

NATIONAL RADIO RULES

PART I

PRELIMINARY

BHUTAN INFORMATION, COMMUNICATIONS AND MEDIA AUTHORITY (BICMA)

Royal Government of Bhutan THIMPHU: October 2011



BHUTAN INFOCOMM & MEDIA AUTHORITY

Royal Government of Bhutan



Chairperson

14th October 2011

FOREWORD

Radio frequency spectrum is a natural asset and national resource with limited amount which have to be managed properly for effective and fair utilization. The demand for application of frequencies is growing daily and it is a predominant need of all equipments which are in operation using energy of electromagnetic waves. Airplanes, ships, satellites, radars, cell phones, sound and TV broadcasters, TV receivers, radio transceivers, microwave links, radio trunk, cordless phones, handsets, wireless apparatus, home appliance, industrial and medical equipments, weather forecasters and many other applications are managed internationally and nationally to take benefit of spectrum.

Fairly and efficiently regulating of spectrum employment among numerous radio applications and disparate users requires an adequate amount of transparent executive rules and terms of reference. Fortunately, the Bhutan Information, Communications and Media Act – 2006 provides Bhutan InfoCom and Media Authority (BICMA) with sufficient authority to regulate Radiocommunications activities inside the Kingdom and to represent national interests in international entities.

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National Radio Rules, Part I, Preliminary

Referencing the Act as legal base, introducing *National Radio Rules*, clarification of areas of authorization and addressing other initiative elements is the main objectives of this part. Definition of terms used here is available in Part II. Part III provides the Rules of licensing, planning, permitting, enforcing, pricing and standardization. Finally Part IV presents all Schedules.

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(Chairperson)

BHUTAN INFOCOMM & MEDIA AUTHORITY

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CHAPTER 1 – PRELEMINARY

1.1 Introduction and Legal basis

These Rules is issued by the Bhutan InfoComm and Media Authority (the "Authority) in accordance with the provisions **25** and **80** of the Bhutan Information, Communications and Media Act 2006 (the "Act") that entitle the Authority to make, modify, replace, repeal and enforce radio Rules so that the Authority could carry out its mandate to control, plan, administer, manage, regulate and to charge for radio frequency spectrum, as well as to enforce rules and to issue license, permits and certificates.

1.2 Title

- (a) These rules shall be called "*National Radio Rules*" and may be shortened as "*Radio Rules*".
- (b) These rules consist of four following Parts:

Part I:	Preliminary
Part II :	Definitions
Part III :	Rules of National Radio Rules
Part IV:	Schedules

1.3 Commencement

These rules shall be called "*National Radio Rules*" and shall come into force on 14^{th} of **October**, 2011.

1.4 Scope of Application

(a) Unless otherwise appears in rules for particular cases, these Rules shall apply:

- (i) to all matters by any entity related to the radiocommunications within or from the territory of Bhutan, its atmosphere and its outer space, except otherwise stipulated in **1.4** (b); and
- (ii) to an apparatus using radio frequency spectrum for a non-radiocommunications purpose,
- (b) This Rule does not apply to:
 - (i) a license of any type before its validity end or one year which ever happens earlier; and
 - (ii) a permit of any type before its validity end or one year which ever happens earlier; and
 - (iii) a certificate of any type before its validity end or one year which ever happens earlier, and
 - (iv) an accreditation of any type before its validity end or one year which ever happens earlier.

1.5 Amendment

These rules have been updated in effect of Act and by its commencement as in provision 1.3, the former "National Radio Regulation – 1999" is repealed.

1.6 Interpretation

- (a) The power to interpret these rules shall vest with the Authority who may issue such instruction as may be necessary to give effect to, and carry out the provisions of these rules.
- (b) In any instance of a difference in meaning between the Dzongkha and English texts of this Act, the Dzongkha text shall prevail.

1.7 Power of the Authority relating radiocommunications

- (a) Pursuant to sections **25**, **27** and **80** of Act, the Authority has power to apply National Radio Rules:
 - (i) To all types of radiocommunications; and,
 - (ii) To all radiocommunication apparatus; and,
 - (iii) To all radiocommunication stations
- (b) and has power to manage radio frequency spectrum through:

Regarding to making regulation:

- (i) Make, modify, replace, repeal and enforce National Radio Rules; and
- (ii) prescribe any obligation, which it deems fit, for which it has powers under the Act, for the purposes of implementation of these Rules in order to ensure efficient utilisation of radiofrequency spectrum

Regarding to planning, licensing, permitting and certificating:

- (iii) Planning radio frequency spectrum; and
- (iv) Production of table of frequency allocations; and
- (v) Improvement of radio frequency spectrum for ICT and media services; and
- (vi) Categorization of licenses; and
- (vii) Issuing, renewing and cancellation of a license; and
- (viii) Granting an exemption from the licensing or permitting requirement; and
- (ix) Approval and registration of license transfer; and

- (x) Issuing, modification, renewing and cancellation of a permit; and
- (xi) Assigning call signs to radiocommunication stations; and
- (xii) Registering radio frequency spectrum utilization; and
- (xiii) Issuing, modification, renewing and cancellation of a certificate; and

Regarding to the spectrum monitoring and standardization:

- (xiv) Supervising radio frequency spectrum utilization; and
- (xv) Inspection of radiocommunication stations of ICT networks and production of license as well as obtaining information; and
- (xvi) Calling for any information from the licensee including information necessary for ensuring transparency or for ascertaining the true ownership of the licence or licensee, whenever necessary; and
- (xvii)Requiring any person to answer all questions related to the illegal license transfer and investigation including entering and searching premises for obtaining relevant evidences; and
- (xviii)Harmful interference resolutions; and
- (xix) Exercising section 15 of the Act, if authorized by the Minister; and
- (xx) Establish national technical standards; and
- (xxi) Ensuring compliance of equipment with standards; and
- (xxii)Ensuring achievement of environmental health and radiation safety; and

Regarding to Fees:

- (xxiii)Prescription and collection of fees for radio frequency spectrum usage, licensing, permitting and for such other cases as the Authority thinks fit under the act; and
- (xxiv)Granting an exemption from prescribed fees, under the Act; and

1.8 Power of Director or Director General of Authority

Pursuant to the subsection 21(3) of Act, the Director shall be the chief executive and the legal representative of the Authority and have powers of general superintendence and direction in the conduct of affairs of the Authority and shall exercise and discharge such powers and functions of the Authority that have been assigned to the Authority under the Act or any other Acts.

