ECTEL REGIONAL SPECTRUM MANAGEMENT PLAN

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Contents

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1. GENERAL

1.0 INTRODUCTION

The radio frequency spectrum is an important but limited resource managed by the Eastern Caribbean Telecommunications Authority ("ECTEL") for the people of the ECTEL Member States. The radio frequency spectrum provides a useful medium for the establishment of telecommunications and broadcasting services for the functioning and growth of the economies of the region.

The ECTEL Regional Spectrum Management Plan ("the Plan") is a regional plan and divides the ECTEL radio frequency spectrum into several frequency bands and designates the general purposes for which each frequency band may be utilized. This process is referred to as the allocation of frequency bands to radiocommunication services.

ECTEL is responsible for providing advice on Electronic Communications (Telecommunications) to the governments of the ECTEL Member States on the allocation of the spectrum resource to meet the demands of existing and emerging technologies and services thereby ensuring that the radio frequency spectrum provides the greatest economic and social benefit to the peoples of the region.

ECTEL Member States are signatories to the International Telecommunications Union (ITU), the Caribbean Telecommunications Union (CTU) and collaborate with other intergovernmental and national telecommunications regulatory organisations in the Americas. Consequently, there is a need to have a regional spectrum framework that will inform the development of national telecommunications infrastructure within the ECTEL Member States as well as ensure that international treaties and conventions are observed.

1.1 BACKGROUND

ECTEL was established by Treaty on 4th May 2000 and provides support for the management of the telecommunications affairs of five ECTEL Member States, namely the Commonwealth of Dominica, Grenada, the Federation of St Kitts and Nevis, Saint Lucia, and St Vincent and the Grenadines. The management of the limited spectrum resource is carried out under a multi-island spectrum management regime. One of the basic principles applied is that of harmonizing the processes to ensure equitable distribution of the spectrum at the national level.

The five (5) ECTEL Member States are located in the Eastern Caribbean, from the Federation of St Kitts and Nevis on the northern extreme to Grenada at the most southern end. The Member States are bordered by islands of English, French and Dutch speaking persons and cultures. This unique juxtaposition of islands requires a sound and prudent spectrum management process for effectiveness.

ECTEL is comprised a Council of Ministers responsible for the formulation of policy for the management of telecommunications in the Member States, a Board of Directors that ensures effective implementation of the Treaty and policies in accordance with Directives from the Council, and a regional Directorate responsible for the general administration of the Treaty and the day-to-day management of ECTEL. The Directorate is headed by a Managing Director and staffed with the required professionals.

1.2 INTENT

The intent of the Plan is to broadly detail the radio communications services that are permitted for use (referred to as 'allocations') in the various frequency bands within the ECTEL Member States and to broadly detail the internationally agreed spectrum allocations of the International Telecommunication Union (ITU) for Region 2. Please be advised that the ECTEL Member States belong to ITU Region 2.

1.3 LEGISLATIVE AND REGULATORY FRAMEWORK

The principal legislative frameworks for the management of the spectrum resource are the ECTEL Treaty, the Electronic Communications/Telecommunications Act and Regulations made under those Acts of the ECTEL Member States. Article 5 of the ECTEL Treaty mandates ECTEL to prepare and maintain a harmonized regional radio spectrum plan for the five (5) ECTEL Member States. Further, ECTEL advises the National Telecommunications Regulatory Commission ('NTRC') of its Member States on the management and assignment of the radio frequency spectrum resource to meet the demands of existing and emerging technologies and services, thereby ensuring that the radio frequency spectrum provides the greatest economic and social benefit to the citizens of the region.

Under the Electronic Communications/Telecommunications Act, the NTRC, in conjunction with ECTEL, plans, supervises, regulates and manages the use of the radio frequency spectrum. The Electronic Communications/Telecommunications Act sets out the basic provisions which give the Commission the power to manage and monitor the national radio frequency spectrum resource. Regulations made pursuant to the Act further enhance the legal mandate for ECTEL and the NTRC to manage radio frequency spectrum resource.

In preparation for the legislative reform and the introduction of the new Electronic Communications legislative framework, the ECTEL Treaty was amended by Protocol Amendment, which came into force on 5th December 2019. ECTEL recommended a harmonised Electronic Communications ('EC') Bill for the five (5) Member States.
On 18th February 2021, the EC Act was passed by the National Assembly in the Federation of St. Kitts and Nevis. The EC Act now replaces the Telecommunications Act in the Federation of St. Kitts and Nevis, and it is envisaged that in the future the remaining ECTEL Member States will transition to the EC legislative framework.

2.0 NAME OF SPECTRUM PLAN

The Spectrum Plan is the ECTEL Regional Spectrum Management Plan.

3.0 COMMENCEMENT

The ECTEL Regional Spectrum Management Plan commenced on 3rd April 2006 and was published on 18th June 2006. On 18th June 2012, the Plan was amended to reflect the recommendations of World Radiocommunications Conference 2007 (WRC-2007). A further revision was conducted in 2021, amending the Plan to incorporate the recommendations of WRC-2012, WRC-2015 and WRC-2019. The revised Plan commences on 15th August 2022.

4.0 DEFINITIONS OF TERMS AND SERVICES AND ITU REGIONS

The ITU has definitions for terms and services used throughout the ITU Radio Regulations that can be found in Article 1 of those regulations. The ECTEL Regional Spectrum Management Plan has incorporated the following ITU definitions for those terms and services used throughout the Plan.

4.1 TERMS AND DEFINITIONS

Introduction

For the purposes of the Plan, the terms used 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 Article 1 of the ITU Radio Regulations.

4.2 GENERAL TERMS

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).

Telecommunications: Any form of transmission, emission, or reception of signs, text, images and sounds or other intelligence of any nature by wire, radio, optical or other electromagnetic means.

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

Radio waves or hertzian waves: Electromagnetic waves of frequencies arbitrarily lower than 3000 GHz, propagated in space without artificial guide**.**

Radiocommunication: Telecommunication by means of radio waves (CS) (CV).

Terrestrial radiocommunication: Any radiocommunication other than space radiocommunication or radio astronomy.

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.

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*.

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

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

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

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

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

4.3 SPECIFIC TERMS RELATED TO FREQUENCY MANAGEMENT

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.

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.

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.

4.4 RADIO SERVICES

Radiocommunication service: A service as defined in this Section involving the transmission, *emission* and/or reception of *radio waves* for specific *telecommunication* purposes. In the Radio Regulations, unless otherwise stated, any *radiocommunication service* relates to *terrestrial radiocommunication*.

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

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*.

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

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.

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

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.

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

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

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.

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.

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.

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.

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.

Aeronautical mobile (R[1]) service*:* An *aeronautical mobile service* reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes.

[1][1]

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] (R): route

[1][1] (OR): off-route

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.

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.

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.

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).

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*.

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

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.

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

Radionavigation-satellite service*:* A *radiodetermination-satellite service* used for the purpose of *radionavigation*. This service may also include *feeder links* necessary for its operation.

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

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

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

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

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

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.

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

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.

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

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.

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.

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

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.

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

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

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

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*.

4.5 RADIO STATIONS AND SYSTEMS

***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.

***Terrestrial station**:* A *station* effecting *terrestrial radiocommunication*. In the Radio Regulations, unless otherwise stated, any *station* is a terrestrial station.

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.

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.

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

***Mobile station**:* A *station* in the *mobile service* intended to be used while in motion or during halts at unspecified points.
***Mobile earth station**:* An *earth station* in the *mobile-satellite service* intended to be used while in motion or during halts at unspecified points. ***Land station**:* A *station* in the *mobile service* not intended to be used while in motion.

***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*.

Base station: A *land station* in the *land mobile service*.

***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*.

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

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.

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

***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*.

***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*.

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

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.

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

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.

***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* .

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

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

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

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

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

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

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

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

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

***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.

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

***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.

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

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

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

***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.*

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

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

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

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

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.

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.

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.

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.

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

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.

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.

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

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

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

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

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.

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.

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.

4.6 OPERATIONAL TERMS

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).

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).

Telegram: Written matter intended to be transmitted by *telegraphy* for delivery to the addressee. This term also includes *radio telegrams* unless otherwise specified (CS). In this definition the term *telegraphy* has the same general meaning as defined in the Convention.

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*.

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*.

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

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.

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

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*.

Simplex operation: Operating method in which transmission is made possible alternately in each direction of a *telecommunication* channel, for example, by means of manual control2.

Duplex operation*:* Operating method in which transmission is possible simultaneously in both directions of a *telecommunication* channel2.

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

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

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 antennae.

[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.

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 antennae larger than those used for *individual reception* , and intended for use:

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

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

Radiotelemetry: *Telemetry* by means of *radio waves*.

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*.

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

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* .

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.

4.7 CHARACTERISTICS OF EMISSIONS AND RADIO EQUIPMENT

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

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.*

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.

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

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

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.

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

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*.

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*.

Unwanted emissions*:* Consist of *spurious emissions* and *out-of-band emissions*.

Out-of-band domain (of an emission)*:* The frequency range, immediately outside the necessary bandwidth but excluding the *spurious domain* , in which *out-o f-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)

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

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

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.

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*.

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 106 or in hertz.

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.

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 ß/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 ß/2 should be taken as 0.5%.

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.

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.

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.
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 norm al operating conditions.

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.

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.

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 (*Gi*), 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 (*Gv*), 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.

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)*.

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.

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.

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

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

4.8 FREQUENCY SHARING

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.

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

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.

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).

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.

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

***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)

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

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

***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.

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.

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*.

4.9 TECHNICAL TERMS RELATING TO SPACE

Deep space: Space at distances from the Earth equal to, or greater than, 2 × 106 km.

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

***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.

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

Reflecting satellite: A *satellite* intended to reflect radiocommunication signals.

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* .

***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.

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.
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)

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

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.

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

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. (WRC03)

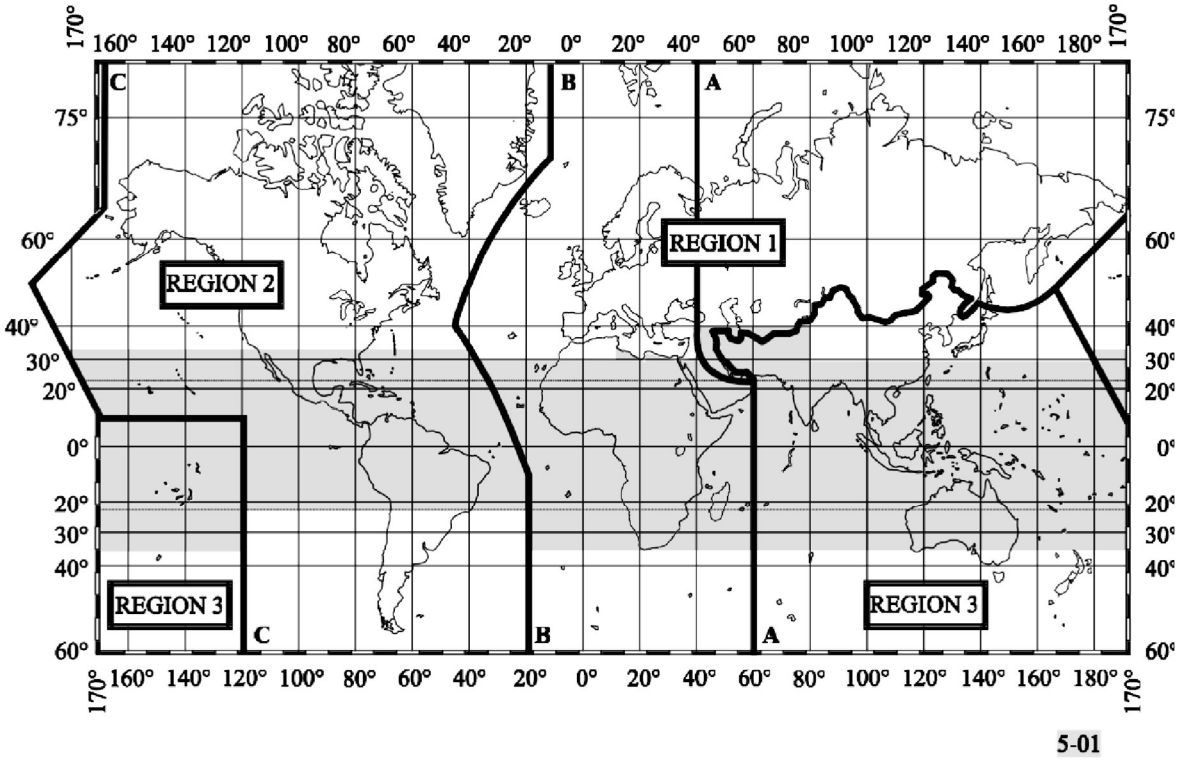
Geostationary-satellite orbit*:* The *orbit* of a *geosynchronous satellite* whose circular and direct *orbit* lies in the plane of the Earth's equator.

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

4.10 ITU GEOGRAPHIC REGIONS

REGIONS AND AREAS

4.11 For the allocation of frequencies the world has been divided into three Regions[4] as shown on the following map and described in Nos. 5.2 to 5 .8:



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

4.12. *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.

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

4.14 *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.

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

4.16 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.

4.17 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.

4.18 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.

