS (↑) via satellite receives in the band 29.46 – 30 (RR Resolution **143**) 4. Earth stations in motion communicating with the FSS is subject to RR Resolution **156**
29.9-30 FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 5.525 5.526 5.527 5.538 5.540 5.542	**29.9-30** FIXED-SATELLITE (Earth-to-space) 5.484A 5.484B 5.516B 5.527A 5.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 5.541 5.543 5.525 5.526 5.527 5.538 5.540	1. UAV CNPC GSO FSS links in non-segregated airspace (RR Resolution **155**) 2. Non-GSO FSS is subject to RR No. **9.12** for coordination with other non-GSO FSS 3. HDFSS (↑) via satellite receives in the band 29.46 – 30 (RR Resolution **143**) 4. Earth stations in motion communicating with the FSS is subject to RR Resolution **156** 5. Spectral line observation for Sulphur monoxide (SO) on 30.002 GHz
30-31 FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth) 5.542	**30-31** FIXED-SATELLITE (Earth-to-space) 5.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth)	1. Ka-band FSS uplink paired with 20.2 – 21.2 GHz 2. Spectral line observation for Sulphur monoxide (SO) on 30.002 GHz
31-31.3 FIXED 5.338A 5.543B MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 5.544 5.149	**31-31.3** FIXED 5.338A 5.543B MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 5.544 5.149	1. FWA and microwave links in the band 31 – 31.3 GHz in accordance with ITU-R Rec. F.746 annexes 5 and 6
31.3-31.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	**31.3-31.5** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band 2. Continuum measurement in the band 31.3 31.8 GHz (ITU-R Rec. RA.314)
31.5-31.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149 5.546	**31.5-31.8** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 5.149	1. FWA and microwave links in the band 31.5 – 31.8 GHz in accordance with ITU-R Rec. F.746 annexes 5 and 6 but with 500 MHz higher f_r 2. Continuum measurement in the band 31.3 31.8 GHz (ITU-R Rec. RA.314)

31.8-35.5 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
31.8-32 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.548	**31.8-32.3** FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.548	1. Worldwide high-density applications in the fixed service (RR Resolution **75**) in the band 31.8 – 33.4 GHz in accordance with ITU-R Rec. F.1520 2. Airborne precision ground mapping, weather avoidance and navigation radars in the band 31.8 – 33.4 GHz in radionavigation service
32-32.3 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.548		
32.3-33 FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.548	**32.3-33** FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.548	1. Worldwide high-density applications in the fixed service (RR Resolution **75**) in the band 31.8 – 33.4 GHz in accordance with ITU-R Rec. F.1520 2. Airborne precision ground mapping, weather avoidance and navigation radars in the band 31.8 – 33.4 GHz in radionavigation service
33-33.4 FIXED 5.547A RADIONAVIGATION 5.547	**33-33.4** FIXED 5.547A RADIONAVIGATION 5.547	1. Worldwide high-density applications in the fixed service (RR Resolution **75**) in the band 31.8 – 33.4 GHz in accordance with ITU-R Rec. F.1520 2. Airborne precision ground mapping, weather avoidance and navigation radars in the band 31.8 – 33.4 GHz in radionavigation service
33.4-34.2 RADIOLOCATION 5.549	**33.4-34.2** RADIOLOCATION	1. Millimeter wave phased array radars
34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space) 5.549	**34.2-34.7** RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space)	1. Different types of millimeter wave SRD radars such as detectors, police handheld radars, etc.
34.7-35.2 RADIOLOCATION Space research 5.549	**34.7-35.2** RADIOLOCATION Space research	1. Different types of millimeter wave SRD radars such as detectors, police handheld radars, etc.
35.2-35.5 METEOROLOGICAL AIDS RADIOLOCATION 5.549	**35.2-35.5** METEOROLOGICAL AIDS RADIOLOCATION	1. Different types of millimeter wave SRD radars such as detectors, police handheld radars, etc.
35.5-36 METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.549 5.549A	**35.5-36** METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.549A	1. Different types of millimeter wave SRD radars such as detectors, police handheld radars, etc.

36-40 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
36-37 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.149 5.550A	**36-37** EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.149 5.550A	1. Radio relay systems in the band 36 – 37 GHz in accordance with ITU-R Rec. F.749 2. Spectral line observation in the band 36.13 – 36.21 GHz for Methanol (CH_3OH) (ITU-R Rec. RA.314)
37-37.5 FIXED MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) 5.547	**37-37.5** FIXED MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) 5.547 TON03 TON04	1. Millimetre-wave TD-IMT in 37-43.5 GHz 2. Worldwide high-density applications in the fixed service (RR Resolution**75**) in the band 37 –40 GHz in accordance with block arrangements in ITU-R Rec. F.749, wherever not interfering with IMT 3. Radio relay systems in the band 37 – 38 GHz in accordance with ITU-R Rec. F.749, wherever not interfering with IMT
37.5-38 FIXED FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547	**37.5-38** FIXED FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE except aeronautical mobile 5.550B SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547 TON03 TON04	1. Millimetre-wave TD-IMT in 37-43.5 GHz 2. Worldwide high-density applications in the fixed service (RR Resolution **75** for 37 – 38 GHz) in the band 37 –40 GHz in accordance with block arrangements in ITU-R Rec. F.749, wherever not interfering with IMT 3. Radio relay systems in the band 37 – 38 GHz in accordance with ITU-R Rec. F.749, wherever not interfering with IMT 4. The frequency band 37.5 – 39.5 GHz (↓) paired with the frequency bands 42.5 – 43.5 GHz (↑) and 49.2 – 50.2 GHz (↑)
38-39.5 FIXED 5.550D FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE 5.550B Earth exploration-satellite (space-to-Earth) 5.547	**38-39.5** FIXED 5.550D FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE 5.550B Earth exploration-satellite (space-to-Earth) 5.547 TON03 TON04	1. Millimetre-wave TD-IMT in 37-43.5 GHz 2. Worldwide high-density applications in the fixed service in the band 37 –40 GHz in accordance with block arrangements in ITU-R Rec. F.749, wherever not interfering with IMT 3. Radio relay systems in the bands 38 – 39.5 GHz and 38.6 – 40 GHz in accordance with ITU-R Rec. F.749, wherever not interfering with IMT 4. The frequency band 37.5 – 39.5 GHz (↓) paired with the frequency bands 42.5 – 43.5 GHz (↑) and 49.2 – 50.2 GHz (↑)
39.5-40 FIXED FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547 5.550E	**39.5-40** FIXED FIXED-SATELLITE (space-to-Earth) 5.550C MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547 5.550E TON03 TON04	1. Millimetre-wave TD-IMT in 37-43.5 GHz 2. Worldwide high-density applications in the fixed service in the band 37 –40 GHz in accordance with block arrangements in ITU-R Rec. F.749, wherever not interfering with IMT 3. Radio relay systems in the band 38.6 – 40 GHz in accordance with ITU-R Rec. F.749, wherever not interfering with IMT

40-43.5 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
40-40.5 EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth) 5.550E	**40-40.5** EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth) 5.550E TON03 TON04	1. Millimetre-wave TD-IMT in 37-43.5 GHz 2. Radio relay systems in the band 39.5 – 40.5 GHz in accordance with ITU-R Rec. F.749, wherever not interfering with IMT 3. HDFSS (↓) via satellite receives in the band 40 – 40.5 (RR Resolution **143**)
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile 5.547	**40.5-41** FIXED FIXED-SATELLITE (space-to-Earth) 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile 5.547 TON03 TON04	1. Millimetre-wave TD-IMT in 37-43.5 GHz 2. Worldwide high-density applications in the fixed service in the band 40.5 –43.5 GHz, wherever not interfering with IMT 3. BFWA and radio relay systems in the band 40.5 – 43.5 GHz in accordance with ITU-R Rec. F.2005, , wherever not interfering with IMT 4. The frequency band 47.2 – 49.2 GHz in FSS (feeder link) is reserved for broadcasting-satellite service in the band 40.5 – 42.5 GHz
41-42.5 FIXED FIXED-SATELLITE (space-to-Earth) 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile 5.547 5.551F 5.551H 5.551I	**41-42.5** FIXED FIXED-SATELLITE (space-to-Earth) 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile 5.547 5.551H 5.551I TON03 TON04	1. Millimetre-wave TD-IMT in 37-43.5 GHz 2. Worldwide high-density applications in the fixed service in the band 40.5 –43.5 GHz, wherever not interfering with IMT 3. BFWA and radio relay systems in the band 40.5 – 43.5 GHz in accordance with ITU-R Rec. F.2005, wherever not interfering with IMT 4. The frequency band 47.2 – 49.2 GHz in FSS (feeder link) is reserved for broadcasting-satellite service in the band 40.5 – 42.5 GHz
42.5-43.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile 5.550B RADIO ASTRONOMY 5.149 5.547	**42.5-43.5** FIXED FIXED-SATELLITE (Earth-to-space) 5.552 MOBILE except aeronautical mobile 5.550B RADIO ASTRONOMY 5.149 5.547 TON03 TON04	1. Millimetre-wave TD-IMT in 37-43.5 GHz 2. Worldwide high-density applications in the fixed service in the band 40.5 –43.5 GHz, wherever not interfering with IMT 3. BFWA and radio relay systems in the band 40.5 – 43.5 GHz in accordance with ITU-R Rec. F.2005, wherever not interfering with IMT 4. Spectral line observation on 42.861 GHz and 43.122 GHz for Silicon monoxide (SiO) 5. The frequency band 37.5 – 39.5 GHz (↓) paired with the frequency bands 42.5 – 43.5 GHz (↑) and 49.2 – 50.2 GHz (↑)

43.5-50.4 GHz		
Allocation to services by ITU **Region 3**	**National Allocations**	**Usage**
43.5-47 MOBILE 5.553 5.553A MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	**43.5-47** MOBILE 5.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	1. This band designated for space communications and terrestrial services are acting as complementary services 2. Land mobile service may be operated subject to not causing harmful interference to the space radiocommunication services 3. Spectral line observation on 45.379 GHz for Dicarbonmonosulphide (CCS)
47-47.2 AMATEUR AMATEUR-SATELLITE	**47-47.2** AMATEUR AMATEUR-SATELLITE	1. 6 millimeters amateur band
47.2-47.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.553B 5.552A	**47.2-47.5** FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.552A	1. Fixed systems in the band 47.2 – 50.2 GHz with separation distance to HAPS in accordance with ITU-R Rec. F.1608 2. The band 47.2 – 47.5 GHz designated for HAPS operation in fixed service 3. Service ancillary to program making and broadcasting (SAP/SAB) in the band 47.2 – 50.2 GHz 4. The frequency band 47.2 – 49.2 GHz in FSS (feeder link) is reserved for broadcasting-satellite service in the band 40.5 – 42.5 GHz
47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.553B	**47.5-47.9** FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE	1. Fixed systems in the band 47.2 – 50.2 GHz 2. Service ancillary to program making and broadcasting (SAP/SAB) in the band 47.2 – 50.2 GHz 3. The frequency band 47.2 – 49.2 GHz in FSS (feeder link) is reserved for broadcasting-satellite service in the band 40.5 – 42.5 GHz
47.9-48.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.553B 5.552A	**47.9-48.2** FIXED FIXED-SATELLITE (Earth-to-space) 5.550C 5.552 MOBILE 5.552A	1. Fixed systems in the band 47.2 – 50.2 GHz with separation distance to HAPS in accordance with ITU-R Rec. F.1608 2. The band 47.9 – 48.2 GHz designated for HAPS operation in fixed service 3. The frequency band 47.2 – 49.2 GHz in FSS (feeder link) is reserved for broadcasting-satellite service in the band 40.5 – 42.5 GHz
48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.550C 5.552 MOBILE 5.149 5.340 5.555	**48.2-50.2** FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.550C 5.552 MOBILE 5.149 5.340 5.555	1. Emissions from airborne stations are prohibited in the 48.94 – 49.04 GHz 2. The frequency band 37.5 – 39.5 GHz (↓) paired with the frequency bands 42.5 – 43.5 GHz (↑) and 49.2 – 50.2 GHz (↑) 3. Spectral line observation on 48.991GHz for Carbon monosulphide (CS) 4. The frequency band 47.2 – 49.2 GHz in FSS (feeder link) is reserved for broadcasting-satellite service in the band 40.5 – 42.5 GHz
50.2-50.4 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340	**50.2-50.4** EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band

50.4-58.2 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.550C MOBILE Mobile-satellite (Earth-to-space)	**50.4-51.4** FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.550C MOBILE Mobile-satellite (Earth-to-space)	Reserved for future
51.4-52.4 FIXED FIXED-SATELLITE (Earth-to-space) 5.555C MOBILE 5.338A 5.547 5.556	**51.4-52.4** FIXED FIXED-SATELLITE (Earth-to-space) 5.555C MOBILE 5.338A 5.547 5.556	1. Worldwide high-density FWS applications in the fixed service in the band 51.4 –52.6 GHz in accordance with ITU-R Rec. F.1496
52.4-52.6 FIXED 5.338A MOBILE 5.547 5.556	**52.4-52.6** FIXED 5.338A MOBILE 5.547 5.556	1. Worldwide high-density FWS applications in the fixed service in the band 51.4 –52.6 GHz in accordance with ITU-R Rec. F.1496
52.6-54.25 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340 5.556	**52.6-54.25** EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340 5.556	1. Currently all emissions are prohibited in this band
54.25-55.78 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive) 5.556B	**54.25-55.78** EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.556A SPACE RESEARCH (passive)	1. Currently all emissions from terrestrial stations are prohibited in this band
55.78-56.9 EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557	**55.78-56.9** EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547	1. Worldwide high-density applications in the fixed service in the band 55.78 –59 GHz under the conditions of No. **5.557A** 2.FWS in the band 55.78 – 57 GHz in accordance with ITU-R Rec. F.1497 3. Spectral line observation on 61.1GHz for Oxygen (O_2)
56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557	**56.9-57** EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5.558 SPACE RESEARCH (passive) 5.547	1. Worldwide high-density applications in the fixed service in the band 55.78 –59 GHz 2.FWS in the band 55.78 – 57 GHz in accordance with ITU-R Rec. F.1497 3. Spectral line observation on 61.1GHz for Oxygen (O_2)
57-58.2 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547 5.557	**57-58.2** EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547	1. Worldwide high-density applications in the fixed service in the band 55.78 –59 GHz 2. Non-specific, LPR and wideband data transmission SRD applications in the frequency band 57 – 64 GHz 3. Spectral line observation on 61.1GHz for Oxygen (O_2)

58.2-71 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
58.2-59 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556	**58.2-59** EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556	1. Worldwide high-density applications in the fixed service in the band 55.78 –59 GHz 2. Non-specific, LPR and wideband data transmission SRD applications in the frequency band 57 – 64 GHz 3. Spectral line observation on 61.1GHz for Oxygen (O_2)
59-59.3 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)	**59-59.3** EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)	1. Non-specific, LPR and wideband data transmission SRD applications in the frequency band 57 – 64 GHz 2. Airborne radars in the band 59 – 64 GHz 3. Spectral line observation on 61.1GHz for Oxygen (O_2)
59.3-64 FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138	**59.3-64** FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138	1. ISM applications in the band 61 – 61.5GHz 2. Non-specific, LPR and wideband data transmission SRD applications in the frequency band 57 – 64 GHz 3. Airborne radars in the band 59 – 64 GHz 4. Spectral line observation on 61.1GHz for Oxygen (O_2)
64-65 FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.547 5.556	**64-65** FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.547 5.556	1. Worldwide high-density applications in the fixed service in the band 64 –66 GHz 2.FWS in the band 64 – 66 GHz in accordance with ITU-R Rec. F. 1497
65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547	**65-66** EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547	1. Worldwide high-density applications in the fixed service in the band 64 –66 GHz 2.FWS in the band 64 – 66 GHz in accordance with ITU-R Rec. F. 1497
66-71 INTER-SATELLITE MOBILE 5.553 5.558 5.559AA MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	**66-71** INTER-SATELLITE MOBILE 5.553 5.558 5.559AA MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554 TON03 TON04	1. Millimetre-wave TD-IMT in 66-71 GHz 2. This band designated for space communications and terrestrial services are acting as complementary services 3. Land mobile service may be operated subject to not causing harmful interference to the space radiocommunication services 4. in This band the aeronautical mobile service may be operated subject to not causing harmful interference to the inter-satellite service

71-81 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
71-74 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	**71-74** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	1. FWS for large capacity transport in the frequency band 71 – 76 GHz paired with 81 – 86 GHz in accordance with ITU-R Rec. F.2006
74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) 5.561	**74-76** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) 5.561	1. FWS for large capacity transport in the frequency band 71 – 76 GHz paired with 81 – 86 GHz in accordance with ITU-R Rec. F.2006 2. LPR SRD applications in the frequency band 75 – 85 GHz
76-77.5 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	**76-77.5** RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	1. Transport in 76 – 77 GHz and TTT in 76 – 81 GHz and LPR in 75 – 85 GHz SRD applications 2. 4 millimeters amateur band
77.5-78 AMATEUR AMATEUR-SATELLITE RADIOLOCATION 5.559B Radio astronomy Space research (space-to-Earth) 5.149	**77.5-78** AMATEUR AMATEUR-SATELLITE RADIOLOCATION 5.559B Radio astronomy Space research (space-to-Earth) 5.149	1. TTT in 76 – 81 GHz and LPR in 75 – 85 GHz SRD applications 2.Radiolocation service in the band 77.5 – 78 GHz is limited to short-range radar for ground-based applications, including automotive radars 3. 4 millimeters amateur band
78-79 RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5.149 5.560	**78-79** RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5.149 5.560	1. TTT in 76 – 81 GHz and LPR in 75 – 85 GHz SRD applications 2. 4 millimeters amateur band
79-81 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	**79-81** RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	1. TTT in 76 – 81 GHz and LPR in 75 – 85 GHz SRD applications 2. 4 millimeters amateur band 3. Spectral line observation on 80.578 GHz for Deuterated water (HDO)

81-100 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
81-84 FIXED 5.338A FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5.149 5.561A	**81-84** FIXED 5.338A FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY Space research (space-to-Earth) 5.149 5.561A	1. FWS for large capacity transport in the frequency band 71 – 76 GHz paired with 81 – 86 GHz in accordance with ITU-R Rec. F.2006 2. LPR SRD applications in the frequency band 75 – 85 GHz
84-86 FIXED 5.338A FIXED-SATELLITE (Earth-to-space) 5.561B MOBILE RADIO ASTRONOMY 5.149	**84-86** FIXED 5.338A FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149	1. FWS for large capacity transport in the frequency band 71 – 76 GHz paired with 81 – 86 GHz in accordance with ITU-R Rec. F.2006 2. LPR SRD applications in the frequency band 75 – 85 GHz 3. Spectral line observation on 85.339GHz for Cyclopropenylidene (C_3H_2)
86-92 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	**86-92** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band 2. Precipitation sensing (clouds, oil spills, ice, snow, rain, etc.) 3. Spectral line observation on 86.243GHz for Silicon monoxide (SiO), 86.754 GHz for Formylium (HCO^+) , 86.847 for Silicon monoxide (SiO), 87.3 GHz for Ethynyl radical (C_2H), 88.632 GHz for Hydrogen cyanide (HCN), 89.189 GHz for Formylium (HCO^+) and 90.664 GHz for Hydrogen isocyanide (HNC)
92-94 FIXED 5.338A MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	**92-94** FIXED 5.338A MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	1. FWS in the band 92 – 95 GHz in accordance with ITU-R Rec. F.2004 (FDD and TDD types) 2. Spectral line observation on 93.171 GHz for Diazenylium (N_2H^+)
94-94.1 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A	**94-94.1** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A	1. Short range radar in radiolocation service 2. Cloud measurement radars 3. Continuum observation in the band 76 – 116 GHz (ITU-R Rec. RA.314)
94.1-95 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	**94.1-95** FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	1. FWS in the band 92 – 95 GHz in accordance with ITU-R Rec. F.2004 (FDD and TDD types)
95-100 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	**95-100** FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	1. Reserved for future 2. Extended FWS to 92 – 95 GHz 3. Stations acting under three complementary services radiolocation, radionavigation and radionavigation satellite 4. Spectral line observation on 97.981 GHz for Carbon monosulphide (CS) and on 99.3 GHz for Sulfphur monoxide (SO)

100-122.25 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
100-102 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	**100-102** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	1. All emissions are prohibited in this band 2. Limb sounding of atmospheric constituents
102-105 FIXED MOBILE RADIO ASTRONOMY 5.149 5.341	**102-105** FIXED MOBILE RADIO ASTRONOMY 5.149 5.341	1. Reserved for future 2. FWS in the band 102 – 109.5 GHz 3. Spectral line observation on 107.014 GHz for Methanol (CH_3OH)
105-109.5 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	**105-109.5** FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	1. Reserved for future 2. FWS in the band 102 – 109.5 GHz 3. Spectral line observation on 107.014 GHz for Methanol (CH_3OH)
109.5-111.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	**109.5-111.8** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	1. All emissions are prohibited in this band 2. Spectral line observation on 109.782 GHz for Carbon monoxide ($C^{18}O$) and on 110.201 GHz for Carbon monoxide (^{13}CO)
111.8-114.25 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	**111.8-114.25** FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	1. Reserved for future 2. Spectral line observation on 112.359 GHz for Carbon monoxide ($C^{17}O$) and on 113.5 GHz for Cyano radical (CN)
114.25-116 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	**114.25-116** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	1. All emissions are prohibited in this band 2. Spectral line observation on 115.271 GHz for Carbon monoxide (CO)
116-119.98 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.341	**116-119.98** EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.341	1. Currently all emissions from terrestrial stations are prohibited in this band 2. Spectral line observation on 118.750 GHz for Oxygen (O_2)
119.98-122.25 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.138 5.341	**119.98-122.25** EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.138 5.341	1. ISM applications in the band 122 – 123 GHz 2. Non-specific SRD applications in the frequency band 122 – 123 GHz

122.25-155.5 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
122.25-123 FIXED INTER-SATELLITE MOBILE 5.558 Amateur 5.138	**122.25-123** FIXED INTER-SATELLITE MOBILE 5.558 Amateur 5.138	1. ISM applications in the band 122 – 123 GHz 2. Non-specific SRD applications in the frequency band 122 – 123 GHz
123-130 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5.562D 5.149 5.554	**123-130** FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5.149 5.554	1. Reserved for future
130-134 EARTH EXPLORATION-SATELLITE (active) 5.562E FIXED INTER-SATELLITE MOBILE 5.558 RADIO ASTRONOMY 5.149 5.562A	**130-134** EARTH EXPLORATION-SATELLITE (active) 5.562E FIXED INTER-SATELLITE MOBILE 5.558 RADIO ASTRONOMY 5.149 5.562A	1. Reserved for future
134-136 AMATEUR AMATEUR-SATELLITE Radio astronomy	**134-136** AMATEUR AMATEUR-SATELLITE Radio astronomy	1. 2 millimeters amateur band
136-141 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149	**136-141** RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149	1. Reserved for future 2. 2 millimeters amateur band 3. Spectral line observation on 137.450 GHz for Oxygen (O_2) and on 140.84 GHz for Formaldehyde (H_2CO)
141-148.5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	**141-148.5** FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	1. Reserved for future 2. Spectral line observation on 146.969 GHz for Carbon monosulphide (CS)
148.5-151.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	**148.5-151.5** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band 2. Spectral line observation on 150.4 GHz for Nitric oxide (NO)
151.5-155.5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	**151.5-155.5** FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	1. Reserved for future

155.5-191.8 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
155.5-158.5 FIXED MOBILE RADIO ASTRONOMY 5.149	**155.5-158.5** FIXED MOBILE RADIO ASTRONOMY 5.149	1. Reserved for future 2. Spectral line observation on 156.602 GHz for Methanol (CH_3OH)
158.5-164 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	**158.5-164** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	1. Reserved for future
164-167 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	**164-167** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band 2. Continuum observation in the band 164 – 167 GHz (ITU-R Rec. RA.314)
167-174. FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5.558 5.149 5.562D	**167-174.5** FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5.558 5.149	1. Reserved for future
174.5-174.8 FIXED INTER-SATELLITE MOBILE 5.558	**174.5-174.8** FIXED INTER-SATELLITE MOBILE 5.558	1. Reserved for future
174.8-182 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	**174.8-182** EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	1. Currently all emissions from terrestrial stations are prohibited in this band
182-185 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	**182-185** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band 2. Spectral line observation on 183.310 GHz for Water vapor (H_2O)
185-190 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	**185-190** EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	1. Currently all emissions from terrestrial stations are prohibited in this band
190-191.8 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340	**190-191.8** EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band 2. Continuum measurement and Spectral observation