1.9 Appeal

- (a) Any person who contravenes any provision of National Radio Rules made under the Act, or causes or permits any radiocommunication station or any radiocommunication apparatus to be used in contravention of any such National Radio Rules, shall be guilty of an offence, which shall be a misdemeanour. In accordance with the gravity of crime, a Court may impose an additional fine of up to one thousand days of the daily minimum national wage rate.
- (b) Any person who establishes or uses any station for radiocommunication or installs or uses any apparatus for radiocommunication except under and in accordance with such a licence shall be guilty of an offence punishable with penalties in accordance with Penal Code.

- Note In determining the liability of a body corporate for an offence under the provisions **1.10** (a) and **1.10** (b), the Penal Code will apply.
- (a) The Authority is empowered to execute the provisions of this Act where the jurisdiction of the Courts does not extend.



NATIONAL RADIO RULES

PART II

DEFINITIONS

BHUTAN INFORMATION, COMMUNICATIONS AND MEDIA AUTHORITY (BICMA)

Royal Government of Bhutan THIMPHU: October 2011



BHUTAN INFOCOMM & MEDIA AUTHORITY



Royal Government of Bhutan

14th October 2011

FOREWORD

Radio frequency spectrum is a natural asset and national resource with limited amount which have to be managed properly for effective and fair utilization. The demand for application of frequencies is growing daily and it is a predominant need of all equipments which are in operation using energy of electromagnetic waves. Airplanes, ships, satellites, radars, cell phones, sound and TV broadcasters, TV receivers, radio transceivers, microwave links, radio trunk, cordless phones, handsets, wireless apparatus, home appliance, industrial and medical equipments, weather forecasters and many other applications are managed internationally and nationally to take benefit of spectrum.

Fairly and efficiently regulating of spectrum employment among numerous radio applications and disparate users requires an adequate amount of transparent executive rules and terms of reference. Fortunately, the Bhutan Information, Communications and Media Act – 2006 provides Bhutan InfoComm and Media Authority (BICMA) with sufficient authority to regulate Radiocommunications activities inside the Kingdom and to represent national interests in international entities.

i

National Radio Rules: Part II, Definitions

Part II of National Radio Rules provides a unified definition of essential words and terms having technical and legal measures throughout the provisions and other regulatory products in Radio Rules. The meanings prescribed here do not necessarily applicable in other materials

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(Chairperson)

BHUTAN INFOCOMM & MEDIA AUTHORITY

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CHAPTER 1 – DEFINITION

All terms used in these Rule shall have the same meaning as accorded to them in the Act. In addition for the purpose of these rules following terms shall have described meaning*.

Section I – General terms

- **1.1** *Act*: means the Bhutan Information, Communications and Media Act 2006;
- **1.2** *administration:* Any governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations.

In case of the Kingdom of Bhutan, Information, Communications and Media Authority (BICMA) takes place of Administration.

- **1.3** *telecommunication:* Any transmission, *emission* or reception of signs, signals, writings, images and sounds or intelligence of any nature by wire, *radio*, optical or other electromagnetic systems.
- **1.4** *radio:* A general term applied to the use of *radio waves*.
- **1.5** *radio waves* or *hertzian waves:* Electromagnetic waves of frequencies arbitrarily lower than 3 000 GHz, propagated in space without artificial guide.

^{*} NOTE - If, in the text of a definition, a term is appeared/printed in italics, this means that the term itself is defined in this Chapter.

- **1.6** *radiocommunication: Telecommunication* by means of *radio waves.*
- **1.7** *terrestrial radiocommunication*: Any *radiocommunication* other than *space radiocommunication* or *radio astronomy*.
- **1.8** *space radiocommunication:* Any *radiocommunication* involving the use of one or more *space stations* or the use of one or more *reflecting satellites* or other objects in space.
- **1.9** *radiodetermination:* The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of *radio waves*.
- **1.10** *radionavigation: Radiodetermination* used for the purposes of navigation, including obstruction warning.
- **1.11** *radiolocation: Radiodetermination* used for purposes other than those of *radionavigation*.
- **1.12** *radio direction-finding: Radiodetermination* using the reception of *radio waves* for the purpose of determining the direction of a *station* or object.
- **1.13** *radio astronomy:* Astronomy based on the reception of *radio waves* of cosmic origin.
- 1.14 Coordinated Universal Time (UTC): Time scale, based on the second (SI), as defined in Recommendation ITU-R TF.460-6. (WRC-03)

For most practical purposes associated with the Radio Regulations, UTC is equivalent to mean solar time at the prime meridian (0° longitude), formerly expressed in GMT.

1.15 *industrial, scientific and medical (ISM) applications* (of radio frequency energy): Operation of equipment or appliances designed to generate and use locally radio frequency energy

for industrial, scientific, medical, domestic or similar purposes, excluding applications in the field of *telecommunications*.

Section II – Specific terms related to frequency management

- **1.16** *allocation* (of a frequency band): Entry in the Table of Frequency Allocations of a given frequency band for the purpose of its use by one or more terrestrial or space *radiocommunication services* or the *radio astronomy service* under specified conditions. This term shall also be applied to the frequency band concerned.
- **1.17** *allotment* (of a radio frequency or radio frequency channel): Entry of a designated frequency channel in an agreed plan, adopted by a competent conference, for use by one or more administrations for a terrestrial or space *radiocommunication service* in one or more identified countries or geographical areas and under specified conditions. BICMA has also authorization, by the Act, to adopt domestic plans for such a similar use for different geographical areas of country.
- **1.18** *assignment* (of a radio frequency or radio frequency channel): Authorization given by an administration for a radio *station* to use a radio frequency or radio frequency channel under specified conditions.