4.19 For the purposes of the Radio Regulations, the term "African Broadcasting Area" means:

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

4.21 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;

4.22 *c) islands in the Atlantic Ocean east of line B defined in No. 6.7 of the Radio Regulations, situated between the parallels 40° South and 30° North.*

4.23 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, Iraq, Jordan and that part of the territory of Syrian Arab Republic, Turkey and Ukraine lying outside the above limits are included in the European Broadcasting Area.

4.24 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.

4.25 1) The "Tropical Zone" (see map in No. 6.1) is defined as:

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

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

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

4.29 ii) that part of Libyan Arab Jamahiriya north of parallel 30° North.

4.30 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 RR).

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

5.0 FREQUENCY ALLOCATION TABLE

The ECTEL regional frequency allocations are based on the ITU's frequency allocations for Region 2 as defined in the geographic regions. The ECTEL frequency allocations are found in column 2 of the Frequency Allocation Table (illustrated below) with the ITU's Region 2 frequency allocations juxtaposed in column 1.

The ECTEL allocations are closely aligned with ITU recommendations of Region 2; however, there are some variations to ensure that national and regional policies are met. Where variations are made, cognisance is taken of Radio Regulation No. 4.4 which requires

that any variation is subject to the condition that the associated radio installations do not cause harmful interference to the radio services or communications of other ITU Member States that operate in accordance with the provisions of the ITU's Radio Regulations, and that the possibility of harmful interference from such services and communications is accepted.

The ECTEL Spectrum is allocated from 9 kHz to 1000 GHz. It is however not utilised beyond 275 GHz as the proliferation of radio equipment within the ECTEL Member States is limited to those devices operating below 275 GHz.

5.1 SPECTRUM PLAN DIVIDED INTO FREQUENCY BANDS

The Plan is divided into frequency bands for the ITU Region 2 and the ECTEL Tables.

5.2 REFERENCES TO SERVICES MADE IN THE TABLE

5.1 Words in the ECTEL Table appearing in Full Upper Case refer to **Primary Services** of the type specified by those words.

5.2 Words in the ECTEL table appearing in lower case refer to **secondary services** of the type specified by those words.

5.3 CONDITIONS THAT APPLY TO CERTAIN SERVICES

Where

(a) A frequency band is used for the purposes of a service in accordance with the Plan and

(b) The ITU Radio Regulations do not provide for the frequency band to be used for that service

Then the requirements for the coordination and notification of services by administrations apply to that use of the frequency band under this Plan.

5.4 TABLE OF FREQUENCY ALLOCATIONS

Table of Frequency Allocations	
8.3-110 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
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
9- 11.3 METEOROLOGICAL AIDS 5.54A RADIONAVIGATION	**9- 11.3** METEOROLOGICAL AIDS 5.54A RADIONAVIGATION
11.3 - 14 RADIONAVIGATION	**11.3 - 14** RADIONAVIGATION
14-19.95 FIXED MARITIME MOBILE 5.57 5.55 5.58	**14-19.95** FIXED MARITIME MOBILE 5.57 5.55
19.95-20.05 STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)	**19.95-20.05** STANDARD FREQUENCY AND TIME SIGNAL (20 kHz)
20.05-70 FIXED MARITIME MOBILE 5.57 5.56 5.58	**20.05-70** FIXED MARITIME MOBILE 5.57 5.56
70-90 FIXED MARITIME MOBILE 5.57 MARITIME RADIONAVIGATION 5.60 Radiolocation	**70-90** FIXED MARITIME MOBILE 5.57 MARITIME RADIONAVIGATION 5.60 Radiolocation
90-110 RADIONAVIGATION 5.62 Fixed 5.64	**90-110** RADIONAVIGATION 5.62 Fixed 5.64

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 1bis) 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.

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.

5.61 In Region 2, the establishment and operation of stations in the maritime radionavigation service in the bands 70-90 kHz and 110-130 kHz shall be subject to agreement obtained under No. 9.21 with administrations whose services,
operating in accordance with the Table, may be affected. However, stations of the fixed, maritime mobile and radiolocation services shall not cause harmful interference to stations in the maritime radionavigation service established under such agreements.

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.

5.63 (SUP - WRC-97)

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.

110-255 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
110-130 FIXED MARITIME MOBILE MARITIME RADIO-NAVIGATION 5.60 Radiolocation 5.61 5.64	**110-130** FIXED MARITIME MOBILE MARITIME RADIO-NAVIGATION 5.60 Radiolocation 5.61 5.64
130-135.7 FIXED MARITIME MOBILE 5.64	**130-135.7** FIXED MARITIME MOBILE 5.64
Allocation to services	
ITU Region 2	**ECTEL**
135.7-137.8 FIXED MARITIME MOBILE Amateur 5.67A	**135.7-137.8** FIXED MARITIME MOBILE Amateur 5.67A
137.8-160 FIXED MARITIME MOBILE	**137.8-160** FIXED MARITIME MOBILE
160-190 FIXED	**160-190** FIXED
190-200 AERONAUTICAL RADIONAVIGATION	**190-200** AERONAUTICAL RADIONAVIGATION

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)

5.73 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. (WRC97)

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.

200-415 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
200-275 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	**200-275** AERONAUTICAL RADIONAVIGATION Aeronautical mobile
275-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)	**275-285** AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)
285-315 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73	**285-315** AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 5.73
315-325 MARITIME RADIONAVIGATION (radiobeacons) 5.73 Aeronautical radionavigation	**315-325** MARITIME RADIONAVIGATION (radiobeacons) 5.73 Aeronautical radionavigation
315-325 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)	**325-335** AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)
335-405 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	**335-405** AERONAUTICAL RADIONAVIGATION Aeronautical mobile
405-415 RADIONAVIGATION 5.76 Aeronautical mobile	**405-415** RADIONAVIGATION 5.76 Aeronautical mobile
415-495 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
415-472 MARITIME MOBILE 5.79 Aeronautical radionavigation 5.77 5.80	**415-472** MARITIME MOBILE 5.79 Aeronautical radionavigation 5.80
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 5.80 5.82
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 5.80 5.82

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 nondirectional beacons not employing voice transmission.

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)

495-1 800 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
495-505 MARITIME MOBILE 5.82C	**495-505** MARITIME MOBILE 5.82C
505-510 MARITIME MOBILE 5.79	**505-510** MARITIME MOBILE 5.79
510-525 MARITIME MOBILE 5.79A 5.84 AERONAUTICAL RADIONAVIGATION	**510-525** MARITIME MOBILE 5.79A 5.84 AERONAUTICAL RADIONAVIGATION
525-535 BROADCASTING 5.86 AERONAUTICAL RADIONAVIGATION	**525-535** BROADCASTING 5.86 AERONAUTICAL RADIONAVIGATION
535-1 605 BROADCASTING	**535-1 605** BROADCASTING
1 605-1 625 BROADCASTING 5.89 5.90	**1 605-1 625** BROADCASTING 5.89 5.90 E.1
1 625-1 705 FIXED MOBILE BROADCASTING 5.89 Radiolocation 5.90	**1 625-1 705** FIXED MOBILE BROADCASTING 5.89 Radiolocation 5.90
1 705-1 800 FIXED MOBILE RADIOLOCATION AERONAUTICAL RADIONAVIGATION	**1 705-1 800** FIXED MOBILE RADIOLOCATION AERONAUTICAL RADIONAVIGATION

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)

5.83 (SUP - WRC-07)

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)

5.86 In Region 2, in the band 525-535 kHz the carrier power of broadcasting stations shall not exceed 1 kW during the day and 250 W at night.

5.89 In Region 2, the use of the band 1 605-1 705 kHz by stations of the broadcasting service is subject to the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988). The examination of frequency assignments to stations of the fixed and mobile services in the band 1 625-1 705 kHz shall take account of the allotments appearing in the Plan established by the Regional Administrative Radio Conference (Rio de Janeiro, 1988).

5.90 In the band 1 605-1 705 kHz, in cases where a broadcasting station of Region 2 is concerned, the service area of the maritime mobile stations in Region 1 shall be limited to that provided by ground-wave propagation.

1 800-2 194 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
1 800-1 850 AMATEUR	**1 800-1 850** AMATEUR
1 850-2 000 AMATEUR FIXED MOBILE except aeronautical mobile RADIOLOCATION RADIONAVIGATION 5.102	**1 850-2 000** AMATEUR FIXED MOBILE except aeronautical mobile RADIOLOCATION RADIONAVIGATION
2 000-2 065 FIXED MOBILE	**2 000-2 065** FIXED MOBILE
2 065-2 107 MARITIME MOBILE 5.105 5.106	**2 065-2 107** MARITIME MOBILE 5.105 5.106
2 107-2 170 FIXED MOBILE	**2 107-2 170** FIXED MOBILE
2 170-2 173.5 MARITIME MOBILE **2 173.5-2 190.5** MOBILE (distress and calling) 5.108 5.109 5.110 5.111	**2 170-2 173.5** MARITIME MOBILE **2 173.5-2 190.5** MOBILE (distress and calling) 5.108 5.109 5.110 5.111 E.2
2 190.5-2 194 MARITIME MOBILE	**2 190.5-2 194** MARITIME MOBILE

5.105 In Region 2, except in Greenland, coast stations and ship stations using radiotelephony in the band 2 065-2 107 kHz shall be limited to class J3E emissions and to a peak envelope power not exceeding 1 kW. Preferably, the following carrier frequencies should be used: 2 065.0 kHz, 2 079.0 kHz, 2 082.5 kHz, 2 086.0 kHz, 2 093.0 kHz, 2 096.5 kHz, 2 100.0 kHz and 2 103.5 kHz. In Argentina and Uruguay, the carrier frequencies 2 068.5 kHz and 2 075.5 kHz are also used for this purpose, while the frequencies within the band 2 072-2 075.5 kHz are used as provided in No. 52.165.

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 ITU RR 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 ITU RR 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 ITU RR 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)

2 194-3 230 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
2 194-2 300 FIXED MOBILE 5.112	**2 194-2 300** FIXED MOBILE 5.112
2 300-2 495 FIXED MOBILE BROADCASTING 5.113	**2 300-2 495** FIXED MOBILE BROADCASTING 5.113
2 495-2 501 STANDARD FREQUENCY AND TIME SIGNAL (2 500 kHz)	**2 495-2 501** STANDARD FREQUENCY AND TIME SIGNAL (2 500 kHz)
2 501-2 502 STANDARD FREQUENCY AND TIME SIGNAL Space Research	**2 501-2 502** STANDARD FREQUENCY AND TIME SIGNAL
2 502-2 505 STANDARD FREQUENCY AND TIME SIGNAL	**2 502-2 505** STANDARD FREQUENCY AND TIME SIGNAL
2 505-2 850 FIXED MOBILE	**2 505-2 850** FIXED MOBILE
2 850-3 025 AERONAUTICAL MOBILE (R) 111 115	**2 850-3 025** AERONAUTICAL MOBILE (R) 5.111 5.115
3 025-3 155 AERONAUTICAL MOBILE (OR)	**3 025-3 155** AERONAUTICAL MOBILE (OR)
3 155-3 200 FIXED MOBILE except aeronautical mobile (R) 116 117	**3 155-3 200** FIXED MOBILE except aeronautical mobile (R) 5.116 5.117

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

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.

3 230-5 003 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
3 230-3 400 FIXED MOBILE except aeronautical mobile BROADCASTING 5.113 5.116 5.118	**3 230-3 400** FIXED MOBILE BROADCASTING 5.113 5.116
3 400-3 500 AERONAUTICAL MOBILE (R)	**3 400-3 500** AERONAUTICAL MOBILE (R)
3 500-3 750 AMATEUR 5.119	**3 500-3 750** AMATEUR
3 750-4 000 AMATEUR FIXED MOBILE except aeronautical mobile (R) 5.122 5.125	**3 750-4 000** AMATEUR FIXED MOBILE except aeronautical mobile (R)
4 000-4 063 FIXED MARITIME MOBILE 5.127 5.126	**4 000-4 063** FIXED MARITIME MOBILE 5.127
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
4 438-4 488 FIXED MOBILE except aeronautical mobile (R) RADIOLOCATION 5.132A	**4 438-4 488** FIXED MOBILE except aeronautical mobile (R) RADIOLOCATION 5.132A
4 488-4 650 FIXED MOBILE except aeronautical mobile (R)	**4 488-4 650** FIXED MOBILE except aeronautical mobile (R)
4 650-4 700 AERONAUTICAL MOBILE (R)	**4 650-4 700** AERONAUTICAL MOBILE (R)
4 700-4 750 AERONAUTICAL MOBILE (OR)	**4 700-4 750** AERONAUTICAL MOBILE (OR)
4 750-4 850 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113	**4 750-4 850** FIXED MOBILE except aeronautical mobile (R) BROADCASTING 5.113
4 850-4 995 FIXED LAND MOBILE BROADCASTING 5.113	**4 850-4 995** FIXED LAND MOBILE BROADCASTING 5.113
4 995-5 003 STANDARD FREQUENCY AND TIME SIGNAL(5 000 kHz)	**4 995-5 003** STANDARD FREQUENCY AND TIME SIGNAL (5 000 kHz)

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 frequency 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 frequency 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 directprinting 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)