191.8-238 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
191.8-200 FIXED INTER-SATELLITE MOBILE 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.341 5.554	**191.8-200** FIXED INTER-SATELLITE MOBILE 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.341 5.554	1. Reserved for future
200-209 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 5.563A	**200-209** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 5.563A	1. All emissions are prohibited in this band 2. Continuum observation in the band 200 – 231.5 GHz (ITU-R Rec. RA.314) 3. Ground-based passive atmospheric sensing to monitor atmospheric constituents
209-217 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.341	**209-217** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.341	1. Reserved for future 2. Continuum observation in the band 200 – 231.5 GHz (ITU-R Rec. RA.314)
217-226 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	**217-226** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	1. Reserved for future 2. Continuum observation in the band 200 – 231.5 GHz (ITU-R Rec. RA.314)
226-231.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	**226-231.5** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	1. All emissions are prohibited in this band 2. . Spectral line observation on 226.6 GHz and on 226.8 GHz for Cyano radical (CN), and on 230.538 GHz for Carbon monoxide (CO) 3. Continuum observation in the band 200 – 231.5 GHz (ITU-R Rec. RA.314)
231.5-232 FIXED MOBILE Radiolocation	**231.5-232** FIXED MOBILE Radiolocation	1. Reserved for future
232-235 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation	**232-235** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation	1. Reserved for future
235-238 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) 5.563A 5.563B	**235-238** EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) 5.563A 5.563B	1. Currently all emissions from terrestrial stations are prohibited in this band

238-3 000 GHz

Allocation to services by ITU Region 3	National Allocations	Usage
238-240 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE	**238-240** FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE	1. Reserved for future
240-241 FIXED MOBILE RADIOLOCATION	**240-241** FIXED MOBILE RADIOLOCATION	1. Reserved for future
241-248 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.138 5.149	**241-248** RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.138 5.149	1. ISM applications in the band 244 – 246GHz 2. Non-specific SRD applications in the frequency band 244 – 246 GHz 3. 1 millimeter amateur band 4. Spectral line observation on 244.953 GHz for Carbon monosulphide (CS)
248-250 AMATEUR AMATEUR-SATELLITE Radio astronomy 5.149	**248-250** AMATEUR AMATEUR-SATELLITE Radio astronomy 5.149	1. 1 millimeter amateur band 2. . Continuum observation in the band 241 – 275 GHz (ITU-R Rec. RA.314)
250-252 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.563A	**250-252** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.563A	1. All emissions are prohibited in this band 2. Spectral line observation on 250.6 GHz for Nitric oxide (NO) 3. Ground-based passive atmospheric sensing to monitor atmospheric constituents 4. Continuum observation in the band 241 – 275 GHz (ITU-R Rec. RA.314)
252-265 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	**252-265** FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	1. Reserved for future 2. Spectral line observation on 262.0 GHz for Ethynyle radical (C_2H) 3. Continuum observation in the band 241 – 275 GHz (ITU-R Rec. RA.314)
265-275 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.563A	**265-275** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.563A	1. Reserved for future 2. Spectral line observation on 265.886 GHz for Hydrogen cyanide (HCN) on 267.557 GHz for Formylium (HCO^+), and on 271.981 GHz for Hydrogen isocyanide (HNC) 3. Continuum observation in the band 241 – 275 GHz (ITU-R Rec. RA.314) 4. Ground-based passive atmospheric sensing to monitor atmospheric constituents
`275-3 000 (Not allocated) 5.564A 5.565	**275-3 000** (Not allocated) 5.564A 5.565	-

5.53 Administrations authorizing the use of frequencies below 8.3 kHz shall ensure that no harmful interference is caused to services to which the bands above 8.3 kHz are allocated. (WRC-12)

5.54 Administrations conducting scientific research using frequencies below 8.3 kHz are urged to advise other administrations that may be concerned in order that such research may be afforded all practicable protection from harmful interference. (WRC-12)

5.54A Use of the 8.3-11.3 kHz frequency band by stations in the meteorological aids service is limited to passive use only. In the band 9-11.3 kHz, meteorological aids stations shall not claim protection from stations of the radionavigation service submitted for notification to the Bureau prior to 1 January 2013. For sharing between stations of the meteorological aids service and stations in the radionavigation service submitted for notification after this date, the most recent version of Recommendation ITU-R RS.1881 should be applied. (WRC-12)

5.54B *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, the Russian Federation, Iran (Islamic Republic of), Iraq, Kuwait, Lebanon, Morocco, Qatar, the Syrian Arab Republic, Sudan and Tunisia, the frequency band 8.3-9 kHz is also allocated to the radionavigation, fixed and mobile services on a primary basis. (WRC-15)

5.54C *Additional allocation:* in China, the frequency band 8.3-9 kHz is also allocated to the maritime radionavigation and maritime mobile services on a primary basis. (WRC-12)

5.55 *Additional allocation:* in Armenia, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the frequency band 14-17 kHz is also allocated to the radionavigation service on a primary basis. (WRC-15)

5.56 The stations of services to which the bands 14-19.95 kHz and 20.05-70 kHz and in Region 1 also the bands 72-84 kHz and 86-90 kHz are allocated may transmit standard frequency and time signals. Such stations shall be afforded protection from harmful interference. In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan, the frequencies 25 kHz and 50 kHz will be used for this purpose under the same conditions. (WRC-12)

5.57 The use of the bands 14-19.95 kHz, 20.05-70 kHz and 70-90 kHz (72-84 kHz and 86-90 kHz in Region 1) by the maritime mobile service is limited to coast radiotelegraph stations (A1A and F1B only). Exceptionally, the use of class J2B or J7B emissions is authorized subject to the necessary bandwidth not exceeding that normally used for class A1A or F1B emissions in the band concerned.

5.58 *Additional allocation:* in Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan, the band 67-70 kHz is also allocated to the radionavigation service on a primary basis. (WRC-2000)

5.59 *Different category of service:* in Bangladesh and Pakistan, the allocation of the bands 70-72 kHz and 84-86 kHz to the fixed and maritime mobile services is on a primary basis (see No. **5.33**). (WRC-2000)

5.60 In the bands 70-90 kHz (70-86 kHz in Region 1) and 110-130 kHz (112-130 kHz in Region 1), pulsed radionavigation systems may be used on condition that they do not cause harmful interference to other services to which these bands are allocated.

5.62 Administrations which operate stations in the radionavigation service in the band 90-110 kHz are urged to coordinate technical and operating characteristics in such a way as to avoid harmful interference to the services provided by these stations.

5.64 Only classes A1A or F1B, A2C, A3C, F1C or F3C emissions are authorized for stations of the fixed service in the bands allocated to this service between 90 kHz and 160 kHz (148.5 kHz in Region 1) and for stations of the maritime mobile service in the bands allocated to this service between 110 kHz and 160 kHz (148.5 kHz in Region 1). Exceptionally, class J2B or J7B emissions are also authorized in the bands between 110 kHz and 160 kHz (148.5 kHz in Region 1) for stations of the maritime mobile service.

5.65 *Different category of service:* in Bangladesh, the allocation of the bands 112-117.6 kHz and 126-129 kHz to the fixed and maritime mobile services is on a primary basis (see No. **5.33**). (WRC-2000)

5.67A Stations in the amateur service using frequencies in the band 135.7-137.8 kHz shall not exceed a maximum radiated power of 1 W (e.i.r.p.) and shall not cause harmful interference to stations of the radionavigation service operating in countries listed in No. **5.67**. (WRC-07)

5.67B The use of the frequency band 135.7-137.8 kHz in Algeria, Egypt, Iraq, Lebanon, Syrian Arab Republic, Sudan, South Sudan and Tunisia is limited to the fixed and maritime mobile services. The amateur service shall not be used in the above-mentioned countries in the frequency band 135.7-137.8 kHz, and this should be taken into account by the countries authorizing such use. (WRC-19)

5.73 The band 285-325 kHz (283.5-325 kHz in Region 1) in the maritime radionavigation service may be used to transmit supplementary navigational information using narrow-band techniques, on condition that no harmful interference is caused to radiobeacon stations operating in the radionavigation service. (WRC-97)

5.76 The frequency 410 kHz is designated for radio direction-finding in the maritime radionavigation service. The other radionavigation services to which the band 405-415 kHz is allocated shall not cause harmful interference to radio direction-finding in the band 406.5-413.5 kHz.

5.77 *Different category of service:* in Australia, China, the French overseas communities of Region 3, Korea (Rep. of), India, Iran (Islamic Republic of), Japan, Pakistan, Papua New Guinea, the Dem. People's Rep. of Korea and Sri Lanka, the allocation of the frequency band 415-495 kHz to the aeronautical radionavigation service is on a primary basis. In Armenia, Azerbaijan, Belarus, the Russian Federation, Kazakhstan, Latvia, Uzbekistan and Kyrgyzstan, the allocation of the frequency band 435-495 kHz to the aeronautical radionavigation service is on a primary basis. Administrations in all the aforementioned countries shall take all practical steps necessary to ensure that aeronautical radionavigation stations in the frequency band 435-495 kHz do not cause interference to reception by coast stations of transmissions from ship stations on frequencies designated for ship stations on a worldwide basis. (WRC-19)

5.79 In the maritime mobile service, the frequency bands 415-495 kHz and 505-526.5 kHz are limited to radiotelegraphy and may also be used for the NAVDAT system in accordance with the most recent version of Recommendation ITU-R M.2010, subject to agreement between interested and affected administrations. NAVDAT transmitting stations are limited to coast stations. (WRC-19)

5.79A When establishing coast stations in the NAVTEX service on the frequencies 490 kHz, 518 kHz and 4 209.5 kHz, administrations are strongly recommended to coordinate the operating characteristics in accordance with the procedures of the International Maritime Organization (IMO) (see Resolution **339 (Rev.WRC-07)**). (WRC-07)

5.80 In Region 2, the use of the band 435-495 kHz by the aeronautical radionavigation service is limited to non-directional beacons not employing voice transmission.

5.80A The maximum equivalent isotropically radiated power (e.i.r.p.) of stations in the amateur service using frequencies in the band 472-479 kHz shall not exceed 1 W. Administrations may increase this limit of e.i.r.p. to 5 W in portions of their territory which are at a distance of over 800 km from the borders of Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, China, Comoros, Djibouti, Egypt, United Arab Emirates, the Russian Federation, Iran (Islamic Republic of), Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Uzbekistan, Qatar, Syrian Arab Republic, Kyrgyzstan, Somalia, Sudan, Tunisia, Ukraine and Yemen. In this frequency band, stations in the amateur service shall not cause harmful interference to, or claim protection from, stations of the aeronautical radionavigation service. (WRC-12)

5.80B The use of the frequency band 472-479 kHz in Algeria, Saudi Arabia, Azerbaijan, Bahrain, Belarus, China, Comoros, Djibouti, Egypt, United Arab Emirates, the Russian Federation, Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Mauritania, Oman, Uzbekistan, Qatar, Syrian Arab Republic, Kyrgyzstan, Somalia, Sudan, Tunisia and Yemen is limited to the maritime mobile and aeronautical radionavigation services. The amateur service shall not be used in the above-mentioned countries in this frequency band, and this should be taken into account by the countries authorizing such use. (WRC-12)

5.82 In the maritime mobile service, the frequency 490 kHz is to be used exclusively for the transmission by coast stations of navigational and meteorological warnings and urgent information to ships, by means of narrow-band direct-printing telegraphy. The conditions for use of the frequency 490 kHz are prescribed in Articles **31** and **52**. In using the frequency band 415-495 kHz for the aeronautical radionavigation service, administrations are requested to ensure that no harmful interference is caused to the frequency 490 kHz. In using the frequency band 472-479 kHz for the amateur service, administrations shall ensure that no harmful interference is caused to the frequency 490 kHz. (WRC-12)

5.82C The frequency band 495-505 kHz is used for the international NAVDAT system as described in the most recent version of Recommendation ITU-R M.2010. NAVDAT transmitting stations are limited to coast stations. (WRC-19)

5.84 The conditions for the use of the frequency 518 kHz by the maritime mobile service are prescribed in Articles **31** and **52**. (WRC-07)

5.88 *Additional allocation:* in China, the band 526.5-535 kHz is also allocated to the aeronautical radionavigation service on a secondary basis.

5.91 *Additional allocation:* in the Philippines and Sri Lanka, the band 1 606.5-1 705 kHz is also allocated to the broadcasting service on a secondary basis. (WRC-97)

5.97 In Region 3, the Loran system operates either on 1 850 kHz or 1 950 kHz, the bands occupied being 1 825-1 875 kHz and 1 925-1 975 kHz respectively. Other services to which the band 1 800-2 000 kHz is allocated may use any frequency therein on condition that no harmful interference is caused to the Loran system operating on 1 850 kHz or 1 950 kHz.

5.106 In Regions 2 and 3, provided no harmful interference is caused to the maritime mobile service, the frequencies between 2 065 kHz and 2 107 kHz may be used by stations of the fixed service communicating only within national borders and whose mean power does not exceed 50 W. In notifying the frequencies, the attention of the Bureau should be drawn to these provisions.

5.108 The carrier frequency 2 182 kHz is an international distress and calling frequency for radiotelephony. The conditions for the use of the band 2 173.5-2 190.5 kHz are prescribed in Articles **31** and **52**. (WRC-07)

5.109 The frequencies 2 187.5 kHz, 4 207.5 kHz, 6 312 kHz, 8 414.5 kHz, 12 577 kHz and 16 804.5 kHz are international distress frequencies for digital selective calling. The conditions for the use of these frequencies are prescribed in Article **31**.

5.110 The frequencies 2 174.5 kHz, 4 177.5 kHz, 6 268 kHz, 8 376.5 kHz, 12 520 kHz and 16 695 kHz are international distress frequencies for narrow-band direct-printing telegraphy. The conditions for the use of these frequencies are prescribed in Article **31**.

5.111 The carrier frequencies 2 182 kHz, 3 023 kHz, 5 680 kHz, 8 364 kHz and the frequencies 121.5 MHz, 156.525 MHz, 156.8 MHz and 243 MHz may also be used, in accordance with the procedures in force for terrestrial radiocommunication services, for search and rescue operations concerning manned space vehicles. The conditions for the use of the frequencies are prescribed in Article **31**.

The same applies to the frequencies 10 003 kHz, 14 993 kHz and 19 993 kHz, but in each of these cases emissions must be confined in a band of ± 3 kHz about the frequency. (WRC-07)

5.112 *Alternative allocation*: in Sri Lanka, the band 2 194-2 300 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-19)

5.113 For the conditions for the use of the bands 2 300-2 495 kHz (2 498 kHz in Region 1), 3 200-3 400 kHz, 4 750-4 995 kHz and 5 005-5 060 kHz by the broadcasting service, see Nos. **5.16** to **5.20**, **5.21** and **23.3** to **23.10**.

5.115 The carrier (reference) frequencies 3 023 kHz and 5 680 kHz may also be used, in accordance with Article **31**, by stations of the maritime mobile service engaged in coordinated search and rescue operations. (WRC-07)

5.116 Administrations are urged to authorize the use of the band 3 155-3 195 kHz to provide a common worldwide channel for low power wireless hearing aids. Additional channels for these devices may be assigned by administrations in the bands between 3 155 kHz and 3 400 kHz to suit local needs.

It should be noted that frequencies in the range 3 000 kHz to 4 000 kHz are suitable for hearing aid devices which are designed to operate over short distances within the induction field.

5.117 *Alternative allocation*: in Côte d'Ivoire, Egypt, Liberia, Sri Lanka and Togo, the band 3 155-3 200 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-19)

5.126 In Region 3, the stations of those services to which the band 3 995-4 005 kHz is allocated may transmit standard frequency and time signals.

5.127 The use of the band 4 000-4 063 kHz by the maritime mobile service is limited to ship stations using radiotelephony (see No. **52.220** and Appendix **17**).

5.128 Frequencies in the bands 4 063-4 123 kHz and 4 130-4 438 kHz may be used exceptionally by stations in the fixed service, communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 W, on condition that harmful interference is not caused to the maritime mobile service. In addition, in Afghanistan, Argentina, Armenia, Belarus, Botswana, Burkina Faso, the Central African Rep., China, the Russian Federation, Georgia, India, Kazakhstan, Mali, Niger, Pakistan, Kyrgyzstan, Tajikistan, Chad, Turkmenistan and Ukraine, in the bands 4 063-4 123 kHz, 4 130-4 133 kHz and 4 408-4 438 kHz, stations in the fixed service, with a mean power not exceeding 1 kW, can be operated on condition that they are situated at least 600 km from the coast and that harmful interference is not caused to the maritime mobile service. (WRC-19)

5.130 The conditions for the use of the carrier frequencies 4 125 kHz and 6 215 kHz are prescribed in Articles **31** and **52**. (WRC-07)

5.131 The frequency 4 209.5 kHz is used exclusively for the transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of narrow-band direct-printing techniques. (WRC-97)

5.132 The frequencies 4 210 kHz, 6 314 kHz, 8 416.5 kHz, 12 579 kHz, 16 806.5 kHz, 19 680.5 kHz, 22 376 kHz and 26 100.5 kHz are the international frequencies for the transmission of maritime safety information (MSI) (see Appendix **17**).

5.132A Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed or mobile services. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution **612 (Rev.WRC-12)**. (WRC-12)

5.133B Stations in the amateur service using the frequency band 5 351.5-5 366.5 kHz shall not exceed a maximum radiated power of 15 W (e.i.r.p.). However, in Region 2 in Mexico, stations in the amateur service using the frequency band 5 351.5-5 366.5 kHz shall not exceed a maximum radiated power of 20 W (e.i.r.p.). In the following Region 2 countries: Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Dominica, El Salvador, Ecuador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela, as well as the overseas countries and territories within the Kingdom of the Netherlands in Region 2, stations in the amateur service using the frequency band 5 351.5-5 366.5 kHz shall not exceed a maximum radiated power of 25 W (e.i.r.p.). (WRC-19)

5.134 The use of the frequency bands 5 900-5 950 kHz, 7 300-7 350 kHz, 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050-12 100 kHz, 13 570-13 600 kHz, 13 800-13 870 kHz, 15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz by the broadcasting service is subject to the application of the procedure of Article **12**. Administrations are encouraged to use these bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of Resolution **517 (Rev.WRC-19)**. (WRC-19)

5.136 *Additional allocation:* frequencies in the band 5 900-5 950 kHz may be used by stations in the following services, communicating only within the boundary of the country in which they are located: fixed service (in all three Regions), land mobile service (in Region 1), mobile except aeronautical mobile (R) service (in Regions 2 and 3), on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.137 On condition that harmful interference is not caused to the maritime mobile service, the bands 6 200-6 213.5 kHz and 6 220.5-6 525 kHz may be used exceptionally by stations in the fixed service, communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 W. At the time of notification of these frequencies, the attention of the Bureau will be drawn to the above conditions.

5.138 The following bands:

6 765-6 795 kHz	(centre frequency 6 780 kHz),
433.05-434.79 MHz	(centre frequency 433.92 MHz) in Region 1 except in the countries mentioned in No. **5.280**,
61-61.5 GHz	(centre frequency 61.25 GHz),
122-123 GHz	(centre frequency 122.5 GHz), and
244-246 GHz	(centre frequency 245 GHz)

are designated for industrial, scientific and medical (ISM) applications. The use of these frequency bands for ISM applications shall be subject to special authorization by the administration concerned, in agreement with other administrations whose radiocommunication services might be affected. In applying this provision, administrations shall have due regard to the latest relevant ITU-R Recommendations.

5.141B *Additional allocation:* in Algeria, Saudi Arabia, Australia, Bahrain, Botswana, Brunei Darussalam, China, Comoros, Korea (Rep. of), Diego Garcia, Djibouti, Egypt, United Arab Emirates, Eritrea, Guinea, Indonesia, Iran (Islamic Republic of), Japan, Jordan, Kuwait, Libya, Mali, Morocco, Mauritania, Niger, New Zealand, Oman, Papua New Guinea, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Sudan, South Sudan, Tunisia, Viet Nam and Yemen, the frequency band 7 100-7 200 kHz is also allocated to the fixed and the mobile, except aeronautical mobile (R), services on a primary basis. (WRC-19)

5.143 *Additional allocation:* frequencies in the band 7 300-7 350 kHz may be used by stations in the fixed service and in the land mobile service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.143A In Region 3, frequencies in the band 7 350-7 450 kHz may be used by stations in the fixed service on a primary basis and land mobile service on a secondary basis, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies for these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-12)

5.143B In Region 1, frequencies in the band 7 350-7 450 kHz may be used by stations in the fixed and land mobile services communicating only within the boundary of the country in which they are located on condition that harmful interference is not caused to the broadcasting service. The total radiated power of each station shall not exceed 24 dBW. (WRC-12)

5.143C *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Iran (Islamic Republic of), Jordan, Kuwait, Libya, Morocco, Mauritania, Niger, Oman, Qatar, the Syrian Arab Republic, Sudan, South Sudan, Tunisia and Yemen, the bands 7 350-7 400 kHz and 7 400-7 450 kHz are also allocated to the fixed service on a primary basis. (WRC-12)

5.144 In Region 3, the stations of those services to which the band 7 995-8 005 kHz is allocated may transmit standard frequency and time signals.

5.145 The conditions for the use of the carrier frequencies 8 291 kHz, 12 290 kHz and 16 420 kHz are prescribed in Articles **31** and **52**. (WRC-07)

5.145A Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed service. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution **612 (Rev.WRC-12)**. (WRC-12)

5.146 *Additional allocation:* frequencies in the bands 9 400-9 500 kHz, 11 600-11 650 kHz, 12 050-12 100 kHz, 15 600-15 800 kHz, 17 480-17 550 kHz and 18 900-19 020 kHz may be used by stations in the fixed service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies in the fixed service, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.147 On condition that harmful interference is not caused to the broadcasting service, frequencies in the bands 9 775-9 900 kHz, 11 650-11 700 kHz and 11 975-12 050 kHz may be used by stations in the fixed service communicating only within the boundary of the country in which they are located, each station using a total radiated power not exceeding 24 dBW.

5.149 In making assignments to stations of other services to which the bands:

13 360-13 410 kHz,	4 950-4 990 MHz,	102-109.5 GHz,
25 550-25 670 kHz,	4 990-5 000 MHz,	111.8-114.25 GHz,
37.5-38.25 MHz,	6 650-6 675.2 MHz,	128.33-128.59 GHz,
73-74.6 MHz in Regions 1 and 3,	10.6-10.68 GHz,	129.23-129.49 GHz,
150.05-153 MHz in Region 1,	14.47-14.5 GHz,	130-134 GHz,
322-328.6 MHz,	22.01-22.21 GHz,	136-148.5 GHz,
406.1-410 MHz,	22.21-22.5 GHz,	151.5-158.5 GHz,
608-614 MHz in Regions 1 and 3,	22.81-22.86 GHz,	168.59-168.93 GHz,
1 330-1 400 MHz,	23.07-23.12 GHz,	171.11-171.45 GHz,
1 610.6-1 613.8 MHz,	31.2-31.3 GHz,	172.31-172.65 GHz,
1 660-1 670 MHz,	31.5-31.8 GHz in Regions 1 and 3,	173.52-173.85 GHz,
1 718.8-1 722.2 MHz,	36.43-36.5 GHz,	195.75-196.15 GHz,
2 655-2 690 MHz,	42.5-43.5 GHz,	209-226 GHz,
3 260-3 267 MHz,	48.94-49.04 GHz,	241-250 GHz,
3 332-3 339 MHz,	76-86 GHz,	252-275 GHz
3 345.8-3 352.5 MHz,	92-94 GHz,	
4 825-4 835 MHz,	94.1-100 GHz,	

are allocated, administrations are urged to take all practicable steps to protect the radio astronomy service from harmful interference. Emissions from spaceborne or airborne stations can be particularly serious sources of interference to the radio astronomy service (see Nos. **4.5** and **4.6** and Article **29**). (WRC-07)

5.150 The following bands:

13 553-13 567 kHz	(centre frequency 13 560 kHz),
26 957-27 283 kHz	(centre frequency 27 120 kHz),
40.66-40.70 MHz	(centre frequency 40.68 MHz),
902-928 MHz	in Region 2 (centre frequency 915 MHz),
2 400-2 500 MHz	(centre frequency 2 450 MHz),
5 725-5 875 MHz	(centre frequency 5 800 MHz), and
24-24.25 GHz	(centre frequency 24.125 GHz)

are also designated for industrial, scientific and medical (ISM) applications. Radiocommunication services operating within these bands must accept harmful interference which may be caused by these applications. ISM equipment operating in these bands is subject to the provisions of No. **15.13**.