Section III – Radio services

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

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

- **1.20** *fixed service*: A *radiocommunication service* between specified fixed points.
- **1.21** *fixed-satellite service:* A *radiocommunication service* between *earth stations* at given positions, when one or more *satellites* are used; the given position may be a specified fixed point or any fixed point within specified areas; in some cases this service includes satellite-to-satellite links, which may also be operated in the *inter-satellite service*; the fixed-satellite service may also include *feeder links* for other *space radiocommunication services*.
- **1.22** *inter-satellite service*: A *radiocommunication service* providing links between artificial *satellites*.
- **1.23** space operation service: A radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry and space telecommand.

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

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

In case of the Kingdom of Bhutan, this definition does not include *maritime mobile service*.

- **1.25** *mobile-satellite service:* A *radiocommunication service:*
 - between mobile earth stations and one or more space stations, or between space stations used by this service; or
 - between *mobile earth stations* by means of one or more *space stations*.

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

- **1.26** *land mobile service:* A *mobile service* between *base stations* and *land mobile stations*, or between *land mobile stations*.
- **1.27** *land mobile-satellite service*: A *mobile-satellite service* in which *mobile earth stations* are located on land.
- **1.28** *maritime mobile service:* A *mobile service* between *coast stations* and *ship stations*, or between *ship stations*, or between associated on-board communication *stations; survival craft stations* and *emergency position-indicating radiobeacon stations* may also participate in this *service*.

In spite of this definition, there is no actual usage for this *radiocommunication service* in the Kingdom of Bhutan and BICMA may decide to allocate designated frequency bands for utilization of alternative *radiocommunication service*.

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

In spite of this definition, there is no actual usage for this *radiocommunication service* in the Kingdom of Bhutan and BICMA may decide to allocate designated frequency bands for utilization of alternative *radiocommunication service*.

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

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

In spite of this definition, there is no actual usage for this *radiocommunication service* in the Kingdom of Bhutan.

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

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

In spite of this definition, there is no actual usage for this *radiocommunication service* in the Kingdom of Bhutan and BICMA may decide to allocate designated frequency bands for utilization of alternative *radiocommunication service*.

- **1.32** *aeronautical mobile service*: A *mobile service* between *aeronautical stations* and *aircraft stations*, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies.
- **1.33** aeronautical mobile $(R)^*$ service: An aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes.
- **1.34** *aeronautical mobile* $(OR)^{**}$ *service:* An *aeronautical mobile service* intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes.
- **1.35** aeronautical mobile-satellite service: A mobile-satellite service in which mobile earth stations are located on board

^{* (}R): route.

^{** (}OR): off-route.

aircraft; *survival craft stations* and *emergency positionindicating radiobeacon stations* may also participate in this *service*.

- **1.36** *aeronautical mobile-satellite* $(R)^*$ *service:* An *aeronautical mobile-satellite service* reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes.
- **1.37** *aeronautical mobile-satellite (OR)** service:* An *aeronautical mobile-satellite service* intended for communications, including those relating to flight coordination, primarily outside national and international civil air routes.
- **1.38** *broadcasting service:* A *radiocommunication service* in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, *television* transmissions or other types of transmission.
- **1.39** *broadcasting-satellite service:* A *radiocommunication service* in which signals transmitted or retransmitted by *space stations* are intended for direct reception by the general public.

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

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

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

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

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

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

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

In spite of this definition, there is no actual usage for this *radiocommunication service* in the Kingdom of Bhutan and BICMA may decide to allocate designated frequency bands for utilization of alternative *radiocommunication service*.

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

In spite of this definition, there is no actual usage for this *radiocommunication service* in the Kingdom of Bhutan and BICMA may decide to allocate designated frequency bands for utilization of alternative *radiocommunication service*.

- **1.46** *aeronautical radionavigation service:* A *radionavigation service* intended for the benefit and for the safe operation of aircraft.
- **1.47** *aeronautical radionavigation-satellite service*: A *radionavigation-satellite service* in which *earth stations* are located on board aircraft.
- **1.48** *radiolocation service*: A *radiodetermination service* for the purpose of *radiolocation*.
- **1.49** *radiolocation-satellite service*: A *radiodetermination-satellite service* used for the purpose of *radiolocation*.

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

- **1.50** *meteorological aids service:* A *radiocommunication service* used for meteorological, including hydrological, observations and exploration.
- **1.51** *Earth exploration-satellite service:* A *radiocommunication service* between *earth stations* and one or more *space stations*, which may include links between *space stations*, in which:
 - information relating to the characteristics of the Earth and its natural phenomena, including data relating to the state of the environment, is obtained from *active sensors* or *passive sensors* on Earth *satellites*;
 - similar information is collected from airborne or Earthbased platforms;
 - such information may be distributed to earth stations within the system concerned;
 - platform interrogation may be included.

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

- **1.52** *meteorological-satellite service:* An *earth explorationsatellite service* for meteorological purposes.
- **1.53** standard frequency and time signal service: A radiocommunication service for scientific, technical and other purposes, providing the transmission of specified frequencies, time signals, or both, of stated high precision, intended for general reception.
- **1.54** standard frequency and time signal-satellite service: A radiocommunication service using space stations on earth satellites for the same purposes as those of the standard frequency and time signal service.