5 003-7 000 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
5 003 – 5 005 STANDARD FREQUENCY AND TIME SIGNAL Space research	**5 003 – 5 005** STANDARD FREQUENCY AND TIME SIGNAL Space research
5 005-5 060 FIXED BROADCASTING 5.113	**5 005-5 060** FIXED BROADCASTING 5.113
5 060-5 250 FIXED Mobile except aeronautical mobile 5.133	**5 060-5 250** FIXED Mobile except aeronautical mobile 5.133
5 250-5 275 FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A	**5 250-5 275** FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A
5 275-5 351.5 FIXED MOBILE except aeronautical mobile	**5 275-5 351.5** FIXED MOBILE except aeronautical mobile
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
5 366.5-5 450 FIXED MOBILE except aeronautical mobile	**5 366.5-5 450** FIXED MOBILE except aeronautical mobile
5 450-5 480 AERONAUTICAL MOBILE (R)	**5 730-5 900** AERONAUTICAL MOBILE (R)
5 480-5 680 AERONAUTICAL MOBILE (R) 5.111 5.115	**5 480-5 680** AERONAUTICAL MOBILE (R) 5.111 5.115
5 680-5 730 AERONAUTICAL MOBILE (OR) 5.111 5.115	 AERONAUTICAL MOBILE (OR) 5.111 5.115
5 730-5 900 FIXED MOBILE except aeronautical mobile (R)	**5 730 – 5 900** FIXED MOBILE except aeronautical mobile (R)
5 900-5 950 BROADCASTING 5.134 5.136	**5 900-5 950** BROADCASTING 5.134 5.136
5 950-6 200 BROADCASTING	**5 950-6 200** BROADCASTING
6 200-6 525 MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137	**6 200-6 525** MARITIME MOBILE 5.109 5.110 5.130 5.132 5.137
6 525 -6 685 AERONAUTICAL MOBILE (R)	**6 525 -6 685** AERONAUTICAL MOBILE (R)

6 685 – 6 765 AERONAUTICAL MOBILE (OR)	**6 685 – 6 765** AERONAUTICAL MOBILE (OR)
6 765-7 000 FIXED MOBILE except aeronautical mobile (R) 5.138	**6 765-7 000** FIXED MOBILE except aeronautical mobile (R) 5.138

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)

5.135 (SUP - WRC-97)

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.

5.138A (SUP - WRC-12)
5.139 (SUP - WRC-12)

7 000-7 450 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
7 000-7 100 AMATEUR AMATEUR-SATELLITE 5.140 5.141 5.141A	**7 000-7 100** AMATEUR AMATEUR-SATELLITE
7 100-7 200 AMATEUR 5.141A 5.141B	**7 100-7 200** AMATEUR
7 200-7 300 AMATEUR 5.142	**7 200-7 300** AMATEUR 5.142
7 300-7 400 BROADCASTING 5.134 5.143 5.143A 5.143B 5.143C 5.143D	**7 300-7 400** BROADCASTING 5.134 5.143 5.143D
7 400-7 450 FIXED MOBILE except aeronautical mobile (R)	**7 400-7 450** FIXED MOBILE except aeronautical mobile (R)

5.141C (SUP - WRC-12)

5.142 The use of the band 7 200-7 300 kHz in Region 2 by the amateur service shall not impose constraints on the broadcasting service intended for use within Region 1 and Region 3. (WRC-12)

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)

5.143D In Region 2, frequencies in the band 7 350-7 400 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-12)

7 450-13 360 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
7 450-8 100 FIXED MOBILE except aeronautical mobile (R) 5.144	**7 450-8 100** FIXED MOBILE except aeronautical mobile (R) 5.144
8 100-8 195 FIX ED MARITIME MOBILE	**8 100-8 195** FIXED MARITIME MOBILE
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
8 815-8 965 AERONAUTICAL MOBILE (R)	**8 815-8 965** AERONAUTICAL MOBILE (R)
8 965-9 040 AERONAUTICAL MOBILE (OR)	**8 965-9 040** AERONAUTICAL MOBILE (OR)
9 040-9 400 FIXED	**9 040-9 400** FIXED
9 400-9 500 BROADCASTING 5.134 5.146	**9 400-9 500** BROADCASTING 5.134 5.146
9 500-9 900 BROADCASTING 5.147	**9 500-9 900** BROADCASTING 5.147
9 900-9 995 FIXED	**9 900-9 995** FIXED
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
10 003-10 005 STANDARD FREQUENCY AND TIME SIGNAL Space research 111	**10 003-10 005** STANDARD FREQUENCY AND TIME SIGNAL Space research 5.111
10 005-10 100 AERONAUTICAL MOBILE (R) 5.111	**10 005-10 100** AERONAUTICAL MOBILE (R) 5.111
10 100-10 150 FIXED Amateur	**10 100-10 150** FIXED Amateur
10 150-11 175 FIXED Mobile except aeronautical mobile (R)	**10 150-11 175** FIXED Mobile except aeronautical mobile (R)
11 175-11 275 AERONAUTICAL MOBILE (OR)	**11 175-11 275** AERONAUTICAL MOBILE (OR)
11 275-11 400 AERONAUTICAL MOBILE (R)	**11 275-11 400** AERONAUTICAL MOBILE (R)
11 400-11 600 FIXED	**11 400-11 600** FIXED
11 600-11 650 BROADCASTING 5.134 5.146	**11 600-12 050** BROADCASTING 5.134 5.146
11 650-12 050 BROADCASTING 5.147	**11 650-12 050** BROADCASTING 5.147
12 050-12 100 BROADCASTING 5.134 5.146	**12 050-12 100** BROADCASTING 5.134 5.146

7 450-13 360 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
12 100-12 230 FIXED	**12 100-12 230** FIXED
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
13 200-13 260 AERONAUTICAL MOBILE (OR)	**13 200-13 260** AERONAUTICAL MOBILE (OR)
13 260-13 360 AERONAUTICAL MOBILE (R)	**13 260-13 360** AERONAUTICAL MOBILE (R)

5.143E (SUP - WRC-12)

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)

5.145B Alternative allocation: in Armenia, Belarus, Moldova and Kyrgyzstan, the frequency bands 9 3059 355 kHz and 16 100-16 200 kHz are allocated to the fixed service on a primary basis. (WRC-19)

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. (WRC07)

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.

5.148 (SUP - WRC-97)

13 360-18 030kHz	
Allocation to services	
ITU Region 2	**ECTEL**
13 360-13 410 FIXED RADIO ASTRONOMY 5.149	**13 360-13 410** FIXED RADIO AST RONOMY 149
13 410-13 450 FIXED Mobile except aeronautical mobile (R)	**13 410-13 450** FIXED Mobile except aeronautical mobile (R)
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
13 550 -13 570 FIXED Mobile except aeronautical mobile (R) 5.150	**13 550 -13 570** FIXED Mobile except aeronautical mobile (R) 5.150
13 570-13 600 BROADCASTING 5.134 5.151	**13 570-13 600** BROADCASTING 5.134 5.151
13 600-13 800 BROADCASTING	**13 600-13 800** BROADCASTING
13 870-13 870 BROADCASTING 5.134 5.151	**13 800-13 870** BROADCASTING 5.134 5.151
13 870-14 000 FIXED Mobile except aeronautical mobile (R)	**13 870-14 000** FIXED Mobile except aeronautical mobile (R)
14 000-14 250 AMATEUR AMATEUR-SATELLITE	**14 000-14 250** AMATEUR AMATEUR-SATELLITE
14 250-14 350 AMATEUR 5.152	**14 250-14 350** AMATEUR 5.152
14 350-14 990 FIXED Mobile except aeronautical mobile (R)	**14 350-14 990** FIXED Mobile except aeronautical mobile (R)
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
15 005-15 010 STANDARD FREQUENCY AND TIME SIGNAL Space research	**15 005-15 010** STANDARD FREQUENCY AND TIME SIGNAL Space research
15 010-15 100 AERONAUTICAL MOBILE (OR)	**15 010-15 100** AERONAUTICAL MOBILE (OR)
15 100-15 600 BROADCASTING	**15 100-15 800** BROADCASTING
15 600-15 800 BROADCASTING 5.134 5.146	**15 600-15 800** BROADCASTING 5.134 5.146
15 800-16 100 FIXED 5.153	**15 800-16 100** FIXED 5.153
16 100-16 200 FIXED RADIOLOCATION 5.145A	**16 100-16 200** FIXED RADIOLOCATION 5.145A

13 360-18 030kHz	
ITU Region 2	**ECTEL**
16 200-16 360 FIXED	**16 200-16 360** FIXED
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
17 410-17 480 FIXED	**17 410-17 480** FIXED
17 480-17 550 BROADCASTING 5.134 5.146	**17 480-17 550** BROADCASTING 5.134 5.146
17 550-17 900 BROADCASTING	**17 550-17 900** BROADCASTING
17 900-17 970 AERONAUTICAL MOBILE (R)	**17 900-17 970** AERONAUTICAL MOBILE (R)
17 970-18 030 AERONAUTICAL MOBILE (OR)	**17 970-18 030** AERONAUTICAL MOBILE (OR)

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,	10.6-10.68 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)

18 030-23 350 kHz	
Allocation to services	
ITU Region 2	**O.E.C.S**
18 030-18 052 FIXED	**18 030-18 052** FIXED
18 052-18 068 FIXED Space research	**18 052-18 068** FIXED Space research
18 068-18 168 AMATEUR AMATEUR-SATELLITE 5.154	**18 068-18 168** AMATEUR AMATEUR-SATELLITE 5.154
18 168-18 780 FIXED Mobile except aeronautical mobile	**18 168-18 780** FIXED Mobile except aeronautical mobile
18 780-18 900 MARITIME MOBILE	**18 780-18 900** MARITIME MOBILE
18 900-19 020 BROADCASTING 5.134 5.146	**18 900-19 020** BROADCASTING 5.134 5.146
19 020-19 680 FIXED	**19 020-19 680** FIXED
19 680-19 800 MARITIME MOBILE 5.132	**19 680-19 800** MARITIME MOBILE 5.132
19 800-19 990 FIXED	**19 800-19 990** FIXED
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
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
20 010-21 000 FIXED Mobile	**20 010-21 000** FIXED Mobile
21 000-21 450 AMATEUR AMATEUR-SATELLITE	**21 000-21 450** AMATEUR AMATEUR-SATELLITE
21 450-21 850 BROADCASTING	**21 450-21 850** BROADCASTING
21 850-21 870 FIXED 5.155A 5.155	**21 850-21 870** FIXED 5.155A 5.155
21 870-21 924 FIXED 5.155B	**21 870-21 924** FIXED 5.155B
21 924-22 000 AERONAUTICAL MOBILE (R)	**21 924-22 000** AERONAUTICAL MOBILE (R)
22 000-22 855 MARITIME MOBILE 5.132 5.156	**22 000-22 855** MARITIME MOBILE 5.132
22 855-23 000 FIXED 5.156	**22 855-23 000** FIXED
23 000-23 200 FIXED Mobile except aeronautical mobile (R) 5.156	**23 000-23 200** FIXED Mobile except aeronautical mobile (R)
23 200-23 350 FIXED 5.156A AERONAUTICAL MOBILE (OR)	**23 200-23 350** FIXED 5.156A AERONAUTICAL MOBILE (OR)

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.

23 350-27 500 kHz	
Allocation to services	
ITU Region 2	**ECTEL**
23 350-24 000 FIXED MOBILE except aeronautical mobile 5.157	**23 350-24 000** FIXED MOBILE except aeronautical mobile 5.157
24 000-24 450 FIXED LAND MOBILE	**24 000-24 450** FIXED LAND MOBILE
24 450-24 650 FIXED LAND MOBILE RADIOLOCATION 5.132A	**24 450-24 650** FIXED LAND MOBILE RADIOLOCATION 5.132A
24 650-24 890 FIXED LAND MOBILE	**24 650-24 890** FIXED LAND MOBILE
24 890-25 990 AMATEUR AMATEUR-SATELLITE	**24 890-25 990** AMATEUR AMATEUR-SATELLITE
24 990-25 005 STANDARD FREQUENCY AND TIME SIGNAL (25 000 kHz)	**24 990-25 005** STANDARD FREQUENCY AND TIME SIGNAL (25 000 kHz)
25 005-25 010 STANDARD FREQUENCY AND TIME SIGNAL Space research	**25 005-25 010** STANDARD FREQUENCY AND TIME SIGNAL Space research
25 010-25 070 FIXED MOBILE except aeronautical mobile	**25 010-25 070** FIXED MOBILE except aeronautical mobile
25 070-25 210 MARITIME MOBILE	**25 070-25 210** MARITIME MOBILE
25 210-25 550 FIXED MOBILE except aeronautical mobile	**25 210-25 550** FIXED MOBILE except aeronautical mobile
25 550-25 670 RADIO ASTRONOMY 5.149	**25 550-25 670** RADIO ASTRONOMY 5.149
25 670-26 100 BROADCASTING	**25 670-26 100** BROADCASTING
26 100-26 175 MARITIME MOBILE 5.132	**26 100-26 175** MARITIME MOBILE 5.132
26 175-26 200 FIXED MOBILE except aeronautical mobile	**26 175-26 200** FIXED MOBILE except aeronautical mobile
26 200-26 420 FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A	**26 200-26 420** FIXED MOBILE except aeronautical mobile RADIOLOCATION 5.132A
26 420-27 500 FIXED MOBILE except aeronautical mobile 5.150	**26 420-27 500** FIXED MOBILE except aeronautical mobile 5.150