5.151 *Additional allocation:* frequencies in the bands 13 570-13 600 kHz and 13 800-13 870 kHz may be used by stations in the fixed service and in the mobile except aeronautical mobile (R) service, communicating only within the boundary of the country in which they are located, on the condition that harmful interference is not caused to the broadcasting service. When using frequencies in these services, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)

5.152 *Additional allocation:* in Armenia, Azerbaijan, China, Côte d'Ivoire, the Russian Federation, Georgia, Iran (Islamic Republic of), Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 14 250-14 350 kHz is also allocated to the fixed service on a primary basis. Stations of the fixed service shall not use a radiated power exceeding 24 dBW. (WRC-03)

5.153 In Region 3, the stations of those services to which the band 15 995-16 005 kHz is allocated may transmit standard frequency and time signals.

5.155B The band 21 870-21 924 kHz is used by the fixed service for provision of services related to aircraft flight safety.

5.156A The use of the band 23 200-23 350 kHz by the fixed service is limited to provision of services related to aircraft flight safety.

5.157 The use of the band 23 350-24 000 kHz by the maritime mobile service is limited to inter-ship radiotelegraphy.

5.161 *Additional allocation:* in Iran (Islamic Republic of) and Japan, the band 41-44 MHz is also allocated to the radiolocation service on a secondary basis.

5.161A *Additional allocation:* in Korea (Rep. of), the United States and Mexico, the frequency bands 41.015-41.665 MHz and 43.35-44 MHz are also allocated to the radiolocation service on a primary basis. Stations in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the fixed or mobile services. Applications of the radiolocation service are limited to oceanographic radars operating in accordance with Resolution **612 (Rev.WRC-12)**. (WRC-19)

5.162 *Additional allocation:* in Australia, the band 44-47 MHz is also allocated to the broadcasting service on a primary basis. (WRC-12)

5.162A *Additional allocation:* in Germany, Austria, Belgium, Bosnia and Herzegovina, China, Vatican, Denmark, Spain, Estonia, the Russian Federation, Finland, France, Ireland, Iceland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Monaco, Montenegro, Norway, the Netherlands, Poland, Portugal, the Czech Rep., the United Kingdom, Serbia, Slovenia, Sweden and Switzerland the frequency band 46-68 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with Resolution **217 (WRC-97)**. (WRC-19)

5.167 *Alternative allocation:* in Bangladesh, Brunei Darussalam, India, Iran (Islamic Republic of), Pakistan and Singapore, the frequency band 50-54 MHz is allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-15)

5.167A *Additional allocation:* in Indonesia and Thailand, the frequency band 50-54 MHz is also allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-15)

5.168 *Additional allocation:* in Australia, China and the Dem. People's Rep. of Korea, the band 50-54 MHz is also allocated to the broadcasting service on a primary basis.

5.170 *Additional allocation:* in New Zealand, the frequency band 51-54 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

5.176 *Additional allocation:* in Australia, China, Korea (Rep. of), the Philippines, the Dem. People's Rep. of Korea and Samoa, the band 68-74 MHz is also allocated to the broadcasting service on a primary basis. (WRC-07)

5.179 *Additional allocation:* in Armenia, Azerbaijan, Belarus, China, the Russian Federation, Georgia, Kazakhstan, Lithuania, Mongolia, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the bands 74.6-74.8 MHz and 75.2-75.4 MHz are also allocated to the aeronautical radionavigation service, on a primary basis, for ground-based transmitters only. (WRC-12)

5.180 The frequency 75 MHz is assigned to marker beacons. Administrations shall refrain from assigning frequencies close to the limits of the guardband to stations of other services which, because of their power or geographical position, might cause harmful interference or otherwise place a constraint on marker beacons.

Every effort should be made to improve further the characteristics of airborne receivers and to limit the power of transmitting stations close to the limits 74.8 MHz and 75.2 MHz.

5.182 *Additional allocation:* in Western Samoa, the band 75.4-87 MHz is also allocated to the broadcasting service on a primary basis.

5.183 *Additional allocation:* in China, Korea (Rep. of), Japan, the Philippines and the Dem. People's Rep. of Korea, the band 76-87 MHz is also allocated to the broadcasting service on a primary basis.

5.185 *Different category of service:* in the United States, the French overseas departments and communities in Region 2, Guyana and Paraguay, the allocation of the frequency band 76-88 MHz to the fixed and mobile services is on a primary basis (see No. **5.33**). (WRC-15)

5.187 *Alternative allocation:* in Albania, the band 81-87.5 MHz is allocated to the broadcasting service on a primary basis and used in accordance with the decisions contained in the Final Acts of the Special Regional Conference (Geneva, 1960).

5.188 *Additional allocation:* in Australia, the band 85-87 MHz is also allocated to the broadcasting service on a primary basis. The introduction of the broadcasting service in Australia is subject to special agreements between the administrations concerned.

5.192 *Additional allocation:* in China and Korea (Rep. of), the band 100-108 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-97)

5.197A *Additional allocation:* the band 108-117.975 MHz is also allocated on a primary basis to the aeronautical mobile (R) service, limited to systems operating in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **413 (Rev.WRC-07)**[*]. The use of the band 108-112 MHz by the aeronautical mobile (R) service shall be limited to systems composed of ground-based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards. (WRC-07)

5.200 In the band 117.975-137 MHz, the frequency 121.5 MHz is the aeronautical emergency frequency and, where required, the frequency 123.1 MHz is the aeronautical frequency auxiliary to 121.5 MHz. Mobile stations of the maritime mobile service may communicate on these frequencies under the conditions laid down in Article **31** for distress and safety purposes with stations of the aeronautical mobile service. (WRC-07)

5.201 *Additional allocation:* in Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq (Republic of), Japan, Kazakhstan, Mali, Mongolia, Mozambique, Uzbekistan, Papua New Guinea, Poland, Kyrgyzstan, Romania, Senegal Tajikistan, Turkmenistan and Ukraine, the frequency band 132-136 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC-19)

5.202 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Bulgaria, the United Arab Emirates, the Russian Federation, Georgia, Iran (Islamic Republic of), Jordan, Mali, Oman, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Romania, Senegal, Tajikistan, Turkmenistan and Ukraine, the frequency band 136-137 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC-19)

5.203C The use of the space operation service (space-to-Earth) with non-geostationary satellite short-duration mission systems in the frequency band 137-138 MHz is subject to Resolution **660 (WRC-19)**. Resolution **32 (WRC-19)** applies. These systems shall not cause harmful interference to, or claim protection from, the existing services to which the frequency band is allocated on a primary basis. (WRC-19)

5.204 *Different category of service:* in Afghanistan, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Cuba, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Kuwait, Montenegro, Oman, Pakistan, the Philippines, Qatar, Singapore, Thailand and Yemen, the frequency band 137-138 MHz is allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis (see No. **5.33**). (WRC-19)

5.207 *Additional allocation:* in Australia, the band 137-144 MHz is also allocated to the broadcasting service on a primary basis until that service can be accommodated within regional broadcasting allocations.

5.208 The use of the band 137-138 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. (WRC-97)

5.208A In making assignments to space stations in the mobile-satellite service in the frequency bands 137-138 MHz, 387-390 MHz and 400.15-401 MHz and in the maritime mobile-satellite service (space-to-Earth) in the frequency bands 157.1875-157.3375 MHz and 161.7875-161.9375 MHz, administrations shall take all practicable steps to protect the radio astronomy service in the frequency bands 150.05-153 MHz, 322-328.6 MHz, 406.1-410 MHz and 608-614 MHz from harmful interference from unwanted emissions as shown in the most recent version of Recommendation ITU-R RA.769. (WRC-19)

5.208B[*] In the frequency bands:

137-138 MHz,
157.1875-157.3375 MHz,
161.7875-161.9375 MHz,
387-390 MHz,
400.15-401 MHz,
1 452-1 492 MHz,

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[*] *Note by the Secretariat:* This Resolution was revised by WRC-12.

[*] This provision was previously numbered as No. **5.347A**. It was renumbered to preserve the sequential order.

1 525-1 610 MHz,
1 613.8-1 626.5 MHz,
2 655-2 690 MHz,
21.4-22 GHz,

Resolution **739 (Rev.WRC-19)** applies. (WRC-19)

5.209 The use of the bands 137-138 MHz, 148-150.05 MHz, 399.9-400.05 MHz, 400.15-401 MHz, 454-456 MHz and 459-460 MHz by the mobile-satellite service is limited to non-geostationary-satellite systems. (WRC-97)

5.209A The use of the frequency band 137.175-137.825 MHz by non-geostationary-satellite systems in the space operation service identified as short-duration mission in accordance with Appendix **4** is not subject to No. **9.11A**. (WRC-19)

5.213 *Additional allocation:* in China, the band 138-144 MHz is also allocated to the radiolocation service on a primary basis.

5.216 *Additional allocation:* in China, the band 144-146 MHz is also allocated to the aeronautical mobile (OR) service on a secondary basis.

5.217 *Alternative allocation:* in Afghanistan, Bangladesh, Cuba, Guyana and India, the band 146-148 MHz is allocated to the fixed and mobile services on a primary basis.

5.218 *Additional allocation:* the band 148-149.9 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under No. **9.21**. The bandwidth of any individual transmission shall not exceed ± 25 kHz.

5.218A The frequency band 148-149.9 MHz in the space operation service (Earth-to-space) may be used by non-geostationary-satellite systems with short-duration missions. Non-geostationary-satellite systems in the space operation service used for a short-duration mission in accordance with Resolution **32 (WRC-19)** of the Radio Regulations are not subject to agreement under No. **9.21**. At the stage of coordination, the provisions of Nos. **9.17** and **9.18** also apply. In the frequency band 148-149.9 MHz, non-geostationary-satellite systems with short-duration missions shall not cause unacceptable interference to, or claim protection from, existing primary services within this frequency band, or impose additional constraints on the space operation and mobile-satellite services. In addition, earth stations in non-geostationary-satellite systems in the space operation service with short-duration missions in the frequency band 148-149.9 MHz shall ensure that the power flux-density does not exceed −149 dB(W/(m^2 · 4 kHz)) for more than 1% of time at the border of the territory of the following countries: Armenia, Azerbaijan, Belarus, China, Korea (Rep. of), Cuba, Russian Federation, India, Iran (Islamic Republic of), Japan, Kazakhstan, Malaysia, Uzbekistan, Kyrgyzstan, Thailand and Viet Nam. In case this power flux-density limit is exceeded, agreement under No. **9.21** is required to be obtained from countries mentioned in this footnote. (WRC-19)

5.219 The use of the frequency band 148-149.9 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. The mobile-satellite service shall not constrain the development and use of the fixed, mobile and space operation services in the frequency band 148-149.9 MHz. The use of the frequency band 148-149.9 MHz by non-geostationary-satellite systems in the space operation service identified as short-duration mission is not subject to No. **9.11A**. (WRC-19)

5.220 The use of the frequency bands 149.9-150.05 MHz and 399.9-400.05 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. (WRC-15)

5.221 Stations of the mobile-satellite service in the frequency band 148-149.9 MHz shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations in the following countries: Albania, Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bosnia and Herzegovina, Botswana, Brunei Darussalam, Bulgaria, Cameroon, China, Cyprus, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Croatia, Cuba, Denmark, Djibouti, Egypt, the United Arab Emirates, Eritrea, Spain, Estonia, Eswatini, Ethiopia, the Russian Federation, Finland, France, Gabon, Georgia, Ghana, Greece, Guinea, Guinea Bissau, Hungary, India, Iran (Islamic Republic of), Ireland, Iceland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Lesotho, Latvia, Lebanon, Libya, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Malaysia, Mali, Malta, Mauritania, Moldova, Mongolia, Montenegro, Mozambique, Namibia, Norway, New Zealand, Oman, Uganda, Uzbekistan, Pakistan, Panama, Papua New Guinea, Paraguay, the Netherlands, the Philippines, Poland, Portugal, Qatar, the Syrian Arab Republic, Kyrgyzstan, Dem. People's Rep. of Korea, Slovakia, Romania, the United Kingdom, Senegal, Serbia, Sierra Leone, Singapore, Slovenia, Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Tanzania, Chad, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Viet Nam, Yemen, Zambia and Zimbabwe. (WRC-19)

5.225 *Additional allocation:* in Australia and India, the band 150.05-153 MHz is also allocated to the radio astronomy service on a primary basis.

5.225A *Additional allocation:* in Algeria, Armenia, Azerbaijan, Belarus, China, the Russian Federation, France, Iran (Islamic Republic of), Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine and Viet Nam, the frequency band 154-156 MHz is also allocated to the radiolocation service on a primary basis. The usage of the frequency band 154-156 MHz by the radiolocation service shall be limited to space-object detection systems operating from terrestrial locations. The operation of stations in the radiolocation service in the frequency band 154-156 MHz shall be subject to agreement obtained under No. **9.21**. For the identification of potentially affected administrations in Region 1, the instantaneous field-strength value of 12 dB(μV/m) for 10% of the time produced at 10 m above ground level in the 25 kHz reference frequency band at the border of the territory of any other administration shall be used. For the identification of potentially affected administrations in Region 3, the interference-to-noise ratio (I/N) value of −6 dB (N = −161 dBW/4 kHz), or −10 dB for applications with greater protection requirements, such as public protection and disaster relief (PPDR (N = −161 dBW/4 kHz)), for 1% of the time produced at 60 m above ground level at the border of the territory of any other administration shall be used. In the frequency bands 156.7625-156.8375 MHz, 156.5125-156.5375 MHz, 161.9625-161.9875 MHz, 162.0125-162.0375 MHz, out-of-band e.i.r.p. of space surveillance radars shall not exceed −16 dBW. Frequency assignments to the radiolocation service under this allocation in Ukraine shall not be used without the agreement of Moldova. (WRC-12)

5.226 The frequency 156.525 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service using digital selective calling (DSC). The conditions for the use of this frequency and the band 156.4875-156.5625 MHz are contained in Articles **31** and **52**, and in Appendix **18**.

The frequency 156.8 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service. The conditions for the use of this frequency and the band 156.7625-156.8375 MHz are contained in Article **31** and Appendix **18**.

In the bands 156-156.4875 MHz, 156.5625-156.7625 MHz, 156.8375-157.45 MHz, 160.6-160.975 MHz and 161.475-162.05 MHz, each administration shall give priority to the maritime mobile service on only such frequencies as are assigned to stations of the maritime mobile service by the administration (see Articles **31** and **52**, and Appendix **18**).

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

However, the frequencies 156.8 MHz and 156.525 MHz and the frequency bands in which priority is given to the maritime mobile service may be used for radiocommunications on inland waterways subject to agreement between interested and affected administrations and taking into account current frequency usage and existing agreements. (WRC-07)

5.227 *Additional allocation:* the bands 156.4875-156.5125 MHz and 156.5375-156.5625 MHz are also allocated to the fixed and land mobile services on a primary basis. The use of these bands by the fixed and land mobile services shall not cause harmful interference to nor claim protection from the maritime mobile VHF radiocommunication service. (WRC-07)

5.228 The use of the frequency bands 156.7625-156.7875 MHz and 156.8125-156.8375 MHz by the mobile-satellite service (Earth-to-space) is limited to the reception of automatic identification system (AIS) emissions of long-range AIS broadcast messages (Message 27, see the most recent version of Recommendation ITU-R M.1371). With the exception of AIS emissions, emissions in these frequency bands by systems operating in the maritime mobile service for communications shall not exceed 1 W. (WRC-12)

5.228AA The use of the frequency bands 161.9375-161.9625 MHz and 161.9875-162.0125 MHz by the maritime mobile-satellite (Earth-to-space) service is limited to the systems which operate in accordance with Appendix **18**. (WRC-15)

5.228AB The use of the frequency bands 157.1875-157.3375 MHz and 161.7875-161.9375 MHz by the maritime mobile-satellite service (Earth-to-space) is limited to non-geostationary-satellite systems operating in accordance with Appendix **18**. (WRC-19)

5.228AC The use of the frequency bands 157.1875-157.3375 MHz and 161.7875-161.9375 MHz by the maritime mobile-satellite service (space-to-Earth) is limited to non-geostationary-satellite systems operating in accordance with Appendix **18**. Such use is subject to agreement obtained under No. **9.21** with respect to the terrestrial services in Azerbaijan, Belarus, China, Korea (Rep. of), Cuba, the Russian Federation, the Syrian Arab Republic, the Dem. People's Rep. of Korea, South Africa and Viet Nam. (WRC-19)

5.228E The use of the automatic identification system in the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the aeronautical mobile (OR) service is limited to aircraft stations for the purpose of search and rescue operations and other safety-related communications. (WRC-12)

5.228F The use of the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the mobile-satellite service (Earth-to-space) is limited to the reception of automatic identification system emissions from stations operating in the maritime mobile service. (WRC-12)

5.230 *Additional allocation:* in China, the band 163-167 MHz is also allocated to the space operation service (space-to-Earth) on a primary basis, subject to agreement obtained under No. **9.21**.

5.231 *Additional allocation:* in Afghanistan and China, the band 167-174 MHz is also allocated to the broadcasting service on a primary basis. The introduction of the broadcasting service into this band shall be subject to agreement with the neighbouring countries in Region 3 whose services are likely to be affected. (WRC-12)

5.233 *Additional allocation:* in China, the band 174-184 MHz is also allocated to the space research (space-to-Earth) and the space operation (space-to-Earth) services on a primary basis, subject to agreement obtained under No. **9.21**. These services shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations.

5.238 *Additional allocation:* in Bangladesh, India, Pakistan and the Philippines, the band 200-216 MHz is also allocated to the aeronautical radionavigation service on a primary basis.

5.240 *Additional allocation:* in China and India, the band 216-223 MHz is also allocated to the aeronautical radionavigation service on a primary basis and to the radiolocation service on a secondary basis.

5.245 *Additional allocation:* in Japan, the band 222-223 MHz is also allocated to the aeronautical radionavigation service on a primary basis and to the radiolocation service on a secondary basis.

5.250 *Additional allocation*: in China, the band 225-235 MHz is also allocated to the radio astronomy service on a secondary basis.

5.254 The bands 235-322 MHz and 335.4-399.9 MHz may be used by the mobile-satellite service, subject to agreement obtained under No. **9.21**, on condition that stations in this service do not cause harmful interference to those of other services operating or planned to be operated in accordance with the Table of Frequency Allocations except for the additional allocation made in footnote No. **5.256A**. (WRC-03)

5.255 The bands 312-315 MHz (Earth-to-space) and 387-390 MHz (space-to-Earth) in the mobile-satellite service may also be used by non-geostationary-satellite systems. Such use is subject to coordination under No. **9.11A**.

5.256 The frequency 243 MHz is the frequency in this band for use by survival craft stations and equipment used for survival purposes. (WRC-07)

5.256A *Additional allocation:* in China, the Russian Federation and Kazakhstan, the frequency band 258-261 MHz is also allocated to the space research service (Earth-to-space) and space operation service (Earth-to-space) on a primary basis. Stations in the space research service (Earth-to-space) and space operation service (Earth-to-space) shall not cause harmful interference to, or claim protection from, or constrain the use and development of, the mobile service systems and mobile-satellite service systems operating in the frequency band. Stations in space research service (Earth-to-space) and space operation service (Earth-to-space) shall not constrain the future development of fixed service systems of other countries. (WRC-15)

5.257 The band 267-272 MHz may be used by administrations for space telemetry in their countries on a primary basis, subject to agreement obtained under No. **9.21**.

5.258 The use of the band 328.6-335.4 MHz by the aeronautical radionavigation service is limited to Instrument Landing Systems (glide path).

5.260A In the frequency band 399.9-400.05 MHz, the maximum e.i.r.p. of any emission of earth stations in the mobile-satellite service shall not exceed 5 dBW in any 4 kHz band and the maximum e.i.r.p. of each earth station in the mobile-satellite service shall not exceed 5 dBW in the whole 399.9-400.05 MHz frequency band. Until 22 November 2022, this limit shall not apply to satellite systems for which complete notification information has been received by the Radiocommunication Bureau by 22 November 2019 and that have been brought into use by that date. After 22 November 2022, these limits shall apply to all systems within the mobile-satellite service operating in this frequency band.

In the frequency band 399.99-400.02 MHz, the e.i.r.p. limits as specified above shall apply after 22 November 2022 to all systems within the mobile-satellite service. Administrations are requested that their mobile-satellite service satellite links in the 399.99-400.02 MHz frequency band comply with the e.i.r.p. limits as specified above, after 22 November 2019. (WRC-19)

5.260B In the frequency band 400.02-400.05 MHz, the provisions of No. **5.260A** are not applicable for telecommand uplinks within the mobile-satellite service. (WRC-19)

5.261 Emissions shall be confined in a band of ± 25 kHz about the standard frequency 400.1 MHz.

5.262 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Botswana, Colombia, Cuba, Egypt, the United Arab Emirates, Ecuador, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Liberia, Malaysia, Moldova, Oman, Uzbekistan, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Kyrgyzstan, Singapore, Somalia, Tajikistan, Chad, Turkmenistan and Ukraine, the band 400.05-401 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-12)

5.263 The band 400.15-401 MHz is also allocated to the space research service in the space-to-space direction for communications with manned space vehicles. In this application, the space research service will not be regarded as a safety service.

5.264 The use of the band 400.15-401 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. The power flux-density limit indicated in Annex 1 of Appendix **5** shall apply until such time as a competent world radiocommunication conference revises it.

5.264A In the frequency band 401-403 MHz, the maximum e.i.r.p. of any emission of each earth station in the meteorological-satellite service and the Earth exploration-satellite service shall not exceed 22 dBW in any 4 kHz band for geostationary-satellite systems and non-geostationary-satellite systems with an orbit of apogee equal or greater than 35 786 km.

The maximum e.i.r.p. of any emission of each earth station in the meteorological-satellite service and the Earth exploration-satellite service shall not exceed 7 dBW in any 4 kHz band for non-geostationary-satellite systems with an orbit of apogee lower than 35 786 km.

The maximum e.i.r.p. of each earth station in the meteorological-satellite service and the Earth exploration-satellite service shall not exceed 22 dBW for geostationary-satellite systems and non-geostationary-satellite systems with an orbit of apogee equal or greater than 35 786 km in the whole 401-403 MHz frequency band. The maximum e.i.r.p. of each earth station in the meteorological-satellite service and the Earth exploration-satellite service shall not exceed 7 dBW for non-geostationary-satellite systems with an orbit of apogee lower than 35 786 km in the whole 401-403 MHz frequency band.

Until 22 November 2029, these limits shall not apply to satellite systems for which complete notification information has been received by the Radiocommunication Bureau by 22 November 2019 and that have been brought into use by that date. After 22 November 2029, these limits shall apply to all systems within the meteorological-satellite service and the Earth exploration-satellite service operating in this frequency band. (WRC-19)

5.264B Non-geostationary-satellite systems in the meteorological-satellite service and the Earth exploration-satellite service for which complete notification information has been received by the Radiocommunication Bureau before 28 April 2007 are exempt from provisions of No. **5.264A** and may continue to operate in the frequency band 401.898-402.522 MHz on a primary basis without exceeding a maximum e.i.r.p. level of 12 dBW. (WRC-19)

5.265 In the frequency band 403-410 MHz, Resolution **205 (Rev.WRC-19)** applies. (WRC-19)

5.266 The use of the band 406-406.1 MHz by the mobile-satellite service is limited to low power satellite emergency position-indicating radiobeacons (see also Article **31**). (WRC-07)

5.267 Any emission capable of causing harmful interference to the authorized uses of the band 406-406.1 MHz is prohibited.

5.268 Use of the frequency band 410-420 MHz by the space research service is limited to space-to-space communication links with an orbiting, manned space vehicle. The power flux-density at the surface of the Earth produced by emissions from transmitting stations of the space research service (space-to-space) in the frequency band 410-420 MHz shall not exceed -153 dB(W/m^2) for $0° \le \delta \le 5°$, $-153 + 0.077\ (\delta - 5)$ dB(W/m^2) for $5° \le \delta \le 70°$ and -148 dB(W/m^2) for $70° \le \delta \le 90°$, where δ is the angle of arrival of the radio-frequency wave and the reference bandwidth is 4 kHz. In this frequency band, stations of the space research service (space-to-space) shall not claim protection from, nor constrain the use and development of, stations of the fixed and mobile services. No. **4.10** does not apply. (WRC-15)

5.269 *Different category of service:* in Australia, the United States, India, Japan and the United Kingdom, the allocation of the bands 420-430 MHz and 440-450 MHz to the radiolocation service is on a primary basis (see No. **5.33**).