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

- **1.55** *space research service:* A *radiocommunication service* in which *spacecraft* or other objects in space are used for scientific or technological research purposes.
- **1.56** *amateur service:* A *radiocommunication service* for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest.
- **1.57** *amateur-satellite service*: A *radiocommunication service* using *space stations* on earth satellites for the same purposes as those of the *amateur service*.
- **1.58** *radio astronomy service*: A service involving the use of *radio astronomy*.
- **1.59** *safety service:* Any *radiocommunication service* used permanently or temporarily for the safeguarding of human life and property.
- **1.60** *special service:* A *radiocommunication service*, not otherwise defined in this Section, carried on exclusively for specific needs of general utility, and not open to *public correspondence*.

Section IV – Radio stations and systems

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

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

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

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

- **1.63** *earth station:* A *station* located either on the Earth's surface or within the major portion of the Earth's atmosphere and intended for communication:
 - with one or more *space stations*; or
 - with one or more *stations* of the same kind by means of one or more reflecting *satellites* or other objects in space.
- **1.64** *space station:* A *station* located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.
- **1.65** *survival craft station:* A *mobile station* in the *maritime mobile service* or the *aeronautical mobile service* intended solely for survival purposes and located on any lifeboat, life-raft or other survival equipment.
- **1.66** *fixed station*: A station in the *fixed service*.
- **1.66A** *high altitude platform station:* A station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the Earth.
- **1.67** *mobile station:* A *station* in the *mobile service* intended to be used while in motion or during halts at unspecified points.
- **1.68** *mobile earth station:* An *earth station* in the *mobile-satellite service* intended to be used while in motion or during halts at unspecified points.
- **1.69** *land station:* A *station* in the *mobile service* not intended to be used while in motion.

- **1.70** *land earth station:* An *earth station* in the *fixed-satellite service* or, in some cases, in the *mobile-satellite service*, located at a specified fixed point or within a specified area on land to provide a *feeder link* for the *mobile-satellite service*.
- **1.71** *base station*: A *land station* in the *land mobile service*.
- **1.72** base earth station: An earth station in the fixed-satellite service or, in some cases, in the land mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the land mobile-satellite service.
- **1.73** *land mobile station:* A *mobile station* in the *land mobile service* capable of surface movement within the geographical limits of a country or continent.
- **1.74** *land mobile earth station:* A *mobile earth station* in the *land mobile-satellite service* capable of surface movement within the geographical limits of a country or continent.
- **1.75** *coast station:* A *land station* in the *maritime mobile service*. Such a station is not implementable in the territory of the Kingdom of Bhutan.
- **1.76** *coast earth station*: An earth station in the *fixed-satellite service* or, in some cases, in the *maritime mobile-satellite service*, located at a specified fixed point on land to provide a feeder link for the *maritime mobile-satellite service*. Such a *station* is not implementable in the territory of the Kingdom of Bhutan.
- **1.77** *ship station:* A *mobile station* in the *maritime mobile service* located on board a vessel which is not permanently moored, other than a *survival craft station*. Such a station is not implementable in the territory of the Kingdom of Bhutan.

- **1.78** ship earth station: A mobile earth station in the maritime mobile-satellite service located on board ship.
- **1.79** *on-board communication station:* A low-powered *mobile station* in the *maritime mobile service* intended for use for internal communications on board a ship, or between a ship and its lifeboats and life-rafts during lifeboat drills or operations, or for communication within a group of vessels being towed or pushed, as well as for line handling and mooring instructions. Such a station is not implementable in the territory of the Kingdom of Bhutan.
- **1.80** *port station:* A *coast station* in the *port operations service*. Such a station is not implementable in the territory of the Kingdom of Bhutan.
- **1.81** *aeronautical station*: A *land station* in the *aeronautical mobile service*.

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

- **1.82** aeronautical earth station: An earth station in the fixedsatellite service, or, in some cases, in the aeronautical mobilesatellite service, located at a specified fixed point on land to provide a feeder link for the aeronautical mobile-satellite service.
- **1.83** *aircraft station*: A *mobile station* in the *aeronautical mobile service*, other than a *survival craft station*, located on board an aircraft.
- **1.84** aircraft earth station: A mobile earth station in the aeronautical mobile-satellite service located on board an aircraft.
- **1.85** broadcasting station: A station in the broadcasting service.

- **1.86** *radiodetermination Station:* A *station* in the *radiodetermination service.*
- **1.87** *radionavigation mobile station:* A *station* in the *radionavigation service* intended to be used while in motion or during halts at unspecified points.
- **1.88** *radionavigation land station*: A *station* in the *radionavigation service* not intended to be used while in motion.
- **1.89** *radiolocation mobile station:* A *station* in the *radiolocation service* intended to be used while in motion or during halts at unspecified points.
- **1.90** *radiolocation land station:* A station in the *radiolocation service* not intended to be used while in motion.
- **1.91** *radio direction-finding station*: A *radiodetermination station* using radio direction-finding.
- **1.92** *radiobeacon station:* A *station* in the *radionavigation service* the *emissions* of which are intended to enable a *mobile station* to determine its bearing or direction in relation to the radiobeacon station.
- **1.93** *emergency position-indicating radiobeacon station:* A *station* in the *mobile service* the *emissions* of which are intended to facilitate search and rescue operations.
- **1.94** *satellite emergency position-indicating radiobeacon:* An *earth station* in the *mobile-satellite service* the *emissions* of which are intended to facilitate search and rescue operations.
- **1.95** *standard frequency and time signal station:* A *station* in the *standard frequency and time signal service.*
- **1.96** *amateur station:* A *station* in the *amateur service*.
- **1.97** *radio astronomy station*: A *station* in the *radio astronomy service*.

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

This definition does not include amateur stations.