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

27.5-40.98 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
27.5-28 METEOROLOGICAL AIDS FIXED MOBILE	**27.5-28** METEOROLOGICAL AIDS FIXED MOBILE
28-29.7 AMATEUR AMATEUR-SATELLITE	**28-29.7** AMATEUR AMAT EUR-SATELLITE
29.7-30.005 FIXED MOBILE	**29.7-30.005** FIXED MOBILE
30.005-30.01 SPACE OPERATION(satellite identification) FIXED MOBILE SPACE RESEARCH	**30.005-30.01** SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH
30.01-37.5 FIXED MOBILE	**30.01-37.5** FIXED MOBILE
37.5-38.25 FIXED MOBILE Radio astronomy 5.149	**37.5-38.25** FIXED MOBILE Radio astronomy 5.149
38.25-39.986 FIXED MOBILE	**38.25-39.986** FIXED MOBILE
39.986-40.02 FIXED MOBILE Space research	**39.986-40.02** FIXED MOBILE Space research
40.02-40.98 FIXED MOBILE 5.150	**40.02-40.98** FIXED MOBILE 5.150

40.98-47 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
40.98-41.015 FIXED MOBILE Space research 5.160 5.161	**40.98-41.015** FIXED MOBILE Space research
41.015-42 FIXED MOBILE 5.160 5.161 5.161A	**41.015-42** FIXED MOBILE
42-42.5 FIXED MOBILE 5.161	**42-42.5** FIXED MOBILE
42.5-44 FIXED MOBILE 5.160 5.161 5.161A	**42.5-44** FIXED MOBILE
44-47 FIXED MOBILE 5.162 5.162A	**44-47** FIXED MOBILE

47-75.2 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
47-50 FIXED MOBILE	**47-50** FIXED MOBILE
50-54 AMATEUR 5.162A 5.167 5.167A 5.168 5.170	**50-54** AMATEUR
54-68 BROADCASTING Fixed Mobile 5.172	**54-68** BROADCASTING Fixed Mobile 5.172
68-72 BROADCASTING Fixed Mobile 5.173	**68-72** BROADCASTING Fixed Mobile 5.173
72-73 FIXED MOBILE	**72-73** FIXED MOBILE
73-74.6 RADIO ASTRONOMY 5.178	**73-74.6** RADIO ASTRONOMY 5.178
74.6-74.8 FIXED MOBILE	**74.6-74.8** FIXED MOBILE
74.8-75.2 AERONAUTICAL RADIONAVIGATION 5.180 5.181	**74.8-75.2** AERONAUTICAL RADIONAVIGATION 5.180

5.172 Different category of service: in the French overseas departments and communities in Region 2 and Guyana, the allocation of the frequency band 54-68 MHz to the fixed and mobile services is on a primary basis (see No. 5.33). (WRC-15)

5.173 Different category of service: in the French overseas departments and communities in Region 2 and Guyana, the allocation of the frequency band 68-72 MHz to the fixed and mobile services is on a primary basis (see No. 5.33). (WRC-15)

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.

75.2-137.175 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
75.2-75.4 FIXED MOBILE 5.179	**75.2-75.4** FIXED MOBILE
75.4-76 FIXED MOBILE	**75.4-76** FIXED MOBILE
76-88 BROADCASTING Fixed Mobile 5.185	**76-88** BROADCASTING Fixed Mobile 5.185
88-100 BROADCASTING	**88-100** BROADCASTING
100-108 BROADCASTING 5.192 5.194	**100-108** BROADCASTING
108-117.975 AERONAUTICAL RADIONAVIGATION 5.197 5.197A	**108-117.975** AERONAUTICAL RADIONAVIGATION
117.975-137 AERONAUTICAL MOBILE (R) 5.111 5.200 5.201 5.202	**117.975-137** AERONAUTICAL MOBILE (R) 5.111 5.200
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 5.205 5.206 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
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 5.205 5.206 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

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)

5.208A 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, 322328.6 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,
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, 454456 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 137.175-137.825MHz 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)

137.175-148 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
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 5.205 5.206 5.207 5.208	**137.175-137.825** SPACE OPERATION (space-to-Earth) 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
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 5.205 5.206 5.207 5.208	**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 5.208
138-143.6 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	**138-143.6** FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)
143.6-143.65 FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-Earth)	**143.6-143.65** FIXED MOBILE RADIOLOCATION SPACE RESEARCH (space-to-Earth)
143.65-144 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	**143.65-144** FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)
144-146 AMATEUR AMATEUR-SATELLITE 5.216	**144-146** AMATEUR AMATEUR-SATELLITE 5.216
146-148 AMATEUR 5.217	**146-148** AMATEUR 5.217

148-156.8375 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
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 E.14
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
150.05-154 FIXED MOBILE 5.225	**150.05-154** FIXED MOBILE E.14
154-156.4875 FIXED MOBILE 5.226	**154-156.4875** FIXED MOBILE 5.226 E.14
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 E.14
156.5625-156.7625 FIXED MOBILE 5.226	**156.5625-156.7625** FIXED MOBILE 5.226 E.14
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
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
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

5.218 *Additional allocation:* the band 148-149.9 MHz is also allocated to the space operation service (Earthto-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 148-149.9MHz 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 148-149.9MHz, 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 148-149.9MHz shall ensure that the power flux-density does not exceed −149 dB(W/(m2 ± 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)

5.226 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)

5.227A (SUP - WRC-12)

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)

156.8375-161.9375 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
156.8375-157.1875 FIXED MOBILE 5.226 5.226	**156.8375-157.1875** FIXED MOBILE 5.226
157.1875-157.3375 FIXED MOBILE Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC	**157.1875-157.3375** FIXED MOBILE Maritime mobile-satellite 5.208A 5.208B 5.228AB 5.228AC
157.3375-161.7875 FIXED MOBILE	**157.3375-161.7875** FIXED MOBILE
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

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)

161.9375-223 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
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
161.9625-161.9875 AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELITE (Earth-to-space) 5.228C 5.228D	**161.9625-161.9875** AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELITE (Earth-to-space) 5.228C 5.228D
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
162.0125-162.0375 AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELITE (Earth-to-space) 5.228C 5.228D	**162.0125-162.0375** AERONAUTICAL MOBILE (OR) MARITIME MOBILE MOBILE-SATELITE (Earth-to-space) 5.228C 5.228D
162.0375-174 FIXED MOBILE 5.226 5.230 5.231	**162.0375-174** FIXED MOBILE 5.226 E.12
174-216 BROADCASTING Fixed Mobile	**174-216** BROADCASTING Fixed Mobile
216-220 FIXED MARITIME MOBILE Radiolocation 5.241 5.242	**216-220** FIXED MARITIME MOBILE Radiolocation 5.241 5.242

5.228A The frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz may be used by aircraft stations for the purpose of search and rescue operations and other safety-related communications. (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)

5.228B The use of the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the fixed and land mobile services shall not cause harmful interference to, or claim protection from, the maritime mobile service. (WRC-12)

5.228C The use of the frequency bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz by the maritime mobile service and the mobile-satellite (Earth-to-space) service is limited to the automatic identification system (AIS). The use of these frequency bands by the aeronautical mobile (OR) service is limited to AIS emissions from search and rescue aircraft operations. The AIS operations in these frequency bands shall not constrain the development and use of the fixed and mobile services operating in the adjacent frequency bands. (WRC-12)

5.228D The frequency bands 161.9625-161.9875 MHz (AIS 1) and 162.0125-162.0375 MHz (AIS 2) may continue to be used by the fixed and mobile services on a primary basis until 1 January 2025, at which time this allocation shall no longer be valid. Administrations are encouraged to make all practicable efforts to discontinue the use of these bands by the fixed and mobile services prior to the transition date. During this transition period, the maritime mobile service in these frequency bands has priority over the fixed, land mobile and aeronautical mobile services. (WRC-12)

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)

5.241 In Region 2, no new stations in the radiolocation service may be authorized in the band 216-225 MHz. Stations authorized prior to 1 January 1990 may continue to operate on a secondary basis.

220-335.4 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
220-225 AMATEUR FIXED MOBILE Radiolocation 5.241	**220-225** AMATEUR FIXED MOBILE Radiolocation 5.241
225-235 FIXED MOBILE	**225-235** FIXED MOBILE
235-267 FIXED MOBILE 5.111 5.252 5.254 5.256 5.256A	**235-267** FIXED MOBILE 5.111 5.252 5.254 5.256 5.256A E.4
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
272-273 SPACE OPERATION (space-to-Earth) FIXED MOBILE 5.254	**272-273** SPACE OPERATION (space-to-Earth) FIXED MOBILE 5.254
273-312 FIXED MOBILE 5.254	**273-312** FIXED MOBILE 5.254
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
315-322 FIXED MOBILE 5.254	**315-322** FIXED MOBILE 5.254
322-328.6 FIXED MOBILE RADIO ASTRONOMY 5.149	**322-328.6** FIXED MOBILE RADIO ASTRONOMY 5.149
328.6-335.4 AERONAUTICAL RADIONAVIGATION 5.258 5.259	**328.6-335.4** AERONAUTICAL RADIONAVIGATION 5.258

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)

5.257 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).

335.4-410 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
335.4-387 FIXED MOBILE 5.254	**335.4 -399.9** FIXED (STUDIO TO TRANSMITTER LINK) E.5
387-390 FIXED MOBILE Mobile-satellite (space-to-Earth) 5.208A 5.208B 5.254 5.255	
390-399.9 FIXED MOBILE 5.254	
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
400.05-400.15 STANDARD FREQUENCY AND TIME SIGNALSATELLITE (400.1 MHz) 5.261 5.262	**400.05-400.15** STANDARD FREQUENCY AND TIME SIGNALSATELLITE (400.1 MHz) 5.261 5.262
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) 5.262 5.264
401-402 METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical	**401-402** METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical
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
403-406 METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile 5.265	**403-406** METEOROLOGICAL AIDS Fixed Mobile except aeronautical mobile 5.265
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
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

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.

5.263 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 radio beacons (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.

410-460 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
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
420-430 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271	**420-430** FIXED MOBILE except aeronautical mobile Radiolocation
430-432 RADIOLOCATION Amateur 5.271 5.276 5.278 5.279	**430-432** RADIOLOCATION Amateur
432-438 RADIOLOCATION Amateur Earth exploration-satellite (active) 5.279A 5.271 5.276 5.278 5.279 5.281 5.282	**432-438** RADIOLOCATION Amateur Earth exploration-satellite (active) 5.279A 5.282
438-440 RADIOLOCATION Amateur 5.271 5.276 5.278 5.279	**438-440** RADIOLOCATION Amateur
440-450 FIXED MOBILE except aeronautical mobile Radiolocation 5.269 5.270 5.271 5.284 5.285 5.286	**440-450** FIXED MOBILE except aeronautical mobile Radiolocation 5.286
450-455 FIXED MOBILE 5.286AA 5.209 5.271 5.286 5.286A 5.286B 5.286C 5.286D 5.286E	**450-454.975** FIXED MOBILE 5.286AA 5.209 5.286 5.286A 5.286B 5.286C
455-456 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.209 5.286A 5.286B 5.286C	**454.975 -460** FIXED (Point to Point Links (temporary) for Outside Broadcast Television/Radio applications) E.6
456-459 FIXED MOBILE 5.286AA 5.271 5.287 5.288	
459-460 FIXED MOBILE 5.286AA MOBILE-SATELLITE (Earth-to-space) 5.209 5.286A 5.286B 5.286C	

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)

5.282 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 Earthto-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 459460 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 459460 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)

5.287 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 channelling 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)

460-890 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
460-470 FIXED MOBILE 5.286AA Meteorological-satellite (space-to-Earth) 5.287 5.288 5.289 5.290	**460-462.5625** FIXED (Point to Point Links (temporary) for Outside Broadcast Television/Radio applications) E.6
	462.5625-467.7125 MOBILE (Family Radio Service) E.7
	467.7125- 470 FIXED (Point to Point Links (temporary) for Outside Broadcast Television/Radio applications) E.6
470-512 BROADCASTING Fixed Mobile 5.292 5.293 5.295	**470-512** BROADCASTING Fixed Mobile
512-608 BROADCASTING 5.295 5.297	**512-608** BROADCASTING
608-614 RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)	**608-614** RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Earth-to-space)
614-698 BROADCASTING Fixed Mobile 5.293 5.308 5.308A 5.309	**614-698** BROADCASTING MOBILE Fixed 5.308A **E.15**
698-806 MOBILE 5.317A BROADCASTING Fixed 5.293 5.309	**698-806** MOBILE (BROADBAND WIRELESS ACCESS) 5.317A E.10, E.14
806-890 FIXED MOBILE 5.317A BROADCASTING 5.317 5.318	**806-824** MOBILE E.13
	824-890 MOBILE 5.317A

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.