5.270 *Additional allocation:* in Australia, the United States, Jamaica and the Philippines, the bands 420-430 MHz and 440-450 MHz are also allocated to the amateur service on a secondary basis.

5.271 *Additional allocation:* in Belarus, China, India, Kyrgyzstan and Turkmenistan, the band 420-460 MHz is also allocated to the aeronautical radionavigation service (radio altimeters) on a secondary basis. (WRC-07)

5.276 *Additional allocation:* in Afghanistan, Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burkina Faso, Djibouti, Egypt, the United Arab Emirates, Ecuador, Eritrea, Ethiopia, Greece, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Jordan, Kenya, Kuwait, Libya, Malaysia, Niger, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Switzerland, Thailand, Togo, Turkey and Yemen, the frequency band 430-440 MHz is also allocated to the fixed service on a primary basis and the frequency bands 430-435 MHz and 438-440 MHz are also allocated, except in Ecuador, to the mobile, except aeronautical mobile, service on a primary basis. (WRC-15)

5.279A The use of the frequency band 432-438 MHz by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU-R RS.1260-2. Additionally, the Earth exploration-satellite service (active) in the frequency band 432-438 MHz shall not cause harmful interference to the aeronautical radionavigation service in China. The provisions of this footnote in no way diminish the obligation of the Earth exploration-satellite service (active) to operate as a secondary service in accordance with Nos. **5.29** and **5.30**. (WRC-19)

5.281 *Additional allocation:* in the French overseas departments and communities in Region 2 and India, the band 433.75-434.25 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis. In France and in Brazil, the band is allocated to the same service on a secondary basis.

5.282 In the bands 435-438 MHz, 1 260-1 270 MHz, 2 400-2 450 MHz, 3 400-3 410 MHz (in Regions 2 and 3 only) and 5 650-5 670 MHz, the amateur-satellite service may operate subject to not causing harmful interference to other services operating in accordance with the Table (see No. **5.43**). Administrations authorizing such use shall ensure that any harmful interference caused by emissions from a station in the amateur-satellite service is immediately eliminated in accordance with the provisions of No. **25.11**. The use of the bands 1 260-1 270 MHz and 5 650-5 670 MHz by the amateur-satellite service is limited to the Earth-to-space direction.

5.286 The band 449.75-450.25 MHz may be used for the space operation service (Earth-to-space) and the space research service (Earth-to-space), subject to agreement obtained under No. **9.21**.

5.286A The use of the bands 454-456 MHz and 459-460 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. (WRC-97)

5.286AA The frequency band 450-470 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) - see Resolution **224 (Rev.WRC-19)**. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-19)

5.286B The use of the band 454-455 MHz in the countries listed in No. **5.286D**, 455-456 MHz and 459-460 MHz in Region 2, and 454-456 MHz and 459-460 MHz in the countries listed in No. **5.286E**, by stations in the mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations. (WRC-97)

5.286C The use of the band 454-455 MHz in the countries listed in No. **5.286D**, 455-456 MHz and 459-460 MHz in Region 2, and 454-456 MHz and 459-460 MHz in the countries listed in No. **5.286E**, by stations in the mobile-satellite service, shall not constrain the development and use of the fixed and mobile services operating in accordance with the Table of Frequency Allocations. (WRC-97)

5.286D *Additional allocation:* in Canada, the United States and Panama, the band 454-455 MHz is also allocated to the mobile-satellite service (Earth-to-space) on a primary basis. (WRC-07)

5.286E *Additional allocation:* in Cape Verde, Nepal and Nigeria, the bands 454-456 MHz and 459-460 MHz are also allocated to the mobile-satellite (Earth-to-space) service on a primary basis. (WRC-07)

5.287 Use of the frequency bands 457.5125-457.5875 MHz and 467.5125-467.5875 MHz by the maritime mobile service is limited to on-board communication stations. The characteristics of the equipment and the channeling arrangement shall be in accordance with Recommendation ITU-R M.1174-4. The use of these frequency bands in territorial waters is subject to the national regulations of the administration concerned. (WRC-19)

5.288 In the territorial waters of the United States and the Philippines, the preferred frequencies for use by on-board communication stations shall be 457.525 MHz, 457.550 MHz, 457.575 MHz and 457.600 MHz paired, respectively, with 467.750 MHz, 467.775 MHz, 467.800 MHz and 467.825 MHz. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-4. (WRC-19)

5.289 Earth exploration-satellite service applications, other than the meteorological-satellite service, may also be used in the bands 460-470 MHz and 1 690-1 710 MHz for space-to-Earth transmissions subject to not causing harmful interference to stations operating in accordance with the Table.

5.290 *Different category of service:* in Afghanistan, Azerbaijan, Belarus, China, the Russian Federation, Japan, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 460-470 MHz to the meteorological-satellite service (space-to-Earth) is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21**. (WRC-12)

5.291 *Additional allocation:* in China, the band 470-485 MHz is also allocated to the space research (space-to-Earth) and the space operation (space-to-Earth) services on a primary basis subject to agreement obtained under No. **9.21** and subject to not causing harmful interference to existing and planned broadcasting stations.

5.296A In Micronesia, the Solomon Islands, Tuvalu and Vanuatu, the frequency band 470-698 MHz, or portions thereof, and in Bangladesh, Maldives and New Zealand, the frequency band 610-698 MHz, or portions thereof, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolution **224 (Rev.WRC-19)**. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. The mobile allocation in this frequency band shall not be used for IMT systems unless subject to agreement obtained under No. **9.21** and shall not cause harmful interference to, or claim protection from, the broadcasting service of neighbouring countries. Nos. **5.43** and **5.43A** apply. (WRC-19)

5.298 *Additional allocation:* in India, the band 549.75-550.25 MHz is also allocated to the space operation service (space-to-Earth) on a secondary basis.

5.305 *Additional allocation:* in China, the band 606-614 MHz is also allocated to the radio astronomy service on a primary basis.

5.306 *Additional allocation:* in Region 1, except in the African Broadcasting Area (see Nos. **5.10** to **5.13**), and in Region 3, the band 608-614 MHz is also allocated to the radio astronomy service on a secondary basis.

5.307 *Additional allocation:* in India, the band 608-614 MHz is also allocated to the radio astronomy service on a primary basis.

5.313A The frequency band, or portions of the frequency band 698-790 MHz, in Australia, Bangladesh, Brunei Darussalam, Cambodia, China, Korea (Rep. of), Fiji, India, Indonesia, Japan, Kiribati, Lao P.D.R., Malaysia, Myanmar (Union of), New Zealand, Pakistan, Papua New Guinea, the Philippines, the Dem. People's Rep. of Korea, Solomon Islands, Samoa, Singapore, Thailand, Tonga, Tuvalu, Vanuatu and Viet Nam, are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-19)

5.317A The parts of the frequency band 698-960 MHz in Region 2 and the frequency bands 694-790 MHz in Region 1 and 790-960 MHz in Regions 1 and 3 which are allocated to the mobile service on a primary basis are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) – see Resolutions **224 (Rev.WRC-19)**, **760 (Rev.WRC-19)** and **749 (Rev.WRC-19)**, where applicable. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-19)

5.320 *Additional allocation*: in Region 3, the bands 806-890 MHz and 942-960 MHz are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service on a primary basis, subject to agreement obtained under No. **9.21**. The use of this service is limited to operation within national boundaries. In seeking such agreement, appropriate protection shall be afforded to services operating in accordance with the Table, to ensure that no harmful interference is caused to such services.

5.327 *Different category of service*: in Australia, the allocation of the band 915-928 MHz to the radiolocation service is on a primary basis (see No. **5.33**).

5.327A The use of the frequency band 960-1 164 MHz by the aeronautical mobile (R) service is limited to systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **417 (Rev.WRC-15)**. (WRC-15)

5.328 The use of the band 960-1 215 MHz by the aeronautical radionavigation service is reserved on a worldwide basis for the operation and development of airborne electronic aids to air navigation and any directly associated ground-based facilities. (WRC-2000)

5.328A Stations in the radionavigation-satellite service in the band 1 164-1 215 MHz shall operate in accordance with the provisions of Resolution **609 (Rev.WRC-07)** and shall not claim protection from stations in the aeronautical radionavigation service in the band 960-1 215 MHz. No. **5.43A** does not apply. The provisions of No. **21.18** shall apply. (WRC-07)

5.328AA The frequency band 1 087.7-1 092.3 MHz is also allocated to the aeronautical mobile-satellite (R) service (Earth-to-space) on a primary basis, limited to the space station reception of Automatic Dependent Surveillance-Broadcast (ADS-B) emissions from aircraft transmitters that operate in accordance with recognized international aeronautical standards. Stations operating in the aeronautical mobile-satellite (R) service shall not claim protection from stations operating in the aeronautical radionavigation service. Resolution **425 (Rev.WRC-19)** shall apply. (WRC-19)

5.328B The use of the bands 1 164-1 300 MHz, 1 559-1 610 MHz and 5 010-5 030 MHz by systems and networks in the radionavigation-satellite service for which complete coordination or notification information, as appropriate, is received by the Radiocommunication Bureau after 1 January 2005 is subject to the application of the provisions of Nos. **9.12**, **9.12A** and **9.13**. Resolution **610(WRC-03)** shall also apply; however, in the case of radionavigation-satellite service (space-to-space) networks and systems, Resolution **610 (WRC-03)** shall only apply to transmitting space stations. In accordance with No. **5.329A**, for systems and networks in the radionavigation-satellite service (space-to-space) in the bands 1 215-1 300 MHz and 1 559-1 610 MHz, the provisions of Nos. **9.7**, **9.12**, **9.12A** and **9.13** shall only apply with respect to other systems and networks in the radionavigation-satellite service (space-to-space). (WRC-07)

5.329 Use of the radionavigation-satellite service in the frequency band 1 215-1 300 MHz shall be subject to the condition that no harmful interference is caused to, and no protection is claimed from, the radionavigation service authorized under No. **5.331**. Furthermore, the use of the radionavigation-satellite service in the frequency band 1 215- 1 300 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. No. **5.43** shall not apply in respect of the radiolocation service. Resolution **608 (Rev.WRC-19)** shall apply. (WRC-19)

5.329A Use of systems in the radionavigation-satellite service (space-to-space) operating in the bands 1 215-1 300 MHz and 1 559-1 610 MHz is not intended to provide safety service applications, and shall not impose any additional constraints on radionavigation-satellite service (space-to-Earth) systems or on other services operating in accordance with the Table of Frequency Allocations. (WRC-07)

5.330 *Additional allocation:* in Angola, Saudi Arabia, Bahrain, Bangladesh, Cameroon, China, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Nepal, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the band 1 215-1 300 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-12)

5.331 *Additional allocation:* in Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Belarus, Belgium, Benin, Bosnia and Herzegovina, Brazil, Burkina Faso, Burundi, Cameroon, China, Korea (Rep. of), Croatia, Denmark, Egypt, the United Arab Emirates, Estonia, the Russian Federation, Finland, France, Ghana, Greece, Guinea, Equatorial Guinea, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Jordan, Kenya, Kuwait, Lesotho, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, North Macedonia, Madagascar, Mali, Mauritania, Montenegro, Nigeria, Norway, Oman, Pakistan, the Kingdom of the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Dem. People's Rep. of Korea, Slovakia, the United Kingdom, Serbia, Slovenia, Somalia, Sudan, South Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Thailand, Togo, Turkey, Venezuela and Viet Nam, the frequency band 1 215-1 300 MHz is also allocated to the radionavigation service on a primary basis. In Canada and the United States, the frequency band 1 240-1 300 MHz is also allocated to the radionavigation service, and use of the radionavigation service shall be limited to the aeronautical radionavigation service. (WRC-19)

5.332 In the band 1 215-1 260 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause harmful interference to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service, the radionavigation-satellite service and other services allocated on a primary basis. (WRC-2000)

5.335A In the band 1 260-1 300 MHz, active spaceborne sensors in the Earth exploration-satellite and space research services shall not cause harmful interference to, claim protection from, or otherwise impose constraints on operation or development of the radiolocation service and other services allocated by footnotes on a primary basis. (WRC-2000)

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

5.337A The use of the band 1 300-1 350 MHz by earth stations in the radionavigation-satellite service and by stations in the radiolocation service shall not cause harmful interference to, nor constrain the operation and development of, the aeronautical-radionavigation service. (WRC-2000)

5.338A In the frequency bands 1 350-1 400 MHz, 1 427-1 452 MHz, 22.55-23.55 GHz, 24.25-27.5 GHz, 30-31.3 GHz, 49.7-50.2 GHz, 50.4-50.9 GHz, 51.4-52.4 GHz, 52.4-52.6 GHz, 81-86 GHz and 92-94 GHz, Resolution **750 (Rev.WRC-19)** applies. (WRC-19)

5.339 The bands 1 370-1 400 MHz, 2 640-2 655 MHz, 4 950-4 990 MHz and 15.20-15.35 GHz are also allocated to the space research (passive) and Earth exploration-satellite (passive) services on a secondary basis.

5.340 All emissions are prohibited in the following bands:

1 400-1 427 MHz,	
2 690-2 700 MHz,	except those provided for by No. **5.422**,
10.68-10.7 GHz,	except those provided for by No. **5.483**,
15.35-15.4 GHz,	except those provided for by No. **5.511**,
23.6-24 GHz,	
31.3-31.5 GHz,	
31.5-31.8 GHz,	in Region 2,
48.94-49.04 GHz,	from airborne stations
50.2-50.4 GHz[2],	
52.6-54.25 GHz,	
86-92 GHz,	
100-102 GHz,	
109.5-111.8 GHz,	
114.25-116 GHz,	
148.5-151.5 GHz,	
164-167 GHz,	
182-185 GHz,	
190-191.8 GHz,	
200-209 GHz,	

[2] **5.340.1** The allocation to the Earth exploration-satellite service (passive) and the space research service (passive) in the band 50.2-50.4 GHz should not impose undue constraints on the use of the adjacent bands by the primary allocated services in those bands. (WRC-97)

226-231.5 GHz,

250-252 GHz. (WRC-03)

5.341 In the bands 1 400-1 727 MHz, 101-120 GHz and 197-220 GHz, passive research is being conducted by some countries in a programme for the search for intentional emissions of extraterrestrial origin.

5.341C The frequency bands 1 427-1 452 MHz and 1 492-1 518 MHz are identified for use by administrations in Region 3 wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution **223 (Rev.WRC-15)**. The use of these frequency bands by the above administrations for the implementation of IMT in the frequency bands 1 429-1 452 MHz and 1 492-1 518 MHz is subject to agreement obtained under No. **9.21** from countries using stations of the aeronautical mobile service. This identification does not preclude the use of these frequency bands by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.345 Use of the frequency band 1 452-1 492 MHz by the broadcasting-satellite service, and by the broadcasting service, is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (Rev.WRC-19)**. (WRC-19)

5.346A The frequency band 1 452-1 492 MHz is identified for use by administrations in Region 3 wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution **223 (Rev.WRC-19)** and Resolution **761 (Rev.WRC-19)**. The use of this frequency band by the above administrations for the implementation of IMT is subject to agreement obtained under No. **9.21** from countries using stations of the aeronautical mobile service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-19)

5.348 The use of the band 1 518-1 525 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. In the band 1 518-1 525 MHz stations in the mobile-satellite service shall not claim protection from the stations in the fixed service. No. **5.43A** does not apply. (WRC-03)

5.348A In the band 1 518-1 525 MHz, the coordination threshold in terms of the power flux-density levels at the surface of the Earth in application of No. **9.11A** for space stations in the mobile-satellite (space-to-Earth) service, with respect to the land mobile service use for specialized mobile radios or used in conjunction with public switched telecommunication networks (PSTN) operating within the territory of Japan, shall be –150 dB(W/m^2) in any 4 kHz band for all angles of arrival, instead of those given in Table 5-2 of Appendix **5**. In the band 1 518-1 525 MHz stations in the mobile-satellite service shall not claim protection from stations in the mobile service in the territory of Japan. No. **5.43A** does not apply. (WRC-03)

5.349 *Different category of service:* in Saudi Arabia, Azerbaijan, Bahrain, Cameroon, Egypt, Iran (Islamic Republic of), Iraq, Israel, Kazakhstan, Kuwait, Lebanon, North Macedonia, Morocco, Qatar, Syrian Arab Republic, Kyrgyzstan, Turkmenistan and Yemen, the allocation of the frequency band 1 525-1 530 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. **5.33**). (WRC-19)

5.351 The bands 1 525-1 544 MHz, 1 545-1 559 MHz, 1 626.5-1 645.5 MHz and 1 646.5-1 660.5 MHz shall not be used for feeder links of any service. In exceptional circumstances, however, an earth station at a specified fixed point in any of the mobile-satellite services may be authorized by an administration to communicate via space stations using these bands.

5.351A For the use of the bands 1 518-1 544 MHz, 1 545-1 559 MHz, 1 610-1 645.5 MHz, 1 646.5-1 660.5 MHz, 1 668-1 675 MHz, 1 980-2 010 MHz, 2 170-2 200 MHz, 2 483.5-2 520 MHz and 2 670-2 690 MHz by the mobile-satellite service, see Resolutions **212 (Rev.WRC-07)*** and **225 (Rev.WRC-07)****. (WRC-07)

5.352A In the frequency band 1 525-1 530 MHz, stations in the mobile-satellite service, except stations in the maritime mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed service in Algeria, Saudi Arabia, Egypt, Guinea, India, Israel, Italy, Jordan, Kuwait, Mali, Morocco, Mauritania, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Viet Nam and Yemen notified prior to 1 April 1998. (WRC-19)

5.353A In applying the procedures of Section II of Article **9** to the mobile-satellite service in the bands 1 530-1 544 MHz and 1 626.5-1 645.5 MHz, priority shall be given to accommodating the spectrum requirements for distress, urgency and safety communications of the Global Maritime Distress and Safety System (GMDSS). Maritime mobile-satellite distress, urgency and safety communications shall have priority access and immediate availability over all other mobile satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, distress, urgency and safety communications of the GMDSS. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of Resolution **222 (WRC-2000)*** shall apply.) (WRC-2000)

5.354 The use of the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz by the mobile-satellite services is subject to coordination under No. **9.11A**.

5.355 *Additional allocation:* in Bahrain, Bangladesh, Congo (Rep. of the), Djibouti, Egypt, Eritrea, Iraq, Israel, Kuwait, Qatar, Syrian Arab Republic, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the bands 1 540-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are also allocated to the fixed service on a secondary basis. (WRC-12)

5.356 The use of the band 1 544-1 545 MHz by the mobile-satellite service (space-to-Earth) is limited to distress and safety communications (see Article **31**).

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* *Note by the Secretariat:* This Resolution was revised by WRC-15.

** *Note by the Secretariat:* This Resolution was revised by WRC-12.

* *Note by the Secretariat:* This Resolution was revised by WRC-07 and WRC-12.

5.357 Transmissions in the band 1 545-1 555 MHz from terrestrial aeronautical stations directly to aircraft stations, or between aircraft stations, in the aeronautical mobile (R) service are also authorized when such transmissions are used to extend or supplement the satellite-to-aircraft links.

5.357A In applying the procedures of Section II of Article **9** to the mobile-satellite service in the frequency bands 1 545-1 555 MHz and 1 646.5-1 656.5 MHz, priority shall be given to accommodating the spectrum requirements of the aeronautical mobile-satellite (R) service providing transmission of messages with priority 1 to 6 in Article **44**. Aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article **44**shall have priority access and immediate availability, by pre-emption if necessary, over all other mobile-satellite communications operating within a network. Mobile-satellite systems shall not cause unacceptable interference to, or claim protection from, aeronautical mobile-satellite (R) service communications with priority 1 to 6 in Article **44**.Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of Resolution **222 (Rev.WRC-12)***shall apply.) (WRC-12)

5.359 *Additional allocation:* in Germany, Saudi Arabia, Armenia, Azerbaijan, Belarus, Cameroon, the Russian Federation, Georgia, Guinea, Guinea-Bissau, Jordan, Kazakhstan, Kuwait, Lithuania, Mauritania, Uganda, Uzbekistan, Pakistan, Poland, the Syrian Arab Republic, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Tajikistan, Tunisia, Turkmenistan and Ukraine, the frequency bands 1 550-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are also allocated to the fixed service on a primary basis. Administrations are urged to make all practicable efforts to avoid the implementation of new fixed-service stations in these frequency bands. (WRC-19)

5.364 The use of the band 1 610-1 626.5 MHz by the mobile-satellite service (Earth-to-space) and by the radiodetermination-satellite service (Earth-to-space) is subject to coordination under No. **9.11A**. A mobile earth station operating in either of the services in this band shall not produce a peak e.i.r.p. density in excess of −15 dB(W/4 kHz) in the part of the band used by systems operating in accordance with the provisions of No. **5.366** (to which No. **4.10** applies), unless otherwise agreed by the affected administrations. In the part of the band where such systems are not operating, the mean e.i.r.p. density of a mobile earth station shall not exceed –3 dB(W/4 kHz). Stations of the mobile-satellite service shall not claim protection from stations in the aeronautical radionavigation service, stations operating in accordance with the provisions of No. **5.366** and stations in the fixed service operating in accordance with the provisions of No. **5.359**. Administrations responsible for the coordination of mobile-satellite networks shall make all practicable efforts to ensure protection of stations operating in accordance with the provisions of No. **5.366**.

5.365 The use of the band 1 613.8-1 626.5 MHz by the mobile-satellite service (space-to-Earth) is subject to coordination under No. **9.11A**.

5.366 The band 1 610-1 626.5 MHz is reserved on a worldwide basis for the use and development of airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities. Such satellite use is subject to agreement obtained under No. **9.21**.

5.367 *Additional allocation*: The frequency band 1 610-1 626.5 MHz is also allocated to the aeronautical mobile-satellite (R) service on a primary basis, subject to agreement obtained under No. **9.21**. (WRC-12)

5.368 The provisions of No. **4.10** do not apply with respect to the radiodetermination-satellite and mobile-satellite services in the frequency band 1 610-1 626.5 MHz. However, No. **4.10** applies in the frequency band 1 610-1 626.5 MHz with respect to the aeronautical radionavigation-satellite service when operating in accordance with No. **5.366**, the aeronautical mobile satellite (R) service when operating in accordance with No. **5.367**, and in the frequency band 1 621.35-1 626.5 MHz with respect to the maritime mobile-satellite service when used for GMDSS. (WRC-19)

5.369 *Different category of service:* in Angola, Australia, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), Israel, Lebanon, Liberia, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, the Dem. Rep. of the Congo, Sudan, South Sudan, Togo and Zambia, the allocation of the band 1 610-1 626.5 MHz to the radiodetermination-satellite service (Earth-to-space) is on a primary basis (see No. **5.33**), subject to agreement obtained under No. **9.21** from countries not listed in this provision. (WRC-12)

5.372 Harmful interference shall not be caused to stations of the radio astronomy service using the frequency band 1 610.6-1 613.8 MHz by stations of the radiodetermination-satellite and mobile-satellite services (No. **29.13** applies). The equivalent power flux-density (epfd) produced in the frequency band 1 610.6-1 613.8 MHz by all space stations of a non-geostationary-satellite system in the mobile-satellite service (space-to-Earth) operating in frequency band 1 613.8-1 626.5 MHz shall be in compliance with the protection criteria provided in Recommendations ITU-R RA.769-2 and ITU-R RA.1513-2, using the methodology given in Recommendation ITU-R M.1583-1, and the radio astronomy antenna pattern described in Recommendation ITU-R RA.1631-0. (WRC-19)

5.373 Maritime mobile earth stations receiving in the frequency band 1 621.35-1 626.5 MHz shall not impose additional constraints on earth stations operating in the maritime mobile-satellite service or maritime earth stations of the radiodetermination-satellite service operating in accordance with the Radio Regulations in the frequency band 1 610-1 621.35 MHz or on earth stations operating in the maritime mobile-satellite service operating in accordance with the Radio Regulations in the frequency band 1 626.5-1 660.5 MHz, unless otherwise agreed between the notifying administrations. (WRC-19)

5.373A Maritime mobile earth stations receiving in the frequency band 1 621.35-1 626.5 MHz shall not impose constraints on the assignments of earth stations of the mobile-satellite service (Earth-to-space) and the radiodetermination-satellite service (Earth-to-space) in the frequency band 1 621.35-1 626.5 MHz in networks for which complete coordination information has been received by the Radiocommunication Bureau before 28 October 2019. (WRC-19)

5.374 Mobile earth stations in the mobile-satellite service operating in the bands 1 631.5-1 634.5 MHz and 1 656.5-1 660 MHz shall not cause harmful interference to stations in the fixed service operating in the countries listed in No. **5.359**. (WRC-97)

5.375 The use of the band 1 645.5-1 646.5 MHz by the mobile-satellite service (Earth-to-space) and for inter-satellite links is limited to distress and safety communications (see Article **31**).