- **1.99** *ship's emergency transmitter:* A ship's transmitter to be used exclusively on a distress frequency for distress, urgency or safety purposes. Such a station is not implementable in the territory of the Kingdom of Bhutan.
- **1.100** *radar:* A *radiodetermination* system based on the comparison of reference signals with radio signals reflected, or retransmitted, from the position to be determined.
- **1.101** *primary radar:* A *radiodetermination* system based on the comparison of reference signals with radio signals reflected from the position to be determined.
- **1.102** *secondary radar:* A *radiodetermination* system based on the comparison of reference signals with radio signals retransmitted from the position to be determined.
- **1.103** *radar beacon (racon):* A transmitter-receiver associated with a fixed navigational mark which, when triggered by a *radar*, automatically returns a distinctive signal which can appear on the display of the triggering *radar*, providing range, bearing and identification information.
- **1.104** *instrument landing system (ILS):* A *radionavigation* system which provides aircraft with horizontal and vertical guidance just before and during landing and, at certain fixed points, indicates the distance to the reference point of landing.
- **1.105** *instrument landing system localizer:* A system of horizontal guidance embodied in the *instrument landing system* which indicates the horizontal deviation of the aircraft from its optimum path of descent along the axis of the runway.

- **1.106** *instrument landing system glide path:* A system of vertical guidance embodied in the *instrument landing system* which indicates the vertical deviation of the aircraft from its optimum path of descent.
- **1.107** *marker beacon:* A transmitter in the *aeronautical radionavigation service* which radiates vertically a distinctive pattern for providing position information to aircraft.
- **1.108** *radio altimeter: Radionavigation* equipment, on board an aircraft or *spacecraft*, used to determine the height of the aircraft or the *spacecraft* above the Earth's surface or another surface.
- **1.109** *radiosonde:* An automatic radio transmitter in the *meteorological aids service* usually carried on an aircraft, free balloon, kite or parachute, and which transmits meteorological data.
- **1.109A** *adaptive system:* A radiocommunication system which varies its radio characteristics according to channel quality.
- **1.110** *space system:* Any group of cooperating *earth stations* and/or *space stations* employing *space radiocommunication* for specific purposes.
- **1.111** *satellite system:* A *space system* using one or more artificial earth *satellites*.
- **1.112** *satellite network*: A satellite system or a part of a satellite system, consisting of only one satellite and the cooperating *earth stations*.
- **1.113** *satellite link:* A radio link between a transmitting *earth station* and a receiving *earth station* through one *satellite*.

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

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

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

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

Section V – Operational terms

- **1.116** *public correspondence:* Any *telecommunication* which the offices and *stations* must, by reason of their being at the disposal of the public, accept for transmission.
- **1.117** *telegraphy*¹: A form of telecommunication in which the transmitted information is intended to be recorded on arrival as a graphic document; the transmitted information may sometimes be presented in an alternative form or may be stored for subsequent use.
- **1.118** *telegram:* Written matter intended to be transmitted by *telegraphy* for delivery to the addressee. This term also includes *radiotelegrams* unless otherwise specified.

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

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

- **1.119** *radiotelegram:* A *telegram*, originating in or intended for a *mobile station* or a *mobile earth station* transmitted on all or part of its route over the *radiocommunication* channels of the *mobile service* or of the *mobile-satellite service*.
- **1.120** *radiotelex call:* A telex call, originating in or intended for a *mobile station* or a *mobile earth station*, transmitted on all or part of its route over the *radiocommunication* channels of the *mobile service* or the *mobile-satellite service*.
- **1.121** *frequency-shift telegraphy: Telegraphy* by frequency modulation in which the telegraph signal shifts the frequency of the carrier between predetermined values.
- **1.122** *facsimile:* A form of *telegraphy* for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form.
- **1.123** *telephony:* A form of *telecommunication* primarily intended for the exchange of information in the form of speech (CS 1017).
- **1.124** *radiotelephone call:* A telephone call, originating in or intended for a *mobile station* or a *mobile earth station*, transmitted on all or part of its route over the *radiocommunication* channels of the *mobile service* or of the *mobile-satellite service*.
- **1.125** *simplex operation:* Operating method in which transmission is made possible alternately in each direction of a *telecommunication* channel, for example, by means of manual control².

² **1.125.1**, **1.126.1** and **1.127.1** In general, *duplex operation* and *semi-duplex operation* require two frequencies in *radiocommunication*; *simplex operation* may use either one or two.
- **1.126** *duplex operation:* Operating method in which transmission is possible simultaneously in both directions of a *telecommunication* channel².
- **1.127** *semi-duplex operation:* A method which is *simplex operation* at one end of the circuit and *duplex operation* at the other.²
- **1.128** *television:* A form of *telecommunication* for the transmission of transient images of fixed or moving objects.
- **1.129** *individual reception* (in the broadcasting-satellite service): The reception of *emissions* from a *space station* in the *broadcasting-satellite service* by simple domestic installations and in particular those possessing small antennas.
- **1.130** *community reception* (in the broadcasting-satellite service): The reception of *emissions* from a *space station* in the *broadcasting-satellite service* by receiving equipment, which in some cases may be complex and have antennas larger than those used for *individual reception*, and intended for use:
 - by a group of the general public at one location; or
 - through a distribution system covering a limited area.
- **1.131** *telemetry:* The use of *telecommunication* for automatically indicating or recording measurements at a distance from the measuring instrument.
- 1.132 radiotelemetry: Telemetry by means of radio waves.
- **1.133** space telemetry: The use of telemetry for the transmission from a space station of results of measurements made in a spacecraft, including those relating to the functioning of the spacecraft.
- **1.134** *telecommand:* The use of *telecommunication* for the transmission of signals to initiate, modify or terminate functions of equipment at a distance.

- **1.135** *space telecommand:* The use of *radiocommunication* for the transmission of signals to a *space station* to initiate, modify or terminate functions of equipment on an associated space object, including the *space station*.
- **1.136** *space tracking:* Determination of the *orbit*, velocity or instantaneous position of an object in space by means of *radiodetermination*, excluding *primary radar*, for the purpose of following the movement of the object.

Section VI – Characteristics of emissions and radio equipment

- **1.137** *radiation:* The outward flow of energy from any source in the form of *radio waves*.
- **1.138** *emission: Radiation* produced, or the production of *radiation*, by a radio transmitting *station*.