5.317A 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)

5.308A In the Bahamas, Barbados, Belize, Canada, Colombia, the United States, Guatemala and Mexico, the frequency band 614-698 MHz, or portions thereof, is identified for 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. Mobile service stations of the IMT system within the frequency band are subject to agreement obtained under No. 9.21 and shall not cause harmful interference.

890-1 300 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
890-902 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation 5.318 5.325	**890-902** MOBILE
902-928 FIXED Amateur Mobile except aeronautical mobile 5.325A Radiolocation 5.150 5.325 5.326	**902-928** FIXED Amateur Mobile except aeronautical mobile 5.325A Radiolocation 5.150 5.325 5.326 E.8
928-942 FIXED MOBILE except aeronautical mobile 5.317A Radiolocation 5.325	**928-935** MOBILE
	935-947 MOBILE
942-960 FIXED MOBILE 5.317A	**947-960** MOBILE 5.317A
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
1 164-1 215 AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (spaceto-space) 5.328B 5.328A	**1 164-1 215** AERONAUTICAL RADIONAVIGATION 5.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-tospace) 5.328B 5.328A
1 215-1 240 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (spaceto-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-tospace) 5.328B 5.329 5.329A SPACE RESEARCH (active) 5.330 5.331 5.332

1 240-1 300 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (spaceto-space) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.330 5.331 5.332 5.335 5.335A	**1 240-1 300** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-tospace) 5.328B 5.329 5.329A SPACE RESEARCH (active) Amateur 5.282 5.332 5.335A

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-tospace) 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)

5.332 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

1 300-1 525 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
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
1 350-1 400 RADIOLOCATION 5.338A 5.149 5.334 5.339	**1 350-1 400** RADIOLOCATION 5.338A 5.149 5.339
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
1 427-1 429 SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.341A 5.341B 5.341C 5.338A 5.341	**1 427-1 429** SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile 5.341A 5.341B 5.341C 5.338A 5.341
1 429-1 452 FIXED MOBILE 5.341B 5.341C 5.343 5.338A 5.341	**1 429-1 452** FIXED MOBILE 5.341B 5.341C 5.343 5.338A 5.341
1 452-1 492 FIXED MOBILE 5.341B 5.343 5.346A BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.344 5.345	**1 452-1 492** FIXED MOBILE 5.341B 5.343 BROADCASTING BROADCASTING-SATELLITE 5.208B 5.341 5.345
1 492-1 518 FIXED MOBILE 5.341B 5.343 5.341 5.344	**1 492-1 518** FIXED MOBILE 5.341B 5.343 5.341
1 518-1 525 FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341 5.344	**1 518-1 525** FIXED MOBILE 5.343 MOBILE-SATELLITE (space-to-Earth) 5.348 5.348A 5.348B 5.351A 5.341

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 GHz2,	
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,	
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.

5.341A In Region 1, the frequency bands 1 427-1 452 MHz and 1 492-1 518 MHz 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 other 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 respect to the aeronautical mobile service used for aeronautical telemetry in accordance with No. 5.342. (WRC-15)
5.341B In Region 2, the frequency band 1 427-1 518 MHz is 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 this frequency band by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-15)

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)

5.343 In Region 2, the use of the band 1 435-1 535 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service.

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)

5.348 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-toEarth) 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/m2) 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)

5.348B In the band 1 518-1 525 MHz, stations in the mobile-satellite service shall not claim protection from aeronautical mobile telemetry stations in the mobile service in the territory of the United States (see Nos. **5.343** and **5.344**) and in the countries listed in No. **5.342**. No. **5.43A** does not apply. (WRC-03)

1 525-1 610 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
1 525-1 530 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A Earth exploration-satellite Fixed Mobile 5.343 5.341 5.351 5.354	**1 525-1 530** SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 5.208B 5.351A 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 5.343 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 5.343 5.341 5.351 5.354
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 5.362A	**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 5.359
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

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)****. (WRC07)

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**.

5.356 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**).

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)

1 610-1 660 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
1 610-1 610.6 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATIONSATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.370 5.372	**1 610-1 610.6** MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATIONSATELLITE (Earth-to-space) 5.341 5.364 5.366 5.367 5.368 5.372
1 610.6-1 613.8 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATIONSATELLITE (Earth-to-space) 5.149 5.341 5.364 5.366 5.367 5.368 5.370 5.372	**1 610.6-1 613.8** MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATIONSATELLITE (Earth-to-space) 5.149 5.341 5.364 5.366 5.367 5.368 5.372
1 613.8-1 621.35 MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATIONSATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.370 5.372	**1 613.8-1 621.35** MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATIONSATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.370 5.372
1 621.35-1 626.5 MARITIME MOBILESATELLITE (space-to-Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATIONSATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) except maritime mobile satellite (space-to-Earth) 5.208B 5.341 5.364 5.365 5.366 5.367 5.368 5.370 5.372	**1 621.35-1 626.5** MARITIME MOBILESATELLITE (space-to-Earth) 5.373 5.373A MOBILE-SATELLITE (Earth-to-space) 5.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATIONSATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) except maritime mobile satellite (space-to-Earth) 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 5.362A 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 5.355 5.357A 5.359 5.374 5.375 5.376

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 mobilesatellite 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 mobilesatellite service when used for GMDSS. (WRC-19)

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 1 626.51 660.5 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 intersatellite 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)

5.379A 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/m2) in 10 MHz and □194 dB(W/m2) 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)

5.380A 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)

1 660-1 710 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
1 660-1 660.5 MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY 5.149 5.341 5.351 5.354 5.362A 5.376A	**1 660-1 660.5** MOBILE-SATELLITE (Earth-to-space) 5.351A RADIO ASTRONOMY 5.149 5.341 5.351 5.354 5.362A 5.376A
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 5.379 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 5.379 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 5.379 5.379A
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** 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
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** METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.379B 5.341 5.379D 5.380A
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
1 690-1 700 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
1700-1 710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341	**1700-1 710** FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.289 5.341

1 710-2 170 MHz	
Allocation to services	
ITU Region 2	**O.E.C.S**
1 710-1 930 FIXED MOBILE 5.384A 5.388A 5.388B 5.149 5.341 5.385 5.386 5.387 5.388	**1 710-1 990** MOBILE 5.384A 5.388 E.9
1 930-1 970 FIXED MOBILE 5.388A 5.388B Mobile-satellite (Earth-to-space) 5.388	
1 970-1 980 FIXED MOBILE 5.388A 5.388B 5.388	
1 980-2 010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.351A 5.388 5.389A 5.389B 5.389F	**1990-2 025** MOBILE 5.388
2 010-2 025 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 5.388 5.389C 5.389E	
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** FIXED (STUDIO TO TRANSMITTER LINKS) MOBILE
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 5.388B SPACE RESEARCH (deep space) (Earth-to-space) 5.388
2 120-2 160 FIXED MOBILE 5.388A 5.388B Mobile-satellite (space-to-Earth) 5.388	**2 120-2 160** FIXED MOBILE 5.388A 5.388B Mobile-satellite (space-to-Earth) 5.388
2 160-2 170 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.388 5.389C 5.389E	**2 160-2 170** FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.388 5.389C 5.389E

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)

5.388 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)

5.389A 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)

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.WRC2000)****. (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.

5.391 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.

2 170-2 520 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
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
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) (spaceto-space) FIXED MOBILE 5.391 SPACE RESEARCH (space-to-Earth) (space-to-space) 5.392
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)
2 300-2 450 FIXED MOBILE 5.384A RADIOLOCATION Amateur 5.150 5.282 5.393 5.394	**2 300-2 450** FIXED MOBILE 5.384A RADIOLOCATION Amateur 5.150 5.282 5.393 5.394 E.10
2 450-2 483.5 FIXED MOBILE RADIOLOCATION 5.150	**2 450-2 483.5** FIXED (Broadband Wireless Access Links) E.10
2 483.5-2 500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATIONSATELLITE (space-to-Earth) 5.398 5.150 5.402	**2 483.5-2 500** FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5.351A RADIOLOCATION RADIODETERMINATIONSATELLITE (space-to-Earth) 5.398 5.150 5.402
2 500-2 520 FIXED 5.410 FIXED-SATELLITE (space-to- Earth) 5.415 MOBILE except aeronautical mobile 5.384A	**2 500-2 520** FIXED 5.410 FIXED-SATELLITE (space-to- Earth) 5.415 MOBILE except aeronautical mobile 5.384A

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.

5.402 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)

5.407 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/(m2 □ 4 kHz)) in Argentina, unless otherwise agreed by the administrations concerned.

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)

2 520-2 700 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
2 520-2 655 FIXED 5.410 FIXED-SATELLITE (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 5.339 5.418B 5.418C	**2 520-2 690** FIXED 5.410 MOBILE except aeronautical mobile 5.384A E.10 E.11
2 655-2 670 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.415 MOBILE except aeronautical mobile 5.384A BROADCASTING-SATELLITE 5.413 5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149 5.208B	
2 670-2 690 FIXED 5.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 5.208B 5.415 MOBILE except aeronautical mobile 5.384A Earth exploration-satellite (passive) Radio astronomy Space research (passive) 5.149	
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

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 (0- 5) dB(W/(m^2·MHz))	for $5° \le \Theta \le 25°$
–122 dB(W/(m^2·MHz))	for $25° \le \Theta \le 90°$

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 broadcastingsatellite 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)

5.418B Use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcastingsatellite 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)

2 700-3 600 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
2 700-2 900 AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423 5.424	**2 700-2 900** AERONAUTICAL RADIONAVIGATION 5.337 Radiolocation 5.423
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
3 100-3 300 RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149 5.428	**3 100-3 300** RADIOLOCATION Earth exploration-satellite (active) Space research (active) 5.149 5.428
3 300-3 400 RADIOLOCATION Amateur Fixed Mobile 5.149 5.429C 5.429D	**3 300-3 400** RADIOLOCATION FIXED (Fixed Wireless Access Links)
3 400-3 500 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431A 5.431B Amateur Radiolocation 5.433 5.282	**3 400-3 600** FIXED (Broadband Wireless Access Services) MOBILE E.10
3 500-3 600 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.431B Radiolocation 5.433	

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**.

5.430A The allocation of the frequency band 3 400-3 600 MHz to the mobile, except aeronautical mobile, service is subject to agreement obtained under No. **9.21**. This frequency band 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. The provisions of Nos. **9.17** and **9.18** shall also apply in the coordination phase. 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) and with the assistance of the Bureau if so requested. In case of disagreement, 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 3 400-3 600 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations (Edition of 2004). (WRC-15)

5.431A In Region 2, the allocation of the frequency band 3 400-3 500 MHz to the mobile, except aeronautical mobile, service on a primary basis is subject to agreement obtained under No. **9.21**. (WRC15)

5.431B In Region 2, the frequency band 3 400-3 600 MHz 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. 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 an IMT system, it shall seek agreement under No. **9.21** with other administrations and ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed −154.5 dBW/(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, including IMT systems, in the frequency band 3 400-3 600 MHz shall not claim more protection from space stations than that provided in Table **21-4** of the Radio Regulations (Edition of 2004). (WRC-15)

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.

3 600-4 800 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
3 600-3 700 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 5.434 Radiolocation 5.433	**3 600-3 700** FIXED (Broadband Services) MOBILE E.10
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
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
4 400-4 500 FIXED MOBILE 5.440A	**4 400-4 500** FIXED MOBILE 5.440A
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 5.440A

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)

5.440 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)

4 800-5 250 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
4 800-4 990 FIXED MOBILE 5.440A 5.441A 5.441B 5.442 Radio astronomy 5.149 5.339 5.443	**4 800-4 990** FIXED MOBILE 5.440A 5.442 Radio astronomy 5.149
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
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
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
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 Fixed E.12
5 150-5 250 FIXED-SATELLITE (Earth-to-space) 5.447A MOBILE except aeronautical mobile 5.446A 5.446B AERONAUTICAL RADIONAVIGATION 5.446 5.446C 5.446D 5.447 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 Fixed E.12

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)

5.443AA 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/m2) 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 ITUR 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 0915 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 nongeostationary 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)

5.446A The use of the frequency 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 fixedsatellite 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/m2) 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**.

5 250-5 570 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
5 250-5 255 EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH 5.447D 5.447E 5.448 5.448A	**5 250-5 350** RADIOLOCATION Fixed E.12
5 255-5 350 EARTH EXPLORATION-SATELLITE (active) MOBILE except aeronautical mobile 5.446A 5.447F RADIOLOCATION SPACE RESEARCH (active) 5.447E 5.448 5.448A	
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 Fixed
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 Fixed
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 5.451	**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

5.447D 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)

5.447F 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.

5.450A 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)

5 570-6 700 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
5 570-5 650 MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION 5.450 5.451 5.452	**5 570-5 650** MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION 5.450B MARITIME RADIONAVIGATION 5.452
5 650-5 725 MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION Amateur Space research (deep space) 5.282 5.451 5.453 5.454 5.455	**5 650-5 725** MOBILE except aeronautical mobile 5.446A 5.450A RADIOLOCATION Amateur Space research (deep space) Fixed
5 725-5 830 RADIOLOCATION Amateur 5.150 5.453 5.455	**5 725-5 830** RADIOLOCATION FIXED (Fixed Wireless Access Links) Amateur E.11
5 830-5 850 RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150 5.453 5.455	**5 830-5 850** RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) 5.150
5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation 5.150	**5 850-6 700** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Amateur Radiolocation 5.150 E.11
5 925-6 700 FIXED 5.457 FIXED-SATELLITE (Earth-to-space) 5.457A 5.457B MOBILE 5.457C 5.149 5.440 5.458	

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.