5.376 Transmissions in the band 1 646.5-1 656.5 MHz from aircraft stations in the aeronautical mobile (R) service directly to terrestrial aeronautical stations, or between aircraft stations, are also authorized when such transmissions are used to extend or supplement the aircraft-to-satellite links.

5.376A Mobile earth stations operating in the band 1 660-1 660.5 MHz shall not cause harmful interference to stations in the radio astronomy service. (WRC-97)

5.379 *Additional allocation:* in Bangladesh, India, Indonesia, Nigeria and Pakistan, the band 1 660.5-1 668.4 MHz is also allocated to the meteorological aids service on a secondary basis.

5.379A Administrations are urged to give all practicable protection in the band 1 660.5-1 668.4 MHz for future research in radio astronomy, particularly by eliminating air-to-ground transmissions in the meteorological aids service in the band 1 664.4-1 668.4 MHz as soon as practicable.

5.379B The use of the band 1 668-1 675 MHz by the mobile-satellite service is subject to coordination under No. **9.11A**. In the band 1 668-1 668.4 MHz, Resolution **904 (WRC-07)** shall apply. (WRC-07)

5.379C In order to protect the radio astronomy service in the band 1 668-1 670 MHz, the aggregate power flux-density values produced by mobile earth stations in a network of the mobile-satellite service operating in this band shall not exceed –181 dB(W/m^2) in 10 MHz and –194 dB(W/m^2) in any 20 kHz at any radio astronomy station recorded in the Master International Frequency Register, for more than 2% of integration periods of 2 000 s. (WRC-03)

5.379D For sharing of the band 1 668.4-1 675 MHz between the mobile-satellite service and the fixed and mobile services, Resolution **744 (Rev.WRC-07)** shall apply. (WRC-07)

5.379E In the band 1 668.4-1 675 MHz, stations in the mobile-satellite service shall not cause harmful interference to stations in the meteorological aids service in China, Iran (Islamic Republic of), Japan and Uzbekistan. In the band 1 668.4-1 675 MHz, administrations are urged not to implement new systems in the meteorological aids service and are encouraged to migrate existing meteorological aids service operations to other bands as soon as practicable. (WRC-03)

5.380A In the band 1 670-1 675 MHz, stations in the mobile-satellite service shall not cause harmful interference to, nor constrain the development of, existing earth stations in the meteorological-satellite service notified before 1 January 2004. Any new assignment to these earth stations in this band shall also be protected from harmful interference from stations in the mobile-satellite service. (WRC-07)

5.381 *Additional allocation:* in Afghanistan, Cuba, India, Iran (Islamic Republic of) and Pakistan, the band 1 690-1 700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-12)

5.384 *Additional allocation:* in India, Indonesia and Japan, the band 1 700-1 710 MHz is also allocated to the space research service (space-to-Earth) on a primary basis. (WRC-97)

5.384A The frequency bands 1 710-1 885 MHz, 2 300-2 400 MHz and 2 500-2 690 MHz, or portions thereof, are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with Resolution **223 (Rev.WRC-15)**. This identification does not preclude the use of these frequency bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-15)

5.385 *Additional allocation:* the band 1 718.8-1 722.2 MHz is also allocated to the radio astronomy service on a secondary basis for spectral line observations. (WRC-2000)

5.386 *Additional allocation:* the frequency band 1 750-1 850 MHz is also allocated to the space operation (Earth-to-space) and space research (Earth-to-space) services in Region 2 (except in Mexico), in Australia, Guam, India, Indonesia and Japan on a primary basis, subject to agreement obtained under No. **9.21**, having particular regard to troposcatter systems. (WRC-15)

5.388 The frequency bands 1 885-2 025 MHz and 2 110-2 200 MHz are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications (IMT). Such use does not preclude the use of these frequency bands by other services to which they are allocated. The frequency bands should be made available for IMT in accordance with Resolution **212 (Rev.WRC-15)** (see also Resolution **223 (Rev.WRC-15)**). (WRC-15)

5.388A In Regions 1 and 3, the bands 1 885-1 980 MHz, 2 010-2 025 MHz and 2 110-2 170 MHz and, in Region 2, the bands 1 885-1 980 MHz and 2 110-2 160 MHz may be used by high altitude platform stations as base stations to provide International Mobile Telecommunications (IMT), in accordance with Resolution **221 (Rev.WRC-07)**. Their use by IMT applications using high altitude platform stations as base stations does not preclude the use of these bands by any station in the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-12)

5.388B In Algeria, Saudi Arabia, Bahrain, Benin, Burkina Faso, Cameroon, Comoros, Côte d'Ivoire, China, Cuba, Djibouti, Egypt, United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, India, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Lebanon, Libya, Mali, Morocco, Mauritania, Nigeria, Oman, Uganda, Pakistan, Qatar, the Syrian Arab Republic, Senegal, Singapore, Sudan, South Sudan, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe, for the purpose of protecting fixed and mobile services, including IMT mobile stations, in their territories from co-channel interference, a high altitude platform station (HAPS) operating as an IMT base station in neighbouring countries, in the frequency bands referred to in No. **5.388A**, shall not exceed a co-channel power flux-density of −127 dB(W/(m^2 · MHz)) at the Earth's surface outside a country's borders unless explicit agreement of the affected administration is provided at the time of the notification of HAPS. (WRC-19)

5.389A The use of the bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service is subject to coordination under No. **9.11A** and to the provisions of Resolution **716 (Rev.WRC-2000)**[*]. (WRC-07)

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[*] *Note by the Secretariat:* This Resolution was revised by WRC-12.

5.389C The use of the bands 2 010-2 025 MHz and 2 160-2 170 MHz in Region 2 by the mobile-satellite service is subject to coordination under No. **9.11A** and to the provisions of Resolution **716 (Rev.WRC-2000)***. (WRC-07)

5.389E The use of the bands 2 010-2 025 MHz and 2 160-2 170 MHz by the mobile-satellite service in Region 2 shall not cause harmful interference to or constrain the development of the fixed and mobile services in Regions 1 and 3.

5.389F In Algeria, Cape Verde, Egypt, Iran (Islamic Republic of), Mali, Syrian Arab Republic and Tunisia, the use of the frequency bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service shall neither cause harmful interference to the fixed and mobile services, nor hamper the development of those services prior to 1 January 2005, nor shall the former service request protection from the latter services. (WRC-19)

5.391 In making assignments to the mobile service in the frequency bands 2 025-2 110 MHz and 2 200-2 290 MHz, administrations shall not introduce high-density mobile systems, as described in Recommendation ITU-R SA.1154-0, and shall take that Recommendation into account for the introduction of any other type of mobile system. (WRC-15)

5.392 Administrations are urged to take all practicable measures to ensure that space-to-space transmissions between two or more non-geostationary satellites, in the space research, space operations and Earth exploration-satellite services in the bands 2 025-2 110 MHz and 2 200-2 290 MHz, shall not impose any constraints on Earth-to-space, space-to-Earth and other space-to-space transmissions of those services and in those bands between geostationary and non-geostationary satellites.

5.398 In respect of the radiodetermination-satellite service in the band 2 483.5-2 500 MHz, the provisions of No. **4.10** do not apply.

5.401 In Angola, Australia, Bangladesh, China, Eritrea, Eswatini, Ethiopia, India, Lebanon, Liberia, Libya, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, Dem. Rep. of the Congo, Sudan, Togo and Zambia, the frequency band 2 483.5-2 500 MHz was already allocated on a primary basis to the radiodetermination-satellite service before WRC-12, subject to agreement obtained under No. **9.21** from countries not listed in this provision. Systems in the radiodetermination-satellite service for which complete coordination information has been received by the Radiocommunication Bureau before 18 February 2012 will retain their regulatory status, as of the date of receipt of the coordination request information. (WRC-19)

5.402 The use of the band 2 483.5-2 500 MHz by the mobile-satellite and the radiodetermination-satellite services is subject to the coordination under No. **9.11A**. Administrations are urged to take all practicable steps to prevent harmful interference to the radio astronomy service from emissions in the 2 483.5-2 500 MHz band, especially those caused by second-harmonic radiation that would fall into the 4 990-5 000 MHz band allocated to the radio astronomy service worldwide.

5.403 Subject to agreement obtained under No. **9.21**, the band 2 520-2 535 MHz may also be used for the mobile-satellite (space-to-Earth), except aeronautical mobile-satellite, service for operation limited to within national boundaries. The provisions of No. **9.11A** apply. (WRC-07)

5.404 *Additional allocation:* in India and Iran (Islamic Republic of), the band 2 500-2 516.5 MHz may also be used for the radiodetermination-satellite service (space-to-Earth) for operation limited to within national boundaries, subject to agreement obtained under No. **9.21**.

5.407 In the band 2 500-2 520 MHz, the power flux-density at the surface of the Earth from space stations operating in the mobile-satellite (space-to-Earth) service shall not exceed –152 dB(W/(m^2 · 4 kHz)) in Argentina, unless otherwise agreed by the administrations concerned.

5.410 The band 2 500-2 690 MHz may be used for tropospheric scatter systems in Region 1, subject to agreement obtained under No. **9.21**. No. **9.21** does not apply to tropospheric scatter links situated entirely outside Region 1. Administrations shall make all practicable efforts to avoid developing new tropospheric scatter systems in this band. When planning new tropospheric scatter radio-relay links in this band, all possible measures shall be taken to avoid directing the antennas of these links towards the geostationary-satellite orbit. (WRC-12)

5.413 In the design of systems in the broadcasting-satellite service in the bands between 2 500 MHz and 2 690 MHz, administrations are urged to take all necessary steps to protect the radio astronomy service in the band 2 690-2 700 MHz.

5.414 The allocation of the frequency band 2 500-2 520 MHz to the mobile-satellite service (space-to-Earth) is subject to coordination under No. **9.11A**. (WRC-07)

5.414A In Japan and India, the use of the bands 2 500-2 520 MHz and 2 520-2 535 MHz, under No. **5.403**, by a satellite network in the mobile-satellite service (space-to-Earth) is limited to operation within national boundaries and subject to the application of No. **9.11A**. The following pfd values shall be used as a threshold for coordination under No. **9.11A**, for all conditions and for all methods of modulation, in an area of 1 000 km around the territory of the administration notifying the mobile-satellite service network:

-136 dB(W/(m^2 · MHz)) for $0° \le \theta \le 5°$

$-136 + 0.55\,(\theta - 5)$ dB(W/(m^2 · MHz)) for $5° < \theta \le 25°$

-125 dB(W/(m^2 · MHz)) for $25° < \theta \le 90°$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. Outside this area Table **21-4** of Article **21** shall apply. Furthermore, the coordination thresholds in Table 5-2 of Annex 1 to Appendix **5** of the Radio Regulations (Edition of 2004), in conjunction with the applicable provisions of Articles **9** and **11** associated with No. **9.11A**, shall apply to systems for which complete notification information has been received by the Radicommunication Bureau by 14 November 2007 and that have been brought into use by that date. (WRC-07)

5.415 The use of the bands 2 500-2 690 MHz in Region 2 and 2 500-2 535 MHz and 2 655-2 690 MHz in Region 3 by the fixed-satellite service is limited to national and regional systems, subject to agreement obtained under No. **9.21**, giving particular attention to the broadcasting-satellite service in Region 1. (WRC-07)

5.415A *Additional allocation*: in India and Japan, subject to agreement obtained under No. **9.21**, the band 2 515-2 535 MHz may also be used for the aeronautical mobile-satellite service (space-to-Earth) for operation limited to within their national boundaries. (WRC-2000)

5.416 The use of the band 2 520-2 670 MHz by the broadcasting-satellite service is limited to national and regional systems for community reception, subject to agreement obtained under No. **9.21**. The provisions of No. **9.19** shall be applied by administrations in this band in their bilateral and multilateral negotiations. (WRC-07)

5.418 *Additional allocation:* in India, the frequency band 2 535-2 655 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of Resolution **528 (Rev.WRC-19)**. The provisions of No. **5.416** and Table **21-4** of Article **21** do not apply to this additional allocation. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to Resolution **539 (Rev.WRC-19)**. Geostationary broadcasting-satellite service (sound) systems for which complete Appendix **4** coordination information has been received after 1 June 2005 are limited to systems intended for national coverage. The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the frequency band 2 630-2 655 MHz, and for which complete Appendix **4** coordination information has been received after 1 June 2005, shall not exceed the following limits, for all conditions and for all methods of modulation:

-130 dB(W/(m^2 · MHz))	for $0° \le \theta \le 5°$
$-130 + 0.4\,(\theta - 5)$ dB(W/(m^2 · MHz))	for $5° < \theta \le 25°$
-122 dB(W/(m^2 · MHz))	for $25° < \theta \le 90°$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. These limits may be exceeded on the territory of any country whose administration has so agreed. As an exception to the limits above, the pfd value of −122 dB(W/(m^2 · MHz)) shall be used as a threshold for coordination under No. **9.11** in an area of 1 500 km around the territory of the administration notifying the broadcasting-satellite service (sound) system.

In addition, an administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. **5.416** for systems for which complete Appendix **4** coordination information has been received after 1 June 2005. (WRC-19)

5.418A In certain Region 3 countries listed in No. **5.418**,use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound) for which complete Appendix **4** coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. **9.12A**, in respect of geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, is considered to have been received after 2 June 2000, and No. **22.2** does not apply. No. **22.2** shall continue to apply with respect to geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, is considered to have been received before 3 June 2000. (WRC-03)

5.418B Use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **5.418**, for which complete Appendix **4** coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of No. **9.12**. (WRC-03)

5.418C Use of the band 2 630-2 655 MHz by geostationary-satellite networks for which complete Appendix **4** coordination information, or notification information, has been received after 2 June 2000 is subject to the application of the provisions of No. **9.13**with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **5.418** and No. **22.2** does not apply. (WRC-03)

5.419 When introducing systems of the mobile-satellite service in the band 2 670-2 690 MHz, administrations shall take all necessary steps to protect the satellite systems operating in this band prior to 3 March 1992. The coordination of mobile-satellite systems in the band shall be in accordance with No. **9.11A**. (WRC-07)

5.420 The band 2 655-2 670 MHz may also be used for the mobile-satellite (Earth-to-space), except aeronautical mobile-satellite, service for operation limited to within national boundaries, subject to agreement obtained under No. **9.21**. The coordination under No. **9.11A** applies. (WRC-07)

5.422 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Brunei Darussalam, Congo (Rep. of the), Côte d'Ivoire, Cuba, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Georgia, Guinea, Guinea-Bissau, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Mauritania, Mongolia, Montenegro, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, the Dem. Rep. of the Congo, Romania, Somalia, Tajikistan, Tunisia, Turkmenistan, Ukraine and Yemen, the band 2 690-2 700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985. (WRC-12)

5.423 In the band 2 700-2 900 MHz, ground-based radars used for meteorological purposes are authorized to operate on a basis of equality with stations of the aeronautical radionavigation service.

5.424A In the band 2 900-3 100 MHz, stations in the radiolocation service shall not cause harmful interference to, nor claim protection from, radar systems in the radionavigation service. (WRC-03)

5.425 In the band 2 900-3 100 MHz, the use of the shipborne interrogator-transponder (SIT) system shall be confined to the sub-band 2 930 -2 950 MHz.

5.426 The use of the band 2 900-3 100 MHz by the aeronautical radionavigation service is limited to ground-based radars.

5.427 In the bands 2 900-3 100 MHz and 9 300-9 500 MHz, the response from radar transponders shall not be capable of being confused with the response from radar beacons (racons) and shall not cause interference to ship or aeronautical radars in the radionavigation service, having regard, however, to No. **4.9**.

5.429 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Benin, Brunei Darussalam, Cambodia, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Egypt, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, New Zealand, Oman, Uganda, Pakistan, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, the Dem. People's Rep. of Korea, Sudan and Yemen, the frequency band 3 300-3 400 MHz is also allocated to the fixed and mobile services on a primary basis. New Zealand and the countries bordering the Mediterranean shall not claim protection for their fixed and mobile services from the radiolocation service. (WRC-19)

5.429E *Additional allocation*: in Papua New Guinea, the frequency band 3 300-3 400 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis. Stations in the mobile service operating in the frequency band 3 300-3 400 MHz shall not cause harmful interference to, or claim protection from, stations operating in the radiolocation service. (WRC-15)

5.429F In the following countries in Region 3: Cambodia, India, Indonesia, Lao P.D.R., Pakistan, the Philippines and Viet Nam, the use of the frequency band 3 300-3 400 MHz is identified for the implementation of International Mobile Telecommunications (IMT). Such use shall be in accordance with Resolution **223 (Rev.WRC-19)**. The use of the frequency band 3 300-3 400 MHz by IMT stations in the mobile service shall not cause harmful interference to, or claim protection from, systems in the radiolocation service. Before an administration brings into use a base or mobile station of an IMT system in this frequency band, it shall seek agreement under No. **9.21** with neighbouring countries to protect the radiolocation service. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-19)

5.432 *Different category of service:* in Korea (Rep. of), Japan, Pakistan and the Dem. People's Rep. of Korea, the allocation of the frequency band 3 400-3 500 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. **5.33**). (WRC-19)

5.432A In Korea (Rep. of), Japan, Pakistan and the Dem. People's Rep. of Korea, the frequency band 3 400-3 500 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. **9.17** and **9.18** also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band it shall ensure that the power flux density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(m^2 · 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the frequency band 3 400-3 500 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations (Edition of 2004). (WRC-19)

5.432B *Different category of service:* in Australia, Bangladesh, Brunei Darussalam, China, French overseas communities of Region 3, India, Indonesia, Iran (Islamic Republic of), Malaysia, New Zealand, the Philippines, Singapore and Thailand, the frequency band 3 400-3 500 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under No. **9.21** with other administrations and is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. **9.17** and **9.18** also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(m^2 · 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the frequency band 3 400-3 500 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations (Edition of 2004). (WRC-19)

5.433 In Regions 2 and 3, in the band 3 400-3 600 MHz the radiolocation service is allocated on a primary basis. However, all administrations operating radiolocation systems in this band are urged to cease operations by 1985. Thereafter, administrations shall take all practicable steps to protect the fixed-satellite service and coordination requirements shall not be imposed on the fixed-satellite service.

5.433A In Australia, Bangladesh, Brunei Darussalam, China, French overseas communities of Region 3, Korea (Rep. of), India, Indonesia, Iran (Islamic Republic of), Japan, New Zealand, Pakistan, the Philippines and the Dem. People's Rep. of Korea, the frequency band 3 500-3 600 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. At the stage of coordination the provisions of Nos. **9.17** and **9.18** also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this frequency band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dB(W/(m^2 · 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the frequency band 3 500-3 600 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations (Edition of 2004). (WRC-19)

5.435 In Japan, in the band 3 620-3 700 MHz, the radiolocation service is excluded.

5.436 Use of the frequency band 4 200-4 400 MHz by stations in the aeronautical mobile (R) service is reserved exclusively for wireless avionics intra-communication systems that operate in accordance with recognized international aeronautical standards. Such use shall be in accordance with Resolution **424 (WRC-15)**. (WRC-15)

5.437 Passive sensing in the Earth exploration-satellite and space research services may be authorized in the frequency band 4 200-4 400 MHz on a secondary basis. (WRC-15)

5.438 Use of the frequency band 4 200-4 400 MHz by the aeronautical radionavigation service is reserved exclusively for radio altimeters installed on board aircraft and for the associated transponders on the ground. (WRC-15)

5.439 *Additional allocation:* in Iran (Islamic Republic of), the band 4 200-4 400 MHz is also allocated to the fixed service on a secondary basis. (WRC-12)

5.440 The standard frequency and time signal-satellite service may be authorized to use the frequency 4 202 MHz for space-to-Earth transmissions and the frequency 6 427 MHz for Earth-to-space transmissions. Such transmissions shall be confined within the limits of ± 2 MHz of these frequencies, subject to agreement obtained under No. **9.21**.

5.440A In Region 2 (except Brazil, Cuba, French overseas departments and communities, Guatemala, Paraguay, Uruguay and Venezuela), and in Australia, the band 4 400-4 940 MHz may be used for aeronautical mobile telemetry for flight testing by aircraft stations (see No. **1.83**). Such use shall be in accordance with Resolution **416 (WRC-07)** and shall not cause harmful interference to, nor claim protection from, the fixed-satellite and fixed services. Any such use does not preclude the use of this band by other mobile service applications or by other services to which this band is allocated on a co-primary basis and does not establish priority in the Radio Regulations. (WRC-07)

5.441 The use of the bands 4 500-4 800 MHz (space-to-Earth), 6 725-7 025 MHz (Earth-to-space) by the fixed-satellite service shall be in accordance with the provisions of Appendix **30B**. The use of the bands 10.7-10.95 GHz (space-to-Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by geostationary-satellite systems in the fixed-satellite service shall be in accordance with the provisions of Appendix **30B**. The use of the bands 10.7-10.95 GHz (space-to-Earth), 11.2-11.45 GHz (space-to-Earth) and 12.75-13.25 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-2000)

5.441B In Angola, Armenia, Azerbaijan, Benin, Botswana, Brazil, Burkina Faso, Burundi, Cambodia, Cameroon, China, Côte d'Ivoire, Djibouti, Eswatini, Russian Federation, Gambia, Guinea, Iran (Islamic Republic of), Kazakhstan, Kenya, Lao P.D.R., Lesotho, Liberia, Malawi, Mauritius, Mongolia, Mozambique, Nigeria, Uganda, Uzbekistan, the Dem. Rep. of the Congo, Kyrgyzstan, the Dem. People's Rep. of Korea, Sudan, South Africa, Tanzania, Togo, Viet Nam, Zambia and Zimbabwe, the frequency band 4 800-4 990 MHz, or portions thereof, is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. The use of IMT stations is subject to agreement obtained under No. **9.21** with concerned administrations, and IMT stations shall not claim protection from stations of other applications of the mobile service. In addition, before an administration brings into use an IMT station in the mobile service, it shall ensure that the power flux-density (pfd) produced by this station does not exceed −155 dB(W/(m2 · 1 MHz)) produced up to 19 km above sea level at 20 km from the coast, defined as the low-water mark, as officially recognized by the coastal State. This pfd criterion is subject to review at WRC-23. Resolution **223 (Rev.WRC-19)** applies. This identification shall be effective after WRC-19. (WRC-19)

5.442 In the frequency bands 4 825-4 835 MHz and 4 950-4 990 MHz, the allocation to the mobile service is restricted to the mobile, except aeronautical mobile, service. In Region 2 (except Brazil, Cuba, Guatemala, Mexico, Paraguay, Uruguay and Venezuela), and in Australia, the frequency band 4 825-4 835 MHz is also allocated to the aeronautical mobile service, limited to aeronautical mobile telemetry for flight testing by aircraft stations. Such use shall be in accordance with Resolution **416 (WRC-07)** and shall not cause harmful interference to the fixed service. (WRC-15)

5.443 *Different category of service:* in Argentina, Australia and Canada, the allocation of the bands 4 825-4 835 MHz and 4 950-4 990 MHz to the radio astronomy service is on a primary basis (see No. **5.33**).