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

- **1.139** *class of emission:* The set of characteristics of an *emission*, designated by standard symbols, e.g. type of modulation of the main carrier, modulating signal, type of information to be transmitted, and also, if appropriate, any additional signal characteristics.
- **1.140** *single-sideband emission:* An amplitude modulated *emission* with one sideband only.
- **1.141** *full carrier single-sideband emission*: A *single-sideband emission* without reduction of the carrier.
- **1.142** *reduced carrier single-sideband emission:* A *single-sideband emission* in which the degree of carrier suppression enables the carrier to be reconstituted and to be used for demodulation.

- **1.143** suppressed carrier single-sideband emission: A single-sideband emission in which the carrier is virtually suppressed and not intended to be used for demodulation.
- **1.144** *out-of-band emission: Emission* on a frequency or frequencies immediately outside the *necessary bandwidth* which results from the modulation process, but excluding *spurious emissions*.
- **1.145** spurious emission: Emission on a frequency or frequencies which are outside the necessary bandwidth and the level of which may be reduced without affecting the corresponding transmission of information. Spurious emissions include harmonic emissions, parasitic emissions, intermodulation products and frequency conversion products, but exclude out-of-band emissions.
- **1.146** *unwanted emissions*: Consist of *spurious emissions* and *out-of- band emissions*.
- **1.146A** *out-of-band domain* (of an emission): The frequency range, immediately outside the necessary bandwidth but excluding the spurious domain, in which *out-of-band emissions* generally predominate. *Out-of-band emissions*, defined based on their source, occur in the out-of-band domain and, to a lesser extent, in the spurious domain. Spurious emissions likewise may occur in the out-of-band domain as well as in the spurious domain. (WRC-03)
- **1.146B***spurious domain* (of an emission): The frequency range beyond the *out-of-band domain* in which *spurious emissions* generally predominate. (WRC-03)
- **1.147** assigned frequency band: The frequency band within which the emission of a station is authorized; the width of the band equals the necessary bandwidth plus twice the absolute value of the frequency tolerance. Where space stations are

concerned, the assigned frequency band includes twice the maximum Doppler shift that may occur in relation to any point of the Earth's surface.

- **1.148** *assigned frequency:* The centre of the frequency band assigned to a *station*.
- **1.149** *characteristic frequency:* A frequency which can be easily identified and measured in a given *emission*.

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

- **1.150** *reference frequency:* A frequency having a fixed and specified position with respect to the *assigned frequency*. The displacement of this frequency with respect to the *assigned frequency* has the same absolute value and sign that the displacement of the *characteristic frequency* has with respect to the centre of the frequency band occupied by the *emission*.
- **1.151** *frequency tolerance:* The maximum permissible departure by the centre frequency of the frequency band occupied by an *emission* from the *assigned frequency* or, by the *characteristic frequency* of an *emission* from the *reference frequency*.

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

- **1.152** *necessary bandwidth:* For a given *class of emission*, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions.
- **1.153** *occupied bandwidth:* The width of a frequency band such that, below the lower and above the upper frequency limits, the *mean powers* emitted are each equal to a specified percentage $\beta/2$ of the total *mean power* of a given *emission*.

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

- **1.154** *right-hand* (clockwise) *polarized wave:* An elliptically- or circularly-polarized wave, in which the electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a right-hand or clockwise direction.
- **1.155** *left-hand* (anticlockwise) *polarized wave:* An elliptically- or circularly-polarized wave, in which the electric field vector, observed in any fixed plane, normal to the direction of propagation, whilst looking in the direction of propagation, rotates with time in a left-hand or anticlockwise direction.
- **1.156** *power:* Whenever the power of a radio transmitter, etc. is referred to it shall be expressed in one of the following forms, according to the class of *emission*, using the arbitrary symbols indicated:
 - peak envelope power (PX or pX);
 - mean *power* (PY or pY);
 - carrier power (PZ or pZ).

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

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

1.157 *peak envelope power* (of a radio transmitter): The average power supplied to the antenna transmission line by a

transmitter during one radio frequency cycle at the crest of the modulation envelope taken under normal operating conditions.

- **1.158** *mean power* (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions.
- **1.159** *carrier power* (of a radio transmitter): The average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle taken under the condition of no modulation.
- **1.160** gain of an antenna: The ratio, usually expressed in decibels, of the power required at the input of a loss-free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power flux-density at the same distance. When not specified otherwise, the gain refers to the direction of maximum *radiation*. The gain may be considered for a specified polarization.

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

- a) absolute or isotropic gain (G_i) , when the reference antenna is an isotropic antenna isolated in space;
- b) gain relative to a half-wave dipole (G_d) , when the reference antenna is a half-wave dipole isolated in space whose equatorial plane contains the given direction;
- c) gain relative to a short vertical antenna (G_v) , when the reference antenna is a linear conductor, much shorter than one quarter of the wavelength, normal to the surface of a

perfectly conducting plane which contains the given direction.

- **1.161** *equivalent isotropically radiated power (e.i.r.p.):* The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).
- **1.162** *effective radiated power (e.r.p.)* (in a given direction): The product of the power supplied to the antenna and its *gain relative to a half-wave dipole* in a given direction.
- **1.163** effective monopole radiated power (e.m.r.p.) (in a given direction): The product of the power supplied to the antenna and its gain relative to a short vertical antenna in a given direction.
- **1.164** *tropospheric scatter:* The propagation of *radio waves* by scattering as a result of irregularities or discontinuities in the physical properties of the troposphere.
- **1.165** *ionospheric scatter:* The propagation of *radio waves* by scattering as a result of irregularities or discontinuities in the ionization of the ionosphere.