5.457A 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)

5.457C In Region 2 (except Brazil, Cuba, French overseas departments and communities, Guatemala, Mexico, Paraguay, Uruguay and Venezuela), the frequency band 5 925-6 700 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, or claim protection from, the fixed-satellite and fixed services. Any such use does not preclude the use of this frequency band by other mobile service applications or by other services to which this frequency band is allocated on a coprimary basis and does not establish priority in the Radio Regulations. (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.

6 700-7 250 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
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
7 075-7 145 FIXED MOBILE 5.458 5.459	**7 075-7 145** FIXED MOBILE 5.458
7 145-7 190 FIXED MOBILE SPACE RESEARCH (deep space) (Earth-to-space) 5.458 5.459	**7 145-7 190** FIXED MOBILE SPACE RESEARCH (deep space) (Earth-to-space) 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 5.459	**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
7 235-7 250 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

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)

7 250-8 500 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
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
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
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
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
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
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
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
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
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
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
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

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)

5.463 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.

8 500-10 000 MHz	
Allocation to services	
ITU Region 2	**ECTEL**
8 500-8 550 RADIOLOCATION 5.468 5.469	**8 500-8 550** RADIOLOCATION
8 550-8 650 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.468 5.469 5.469A	**8 550-8 650** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.469A
8 650-8 750 RADIOLOCATION 5.468 5.469	**8 650-8 750** RADIOLOCATION
8 750-8 850 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470 5.471	**8 750-8 850** RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.470
8 850-9 000 RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.473	**8 850-9 000** RADIOLOCATION MARITIME RADIONAVIGATION 5.472
9 000-9 200 RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 5.471 5.473A	**9 000-9 200** RADIOLOCATION AERONAUTICAL RADIONAVIGATION 5.337 5.473A
9 200-9 300 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.473 5.474 5.474D	**9 200-9 300** EARTH EXPLORATION-SATELLITE (active) 5.474B 5.474C RADIOLOCATION MARITIME RADIONAVIGATION 5.472 5.474 5.474D
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
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
9 800-9 900 RADIOLOCATION Earth exploration-satellite (active) Fixed Space research (active) 5.477 5.478 5.478A 5.478B	**9 800-9 900** RADIOLOCATION Earth exploration-satellite (active) Fixed Space research (active) 5.478A 5.478B
9 900-10 000 EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION Fixed 5.474D 5.477 5.478 5.479	**9 900-10 000** EARTH EXPLORATION-SATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION Fixed 5.474D 5.479

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.

5.472 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**).

5.474B 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)

5.478A 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.

10-10.7 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
10-10.4 EARTH EXPLORATIONSATELLITE (active) 5.474A 5.474B 5.474C RADIOLOCATION Amateur 5.474D 5.479 5.480	**10-10.4** EARTH EXPLORATIONSATELLITE (active) 5.474B 5.474C RADIOLOCATION Amateur 5.474D 5.479
10.4-10.45 RADIOLOCATION Amateur 5.480	**10.4-10.45** RADIOLOCATION Amateur
10.45-10.5 RADIOLOCATION Amateur Amateur-satellite 5.481	**10.45-10.5** RADIOLOCATION Amateur Amateur-satellite
10.5-10.55 FIXED MOBILE RADIOLOCATION	**10.5-10.55** FIXED MOBILE RADIOLOCATION
10.55-10.6 FIXED MOBILE except aeronautical mobile Radiolocation	**10.55-10.6** FIXED MOBILE except aeronautical mobile Radiolocation
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
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

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. (WRC07)

10.7-11.7 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
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
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
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
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

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)

11.7-13.4 GHz	
Allocation to services	
ITU Region 2	**ECTEL**

11.7-12.1 FIXED 5.486 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.488 Mobile except aeronautical mobile 5.485	**11.7-12.1** FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.488 Mobile except aeronautical mobile 5.485
12.1-12.2 FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.488 5.485 5.489	**12.1-12.2** FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.488 5.485
12.2-12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492 5.487A 5.488 5.490	**12.2-12.7** FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 5.492 5.488 5.490
12.7-12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile	**12.7-12.75** FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile
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)
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

5.485 In Region 2, in the band 11.7-12.2 GHz, transponders on space stations in the fixed-satellite service may be used additionally for transmissions in the broadcasting-satellite service, provided that such transmissions do not have a maximum e.i.r.p. greater than 53 dBW per television channel and do not cause greater interference or require more protection from interference than the coordinated fixed-satellite service frequency assignments. With respect to the space services, this band shall be used principally for the fixed satellite service.

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)

5.490 In Region 2, in the band 12.2-12.7 GHz, existing and future terrestrial radiocommunication services shall not cause harmful interference to the space services operating in conformity with the broadcasting satellite Plan for Region 2 contained in Appendix **30**.

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 fluxdensity not exceeding –111 dB(W/(m2 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)

13.4-14 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
13.4-13.65 EARTH EXPLORATION-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** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.499C 5.499D Standard frequency and time signal-satellite (Earth-to-space) 5.501B
13.65-13.75 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 5.501A Standard frequency and time signal-satellite (Earth-to-space) 5.499 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
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

5.499A The use of the frequency band 13.4-13.65 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary-satellite systems and is subject to agreement obtained under No. **9.21** with respect 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. (WRC-15)

5.499B Administrations shall not preclude the deployment and operation of transmitting earth stations in the standard frequency and time signal-satellite service (Earth-to-space) allocated on a secondary basis in the frequency band 13.4-13.65 GHz due to the primary allocation to FSS (space-to-Earth). (WRC-15)

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)

5.499E In the frequency band 13.4-13.65 GHz, geostationary-satellite networks in the fixed-satellite service

(space-to-Earth) shall not claim protection from space stations in the Earth exploration-satellite service (active) operating in accordance with these Regulations, and No. **5.43A** does not apply. The provisions of No. **22.2** do not apply to the Earth exploration-satellite service (active) with respect to the fixed-satellite service (space-to-Earth) in this frequency band. (WRC-15)

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/(m2 · 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/(m2 · 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)

14-14.5 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
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 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.506A Space research 5.504A
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 5.508	**14.25-14.3** FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 5.506B RADIONAVIGATION 5.504 Mobile-satellite (Earth-to-space) 5.504B 5.506A Space research 5.504A
14.3-14.4 FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 5.506B Mobile-satellite (Earth-to-space) 5.506A Radionavigation-satellite 5.504A	**14.3-14.4** FIXED-SATELLITE (Earth-to-space) 5.457A 5.484A 5.484B 5.506 5.506B Mobile-satellite (Earth-to-space) 5.506A Radionavigation-satellite 5.504A
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 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A Space research (space-to-Earth) 5.504A
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 5.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 5.504B 5.506A Radio astronomy 5.149 5.504A

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)

5.506 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)

14.5-15.4 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
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) 5.509B 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	**14.75-14.8** FIXED FIXED-SATELLITE (Earth-to-space) 5.510 MOBILE Space research 5.509G
14.8-15.35 FIXED MOBILE Space research 5.339	**14.8-15.35** FIXED MOBILE Space research 5.339
15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.51**1**	**15.35-15.4** EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340

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. (WRC15)

5.509C For the use of the frequency bands 14.5-14.75 GHz in countries listed in Resolution **163 (WRC15)** 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/(m2 · 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 14.5014.8 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 14.5014.8 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 guard-bands 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)
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15.4-18.4 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
15.4-15.43 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION	**15.4-15.43** RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION
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
15.63-15.7 RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION	**15.63-15.7** RADIOLOCATION 5.511E 5.511F AERONAUTICAL RADIONAVIGATION
15.7-16.6 RADIOLOCATION 5.512 5.513	**15.7-16.6** RADIOLOCATION
16.6-17.1 RADIOLOCATION Space research (deep space) (Earth-to-space) 5.512 5.513	**16.6-17.1** RADIOLOCATION Space research (deep space) (Earth-to-space)
17.1-17.2 RADIOLOCATION 5.512 5.513	**17.1-17.2** RADIOLOCATION
17.2-17.3 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.512 5.513 5.513A	**17.2-17.3** EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 5.513A
17.3-17.7 FIXED-SATELLITE (Earth-to-space) 5.516 BROADCASTING-SATELLITE Radiolocation 5.514 5.515	**17.3-17.7** FIXED-SATELLITE (Earth-to-space) 5.516 BROADCASTING-SATELLITE Radiolocation 5.515
17.7-17.8 FIXED FIXED-SATELLITE (space-to-Earth) 5.517 5.517A (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.515	**17.7-17.8** FIXED FIXED-SATELLITE (space-to-Earth) 5.517 5.517A (Earth-to-space) 5.516 BROADCASTING-SATELLITE Mobile 5.515
17.8-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A (Earth-to-space) 5.516 MOBILE 5.519	**17.8-18.1** FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.517A (Earth-to-space) 5.516 MOBILE

18.1-18.4 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A (Earth-to-space) 5.520 MOBILE 5.519 5.521	**18.1-18.4** FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A (Earth-to-space) 5.520 MOBILE

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/m2) 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)

5.513A 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)

5.515 In the band 17.3-17.8 GHz, sharing between the fixed-satellite service (Earth-to-space) and the broadcasting-satellite service shall also be in accordance with the provisions of § 1 of Annex 4 of Appendix **30A**.

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 17.317.8 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-geostationarysatellite 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-geostationarysatellite 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 (Rev.WRC-19)**. (WRC-19)

5.517 In Region 2, use of the fixed-satellite (space-to-Earth) service in the band 17.7-17.8 GHz shall not cause harmful interference to nor claim protection from assignments in the broadcasting-satellite service operating in conformity with the Radio Regulations. (WRC-07)

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-tospace) shall be subject to the application of Resolution **169 (WRC-19)**. (WRC-19)

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)

18.4-22 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A MOBILE	**18.4-18.6** FIXED FIXED-SATELLITE (space-to-Earth) 5.484A 5.516B 5.517A MOBILE
18.6-18.8 EARTH EXPLORATIONSATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.517A 5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) 5.522A	**18.6-18.8** EARTH EXPLORATIONSATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.517A 5.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) 5.522A
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) 5.516B 5.517A 5.523A 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	**19.3-19.7** FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 5.517A 5.523B 5.523C 5.523D 5.523E MOBILE
19.7-20.1 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 5.529	**19.7-20.1** FIXED-SATELLITE (space-to-Earth) 5.484A 5.484B 5.516B 5.527A MOBILE-SATELLITE (space-to-Earth) 5.525 5.527 5.528 5.529
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 5.527 5.528
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)
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)
21.4-22 FIXED 5.530E MOBILE 5.530A	**21.4-22** FIXED 5.530E MOBILE 5.530A

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)

5.523A 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)

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)

5.525 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.

5.527 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 spotbeam 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**.

5.529 The use of the bands 19.7-20.1 GHz and 29.5-29.9 GHz by the mobile-satellite service in Region 2 is limited to satellite networks which are both in the fixed-satellite service and in the mobile-satellite service as described in No. **5.526**.

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/(m2 · 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)

5.530E The allocation to the fixed service in the frequency band 21.4-22 GHz is identified for use in Region 2 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 it 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 is limited to the HAPS-to-ground direction, and shall be in accordance with the provisions of Resolution **165 (WRC-19)**. (WRC-19)

22-24.75 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
22-22.21 FIXED MOBILE except aeronautical mobile 5.149	**22-22.21** FIXED MOBILE except aeronautical mobile 5.149
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
22.5-22.55 FIXED MOBILE	**22.5-22.55** FIXED MOBILE
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
23.15-23.55 FIXED INTER-SATELLITE 5.338A MOBILE	**23.15-23.55** FIXED INTER-SATELLITE 5.338A MOBILE
23.55-23.6 FIXED MOBILE	**23.55-23.6** FIXED MOBILE
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
24-24.05 AMATEUR AMATEUR-SATELLITE 5.150	**24-24.05** AMATEUR AMATEUR-SATELLITE 5.150
24.05-24.25 RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150	**24.05-24.25** RADIOLOCATION Amateur Earth exploration-satellite (active) 5.150
24.25-24.45 FIXED 5.532AA MOBILE except aeronautical mobile 5.338A 5.532AB RADIONAVIGATION	**24.25-24.45** FIXED 5.532AA MOBILE except aeronautical mobile 5.338A 5.532AB RADIONAVIGATION
24.45-24.65 FIXED 5.532AA INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB RADIONAVIGATION 5.533	**24.45-24.65** FIXED 5.532AA INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB RADIONAVIGATION 5.533

24.65-24.75 FIXED 5.532AA INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB	**24.65-24.75** FIXED 5.532AA INTER-SATELLITE MOBILE except aeronautical mobile 5.338A 5.532AB
RADIOLOCATIONSATELLITE (Earth-to-space)	RADIOLOCATIONSATELLITE (Earth-to-space)

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)

5.532AA The allocation to the fixed service in the frequency band 24.25-25.25 GHz is identified for use in Region 2 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 is limited to the HAPS-to-ground direction and shall be in accordance with the provisions of Resolution **166 (WRC-19)**. (WRC-19)

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)

5.533 The inter-satellite service shall not claim protection from harmful interference from airport surface detection equipment stations of the radionavigation service.