5.443AA In the frequency bands 5 000-5 030 MHz and 5 091-5 150 MHz, the aeronautical mobile-satellite (R) service is subject to agreement obtained under No. **9.21**. The use of these bands by the aeronautical mobile-satellite (R) service is limited to internationally standardized aeronautical systems. (WRC-12)

5.443B In order not to cause harmful interference to the microwave landing system operating above 5 030 MHz, the aggregate power flux-density produced at the Earth's surface in the frequency band 5 030-5 150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the frequency band 5 010-5 030 MHz shall not exceed −124.5 dB(W/m^2) in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the frequency band 4 990-5 000 MHz, radionavigation-satellite service systems operating in the frequency band 5 010-5 030 MHz shall comply with the limits in the frequency band 4 990-5 000 MHz defined in Resolution **741(Rev.WRC-15)**. (WRC-15)

5.443C The use of the frequency band 5 030-5 091 MHz by the aeronautical mobile (R) service is limited to internationally standardized aeronautical systems. Unwanted emissions from the aeronautical mobile (R) service in the frequency band 5 030-5 091 MHz shall be limited to protect RNSS system downlinks in the adjacent 5 010-5 030 MHz band. Until such time that an

appropriate value is established in a relevant ITU-R Recommendation, the e.i.r.p. density limit of −75 dBW/MHz in the frequency band 5 010-5 030 MHz for any AM(R)S station unwanted emission should be used. (WRC-12)

5.443D In the frequency band 5 030-5 091 MHz, the aeronautical mobile-satellite (R) service is subject to coordination under No. **9.11A**. The use of this frequency band by the aeronautical mobile-satellite (R) service is limited to internationally standardized aeronautical systems. (WRC-12)

5.444 The frequency band 5 030-5 150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. In the frequency band 5 030-5 091 MHz, the requirements of this system shall have priority over other uses of this frequency band. For the use of the frequency band 5 091-5 150 MHz, No. **5.444A** and Resolution **114 (Rev.WRC-15)** apply. (WRC-15)

5.444A The use of the allocation to the fixed-satellite service (Earth-to-space) in the frequency band 5 091-5 150 MHz is limited to feeder links of non-geostationary satellite systems in the mobile-satellite service and is subject to coordination under No. **9.11A**. The use of the frequency band 5 091-5 150 MHz by feeder links of non-geostationary satellite systems in the mobile-satellite service shall be subject to application of Resolution **114(Rev.WRC-15)**. Moreover, to ensure that the aeronautical radionavigation service is protected from harmful interference, coordination is required for feeder-link earth stations of the non-geostationary satellite systems in the mobile-satellite service which are separated by less than 450 km from the territory of an administration operating ground stations in the aeronautical radionavigation service. (WRC-15)

5.444B The use of the frequency band 5 091-5 150 MHz by the aeronautical mobile service is limited to:

– systems operating in the aeronautical mobile (R) service and in accordance with international aeronautical standards, limited to surface applications at airports. Such use shall be in accordance with Resolution **748 (Rev.WRC-19)**;

– aeronautical telemetry transmissions from aircraft stations (see No. **1.83**) in accordance with Resolution **418 (Rev.WRC-19)**. (WRC-19)

5.446 *Additional allocation:* in the countries listed in No. **5.369**, the frequency band 5 150-5 216 MHz is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis, subject to agreement obtained under No. **9.21**. In Region 2 (except in Mexico), the frequency band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis. In Regions 1 and 3, except those countries listed in No. **5.369** and Bangladesh, the frequency band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a secondary basis. The use by the radiodetermination-satellite service is limited to feeder links in conjunction with the radiodetermination-satellite service operating in the frequency bands 1 610-1 626.5 MHz and/or 2 483.5-2 500 MHz. The total power flux-density at the Earth's surface shall in no case exceed −159 dB(W/m^2) in any 4 kHz band for all angles of arrival. (WRC-15)

5.446A The use of the bands 5 150-5 350 MHz and 5 470-5 725 MHz by the stations in the mobile, except aeronautical mobile, service shall be in accordance with Resolution **229 (Rev.WRC-19)**. (WRC-19)

5.446B In the band 5 150-5 250 MHz, stations in the mobile service shall not claim protection from earth stations in the fixed-satellite service. No. **5.43A** does not apply to the mobile service with respect to fixed-satellite service earth stations. (WRC-03)

5.447A The allocation to the fixed-satellite service (Earth-to-space) in the band 5 150-5 250 MHz is limited to feeder links of non-geostationary-satellite systems in the mobile-satellite service and is subject to coordination under No. **9.11A**.

5.447B *Additional allocation*: the band 5 150-5 216 MHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis. This allocation is limited to feeder links of non-geostationary-satellite systems in the mobile-satellite service and is subject to provisions of No. **9.11A**. The power flux-density at the Earth's surface produced by space stations of the fixed-satellite service operating in the space-to-Earth direction in the band 5 150-5 216 MHz shall in no case exceed –164 dB(W/m^2) in any 4 kHz band for all angles of arrival.

5.447C Administrations responsible for fixed-satellite service networks in the band 5 150-5 250 MHz operated under Nos. **5.447A** and **5.447B** shall coordinate on an equal basis in accordance with No. **9.11A** with administrations responsible for non-geostationary-satellite networks operated under No. **5.446** and brought into use prior to 17 November 1995. Satellite networks operated under No. **5.446** brought into use after 17 November 1995 shall not claim protection from, and shall not cause harmful interference to, stations of the fixed-satellite service operated under Nos. **5.447A** and **5.447B**.

5.447D The allocation of the band 5 250-5 255 MHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the band by the space research service are on a secondary basis. (WRC-97)

5.447E *Additional allocation:* The frequency band 5 250-5 350 MHz is also allocated to the fixed service on a primary basis in the following countries in Region 3: Australia, Korea (Rep. of), India, Indonesia, Iran (Islamic Republic of), Japan, Malaysia, Papua New Guinea, the Philippines, Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam. The use of this frequency band by the fixed service is intended for the implementation of fixed wireless access systems and shall comply with Recommendation ITU-R F.1613-0. In addition, the fixed service shall not claim protection from the radiodetermination, Earth exploration-satellite (active) and space research (active) services, but the provisions of No. **5.43A** do not apply to the fixed service with respect to the Earth exploration-satellite (active) and space research (active) services. After implementation of fixed wireless access systems in the fixed service with protection for the existing radiodetermination systems, no more stringent constraints should be imposed on the fixed wireless access systems by future radiodetermination implementations. (WRC-15)

5.447F In the frequency band 5 250-5 350 MHz, stations in the mobile service shall not claim protection from the radiolocation service, the Earth exploration-satellite service (active) and the space research service (active). The radiolocation service, the Earth exploration-satellite service (active) and the space research service (active) shall not impose more stringent conditions upon the mobile service than those stipulated in Resolution **229 (Rev.WRC-19)**. (WRC-19)

5.448A The Earth exploration-satellite (active) and space research (active) services in the frequency band 5 250-5 350 MHz shall not claim protection from the radiolocation service. No. **5.43A** does not apply. (WRC-03)

5.448B The Earth exploration-satellite service (active) operating in the band 5 350-5 570 MHz and space research service (active) operating in the band 5 460-5 570 MHz shall not cause harmful interference to the aeronautical radionavigation service in the band 5 350-5 460 MHz, the radionavigation service in the band 5 460-5 470 MHz and the maritime radionavigation service in the band 5 470-5 570 MHz. (WRC-03)

5.448C The space research service (active) operating in the band 5 350-5 460 MHz shall not cause harmful interference to nor claim protection from other services to which this band is allocated. (WRC-03)

5.448D In the frequency band 5 350-5 470 MHz, stations in the radiolocation service shall not cause harmful interference to, nor claim protection from, radar systems in the aeronautical radionavigation service operating in accordance with No. **5.449**. (WRC-03)

5.449 The use of the band 5 350-5 470 MHz by the aeronautical radionavigation service is limited to airborne radars and associated airborne beacons.

5.450 *Additional allocation:* in Austria, Azerbaijan, Iran (Islamic Republic of), Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 5 470-5 650 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-12)

5.450A In the frequency band 5 470-5 725 MHz, stations in the mobile service shall not claim protection from radiodetermination services. The radiodetermination services shall not impose more stringent conditions upon the mobile service than those stipulated in Resolution **229 (Rev.WRC-19)**. (WRC-19)

5.450B In the frequency band 5 470-5 650 MHz, stations in the radiolocation service, except ground-based radars used for meteorological purposes in the band 5 600-5 650 MHz, shall not cause harmful interference to, nor claim protection from, radar systems in the maritime radionavigation service. (WRC-03)

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

5.453 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Djibouti, Egypt, the United Arab Emirates, Eswatini, Gabon, Guinea, Equatorial Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kenya, Kuwait, Lebanon, Libya, Madagascar, Malaysia, Niger, Nigeria, Oman, Uganda, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Sri Lanka, Tanzania, Chad, Thailand, Togo, Viet Nam and Yemen, the frequency band 5 650-5 850 MHz is also allocated to the fixed and mobile services on a primary basis. In this case, the provisions of Resolution **229** (**Rev.WRC-19**) do not apply. In addition, in Afghanistan, Angola, Benin, Bhutan, Botswana, Burkina Faso, Burundi, Dem. Rep. of the Congo, Fiji, Ghana, Kiribati, Lesotho, Malawi, Maldives, Mauritius, Micronesia, Mongolia, Mozambique, Myanmar, Namibia, Nauru, New Zealand, Papua New Guinea, Rwanda, Solomon Islands, South Sudan, South Africa, Tonga, Vanuatu, Zambia and Zimbabwe, the frequency band 5 725-5 850 MHz is allocated to the fixed service on a primary basis, and stations operating in the fixed service shall not cause harmful interference to and shall not claim protection from other primary services in the frequency band. (WRC-19)

5.457 In Australia, Burkina Faso, Cote d'Ivoire, Mali and Nigeria, the allocation to the fixed service in the bands 6 440-6 520 MHz (HAPS-to-ground direction) and 6 560-6 640 MHz (ground-to-HAPS direction) may also be used by gateway links for high-altitude platform stations (HAPS) within the territory of these countries. Such use is limited to operation in HAPS gateway links and shall not cause harmful interference to, and shall not claim protection from, existing services, and shall be in compliance with Resolution **150 (WRC-12)**. Existing services shall not be constrained in future development by HAPS gateway links. The use of HAPS gateway links in these bands requires explicit agreement with other administrations whose territories are located within 1 000 kilometres from the border of an administration intending to use the HAPS gateway links. (WRC-12)

5.457A In the frequency bands 5 925-6 425 MHz and 14-14.5 GHz, earth stations located on board vessels may communicate with space stations of the fixed-satellite service. Such use shall be in accordance with Resolution **902(WRC-03)**. In the frequency band 5 925-6 425 MHz, earth stations located on board vessels and communicating with space stations of the fixed-satellite service may employ transmit antennas with minimum diameter of 1.2 m and operate without prior agreement of any administration if located at least 330 km away from the low-water mark as officially recognized by the coastal State. All other provisions of Resolution **902 (WRC-03)** shall apply. (WRC-15)

5.458 In the band 6 425-7 075 MHz, passive microwave sensor measurements are carried out over the oceans. In the band 7 075-7 250 MHz, passive microwave sensor measurements are carried out. Administrations should bear in mind the needs of the Earth exploration-satellite (passive) and space research (passive) services in their future planning of the bands 6 425-7 075 MHz and 7 075-7 250 MHz.

5.458A In making assignments in the band 6 700-7 075 MHz to space stations of the fixed-satellite service, administrations are urged to take all practicable steps to protect spectral line observations of the radio astronomy service in the band 6 650-6 675.2 MHz from harmful interference from unwanted emissions.

5.458B The space-to-Earth allocation to the fixed-satellite service in the band 6 700-7 075 MHz is limited to feeder links for non-geostationary satellite systems of the mobile-satellite service and is subject to coordination under No. **9.11A**. The use of the band 6 700-7 075 MHz (space-to-Earth) by feeder links for non-geostationary satellite systems in the mobile-satellite service is not subject to No. **22.2**.

5.460 No emissions from space research service (Earth-to-space) systems intended for deep space shall be effected in the frequency band 7 190-7 235 MHz. Geostationary satellites in the space research service operating in the frequency band 7 190-7 235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. **5.43A**does not apply. (WRC-15)

5.460A The use of the frequency band 7 190-7 250 MHz (Earth-to-space) by the Earth exploration-satellite service shall be limited to tracking, telemetry and command for the operation of spacecraft. Space stations operating in the Earth exploration-satellite service (Earth-to-space) in the frequency band 7 190-7 250 MHz shall not claim protection from existing and future stations in the

fixed and mobile services, and No. **5.43A** does not apply. No. **9.17** applies. Additionally, to ensure protection of the existing and future deployment of fixed and mobile services, the location of earth stations supporting spacecraft in the Earth exploration-satellite service in non-geostationary orbits or geostationary orbit shall maintain a separation distance of at least 10 km and 50 km, respectively, from the respective border(s) of neighbouring countries, unless a shorter distance is otherwise agreed between the corresponding administrations. (WRC-15)

5.460B Space stations on the geostationary orbit operating in the Earth exploration-satellite service (Earth-to-space) in the frequency band 7 190-7 235 MHz shall not claim protection from existing and future stations of the space research service, and No. **5.43A** does not apply. (WRC-15)

5.461 *Additional allocation:* the bands 7 250-7 375 MHz (space-to-Earth) and 7 900-8 025 MHz (Earth-to-space) are also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under No. **9.21**.

5.461A The use of the band 7 450-7 550 MHz by the meteorological-satellite service (space-to-Earth) is limited to geostationary-satellite systems. Non-geostationary meteorological-satellite systems in this band notified before 30 November 1997 may continue to operate on a primary basis until the end of their lifetime. (WRC-97)

5.461AA The use of the frequency band 7 375-7 750 MHz by the maritime mobile-satellite service is limited to geostationary-satellite networks. (WRC-15)

5.461AB In the frequency band 7 375-7 750 MHz, earth stations in the maritime mobile-satellite service shall not claim protection from, nor constrain the use and development of, stations in the fixed and mobile, except aeronautical mobile, services. No. **5.43A** does not apply. (WRC-15)

5.461B The use of the band 7 750-7 900 MHz by the meteorological-satellite service (space-to-Earth) is limited to non-geostationary satellite systems. (WRC-12)

5.462A In Regions 1 and 3 (except for Japan), in the band 8 025-8 400 MHz, the Earth exploration-satellite service using geostationary satellites shall not produce a power flux-density in excess of the following values for angles of arrival (θ), without the consent of the affected administration:

-135 dB(W/m^2) in a 1 MHz band	for $0 \le \theta < 5°$	
$-135 + 0.5\,(\theta - 5)$ dB(W/m^2) in a 1 MHz band	for $5 \le \theta < 25°$	
-125 dB(W/m^2) in a 1 MHz band	for $25 \le \theta \le 90°$	(WRC-12)

5.463 Aircraft stations are not permitted to transmit in the band 8 025-8 400 MHz. (WRC-97)

5.465 In the space research service, the use of the band 8 400-8 450 MHz is limited to deep space.

5.466 *Different category of service:* in Singapore and Sri Lanka, the allocation of the band 8 400-8 500 MHz to the space research service is on a secondary basis (see No. **5.32**). (WRC-12)

5.468 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burundi, Cameroon, China, Congo (Rep. of the), Djibouti, Egypt, the United Arab Emirates, Eswatini, Gabon, Guyana, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Uganda, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Senegal, Singapore, Somalia, Sudan, Chad, Togo, Tunisia and Yemen, the frequency band 8 500-8 750 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-19)

5.469A In the band 8 550-8 650 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, or constrain the use and development of, stations of the radiolocation service. (WRC-97)

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

5.471 *Additional allocation:* in Algeria, Germany, Bahrain, Belgium, China, Egypt, the United Arab Emirates, France, Greece, Indonesia, Iran (Islamic Republic of), Libya, the Netherlands, Qatar and Sudan, the frequency bands 8 825-8 850 MHz and 9 000-9 200 MHz are also allocated to the maritime radionavigation service, on a primary basis, for use by shore-based radars only. (WRC-15)

5.472 In the bands 8 850-9 000 MHz and 9 200-9 225 MHz, the maritime radionavigation service is limited to shore-based radars.

5.473A In the band 9 000-9 200 MHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, systems identified in No. **5.337** operating in the aeronautical radionavigation service, or radar systems in the maritime radionavigation service operating in this band on a primary basis in the countries listed in No. **5.471**. (WRC-07)

5.474 In the band 9 200-9 500 MHz, search and rescue transponders (SART) may be used, having due regard to the appropriate ITU-R Recommendation (see also Article **31**).

5.474A The use of the frequency bands 9 200-9 300 MHz and 9 900-10 400 MHz by the Earth exploration-satellite service (active) is limited to systems requiring necessary bandwidth greater than 600 MHz that cannot be fully accommodated within the frequency band 9 300-9 900 MHz. Such use is subject to agreement to be obtained under No. **9.21** from Algeria, Saudi Arabia, Bahrain, Egypt, Indonesia, Iran (Islamic Republic of), Lebanon and Tunisia. An administration that has not replied under No. **9.52** is considered as not having agreed to the coordination request. In this case, the notifying administration of the satellite system operating in the Earth exploration-satellite service (active) may request the assistance of the Bureau under Sub-Section IID of Article **9**. (WRC-15)

5.474B Stations operating in the Earth exploration-satellite (active) service shall comply with Recommendation ITU-R RS.2066-0. (WRC-15)

5.474C Stations operating in the Earth exploration-satellite (active) service shall comply with Recommendation ITU-R RS.2065-0. (WRC-15)

5.474D Stations in the Earth exploration-satellite service (active) shall not cause harmful interference to, or claim protection from, stations of the maritime radionavigation and radiolocation services in the frequency band 9 200-9 300 MHz, the radionavigation and radiolocation services in the frequency band 9 900-10 000 MHz and the radiolocation service in the frequency band 10.0-10.4 GHz. (WRC-15)

5.475 The use of the band 9 300-9 500 MHz by the aeronautical radionavigation service is limited to airborne weather radars and ground-based radars. In addition, ground-based radar beacons in the aeronautical radionavigation service are permitted in the band 9 300-9 320 MHz on condition that harmful interference is not caused to the maritime radionavigation service. (WRC-07)

5.475A The use of the band 9 300-9 500 MHz by the Earth exploration-satellite service (active) and the space research service (active) is limited to systems requiring necessary bandwidth greater than 300 MHz that cannot be fully accommodated within the 9 500-9 800 MHz band. (WRC-07)

5.475B In the band 9 300-9 500 MHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, radars operating in the radionavigation service in conformity with the Radio Regulations. Ground-based radars used for meteorological purposes have priority over other radiolocation uses. (WRC-07)

5.476A In the band 9 300-9 800 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from, stations of the radionavigation and radiolocation services. (WRC-07)

5.477 *Different category of service:* in Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Djibouti, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Japan, Jordan, Kuwait, Lebanon, Liberia, Malaysia, Nigeria, Oman, Uganda, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Trinidad and Tobago, and Yemen, the allocation of the frequency band 9 800-10 000 MHz to the fixed service is on a primary basis (see No. **5.33**). (WRC-15)

5.478A The use of the band 9 800-9 900 MHz by the Earth exploration-satellite service (active) and the space research service (active) is limited to systems requiring necessary bandwidth greater than 500 MHz that cannot be fully accommodated within the 9 300-9 800 MHz band. (WRC-07)

5.478B In the band 9 800-9 900 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from stations of the fixed service to which this band is allocated on a secondary basis. (WRC-07)

5.479 The band 9 975-10 025 MHz is also allocated to the meteorological-satellite service on a secondary basis for use by weather radars.

5.481 *Additional allocation:* in Algeria, Germany, Angola, Brazil, China, Côte d'Ivoire, Egypt, El Salvador, Ecuador, Spain, Guatemala, Hungary, Japan, Kenya, Morocco, Nigeria, Oman, Uzbekistan, Pakistan, Paraguay, Peru, the Dem. People's Rep. of Korea, Romania, Tunisia and Uruguay, the frequency band 10.45-10.5 GHz is also allocated to the fixed and mobile services on a primary basis. In Costa Rica, the frequency band 10.45-10.5 GHz is also allocated to the fixed service on a primary basis. (WRC-19)

5.482 In the band 10.6-10.68 GHz, the power delivered to the antenna of stations of the fixed and mobile, except aeronautical mobile, services shall not exceed −3 dBW. This limit may be exceeded, subject to agreement obtained under No. **9.21**. However, in Algeria, Saudi Arabia, Armenia, Azerbaijan, Bahrain, Bangladesh, Belarus, Egypt, United Arab Emirates, Georgia, India, Indonesia, Iran (Islamic Republic of), Iraq, Jordan, Kazakhstan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Moldova, Nigeria, Oman, Uzbekistan, Pakistan, Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, Singapore, Tajikistan, Tunisia, Turkmenistan and Viet Nam, this restriction on the fixed and mobile, except aeronautical mobile, services is not applicable. (WRC-07)

5.482A For sharing of the band 10.6-10.68 GHz between the Earth exploration-satellite (passive) service and the fixed and mobile, except aeronautical mobile, services, Resolution **751 (WRC-07)** applies. (WRC-07)

5.483 *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, China, Colombia, Korea (Rep. of), Egypt, the United Arab Emirates, Georgia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Lebanon, Mongolia, Qatar, Kyrgyzstan, the Dem. People's Rep. of Korea, Tajikistan, Turkmenistan and Yemen, the frequency band 10.68-10.7 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985. (WRC-19)

5.484A The use of the bands 10.95-11.2 GHz (space-to-Earth), 11.45-11.7 GHz (space-to-Earth), 11.7-12.2 GHz (space-to-Earth) in Region 2, 12.2-12.75 GHz (space-to-Earth) in Region 3, 12.5-12.75 GHz (space-to-Earth) in Region 1, 13.75-14.5 GHz (Earth-to-space), 17.8-18.6 GHz (space-to-Earth), 19.7-20.2 GHz (space-to-Earth), 27.5-28.6 GHz (Earth-to-space), 29.5-30 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-2000)

5.484B Resolution **155 (WRC-15)** shall apply. (WRC-15)

5.487 In the band 11.7-12.5 GHz in Regions 1 and 3, the fixed, fixed-satellite, mobile, except aeronautical mobile, and broadcasting services, in accordance with their respective allocations, shall not cause harmful interference to, or claim protection from, broadcasting-satellite stations operating in accordance with the Regions 1 and 3 Plan in Appendix **30**. (WRC-03)

5.487A *Additional allocation:* in Region 1, the band 11.7-12.5 GHz, in Region 2, the band 12.2-12.7 GHz and, in Region 3, the band 11.7-12.2 GHz, are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis, limited to non-geostationary systems and subject to application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the broadcasting-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-03)

5.488 The use of the band 11.7-12.2 GHz by geostationary-satellite networks in the fixed-satellite service in Region 2 is subject to application of the provisions of No. **9.14** for coordination with stations of terrestrial services in Regions 1, 2 and 3. For the use of the band 12.2-12.7 GHz by the broadcasting-satellite service in Region 2, see Appendix **30**. (WRC-03)

5.492 Assignments to stations of the broadcasting-satellite service which are in conformity with the appropriate regional Plan or included in the Regions 1 and 3 List in Appendix **30** may also be used for transmissions in the fixed-satellite service (space-to-Earth), provided that such transmissions do not cause more interference, or require more protection from interference, than the broadcasting-satellite service transmissions operating in conformity with the Plan or the List, as appropriate. (WRC-2000)

5.493 The broadcasting-satellite service in the band 12.5-12.75 GHz in Region 3 is limited to a power flux-density not exceeding –111 dB(W/(m^2 · 27 MHz)) for all conditions and for all methods of modulation at the edge of the service area. (WRC-97)

5.497 The use of the band 13.25-13.4 GHz by the aeronautical radionavigation service is limited to Doppler navigation aids.

5.498A The Earth exploration-satellite (active) and space research (active) services operating in the band 13.25-13.4 GHz shall not cause harmful interference to, or constrain the use and development of, the aeronautical radionavigation service. (WRC-97)

5.499 *Additional allocation:* in Bangladesh and India, the band 13.25-14 GHz is also allocated to the fixed service on a primary basis. In Pakistan, the band 13.25-13.75 GHz is allocated to the fixed service on a primary basis. (WRC-12)

5.499C The allocation of the frequency band 13.4-13.65 GHz to the space research service on a primary basis is limited to:

– satellite systems operating in the space research service (space-to-space) to relay data from space stations in the geostationary-satellite orbit to associated space stations in non-geostationary satellite orbits for which advance publication information has been received by the Bureau by 27 November 2015,

– active spaceborne sensors,

– satellite systems operating in the space research service (space-to-Earth) to relay data from space stations in the geostationary-satellite orbit to associated earth stations.