Section VII – Frequency sharing

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

- **1.167** *permissible interference*³: Observed or predicted *interference* which complies with quantitative *interference* and sharing criteria contained in these Regulations or in ITU-R Recommendations or in special agreements as provided for in these Regulations.
- **1.168** accepted interference³: Interference at a higher level than that defined as *permissible interference* and which has been agreed upon between two or more administrations without prejudice to other administrations.
- **1.169** *harmful interference: Interference* which endangers the functioning of a *radionavigation service* or of other *safety services* or seriously degrades, obstructs, or repeatedly interrupts a *radiocommunication service* operating in accordance with Radio Regulations.
- **1.170** *protection ratio* (R.F.): The minimum value of the wanted-tounwanted signal ratio, usually expressed in decibels, at the receiver input, determined under specified conditions such that a specified reception quality of the wanted signal is achieved at the receiver output.
- **1.171** *coordination area:* When determining the for need 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 (WRC-2000) required.

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

- **1.172** *coordination contour*: The line enclosing the *coordination area*.
- **1.173** *coordination distance:* When determining the need for coordination, the distance on a given azimuth from an *earth station* sharing the same frequency band with *terrestrial stations*, or from a transmitting *earth station* sharing the same bidirectionally allocated frequency band with receiving *earth stations*, beyond which the level of *permissible interference* will not be exceeded and coordination is therefore not required. (WRC-2000)
- **1.174** *equivalent satellite link noise temperature:* The noise temperature referred to the output of the receiving antenna of the *earth station* corresponding to the radio frequency noise power which produces the total observed noise at the output of the satellite *link* excluding noise due to *interference* coming from *satellite links* using other *satellites* and from terrestrial systems.
- **1.175** *effective boresight area* (of a steerable satellite beam): An area on the surface of the Earth within which the boresight of a *steerable satellite beam* is intended to be pointed.

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

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

Section VIII – Technical terms relating to space

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

- **1.178** *spacecraft:* A man-made vehicle which is intended to go beyond the major portion of the Earth's atmosphere.
- **1.179** *satellite:* A body which revolves around another body of preponderant mass and which has a motion primarily and permanently determined by the force of attraction of that other body.
- **1.180** *active satellite:* A *satellite* carrying a *station* intended to transmit or retransmit radiocommunication signals.
- **1.181** *reflecting satellite:* A *satellite* intended to reflect radiocommunication signals.
- **1.182** *active sensor:* A measuring instrument in the *earth exploration-satellite service* or in the *space research service* by means of which information is obtained by transmission and reception of *radio waves*.
- **1.183** *passive sensor:* A measuring instrument in the *earth exploration-satellite service* or in the *space research service* by means of which information is obtained by reception of *radio waves* of natural origin.
- **1.184** *orbit:* The path, relative to a specified frame of reference, described by the centre of mass of a *satellite* or other object in space subjected primarily to natural forces, mainly the force of gravity.
- **1.185** *inclination of an orbit* (of an earth satellite): The angle determined by the plane containing the *orbit* and the plane of the Earth's equator measured in degrees between 0° and 180° and in counter-clockwise direction from the Earth's equatorial plane at the ascending node of the *orbit*. (WRC-2000)
- **1.186** *period* (of a satellite): The time elapsing between two consecutive passages of a *satellite* through a characteristic point on its *orbit*.

- **1.187** *altitude of the apogee* or *of the perigee:* The altitude of the apogee or perigee above a specified reference surface serving to represent the surface of the Earth.
- **1.188** geosynchronous satellite: An earth satellite whose period of revolution is equal to the period of rotation of the Earth about its axis.
- **1.189** geostationary satellite: A geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a geosynchronous satellite which remains approximately fixed relative to the Earth. (WRC-03)
- **1.190** geostationary-satellite orbit: The orbit of a geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator.
- **1.191** *steerable satellite beam:* A *satellite* antenna beam that can be re-pointed.

Section IX – Terms relating to the planning, licensing and permitting

- **1.192** *Minister*: means a member of the Cabinet and who is incharge of the Ministry of Information and Communications acting solely in his official capacity.
- **1.193** *Authority:* The Bhutan InfoComm and Media Authority (BICMA);
- **1.194** *spectrum plan:* A plan to divide radio frequency spectrum into several frequency bands for certain purposes.
- **1.195** *frequency band plan:* A plan to identify usage of frequency bands and contained radio frequency channels in a given area or period.

- **1.196** *marketing plan*: A plan to measure economic potential of market for conduction of specific business, required resources, entering method and trading off among key parameters including possible services, regulations, dimensions, social characteristics, statistics, expenditures and revenues.
- **1.197** *person:* includes any individual, partnership, company, unincorporated organization, Government, Governmental agency, trustee, executor, administrator or other legal representative.
- **1.198** *spectrum license*: A license issued to authorize a person to establish, to own, to install and to operate *radiocommunications apparatus* under the terms specified in the license.
- **1.199** *apparatus license:* A license that issued to authorize a person to establish, to own, to install and to operate a *radiocommunication apparatus* under the terms specified in the license.
- **1.200** *ICT system:* An *ICT network service* and *ICT network facility* used by a *person* or another *person* to provide *ICT* and *media service*; unless otherwise stated, ICT system relates to *public ICT system*.
- **1.201** *Public ICT system:* An *ICT network facility* and *ICT network service* used by a *person* to provide *ICT service* to the public for compensation.
- **1.202** *ICT network facility:* Any element or combination of elements of physical infrastructure used principally for, or in connection with, the provision of *ICT services*, but does not include customer equipment, and includes such other facilities as may be prescribed by Rules; unless otherwise stated, ICT network facility relates to public ICT network facility.