24.75-29.9 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
24.75-25.25 FIXED 5.532AA FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE except aeronautical mobile 5.338A 5.532AB	**24.75-25.25** FIXED 5.532AA FIXED-SATELLITE (Earth-to-space) 5.535 MOBILE except aeronautical mobile 5.338A 5.532AB
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)
25.5-27 EARTH 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

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
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
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
29.1-29.5 FIXED FIXED-SATELLITE (Earth-to-space) 5.516B 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) 5.516B 5.517A 5.523C 5.523E 5.535A 5.539 5.541A MOBILE Earth exploration-satellite (Earth-to-space) 5.541 5.540
29.5-29.9 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 5.525 5.526 5.527 5.529 5.540	**29.5-29.9** 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 5.525 5.527 5.529 5.540

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 coprimary 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)

5.537 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**.

5.538 *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 uplink 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. (WRC07)

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)

29.9-34.2 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
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 5.527 5.538 5.540 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) 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)
31-31.3 FIXED 5.338A 5.543B MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 5.544 5.545 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
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
31.5-31.8 EARTH EXPLORATIONSATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	**31.5-31.8** EARTH EXPLORATIONSATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340
31.8-32 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547B 5.548	**31.8-32** FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.548
32-32.3 FIXED 5.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 5.547 5.547C 5.548	**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 5.547D 5.548	**32.3-33** FIXED 5.547A INTER-SATELLITE RADIONAVIGATION 5.547 5.548
33-33.4 FIXED 5.547A RADIONAVIGATION 5.547 5.547E	**33-33.4** FIXED 5.547A RADIONAVIGATION 5.547
33.4-34.2 RADIOLOCATION 5.549	**33.4-34.2** RADIOLOCATION

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.

5.547 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)

34.2-40 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
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)
34.7-35.2 RADIOLOCATION Space research 5.550 5.549	**34.7-35.2** RADIOLOCATION Space research
35.2-35.5 METEOROLOGICAL AIDS RADIOLOCATION 5.549	**35.2-35.5** METEOROLOGICAL AIDS RADIOLOCATION
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

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) 5.550A
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
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
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
39.5-40 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 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) 5.516B 5.550C MOBILE 5.550B MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth) 5.547 5.550E

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/m2) in this band. (WRC03)

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 fixedsatellite 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 nongeostationary-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-toground 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)

40-47.5 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
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
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile Mobile-satellite (space-to-Earth) 5.547	**40.5-41** FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile Mobile-satellite (space-to-Earth) 5.547
41-42.5 FIXED FIXED-SATELLITE (space-to-Earth) 5.516B 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) 5.516B 5.550C LAND MOBILE 5.550B BROADCASTING BROADCASTING-SATELLITE Aeronautical mobile Maritime mobile 5.547 5.551H 5.551I
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

43.5-47 MOBILE 5.553 5.553A MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	**43.5-47** MOBILE 5.553 5.553A MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554
47-47.2 AMATEUR AMATEUR-SATELLITE	**47-47.2** AMATEUR AMATEUR-SATELLITE
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 5.553B 5.552A

5.551H The equivalent power flux-density (e.p.f.d.) 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/m2) in 1 GHz and −246 dB(W/m2) 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/m2) 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.

These e.p.f.d. values shall be evaluated using the methodology given in Recommendation ITU-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/m2) in 1 GHz and –153 dB(W/m2) 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/m2) 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 47.250.2 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)

5.553B 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, GuineaBissau, 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)

47.5-51.4 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
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 5.553B
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 5.553B 5.552A
48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.516B 5.550C 5.552 MOBILE 5.149 5.340 5.555	**48.2-50.2** FIXED FIXED-SATELLITE (Earth-to-space) 5.338A 5.516B 5.550C 5.552 MOBILE 5.149 5.340 5.555
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
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)

5.554A The use of the bands 47.5-47.9 GHz, 48.2-48.54 GHz and 49.44-50.2 GHz by the fixed-satellite service (space-to-Earth) is limited to geostationary satellites. (WRC-03)

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)

5.555B The power flux-density in the band 48.94-49.04 GHz produced by any geostationary space station in the fixed-satellite service (space-to-Earth) operating in the bands 48.2-48.54 GHz and 49.44-50.2 GHz shall not exceed –151.8 dB(W/m2) in any 500 kHz band at the site of any radio astronomy station. (WRC-03)

51.4-55.78 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
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
52.4-52.6 FIXED 5.338A MOBILE 5.547 5.556	**52.4-52.6** FIXED 5.338A MOBILE 5.547 5.556
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
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)

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)

55.78-66 GHz	
Allocation to services	
ITU region 2	**ECTEL**
55.78-56.9 EARTH EXPLORATION-SATELLITE (passive) FIXED 5.557A INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547	
56.9-57 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.558A MOBILE 5.558 SPACE RESEARCH (passive) 5.547	
57-58.2 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 SPACE RESEARCH (passive) 5.547	
58.2-59 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 5.547 5.556	
59-59.3 EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 5.556A MOBILE 5.558 RADIOLOCATION 5.559 SPACE RESEARCH (passive)	
59.3-64 FIXED INTER-SATELLITE MOBILE 5.558 RADIOLOCATION 5.559 5.138	
64-65 FIXED INTER-SATELLITE MOBILE except aeronautical mobile 5.547 5.556	
65-66 EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH 5.547	

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. (WRC97)

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)

66-81 GHz	
Allocation to services	
ITU region 2	**ECTEL**
66-71 INTER-SATELLITE MOBILE 5.553 5.558 5.559AA MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.554	
71-74 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	
74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) 5.561	
76-77.5 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 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	
78-79 RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth) 5.149 5.560	
79-81 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 5.149	

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 shortrange 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).

81-86 GHz	
Allocation to services	
ITURegion 2	**ECTEL**
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	
84-86 FIXED 5.338A FIXED-SATELLITE (Earth-to-space) 5.561B MOBILE RADIO ASTRONOMY 5.149	

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)

86-111.8 GHz	
Allocation to services	
ITURegion 2	**ECTEL**
86-92 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
92-94 FIXED 5.338A MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
94-94.1 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy 5.562 5.562A	
94.1-95 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
95-100 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	
100-102 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	
102-105 FIXED MOBILE RADIO ASTRONOMY 5.149 5.341	
105-109.5 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	
109.5-111.8 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	

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)

111.8-119.98 GHz	
Allocation to services	
ITURegion 2	**ECTEL**
111.8-114.25 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	
114.25-116 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341	
116-119.98 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.341	

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/(m2 □ MHz)) for all angles of arrival. (WRC-2000)

119.98-151.5 GHz	
Allocation to services	
ITURegion 2	**ECTEL**
119.98-122.25 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562C SPACE RESEARCH (passive) 5.138 5.341	
122.25-123 FIXED INTER-SATELLITE MOBILE 5.558 Amateur 5.138	
123-130 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 5.562D 5.149 5.554	
130-134 EARTH EXPLORATION-SATELLITE (active) 5.562E FIXED INTER-SATELLITE MOBILE 5.558 RADIO ASTRONOMY 5.149 5.562A	
134-136 AMATEUR AMATEUR-SATELLITE Radio astronomy	
136-141 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.149	
141-148.5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
148.5-151.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	

5.562E The allocation to the Earth exploration-satellite service (active) is limited to the band 133.5-134 GHz.
(WRC-2000)

151.5-158.5 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
151.5-155.5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 5.149	
155.5-158.5 FIXED MOBILE RADIO ASTRONOMY 5.149	

158.5-200 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
158.5-164 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)	
164-167 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
167-174.5 FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 5.558 5.149	
174.5-174.8 FIXED INTER-SATELLITE MOBILE 5.558	
174.8-182 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	
182-185 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
185-190 EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 5.562H SPACE RESEARCH (passive)	
190-191.8 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive) 5.340	
191.8-200 FIXED INTER-SATELLITE MOBILE 5.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.341 5.554	
241-248 RADIO ASTRONOMY RADIOLOCATIO N	

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)

200-248 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
200-209 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.341 5.563A	
209-217 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.341	
217-226 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 5.562B 5.149 5.341	
226-231.5 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340	
231.5-232 FIXED MOBILE Radiolocation	
232-235 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Radiolocation	
235-238 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive) 5.563A 5.563B	
238-240 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE	
240-241 FIXED MOBILE RADIOLOCATION	
241-248 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 5.138 5.149	

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)

248-3 000 GHz	
Allocation to services	
ITU Region 2	**ECTEL**
248-250 AMATEUR AMATEUR-SATELLITE Radio astronomy 5.149	
250-252 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 5.340 5.563A	
252-265 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 5.149 5.554	
265-275 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 5.149 5.563A	
275-3 000 (Not allocated) 5.564A 5.565	

5.564A For the operation of fixed and land mobile service applications in frequency bands in the range 275450 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)

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5.2 FOOTNOTES EXCLUSIVE TO ECTEL MEMBER STATES

E.1

The range 1605-1705 kHz is allocated to Broadcasting on an exclusive basis. Assignments require ITU coordination.

E.2

The following frequencies are allocated for the provision of Maritime Health and

Safety Services 2174.5 kHz: for Search and Rescue (SAR)

2 182 kHz : for GMDSS

2187.5 kHz: for Distress and Safety Radio Communication Services using DSC

E.3

The sub-band 88.0-89.6 MHz is allocated to Community Radio Service on a primary basis. Any FM Broadcast Services that have existing assignments in this band on May 1st 2011 may continue on their existing assigned frequencies. The power limit for the use of this sub-band for use by Community Radio Service is limited to maximum power output of 25 W.

The occupied Bandwidth for FM broadcast stations is limited to 150 kHz unless otherwise authorized by the NTRC.

E.4

In the previous edition of the ECTEL's Regional Spectrum Plan, the frequency band **235-267 MHz**. was identified and allocated to Digital Audio Broadcast services, however internationally the main frequency band for use of Digital Audio Broadcasting service is 174 MHz to 240 MHz. Further, in ECTEL Member States and Region 2, the band 174 MHz to 240 MHz is allocated to Broadcasting services which also facilitates for application such as Digital Audio Broadcast services. Therefore, the frequency band **235 MHz -267 MHz** is no longer identified and allocated for Digital Audio Broadcast service applications. In conformity with ITU Region 2, Digital Audio Broadcast applications are allocated to the frequency band 174 MHz to 240 MHz.

E.5

The band 335 MHz – 399.9 MHz is allocated for applications such as Studio to Transmitter Links (STL)

E.6

The band 454.975 MHz - 470 MHz is allocated for point to point links for Radio and Television outside Broadcast applications on a primary basis.

E.7

The band 462.5625-467.7125 is allocated to Family Radio Service applications on a secondary basis.

E.8

In the Commonwealth of Dominica, the band 912-915 is allocated to Mobile Services

E.9

The band 1710-1990 MHz is identified for use by ECTEL Member States to implement International Mobile Telecommunications ('IMT') and Broadband Wireless Access ('BWA') services.

E.10

The following radio frequency bands are allocated for the provision of Broadband Wireless Access services on a primary basis:

- 698 MHz – 806 MHz;
- 2300 MHz – 2400 MHz;
- 2520 MHz – 2690 MHz; and
- 3400 MHz – 3600 MHz.

Band Plans for Broadband Wireless Access Services

Band Plans for 2.3 GHz, 2.5 GHz and 3.5 GHz

The ECTEL band plans for following radio frequency bands 2.3 GHz, 2.5 GHz and 3.5 GHz have been adopted since June 2012. However, the aforementioned band plans have remained largely unchanged in the ECTEL Member States whilst in the international community these band plans have undergone several modifications to meet the increasing demands being placed by various wireless applications. Therefore, the aforementioned band plans will require modifications to comply with globally accepted standards and to ensure that equipment eco-system will be able to

operate in the ECTEL Member States. The modifications to the band plans are as follows:

3.5 GHz band (3400 MHz - 3600 MHz)

Globally, the radio frequencies in the 3.5 GHz band (3,400 to 3,500 MHz) are being used as the basis for the first implementations of advanced broadband wireless access networks and services such 5G New Radio (5G NR). The global standards for the equipment eco-system for 3.5 GHz band is based on Time Division Duplex (TDD) frame structure. However, the current 3.5 GHz band plan used in the ECTEL Member States is based on Frequency Division Duplex (FDD) operation and may not be compatible with TDD networks operating in the 3.5 GHz band. Therefore, ECTEL is considering adopting a band plan for the 3.5 GHz band that will be based on Time Duplex Division (TDD) time frame structure. The proposed channel bandwidths to be assigned to each operators will be 10 MHz or 20 MHz.

2.5 GHz band

The range 2520 - 2690 MHz is allocated for broadband wireless applications and will be utilising TDD time frame structure.

2.3 GHz band (2300 MHz to 2400 MHz)

The 2.3 GHz band plan for the ECTEL Member States will use a TDD time frame structure.

E.11

The following bands are designated for use by licence-exempt wireless local area networks and devices for non-commercial purposes operating on low power output levels with appropriately specified technical parameters and based upon not interfering with, or claiming protection from, licensed services.