Other uses of the frequency band by the space research service are on a secondary basis. (WRC-15)

5.499D In the frequency band 13.4-13.65 GHz, satellite systems in the space research service (space-to-Earth) and/or the space research service (space-to-space) shall not cause harmful interference to, nor claim protection from, stations in the fixed, mobile, radiolocation and Earth exploration-satellite (active) services. (WRC-15)

5.500 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Madagascar, Malaysia, Mali, Morocco, Mauritania, Niger, Nigeria, Oman, Qatar, the Syrian Arab Republic, Singapore, Sudan, South Sudan, Chad and Tunisia, the frequency band 13.4-14 GHz is also allocated to the fixed and mobile services on a primary basis. In Pakistan, the frequency band 13.4-13.75 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

5.501 *Additional allocation:* in Azerbaijan, Hungary, Japan, Kyrgyzstan, Romania and Turkmenistan, the band 13.4-14 GHz is also allocated to the radionavigation service on a primary basis. (WRC-12)

5.501A The allocation of the frequency band 13.65-13.75 GHz to the space research service on a primary basis is limited to active spaceborne sensors. Other uses of the frequency band by the space research service are on a secondary basis. (WRC-15)

5.501B In the band 13.4-13.75 GHz, the Earth exploration-satellite (active) and space research (active) services shall not cause harmful interference to, or constrain the use and development of, the radiolocation service. (WRC-97)

5.502 In the band 13.75-14 GHz, an earth station of a geostationary fixed-satellite service network shall have a minimum antenna diameter of 1.2 m and an earth station of a non-geostationary fixed-satellite service system shall have a minimum antenna diameter of 4.5 m. In addition, the e.i.r.p., averaged over one second, radiated by a station in the radiolocation or radionavigation services shall not exceed 59 dBW for elevation angles above 2° and 65 dBW at lower angles. Before an administration brings into use an earth station in a geostationary-satellite network in the fixed-satellite service in this band with an antenna diameter smaller than 4.5 m, it shall ensure that the power flux-density produced by this earth station does not exceed:

– –115 dB(W/(m^2 · 10 MHz)) for more than 1% of the time produced at 36 m above sea level at the low water mark, as officially recognized by the coastal State;

– –115 dB(W/(m^2 · 10 MHz)) for more than 1% of the time produced 3 m above ground at the border of the territory of an administration deploying or planning to deploy land mobile radars in this band, unless prior agreement has been obtained.

For earth stations within the fixed-satellite service having an antenna diameter greater than or equal to 4.5 m, the e.i.r.p. of any emission should be at least 68 dBW and should not exceed 85 dBW. (WRC-03)

5.503 In the band 13.75-14 GHz, geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 shall operate on an equal basis with stations in the fixed-satellite service; after that date, new geostationary space stations in the space research service will operate on a secondary basis. Until those geostationary space stations in the space research service for which information for advance publication has been received by the Bureau prior to 31 January 1992 cease to operate in this band:

– in the band 13.77-13.78 GHz, the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in geostationary-satellite orbit shall not exceed:

  i) $4.7D + 28$ dB(W/40 kHz), where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 1.2 m and less than 4.5 m;

  ii) $49.2 + 20 \log(D/4.5)$ dB(W/40 kHz), where D is the fixed-satellite service earth station antenna diameter (m) for antenna diameters equal to or greater than 4.5 m and less than 31.9 m;

  iii) 66.2 dB(W/40 kHz) for any fixed-satellite service earth station for antenna diameters (m) equal to or greater than 31.9 m;

  iv) 56.2 dB(W/4 kHz) for narrow-band (less than 40 kHz of necessary bandwidth) fixed-satellite service earth station emissions from any fixed-satellite service earth station having an antenna diameter of 4.5 m or greater;

– the e.i.r.p. density of emissions from any earth station in the fixed-satellite service operating with a space station in non-geostationary-satellite orbit shall not exceed 51 dBW in the 6 MHz band from 13.772 to 13.778 GHz.

Automatic power control may be used to increase the e.i.r.p. density in these frequency ranges to compensate for rain attenuation, to the extent that the power flux-density at the fixed-satellite service space station does not exceed the value resulting from use by an earth station of an e.i.r.p. meeting the above limits in clear-sky conditions. (WRC-03)

5.504 The use of the band 14-14.3 GHz by the radionavigation service shall be such as to provide sufficient protection to space stations of the fixed-satellite service.

5.504A In the band 14-14.5 GHz, aircraft earth stations in the secondary aeronautical mobile-satellite service may also communicate with space stations in the fixed-satellite service. The provisions of Nos. **5.29**, **5.30** and **5.31** apply. (WRC-03)

5.504B Aircraft earth stations operating in the aeronautical mobile-satellite service in the frequency band 14-14.5 GHz shall comply with the provisions of Annex 1, Part C of Recommendation ITU-R M.1643-0, with respect to any radio astronomy station performing observations in the 14.47-14.5 GHz frequency band located on the territory of Spain, France, India, Italy, the United Kingdom and South Africa. (WRC-15)

5.504C In the frequency band 14-14.25 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, Côte d'Ivoire, Egypt, Guinea, India, Iran (Islamic Republic of), Kuwait, Nigeria, Oman, the Syrian Arab Republic and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643-0, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **5.29**. (WRC-15)

5.505 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Botswana, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Djibouti, Egypt, the United Arab Emirates, Eswatini, Gabon, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Oman, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Chad, Viet Nam and Yemen, the frequency band 14-14.3 GHz is also allocated to the fixed service on a primary basis. (WRC-19)

5.506 The band 14-14.5 GHz may be used, within the fixed-satellite service (Earth-to-space), for feeder links for the broadcasting-satellite service, subject to coordination with other networks in the fixed-satellite service. Such use of feeder links is reserved for countries outside Europe.

5.506A In the band 14-14.5 GHz, ship earth stations with an e.i.r.p. greater than 21 dBW shall operate under the same conditions as earth stations located on board vessels, as provided in Resolution **902 (WRC-03)**. This footnote shall not apply to ship earth stations for which the complete Appendix **4** information has been received by the Bureau prior to 5 July 2003. (WRC-03)

5.506B Earth stations located on board vessels communicating with space stations in the fixed-satellite service may operate in the frequency band 14-14.5 GHz without the need for prior agreement from Cyprus and Malta, within the minimum distance given in Resolution **902 (WRC-03)** from these countries. (WRC-15)

5.508A In the frequency band 14.25-14.3 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, China, Côte d'Ivoire, Egypt, France, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643-0, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **5.29**. (WRC-15)

5.509A In the frequency band 14.3-14.5 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Bahrain, Botswana, Cameroon, China, Côte d'Ivoire, Egypt, France, Gabon, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Morocco, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom, Sri Lanka, Tunisia and Viet Nam by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643-0,

unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **5.29**. (WRC-15)

5.509B The use of the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163(WRC-15)** and 14.5-14.8 GHz in countries listed in Resolution **164 (WRC-15)** by the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service is limited to geostationary-satellites. (WRC-15)

5.509C For the use of the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163(WRC-15)** and 14.5-14.8 GHz in countries listed in Resolution **164 (WRC-15)** by the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service, the fixed-satellite service earth stations shall have a minimum antenna diameter of 6 m and a maximum power spectral density of −44.5 dBW/Hz at the input of the antenna. The earth stations shall be notified at known locations on land. (WRC-15)

5.509D Before an administration brings into use an earth station in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service in the frequency bands 14.5-14.75 GHz (in countries listed in Resolution **163(WRC-15)**) and 14.5-14.8 GHz (in countries listed in Resolution **164 (WRC-15)**), it shall ensure that the power flux-density produced by this earth station does not exceed −151.5 dB(W/(m^2 · 4 kHz)) produced at all altitudes from 0 m to 19 000 m above sea level at 22 km seaward from all coasts, defined as the low-water mark, as officially recognized by each coastal State. (WRC-15)

5.509E In the frequency bands 14.50-14.75 GHz in countries listed in Resolution **163 (WRC-15)** and 14.50-14.8 GHz in countries listed in Resolution **164(WRC-15)**, the location of earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall maintain a separation distance of at least 500 km from the border(s) of other countries unless shorter distances are explicitly agreed by those administrations. No. **9.17** does not apply. When applying this provision, administrations should consider the relevant parts of these Regulations and the latest relevant ITU-R Recommendations. (WRC-15)

5.509F In the frequency bands 14.50-14.75 GHz in countries listed in Resolution **163 (WRC-15)** and 14.50-14.8 GHz in countries listed in Resolution **164 (WRC-15)**, earth stations in the fixed-satellite service (Earth-to-space) not for feeder links for the broadcasting-satellite service shall not constrain the future deployment of the fixed and mobile services. (WRC-15)

5.509G The frequency band 14.5-14.8 GHz is also allocated to the space research service on a primary basis. However, such use is limited to the satellite systems operating in the space research service (Earth-to-space) to relay data to space stations in the geostationary-satellite orbit from associated earth stations. Stations in the space research service shall not cause harmful interference to, or claim protection from, stations in the fixed and mobile services and in the fixed-satellite service limited to feeder links for the broadcasting-satellite service and associated space operations functions using the guardbands under Appendix **30A** and feeder links for the broadcasting-satellite service in Region 2. Other uses of this frequency band by the space research service are on a secondary basis. (WRC-15)

5.510 Except for use in accordance with Resolution **163(WRC-15)** and Resolution **164(WRC-15)**, the use of the frequency band 14.5-14.8 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. This use is reserved for countries outside Europe. Uses other than feeder links for the broadcasting-satellite service are not authorized in Regions 1 and 2 in the frequency band 14.75-14.8 GHz. (WRC-15)

5.511 *Additional allocation:* in Saudi Arabia, Bahrain, Cameroon, Egypt, the United Arab Emirates, Guinea, Iran (Islamic Republic of), Iraq, Israel, Kuwait, Lebanon, Oman, Pakistan, Qatar, the Syrian Arab Republic and Somalia, the band 15.35-15.4 GHz is also allocated to the fixed and mobile services on a secondary basis. (WRC-12)

5.511A Use of the frequency band 15.43-15.63 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under No. **9.11A**. (WRC-15)

5.511C Stations operating in the aeronautical radionavigation service shall limit the effective e.i.r.p. in accordance with Recommendation ITU-R S.1340-0. The minimum coordination distance required to protect the aeronautical radionavigation stations (No. **4.10** applies) from harmful interference from feeder-link earth stations and the maximum e.i.r.p. transmitted towards the local horizontal plane by a feeder-link earth station shall be in accordance with Recommendation ITU-R S.1340-0. (WRC-15)

5.511E In the frequency band 15.4-15.7 GHz, stations operating in the radiolocation service shall not cause harmful interference to, or claim protection from, stations operating in the aeronautical radionavigation service. (WRC-12)

5.511F In order to protect the radio astronomy service in the frequency band 15.35-15.4 GHz, radiolocation stations operating in the frequency band 15.4-15.7 GHz shall not exceed the power flux-density level of −156 dB(W/m^2) in a 50 MHz bandwidth in the frequency band 15.35-15.4 GHz, at any radio astronomy observatory site for more than 2 per cent of the time. (WRC-12)

5.512 *Additional allocation:* in Algeria, Saudi Arabia, Austria, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Congo (Rep. of the), Egypt, El Salvador, the United Arab Emirates, Eritrea, Finland, Guatemala, India, Indonesia, Iran (Islamic Republic of), Jordan, Kenya, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Montenegro, Nepal, Nicaragua, Niger, Oman, Pakistan, Qatar, Syrian Arab Republic, the Dem. Rep. of the Congo, Singapore, Somalia, Sudan, South Sudan, Chad, Togo and Yemen, the frequency band 15.7-17.3 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-15)

5.513A Spaceborne active sensors operating in the band 17.2-17.3 GHz shall not cause harmful interference to, or constrain the development of, the radiolocation and other services allocated on a primary basis. (WRC-97)

5.514 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Bangladesh, Cameroon, El Salvador, the United Arab Emirates, Guatemala, India, Iran (Islamic Republic of), Iraq, Israel, Italy, Japan, Jordan, Kuwait, Libya, Lithuania, Nepal, Nicaragua, Nigeria, Oman, Uzbekistan, Pakistan, Qatar, Kyrgyzstan, Sudan and South Sudan, the frequency band 17.3-17.7 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits given in Nos. **21.3** and **21.5** shall apply. (WRC-15)

5.516 The use of the band 17.3-18.1 GHz by geostationary-satellite systems in the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service. The use of the band 17.3-17.8 GHz in Region 2 by systems in the fixed-satellite service (Earth-to-space) is limited to geostationary satellites. For the use of the band 17.3-17.8 GHz in Region 2 by feeder links for the broadcasting-satellite service in the band 12.2-12.7 GHz, see Article **11**. The use of the bands 17.3-18.1 GHz (Earth-to-

space) in Regions 1 and 3 and 17.8-18.1 GHz (Earth-to-space) in Region 2 by non-geostationary-satellite systems in the fixed-satellite service is subject to application of the provisions of No. **9.12** for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite systems in the fixed-satellite service shall not claim protection from geostationary-satellite networks in the fixed-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite systems in the fixed-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. **5.43A** does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-2000)

5.516B The following bands are identified for use by high-density applications in the fixed-satellite service:

17.3-17.7 GHz	(space-to-Earth) in Region 1,
18.3-19.3 GHz	(space-to-Earth) in Region 2,
19.7-20.2 GHz	(space-to-Earth) in all Regions,
39.5-40 GHz	(space-to-Earth) in Region 1,
40-40.5 GHz	(space-to-Earth) in all Regions,
40.5-42 GHz	(space-to-Earth) in Region 2,
47.5-47.9 GHz	(space-to-Earth) in Region 1,
48.2-48.54 GHz	(space-to-Earth) in Region 1,
49.44-50.2 GHz	(space-to-Earth) in Region 1,
and	
27.5-27.82 GHz	(Earth-to-space) in Region 1,
28.35-28.45 GHz	(Earth-to-space) in Region 2,
28.45-28.94 GHz	(Earth-to-space) in all Regions,
28.94-29.1 GHz	(Earth-to-space) in Region 2 and 3,
29.25-29.46 GHz	(Earth-to-space) in Region 2,
29.46-30 GHz	(Earth-to-space) in all Regions,
48.2-50.2 GHz	(Earth-to-space) in Region 2.

This identification does not preclude the use of these frequency bands by other fixed-satellite service applications or by other services to which these frequency bands are allocated on a co-primary basis and does not establish priority in these Radio Regulations among users of the frequency bands. Administrations should take this into account when considering regulatory provisions in relation to these frequency bands. See Resolution **143 (WRC-19)**[*]. (WRC-19)

5.517A The operation of earth stations in motion communicating with geostationary fixed-satellite service space stations within the frequency bands 17.7-19.7 GHz (space-to-Earth) and 27.5-29.5 GHz (Earth-to-space) shall be subject to the application of Resolution **169 (WRC-19)**. (WRC-19)

5.519 *Additional allocation:* the bands 18-18.3 GHz in Region 2 and 18.1-18.4 GHz in Regions 1 and 3 are also allocated to the meteorological-satellite service (space-to-Earth) on a primary basis. Their use is limited to geostationary satellites. (WRC-07)

5.520 The use of the band 18.1-18.4 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links of geostationary-satellite systems in the broadcasting-satellite service. (WRC-2000)

5.522A The emissions of the fixed service and the fixed-satellite service in the band 18.6-18.8 GHz are limited to the values given in Nos. **21.5A**and**21.16.2**, respectively. (WRC-2000)

5.522B The use of the band 18.6-18.8 GHz by the fixed-satellite service is limited to geostationary systems and systems with an orbit of apogee greater than 20 000 km. (WRC-2000)

5.522C In the band 18.6-18.8 GHz, in Algeria, Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, Jordan, Lebanon, Libya, Morocco, Oman, Qatar, the Syrian Arab Republic, Tunisia and Yemen, fixed-service systems in operation at the date of entry into force of the Final Acts of WRC-2000 are not subject to the limits of No. **21.5A**. (WRC-2000)

5.523A The use of the bands 18.8-19.3 GHz (space-to-Earth) and 28.6-29.1 GHz (Earth-to-space) by geostationary and non-geostationary fixed-satellite service networks is subject to the application of the provisions of No. **9.11A**and No. **22.2** does not apply. Administrations having geostationary-satellite networks under coordination prior to 18 November 1995 shall cooperate to the maximum extent possible to coordinate pursuant to No. **9.11A** with non-geostationary-satellite networks for which notification information has been received by the Bureau prior to that date, with a view to reaching results acceptable to all the parties concerned. Non-geostationary-satellite networks shall not cause unacceptable interference to geostationary fixed-satellite service networks for which complete Appendix **4** notification information is considered as having been received by the Bureau prior to 18 November 1995. (WRC-97)

[*] *Note by the Secretariat:* This Resolution was revised by WRC-07.

5.523B The use of the band 19.3-19.6 GHz (Earth-to-space) by the fixed-satellite service is limited to feeder links for non-geostationary-satellite systems in the mobile-satellite service. Such use is subject to the application of the provisions of No. **9.11A**, and No. **22.2** does not apply.

5.523C No. **22.2** shall continue to apply in the bands 19.3-19.6 GHz and 29.1-29.4 GHz, between feeder links of non-geostationary mobile-satellite service networks and those fixed-satellite service networks for which complete Appendix **4** coordination information, or notification information, is considered as having been received by the Bureau prior to 18 November 1995. (WRC-97)

5.523D The use of the band 19.3-19.7 GHz (space-to-Earth) by geostationary fixed-satellite service systems and by feeder links for non-geostationary-satellite systems in the mobile-satellite service is subject to the application of the provisions of No. **9.11A**, but not subject to the provisions of No. **22.2**. The use of this band for other non-geostationary fixed-satellite service systems, or for the cases indicated in Nos. **5.523C** and **5.523E**, is not subject to the provisions of No. **9.11A** and shall continue to be subject to Articles **9** (except No. **9.11A**) and **11** procedures, and to the provisions of No. **22.2**. (WRC-97)

5.523E No. **22.2** shall continue to apply in the bands 19.6-19.7 GHz and 29.4-29.5 GHz, between feeder links of non-geostationary mobile-satellite service networks and those fixed-satellite service networks for which complete Appendix **4** coordination information, or notification information, is considered as having been received by the Bureau by 21 November 1997. (WRC-97)

5.524 *Additional allocation:* in Afghanistan, Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Costa Rica, Egypt, the United Arab Emirates, Gabon, Guatemala, Guinea, India, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, South Sudan, Chad, Togo and Tunisia, the frequency band 19.7-21.2 GHz is also allocated to the fixed and mobile services on a primary basis. This additional use shall not impose any limitation on the power flux-density of space stations in the fixed-satellite service in the frequency band 19.7-21.2 GHz and of space stations in the mobile-satellite service in the frequency band 19.7-20.2 GHz where the allocation to the mobile-satellite service is on a primary basis in the latter frequency band. (WRC-15)

5.525 In order to facilitate interregional coordination between networks in the mobile-satellite and fixed-satellite services, carriers in the mobile-satellite service that are most susceptible to interference shall, to the extent practicable, be located in the higher parts of the bands 19.7-20.2 GHz and 29.5-30 GHz.

5.526 In the bands 19.7-20.2 GHz and 29.5-30 GHz in Region 2, and in the bands 20.1-20.2 GHz and 29.9-30 GHz in Regions 1 and 3, networks which are both in the fixed-satellite service and in the mobile-satellite service may include links between earth stations at specified or unspecified points or while in motion, through one or more satellites for point-to-point and point-to-multipoint communications.

5.527 In the bands 19.7-20.2 GHz and 29.5-30 GHz, the provisions of No. **4.10** do not apply with respect to the mobile-satellite service.

5.527A The operation of earth stations in motion communicating with the FSS is subject to Resolution **156 (WRC-15)**. (WRC-15)

5.528 The allocation to the mobile-satellite service is intended for use by networks which use narrow spot-beam antennas and other advanced technology at the space stations. Administrations operating systems in the mobile-satellite service in the band 19.7-20.1 GHz in Region 2 and in the band 20.1-20.2 GHz shall take all practicable steps to ensure the continued availability of these bands for administrations operating fixed and mobile systems in accordance with the provisions of No. **5.524**.

5.530A Unless otherwise agreed between the administrations concerned, any station in the fixed or mobile services of an administration shall not produce a power flux-density in excess of −120.4 dB(W/(m^2 · MHz)) at 3 m above the ground of any point of the territory of any other administration in Regions 1 and 3 for more than 20% of the time. In conducting the calculations, administrations should use the most recent version of Recommendation ITU-R P.452 (see also the most recent version of Recommendation ITU-R BO.1898). (WRC-15)

5.530B In the band 21.4-22 GHz, in order to facilitate the development of the broadcasting-satellite service, administrations in Regions 1 and 3 are encouraged not to deploy stations in the mobile service and are encouraged to limit the deployment of stations in the fixed service to point-to-point links. (WRC-12)

5.531 *Additional allocation:* in Japan, the band 21.4-22 GHz is also allocated to the broadcasting service on a primary basis.

5.532 The use of the band 22.21-22.5 GHz by the Earth exploration-satellite (passive) and space research (passive) services shall not impose constraints upon the fixed and mobile, except aeronautical mobile, services.

5.532A The location of earth stations in the space research service shall maintain a separation distance of at least 54 km from the respective border(s) of neighbouring countries to protect the existing and future deployment of fixed and mobile services unless a shorter distance is otherwise agreed between the corresponding administrations. Nos. **9.17** and **9.18** do not apply. (WRC-12)

5.532AB The frequency band 24.25-27.5 GHz is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution **242 (WRC-19)** applies. (WRC-19)

5.532B Use of the band 24.65-25.25 GHz in Region 1 and the band 24.65-24.75 GHz in Region 3 by the fixed-satellite service (Earth-to-space) is limited to earth stations using a minimum antenna diameter of 4.5 m. (WRC-12)

5.533 The inter-satellite service shall not claim protection from harmful interference from airport surface detection equipment stations of the radionavigation service.

5.534A The allocation to the fixed service in the frequency band 25.25-27.5 GHz is identified in Region 2 for use by high-altitude platform stations (HAPS) in accordance with the provisions of Resolution **166 (WRC-19)**. Such use of the fixed-service allocation by HAPS shall be limited to the ground-to-HAPS direction in the frequency band 25.25-27.0 GHz and to the HAPS-to-

ground direction in the frequency band 27.0-27.5 GHz. Furthermore, the use of the frequency band 25.5-27.0 GHz by HAPS shall be limited to gateway links. This identification does not preclude the use of this frequency band by other fixed-service applications or by other services to which this band is allocated on a co-primary basis, and does not establish priority in the Radio Regulations. (WRC-19)

5.535 In the band 24.75-25.25 GHz, feeder links to stations of the broadcasting-satellite service shall have priority over other uses in the fixed-satellite service (Earth-to-space). Such other uses shall protect and shall not claim protection from existing and future operating feeder-link networks to such broadcasting satellite stations.

5.535A The use of the band 29.1-29.5 GHz (Earth-to-space) by the fixed-satellite service is limited to geostationary-satellite systems and feeder links to non-geostationary-satellite systems in the mobile-satellite service. Such use is subject to the application of the provisions of No. **9.11A**, but not subject to the provisions of No. **22.2**, except as indicated in Nos. **5.523C** and **5.523E** where such use is not subject to the provisions of No. **9.11A** and shall continue to be subject to Articles **9** (except No. **9.11A**) and **11** procedures, and to the provisions of No. **22.2**. (WRC-97)

5.536 Use of the 25.25-27.5 GHz band by the inter-satellite service is limited to space research and Earth exploration-satellite applications, and also transmissions of data originating from industrial and medical activities in space.

5.536A Administrations operating earth stations in the Earth exploration-satellite service or the space research service shall not claim protection from stations in the fixed and mobile services operated by other administrations. In addition, earth stations in the Earth exploration-satellite service or in the space research service should be operated taking into account the most recent version of Recommendation ITU-R SA.1862. Resolution **242 (WRC-19)** applies. (WRC-19)

5.536B In Algeria, Saudi Arabia, Austria, Bahrain, Belgium, Brazil, China, Korea (Rep. of), Denmark, Egypt, United Arab Emirates, Estonia, Finland, Hungary, India, Iran (Islamic Republic of), Iraq, Ireland, Israel, Italy, Jordan, Kenya, Kuwait, Lebanon, Libya, Lithuania, Moldova, Norway, Oman, Uganda, Pakistan, the Philippines, Poland, Portugal, Qatar, the Syrian Arab Republic, Dem. People's Rep. of Korea, Slovakia, the Czech Rep., Romania, the United Kingdom, Singapore, Slovenia, Sudan, Sweden, Tanzania, Turkey, Viet Nam and Zimbabwe, earth stations operating in the Earth exploration-satellite service in the frequency band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. Resolution **242 (WRC-19)** applies. (WRC-19)

5.536C In Algeria, Saudi Arabia, Bahrain, Botswana, Brazil, Cameroon, Comoros, Cuba, Djibouti, Egypt, United Arab Emirates, Estonia, Finland, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Lithuania, Malaysia, Morocco, Nigeria, Oman, Qatar, Syrian Arab Republic, Somalia, Sudan, South Sudan, Tanzania, Tunisia, Uruguay, Zambia and Zimbabwe, earth stations operating in the space research service in the band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. (WRC-12)

5.537 Space services using non-geostationary satellites operating in the inter-satellite service in the band 27-27.5 GHz are exempt from the provisions of No. **22.2**.