2.4 – 2.4835 GHz. 5.150 - 5.350 GHz; and

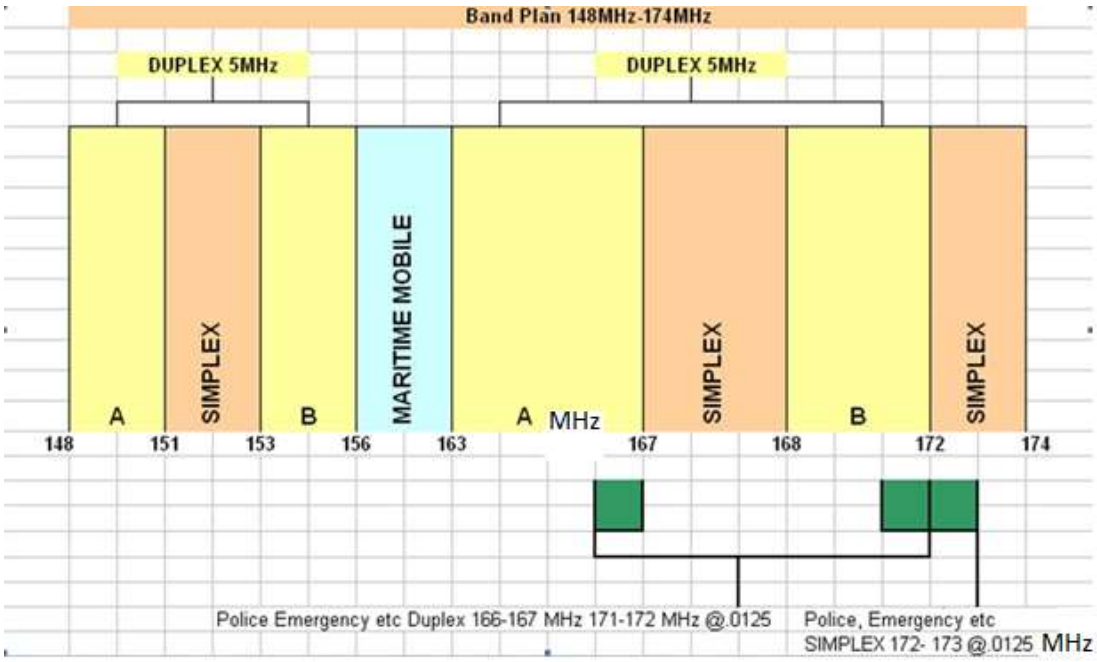
5.725 - 5.875 GHz (Indoor use)

E.12

The allocation for the VHF land mobile band is 148 MHz to 174 MHz, with 156 MHz to 163 MHz allocated for maritime mobile use (this is a standard channelized band with international standards). The land mobile band is further divided into 2 duplex band with 5MHz separation between the transmit frequencies and the receive frequencies, and 3 bands allocated for simplex operation. The channel spacing will be 12.5 kHz.

3 MHz (2 MHz for duplex operation and 1 MHz for simplex operation) is allocated for emergency and Non-Governmental Organisation ('NGO') use as seen in the table below.

Land Mobile Band Plan

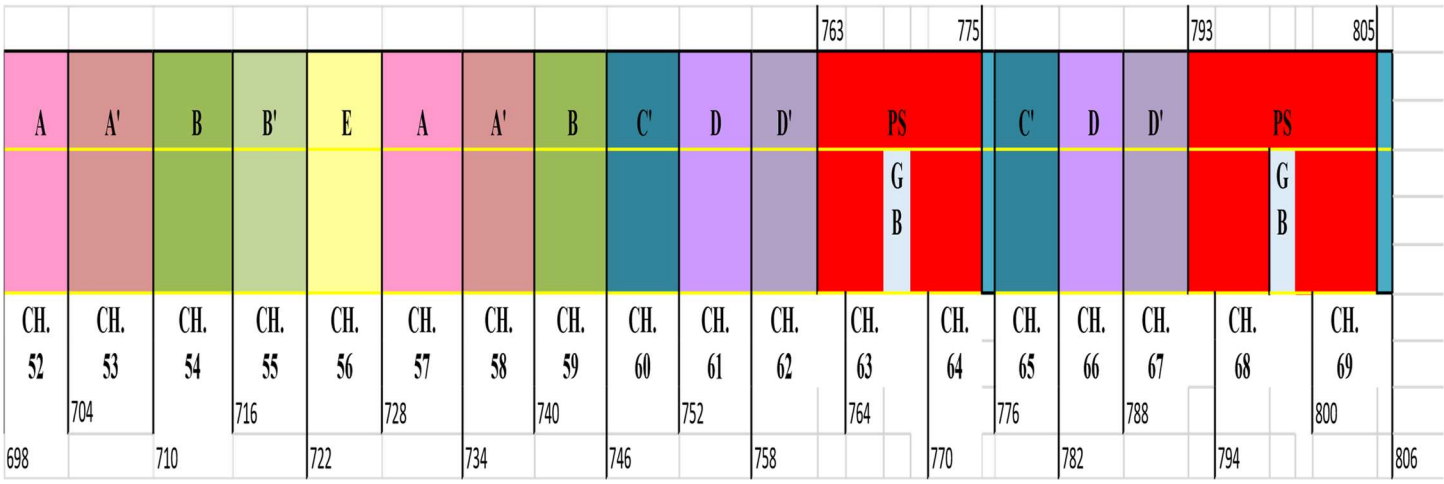


E.13

The band 806MHz to 824.040 MHz is allocated for UHF Land Mobile Service

E.14

The range 698 to 806 MHz is allocated to Broadband Wireless Access applications.



The ECTEL 700 MHz band plan has been revised to align closer to the FCC's 700 MHz band plan including making changes to align it closer to the FCC's Upper 700 MHz band plan

Frequency Block	Frequency range /MHz UL/DL	Bandwidth /MHz
A	698 to 704 / 728 to734	2 X 6 MHz
A'	704 to 710 / 734 to740	2 X 6 MHz
B	710 to 716 / 740 to 746	2 X 6 MHz
B'	716 to 722	6 MHz
E	722 to 728	6 MHz
C'	776 to 782 / 746 to 752	2 X 6 MHz
D	782 to 788 / 752 to 758	2 X 6 MHz
D'	788 to 793 / 758 to 763	2 X 5 MHz
PS	793 to 805 /763 to 775	

ECTEL is proposing a revision to allocate the D'-Block (758-763 MHz / 788-793 MHz) to Public Safety applications (Public Protection and Disaster Relief- PPDR) for nationwide emergency response broadband network; and PS Block for deploying and operating the nationwide public safety network. It is also proposed that the prospective licensee will hold be authorised to use both the existing public safety spectrum (763-769 MHz/793-799 MHz) and the reallocated D' Block.

The rationale for the revision for the upper 700 MHz band to align it closer to the FCC's Upper 700 MHz band plan is to allow the ECTEL Member States especially agencies with responsibility for disaster management and emergency response to take advantage of the equipment ecosystem and technology from North America.

The revision of ECTEL's 700 MHz band plan does not affect the blocks that have been assigned to licensees in the ECTEL Member States namely ECTEL Blocks A', B, C' and D. All licensees who have been assigned spectrum in 700 MHz band prior to the revision of the Plan will maintain the assigned spectrum. New licensees will have to comply with the revision to the ECTEL 700 MHz spectrum band.

E.15

In the ECTEL Member States, the frequency band 614 MHz to 698 MHz, or portions thereof, is identified for International Mobile Telecommunications (IMT) – see Resolution 224 (Rev.WRC19). 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. Mobile service stations of the IMT system within the frequency band are subject to agreement obtained under No. 9.21 of the ITU Radio Regulations and shall not cause harmful interference.

6.0 SPECTRUM MANAGEMENT IN ECTEL MEMBER STATES

6.1 TECHNICAL PLANNING TOOLS

The Spectrum plan is the principal technical document providing information on the allocation of frequency bands to the different types of radio communications services used in the ECTEL Member States. The Plan in its formulation takes into account the harmonized regulatory and spectrum management frameworks for the management of the radio frequency spectrum resources in the Member States. The Spectrum Plan provides valuable information for radio system planning and implementation within the ECTEL Member States. Radio communications engineers and wireless telecommunication designers should consult the NTRC prior to any system designs utilizing spectrum resource as there are critical elements which are integral in the spectrum management process within the ECTEL States. The monitoring and management of the radio frequency spectrum are carried out by the National Telecommunications Regulatory Commission in each Member State. The NTRC will consult with ECTEL on the management of its national radio frequency spectrum.

Some of the important elements which comprise the planning tools in spectrum management are:

- Legal requirements for licence and frequency authorisations prior to use spectrum;
- Band plans and channel assignment plans for various radio communications services;
- Designation of licensed and license-exempt frequency bands;
- Technical parameters placed in the frequency authorisations for the use of spectrum;
- Requirements for frequency coordination for certain frequency assignments between ECTEL Member and neighbouring territories.

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7.0 BROADCASTING SERVICES

The ECTEL Spectrum Plan makes provisions for the allocation of spectrum for the provision of broadcasting services in keeping with the ITU Region 2 recommendations.

The frequency bands as designated under the plan for broadcast services are:

a) 525-1705 kHz.AM radio transmitters are assigned frequencies in this band

b) 44-50 MHz and 54-72 MHz. Analog Television transmitters are assigned frequencies in this band.(TV channels 2,3 and 4)

c) 76-88 MHz. Analog television transmitters are assigned frequencies in this band (TV channels 5 and 6)

d) 88-108 MHz. FM radio transmitters are assigned frequencies in this band. FM radio broadcasting is allocated 100 channels from 88.1 to 107.9 MHz.

e) The frequencies assigned in the 88-108 MHz band are for the delivery of FM broadcasting and are not intended to be used for the purpose of linking one broadcast transmitter site to another broadcast transmitter site.

f) 335.4 MHz -399.9 MHz Studio to Transmitter Links are assigned frequencies in this band.

g) 174-216 MHz. Analog television transmitters are assigned frequencies in this band.

h) 470-512 MHz. Analog television providing UHF television broadcast are assigned frequencies in this band.

i) The assignment of frequencies in the respective broadcast bands are made subject to the adoption of the relevant standards promulgated under the Broadcast Regulations.

7.1 AM STANDARDS

The standards contained in the AM Standards document are the conditions necessary for the establishment of sound broadcasting in the Medium Wave (AM) band and in addition for the issuance of a Type Approval Certification for AM transmitters.

Type Approval Certification will be issued in accordance with accepted International Standards that the equipment has met or test carried by the applicant and certified by a professional engineer.

The Authority reserves the right to require adjustments to be made to the equipment should it cause interference notwithstanding having been certified previously.

The assignment of a broadcast channel is made in conformity with the Americas Regional Plan, RJ81.

DEFINITIONS

AM broadcast Channel
The band of frequencies occupied by the carrier and the upper and lower sidebands of an AM broadcast signal with the carrier frequency at the centre. Channels are designated by their assigned carrier frequencies. The 117 carrier frequencies assigned to AM broadcast stations begin at 540 kHz and progress in 10 Hz steps to 1700 kHz.

Class A Station.
A Class A station is an unlimited time station (that is, it can broadcast 24 hours per day) that operates on a clear channel. The operating power shall not be less than 10 kilowatts (kW) or more than 50 kW.

Class B Station.
A Class B station is an unlimited time station. Class B stations are authorized to operate with a minimum power of 0.250 kW (250 watts) and a maximum power of 50 kW. (If a Class B station operates with less than 0.250 kW, the RMS must be equal to or greater than 141 mV/m at 1 km for the actual power.) If the station is authorized to operate in the expanded band (1610 to 1700 kHz), the maximum power is 10 kW.

Class C Station.
A Class C station is an unlimited time station that operates on a local channel. The power shall not be less than 0.25 kW nor more than 1 kW. Class C stations that are licensed to operate with 0.100 kW may continue to operate as licensed.

Class D Station.
A Class D station operates either daytime, limited time, or unlimited time with a nighttime power less than 0.250 kW and an equivalent RMS antenna field less than 141 mV/m at 1 km for the actual power. Class D stations shall operate with *daytime* powers not less than 0.250 kW or more than 50 kW. NOTE: If a station is an existing daytime-only station, its class will be Class D.

7.2 FM STANDARDS

The standards contained in the FM Standards document are the conditions necessary for the establishment of sound broadcasting in the FM band and in addition for the issuance of a Type Approval Certification for FM transmitters.

Type Approval Certification will be issued in accordance with accepted international standards that the equipment has met or test carried by the applicant and certified by a professional engineer.

The Authority [NTRC] reserves the right to require adjustments to be made to the equipment should it cause interference notwithstanding having been certified previously

Major changes in design made to the equipment, other than for the replacement of defective parts, will void the certification unless notified and approved by the Authority.

Transmitters will be authorized for power levels which will provide the minimum accepted field strength of 70 dBu (3.16μV/m) but shall not exceed 1KW transmitter power and an ERP of 3dBK

Licensees of FM stations will not be permitted to operate same programming in multiple sub-bands

The use of prime (broadcast) frequencies (88-108 MHz) for program rebroadcast will not be permitted.