5.537A In Bhutan, Cameroon, China, Korea (Rep. of), the Russian Federation, India, Indonesia, Iran (Islamic Republic of), Iraq, Japan, Kazakhstan, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sudan, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the frequency band 27.9-28.2 GHz may also be used by high altitude platform stations (HAPS) within the territory of these countries. Such use of 300 MHz of the fixed-service allocation by HAPS in the above countries is further limited to operation in the HAPS-to-ground direction and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services. Furthermore, the development of these other services shall not be constrained by HAPS. See Resolution **145 (Rev.WRC-19)**. (WRC-19)

5.538 *Additional allocation:* the bands 27.500-27.501 GHz and 29.999-30.000 GHz are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis for the beacon transmissions intended for up-link power control. Such space-to-Earth transmissions shall not exceed an equivalent isotropically radiated power (e.i.r.p.) of +10 dBW in the direction of adjacent satellites on the geostationary-satellite orbit. (WRC-07)

5.539 The band 27.5-30 GHz may be used by the fixed-satellite service (Earth-to-space) for the provision of feeder links for the broadcasting-satellite service.

5.540 *Additional allocation:* the band 27.501-29.999 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a secondary basis for beacon transmissions intended for up-link power control.

5.541 In the band 28.5-30 GHz, the earth exploration-satellite service is limited to the transfer of data between stations and not to the primary collection of information by means of active or passive sensors.

5.541A Feeder links of non-geostationary networks in the mobile-satellite service and geostationary networks in the fixed-satellite service operating in the band 29.1-29.5 GHz (Earth-to-space) shall employ uplink adaptive power control or other methods of fade compensation, such that the earth station transmissions shall be conducted at the power level required to meet the desired link performance while reducing the level of mutual interference between both networks. These methods shall apply to networks for which Appendix **4** coordination information is considered as having been received by the Bureau after 17 May 1996 and until they are changed by a future competent world radiocommunication conference. Administrations submitting Appendix **4** information for coordination before this date are encouraged to utilize these techniques to the extent practicable. (WRC-2000)

5.542 *Additional allocation:* in Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guinea, India, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Oman, Pakistan, Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Somalia, Sudan, South Sudan, Sri Lanka and Chad, the band 29.5-31 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits specified in Nos. **21.3** and **21.5** shall apply. (WRC-12)

5.543 The band 29.95-30 GHz may be used for space-to-space links in the Earth exploration-satellite service for telemetry, tracking, and control purposes, on a secondary basis.

5.543B The allocation to the fixed service in the frequency band 31-31.3 GHz is identified for worldwide use by high-altitude platform stations (HAPS). This identification does not preclude the use of this frequency band by other fixed-service applications or by other services to which this frequency band is allocated on a co-primary basis, and does not establish priority in the Radio Regulations. Such use of the fixed-service allocation by HAPS shall be in accordance with the provisions of Resolution **167 (WRC-19)**. (WRC-19)

5.544 In the band 31-31.3 GHz the power flux-density limits specified in Article **21**, Table **21-4** shall apply to the space research service.

5.546 *Different category of service:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Egypt, the United Arab Emirates, Spain, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Israel, Jordan, Lebanon, Moldova, Mongolia, Oman, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Romania, the United Kingdom, South Africa, Tajikistan, Turkmenistan and Turkey, the allocation of the frequency band 31.5-31.8 GHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. **5.33**). (WRC-19)

5.547 The bands 31.8-33.4 GHz, 37-40 GHz, 40.5-43.5 GHz, 51.4-52.6 GHz, 55.78-59 GHz and 64-66 GHz are available for high-density applications in the fixed service (see Resolution **75(WRC-2000)**[*]). Administrations should take this into account when considering regulatory provisions in relation to these bands. Because of the potential deployment of high-density applications in the fixed-satellite service in the bands 39.5-40 GHz and 40.5-42 GHz (see No. **5.516B**), administrations should further take into account potential constraints to high-density applications in the fixed service, as appropriate. (WRC-07)

5.547A Administrations should take practical measures to minimize the potential interference between stations in the fixed service and airborne stations in the radionavigation service in the 31.8-33.4 GHz band, taking into account the operational needs of the airborne radar systems. (WRC-2000)

5.548 In designing systems for the inter-satellite service in the band 32.3-33 GHz, for the radionavigation service in the band 32-33 GHz, and for the space research service (deep space) in the band 31.8-32.3 GHz, administrations shall take all necessary measures to prevent harmful interference between these services, bearing in mind the safety aspects of the radionavigation service (see Recommendation **707**). (WRC-03)

5.549 *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Singapore, Somalia, Sudan, South Sudan, Sri Lanka, Togo, Tunisia and Yemen, the band 33.4-36 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-12)

5.549A In the band 35.5-36.0 GHz, the mean power flux-density at the Earth's surface, generated by any spaceborne sensor in the Earth exploration-satellite service (active) or space research service (active), for any angle greater than 0.8° from the beam centre shall not exceed −73.3 dB(W/m^2) in this band. (WRC-03)

5.550A For sharing of the band 36-37 GHz between the Earth exploration-satellite (passive) service and the fixed and mobile services, Resolution **752 (WRC-07)** shall apply. (WRC-07)

5.550B The frequency band 37-43.5 GHz, or portions thereof, is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Because of the potential deployment of FSS earth stations within the frequency range 37.5-42.5 GHz and high-density applications in the fixed-satellite service in the frequency bands 39.5-40 GHz in Region 1, 40-40.5 GHz in all Regions and 40.5-42 GHz in Region 2 (see No. **5.516B**), administrations should further take into account potential constraints to IMT in these frequency bands, as appropriate. Resolution **243 (WRC-19)** applies. (WRC-19)

5.550C The use of the frequency bands 37.5-39.5 GHz (space-to-Earth), 39.5-42.5 GHz (space-to-Earth), 47.2-50.2 GHz (Earth-to-space) and 50.4-51.4 GHz (Earth-to-space) by a non-geostationary-satellite system in the fixed-satellite service is subject to the application of the provisions of No. **9.12** for coordination with other non-geostationary satellite systems in the fixed-satellite service but not with non-geostationary-satellite systems in other services. Resolution **770 (WRC-19)** shall also apply, and No. **22.2** shall continue to apply. (WRC-19)

5.550D The allocation to the fixed service in the frequency band 38-39.5 GHz is identified for worldwide use by administrations wishing to implement high-altitude platform stations (HAPS). In the HAPS-to-ground direction, the HAPS ground station shall not claim protection from stations in the fixed, mobile and fixed-satellite services; and No. **5.43A** does not apply. This identification does not preclude the use of this frequency band by other fixed-service applications or by other services to which this frequency band is allocated on a co-primary basis and does not establish priority in the Radio Regulations. Furthermore, the development of the fixed-satellite, fixed and mobile services shall not be unduly constrained by HAPS. Such use of the fixed-service allocation by HAPS shall be in accordance with the provisions of Resolution **168 (WRC-19)**. (WRC-19)

5.550E The use of the frequency bands 39.5-40 GHz and 40-40.5 GHz by non-geostationary-satellite systems in the mobile-satellite service (space-to-Earth) and by non-geostationary-satellite systems in the fixed-satellite service (space-to-Earth) is subject to the application of the provisions of No. **9.12** for coordination with other non-geostationary satellite systems in the fixed-satellite and mobile-satellite services but not with non-geostationary-satellite systems in other services. No. **22.2** shall continue to apply for non-geostationary-satellite-systems. (WRC-19)

5.551F *Different category of service*: in Japan, the allocation of the band 41.5-42.5 GHz to the mobile service is on a primary basis (see No. **5.33**). (WRC-97)

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[*] *Note by the Secretariat:* This Resolution was revised by WRC-12.

5.551H The equivalent power flux-density (epfd) produced in the frequency band 42.5-43.5 GHz by all space stations in any non-geostationary-satellite system in the fixed-satellite service (space-to-Earth), or in the broadcasting-satellite service operating in the frequency band 42-42.5 GHz, shall not exceed the following values at the site of any radio astronomy station for more than 2% of the time:

−230 dB(W/m^2) in 1 GHz and −246 dB(W/m^2) in any 500 kHz of the frequency band 42.5-43.5 GHz at the site of any radio astronomy station registered as a single-dish telescope; and

−209 dB(W/m^2) in any 500 kHz of the frequency band 42.5-43.5 GHz at the site of any radio astronomy station registered as a very long baseline interferometry station.

Theseepfdvaluesshallbeevaluatedusingthemethodologygiveninrecommendationitu-r S.1586-1 and the reference antenna pattern and the maximum gain of an antenna in the radio astronomy service given in Recommendation ITU-R RA.1631-0 and shall apply over the whole sky and for elevation angles higher than the minimum operating angle θ_{min} of the radiotelescope (for which a default value of 5° should be adopted in the absence of notified information).

These values shall apply at any radio astronomy station that either:

– was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or

– was notified before the date of receipt of the complete Appendix **4** information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution **743 (WRC-03)** shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed. (WRC-15)

5.551I The power flux-density in the band 42.5-43.5 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth), or the broadcasting-satellite service operating in the 42-42.5 GHz band, shall not exceed the following values at the site of any radio astronomy station:

–137 dB(W/m^2) in 1 GHz and –153 dB(W/m^2) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a single-dish telescope; and

–116 dB(W/m^2) in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a very long baseline interferometry station.

These values shall apply at the site of any radio astronomy station that either:

– was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or

– was notified before the date of receipt of the complete Appendix **4** information for coordination or notification, as appropriate, for the space station to which the limits apply.

Other radio astronomy stations notified after these dates may seek an agreement with administrations that have authorized the space stations. In Region 2, Resolution **743(WRC-03)** shall apply. The limits in this footnote may be exceeded at the site of a radio astronomy station of any country whose administration so agreed. (WRC-03)

5.552 The allocation of the spectrum for the fixed-satellite service in the bands 42.5-43.5 GHz and 47.2-50.2 GHz for Earth-to-space transmission is greater than that in the band 37.5-39.5 GHz for space-to-Earth transmission in order to accommodate feeder links to broadcasting satellites. Administrations are urged to take all practicable steps to reserve the band 47.2-49.2 GHz for feeder links for the broadcasting-satellite service operating in the band 40.5-42.5 GHz.

5.552A The allocation to the fixed service in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz is identified for use by high-altitude platform stations (HAPS). This identification does not preclude the use of this frequency band by any application of the services to which it is allocated on a co-primary basis, and does not establish priority in the Radio Regulations. Such use of the fixed-service allocation in the frequency bands 47.2-47.5 GHz and 47.9-48.2 GHz by HAPS shall be in accordance with the provisions of Resolution **122 (Rev.WRC-19)**. (WRC-19)

5.553 In the bands 43.5-47 GHz and 66-71 GHz, stations in the land mobile service may be operated subject to not causing harmful interference to the space radiocommunication services to which these bands are allocated (see No. **5.43**). (WRC-2000)

5.553A In Algeria, Angola, Bahrain, Belarus, Benin, Botswana, Brazil, Burkina Faso, Cabo Verde, Korea (Rep. of), Côte d'Ivoire, Croatia, United Arab Emirates, Estonia, Eswatini, Gabon, Gambia, Ghana, Greece, Guinea, Guinea-Bissau, Hungary, Iran (Islamic Republic of), Iraq, Jordan, Kuwait, Lesotho, Latvia, Liberia, Lithuania, Madagascar, Malawi, Mali, Morocco, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Oman, Qatar, Senegal, Seychelles, Sierra Leone, Slovenia, Sudan, South Africa, Sweden, Tanzania, Togo, Tunisia, Zambia and Zimbabwe, the frequency band 45.5-47 GHz is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT), taking into account No. **5.553**. With respect to the aeronautical mobile service and radionavigation service, the use of this frequency band for the implementation of IMT is subject to agreement obtained under No. **9.21** with concerned administrations and shall not cause harmful interference to, or claim protection from these services. This identification does not preclude the use of this frequency band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. Resolution **244 (WRC-19**) applies. (WRC-19)

5.553B In Region 2 and Algeria, Angola, Saudi Arabia, Australia, Bahrain, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Central African Rep., Comoros, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Djibouti, Egypt, United Arab Emirates, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Equatorial Guinea, India, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kenya, Kuwait, Lesotho, Liberia, Libya, Lithuania, Madagascar, Malaysia, Malawi, Mali, Morocco, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Oman, Uganda, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Singapore, Slovenia, Somalia, Sudan, South Sudan, South Africa, Sweden, Tanzania, Chad, Togo, Tunisia, Zambia and Zimbabwe, the frequency band 47.2-48.2 GHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency

band by any application of the services to which it is allocated, and does not establish any priority in the Radio Regulations. Resolution **243 (WRC-19)** applies. (WRC-19)

5.554 In the bands 43.5-47 GHz, 66-71 GHz, 95-100 GHz, 123-130 GHz, 191.8-200 GHz and 252-265 GHz, satellite links connecting land stations at specified fixed points are also authorized when used in conjunction with the mobile-satellite service or the radionavigation-satellite service. (WRC-2000)

5.555 *Additional allocation:* the band 48.94-49.04 GHz is also allocated to the radio astronomy service on a primary basis. (WRC-2000)

5.555C The use of the frequency band 51.4-52.4 GHz by the fixed-satellite service (Earth-to-space) is limited to geostationary-satellite networks. The earth stations shall be limited to gateway earth stations with a minimum antenna diameter of 2.4 metres. (WRC-19)

5.556 In the bands 51.4-54.25 GHz, 58.2-59 GHz and 64-65 GHz, radio astronomy observations may be carried out under national arrangements. (WRC-2000)

5.556A Use of the bands 54.25-56.9 GHz, 57-58.2 GHz and 59-59.3 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density at all altitudes from 0 km to 1 000 km above the Earth's surface produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, shall not exceed –147 dB(W/(m^2 · 100 MHz)) for all angles of arrival. (WRC-97)

5.556B *Additional allocation:* in Japan, the band 54.25-55.78 GHz is also allocated to the mobile service on a primary basis for low-density use. (WRC-97)

5.557 *Additional allocation:* in Japan, the band 55.78-58.2 GHz is also allocated to the radiolocation service on a primary basis. (WRC-97)

5.557A In the band 55.78-56.26 GHz, in order to protect stations in the Earth exploration-satellite service (passive), the maximum power density delivered by a transmitter to the antenna of a fixed service station is limited to –26 dB(W/MHz). (WRC-2000)

5.558 In the bands 55.78-58.2 GHz, 59-64 GHz, 66-71 GHz, 122.25-123 GHz, 130-134 GHz, 167-174.8 GHz and 191.8-200 GHz, stations in the aeronautical mobile service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **5.43**). (WRC-2000)

5.558A Use of the band 56.9-57 GHz by inter-satellite systems is limited to links between satellites in geostationary-satellite orbit and to transmissions from non-geostationary satellites in high-Earth orbit to those in low-Earth orbit. For links between satellites in the geostationary-satellite orbit, the single entry power flux-density at all altitudes from 0 km to 1 000 km above the Earth's surface, for all conditions and for all methods of modulation, shall not exceed –147 dB(W/(m^2 · 100 MHz)) for all angles of arrival. (WRC-97)

5.559 In the band 59-64 GHz, airborne radars in the radiolocation service may be operated subject to not causing harmful interference to the inter-satellite service (see No. **5.43**). (WRC-2000)

5.559AA The frequency band 66-71 GHz is identified for use by administrations wishing to implement the terrestrial component of International Mobile Telecommunications (IMT). This identification does not preclude the use of this frequency band by any application of the services to which this frequency band is allocated and does not establish priority in the Radio Regulations. Resolution **241 (WRC-19)** applies. (WRC-19)

5.559B The use of the frequency band 77.5-78 GHz by the radiolocation service shall be limited to short-range radar for ground-based applications, including automotive radars. The technical characteristics of these radars are provided in the most recent version of Recommendation ITU-R M.2057. The provisions of No. **4.10** do not apply. (WRC-15)

5.560 In the band 78-79 GHz radars located on space stations may be operated on a primary basis in the Earth exploration-satellite service and in the space research service.

5.561 In the band 74-76 GHz, stations in the fixed, mobile and broadcasting services shall not cause harmful interference to stations of the fixed-satellite service or stations of the broadcasting-satellite service operating in accordance with the decisions of the appropriate frequency assignment planning conference for the broadcasting-satellite service. (WRC-2000)

5.561A The 81-81.5 GHz band is also allocated to the amateur and amateur-satellite services on a secondary basis. (WRC-2000)

5.561B In Japan, use of the band 84-86 GHz, by the fixed-satellite service (Earth-to-space) is limited to feeder links in the broadcasting-satellite service using the geostationary-satellite orbit. (WRC-2000)

5.562 The use of the band 94-94.1 GHz by the Earth exploration-satellite (active) and space research (active) services is limited to spaceborne cloud radars. (WRC-97)

5.562A In the bands 94-94.1 GHz and 130-134 GHz, transmissions from space stations of the Earth exploration-satellite service (active) that are directed into the main beam of a radio astronomy antenna have the potential to damage some radio astronomy receivers. Space agencies operating the transmitters and the radio astronomy stations concerned should mutually plan their operations so as to avoid such occurrences to the maximum extent possible. (WRC-2000)

5.562B In the frequency bands 105-109.5 GHz, 111.8-114.25 GHz and 217-226 GHz, the use of this allocation is limited to space-based radio astronomy only. (WRC-19)

5.562C Use of the band 116-122.25 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, at all altitudes from 0 km to 1 000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, shall not exceed –148 dB(W/(m^2 · MHz)) for all angles of arrival. (WRC-2000)

5.562D *Additional allocation*: In Korea (Rep. of), the frequency bands 128-130 GHz, 171-171.6 GHz, 172.2-172.8 GHz and 173.3-174 GHz are also allocated to the radio astronomy service on a primary basis. Radio astronomy stations in Korea (Rep. of) operating in the frequency bands referred to in this footnote shall not claim protection from, or constrain the use and development of, services in other countries operating in accordance with the Radio Regulations. (WRC-15)

5.562E The allocation to the Earth exploration-satellite service (active) is limited to the band 133.5-134 GHz. (WRC-2000)

5.562H Use of the bands 174.8-182 GHz and 185-190 GHz by the inter-satellite service is limited to satellites in the geostationary-satellite orbit. The single-entry power flux-density produced by a station in the inter-satellite service, for all conditions and for all methods of modulation, at all altitudes from 0 to 1 000 km above the Earth's surface and in the vicinity of all geostationary orbital positions occupied by passive sensors, shall not exceed −144 dB(W/(m^2 · MHz)) for all angles of arrival. (WRC-2000)

5.563A In the bands 200-209 GHz, 235-238 GHz, 250-252 GHz and 265-275 GHz, ground-based passive atmospheric sensing is carried out to monitor atmospheric constituents. (WRC-2000)

5.563B The band 237.9-238 GHz is also allocated to the Earth exploration-satellite service (active) and the space research service (active) for spaceborne cloud radars only. (WRC-2000)

5.564A For the operation of fixed and land mobile service applications in frequency bands in the range 275-450 GHz:

The frequency bands 275-296 GHz, 306-313 GHz, 318-333 GHz and 356-450 GHz are identified for use by administrations for the implementation of land mobile and fixed service applications, where no specific conditions are necessary to protect Earth exploration-satellite service (passive) applications.

The frequency bands 296-306 GHz, 313-318 GHz and 333-356 GHz may only be used by fixed and land mobile service applications when specific conditions to ensure the protection of Earth exploration-satellite service (passive) applications are determined in accordance with Resolution **731 (Rev.WRC-19)**.

In those portions of the frequency range 275-450 GHz where radio astronomy applications are used, specific conditions (e.g. minimum separation distances and/or avoidance angles) may be necessary to ensure protection of radio astronomy sites from land mobile and/or fixed service applications, on a case-by-case basis in accordance with Resolution **731 (Rev.WRC-19)**.

The use of the above-mentioned frequency bands by land mobile and fixed service applications does not preclude use by, and does not establish priority over, any other applications of radio services in the range of 275-450 GHz. (WRC-19)

5.565 The following frequency bands in the range 275-1 000 GHz are identified for use by administrations for passive service applications:

– radio astronomy service: 275-323 GHz, 327-371 GHz, 388-424 GHz, 426-442 GHz, 453-510 GHz, 623-711 GHz, 795-909 GHz and 926-945 GHz;

– Earth exploration-satellite service (passive) and space research service (passive): 275-286 GHz, 296-306 GHz, 313-356 GHz, 361-365 GHz, 369-392 GHz, 397-399 GHz, 409-411 GHz, 416-434 GHz, 439-467 GHz, 477-502 GHz, 523-527 GHz, 538-581 GHz, 611-630 GHz, 634-654 GHz, 657-692 GHz, 713-718 GHz, 729-733 GHz, 750-754 GHz, 771-776 GHz, 823-846 GHz, 850-854 GHz, 857-862 GHz, 866-882 GHz, 905-928 GHz, 951-956 GHz, 968-973 GHz and 985-990 GHz.

The use of the range 275-1 000 GHz by the passive services does not preclude use of this range by active services. Administrations wishing to make frequencies in the 275-1 000 GHz range available for active service applications are urged to take all practicable steps to protect these passive services from harmful interference until the date when the Table of Frequency Allocations is established in the above-mentioned 275-1 000 GHz frequency range.

All frequencies in the range 1 000-3 000 GHz may be used by both active and passive services. (WRC-12)

National Footnotes

TON01 Ministry OF MEIDECC may issue individual license, on case by case basis, for operation of low power broadcasting stations in broadcasting service for small coverage community audio-broadcasting in the certain number of channels in the frequency bands 47 – 50 MHz, 54 – 68 MHz and 87 – 108 MHz under section 5 Communication Radio Spectrum Rule 2019. The detailed technical and operational regulations may be found in Ministry OF MEIDECC;

TON02 The frequency bands 380 – 399.9 MHz, 821 – 824 MHz / 866 – 869 MHz and 5850 – 5925 MHz are also reserved for PPDR purpose.

TON03 The application of fixed service in the frequency bands that are identified for IMT by this footnote is restricted to co-existing converged fixed and mobile wireless access in the same IMT network, if permitted by issued license.

TON04 The frequency bands, or part of the frequency bands 3300 – 3400 MHz, 3600 – 3800 MHz, 24.25 – 27.5 GHz, 37 – 43.5 GHz, 66 – 71 GHz or the part of, designated to IMT and reserved for future extension of broadband IMT services. Any other use of these bands is subject to protection of above utilization.

FREQUENCY ALLOCATIONS OF KINGDOM OF TONGA

MINISTRY OF MEIDECC

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Abbreviations

ACAS	Airborne Collision Avoidance System
ALS	Aircraft Landing System
ASDE	Airport Surface Detection Equipment
BFWA	Broadband Fixed Wireless Access
CB	Citizen Band (transceiver)
CNPC	Control and Non-payload Communication (link)
CT	Cordless Telephone
DL	Downlink
DME	Distance Measuring Equipment
DSRC	Dedicated Short Range Communications (vehicular system)
DTH	Direct To Home (broadcasting via satellite)
DVB-S	Digital Video Broadcasting – Satellite (specification)
ENG	Electronic News Gathering
ESV	Earth Stations on-board Vessels
FD	Frequency Division (Duplex)
FWA	Fixed Wireless Access
FWS	Fixed Wireless System
GSO	Geostationary Orbit
HAPS	High Altitude Platform Stations
HDFSS	High-Density applications in the Fixed-Satellite Service
HIPERLAN	High Performance Radio LAN
IMT	International Mobile Telecommunications
IoT	Internet of Thing
ISM	Industrial, Scientific and Medical applications
ITU	International Telecommunications Union
JTIDS	Joint Tactical Information and Distribution System
LAN	Local Area Network
LPR	Level Probing Radar
MDS	Multipoint Distribution System
MIDS	Multifunctional Information Distribution System
MLS	Microwave Landing System
MNO	Mobile Network Operator
MPR	Medium Power Radar
PPDR	Public Protection and Disaster Relief
RDF	Radio Direction Finding
Rec.	Recommendation
RFID	Radio Frequency Identification
RLAN	Radio Local Area Network
RR	Radio Regulations
RSME	Radar Sensing and Measurement System
RT-COM	Radio Telephony Communication
SAB	Service Ancillary to Broadcasting
SAP	Service Ancillary to Program making
SART	Search And Rescue Radar Transponders
SIT	Satellite Interactive Terminals
SNG	Satellite News Gathering
SSR	Secondary Surveillance Radar
TACAN	TACtical Air Navigation
TD	Time Division (Duplex)
TON	Tonga
TTT	Transport and Traffic Telematics
UAS	Unmanned Aircraft Systems

UL	Uplink
ULP-WMCE	Ultra-Low Power Wireless Medical Capsule Endoscopy
UWB	Ultra Wide Band
VLBI	Very Long Baseline Interferometry
VTS	Vessel Traffic Service
WLL	Wireless Local Loop