- **1.203** *ICT network service:* Any element or combination of elements of *ICT services* provided with the use of any *ICT facility* or combination of *ICT facilities*, and includes such other services as may be prescribed by Rules; unless otherwise stated, ICT network service relates to public ICT network service.
- Any or all of the following services: **1.204** *ICT* service: telecommunications services, like public telephony, telegraphy, facsimile, cellular telephony, and pay-phone/communication services, broadcasting services, like satellite broadcasting, broadcasting distribution (cable television), mobile satellite, subscription broadcasting, and terrestrial free-to-air television and radio broadcasting, information technology services, like Internet service, web-casting, e-mail and all other sorts of eservices, Internet Protocol (IP) telephony, digital library and commercial information services, network-based information and related specialised professional services provided by electronic means, public-switched data and any other similar service, and includes such other services as may be prescribed by Rules; unless otherwise stated, ICT service relates to public ICT service.
- **1.205** *ICT facility:* Any facility, apparatus or other thing that is used or is capable of being used principally for, or in connection with, the provision of *ICT services*, and includes a transmission facility as well as any or all of the following facilities: *fixed links* and cables, computer facilities, payphone/communication facilities, *radiocommunication* transmitters, receivers and links, satellite *earth stations*, towers, poles, and ducts and pits used in conjunction with other facilities. This term does not include customer equipment, but includes such other services as may be prescribed by Rules; unless otherwise stated, ICT facility relates to public ICT facility.

- **1.206** *Media service:* Service provided through any mode of *media* and made available to the general public.
- **1.207** Media: Relevant ICT services, including broadcasting and where pertinent, also includes: newspapers, books, journals, periodicals, brochures, pamphlets, circulars, magazines, publications and other works made available to the general public in printed and/or electronic form or format; cinematographic films, performance of dramas and other entertainments made accessible to the general public; radio and television channels and/or stations broadcasting to the general public (whether terrestrial or satellite-based); the Internet accessible to the general public; Internet-based suppliers of information, news and entertainment accessible to the general public; and news agencies engaged in collecting, processing and collating news reports, feature articles and/or other material, or supplying such material to any of the aforesaid media, for the purposes of public dissemination.
- **1.208** *Radiocommunication apparatus*: An apparatus capable to transmit and/or receive *radio waves* for the purpose of *radiocommunications*;
- **1.209** Appellate Tribunal: The Bhutan InfoComm and Media Appellate Tribunal as established under the *Act*.
- **1.210** *The Register*: The registry of particulars, information and history of applications and granted licenses.
- **1.211** *Class license*: A license that authorises any *person*:
 - a) to operate a *radiocommunications apparatus* or *device* of a specified kind; or
 - b) to operate a *radiocommunications apparatus* or *device* for a specified purpose; or

- c) to operate a *radiocommunications apparatus* or *device* of a specified kind for a specified purpose.
- **1.212** *device*: In this *Radio Rules*, any equipments which is capable to use *radio wave* for a purpose not necessarily *radiocommunications*.
- **1.213** *Restricted (certificate of proficiency):* A type of certificate which a person required to obtain before the operation of an amateur station in given frequency bands and predetermined technical conditions under this Radio Rules.
- **1.214** *General (certificate of proficiency)*: A type of certificate which a person required to obtain before the operation of an amateur station in given frequency bands and predetermined technical conditions under this Radio Rules.
- **1.215** *Novice (certificate of proficiency):* A type of certificate which a person required to obtain before the operation of an amateur station in given frequency bands and predetermined technical conditions under this Radio Rules.
- **1.216** *Inspector:* The Authority or any officer who has been authorised by the Authority to have power to inspect stations or apparatuses and obtain information, wherever necessary, from all licensees, as to the production of the license, or of such other evidence of the licensing of the station or apparatus.
- **1.217** *Permit*: A formal permission granted by authority in pursuant to subsections **27**(**3**)(**j**), **85**(**1**)(**a**) and **85**(**1**)(**b**).
- **1.218** *cordless telephone (CT)*: An apparatus intended for short range communication and usually consists of a base unit (land station) and handset(s), providing, single or multiple, interconnection with the Public Switched Telephone Network (PSTN), and a portable unit.

- **1.219** wireless local loop (WLL): A commercial arrangement between a telecommunication operator and a person for the service provider to provide a connection between a telecommunications network and a device owned or used by the person, as the "last mile / first mile" connection, by means of wireless link.
- **1.220** *Radio-frequency identification (RFID)*: RFID is a technology that uses communication via electromagnetic waves to exchange data between a terminal and an object such as a product, animal, or person for the purpose of identification and tracking. Some tags can be read from several meters away and beyond the line of sight of the reader. Radio-frequency identification involves interrogators (also known as readers), and tags (also known as labels).



NATIONAL RADIO RULES PART III

BHUTAN INFORMATION, COMMUNICATIONS AND MEDIA AUTHORITY (BICMA)

Royal Government of Bhutan THIMPHU: October 2011



BHUTAN INFOCOMM & MEDIA AUTHORITY Royal Government of Bhutan



14th October 2011

FOREWORD

Radio spectrum is a scarce natural asset and resource which needs to be managed properly for efficient, effective and fair utilization. The demand for radio frequencies grows daily and radio frequencies are needed by all apparatus using the energy of electromagnetic waves. Airplanes, ships, satellites, radars, cell phones, sound and TV broadcasters, TV receivers, radio transceivers, microwave links, radio trunk links, cordless phones, handsets, wireless apparatus, home appliances, industrial and medical equipment, weather forecasters and many other applications are managed internationally and nationally to take advantage of spectrum.

The fair and efficient regulation of spectrum use amongst numerous radio applications and a variety of users requires the adoption and implementation of transparent executive rules and terms of reference. Fortunately, the Bhutan Information, Communications and Media Act – 2006 provides the Bhutan InfoComm and Media Authority (BICMA) with sufficient authority to regulate radiocommunications activities inside the Kingdom and to represent our national interests in international entities.

Issues such as planning, licensing, permitting, spectrum pricing, trading, certificating, accrediting and enforcement are the essential objectives of Part **III** of the National Radio Rules. These Rules clarify the rights and obligations of the various parties, outline the procedures for the use of radio spectrum by radio applications in an efficient manner and enable the Authority to carry out its duties and functions

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on a daily basis. The definitions of the terms used are contained in Part II of these National Radio Rules. In addition, the schedules of values, methods and the tables which are subject to modification from time to time are contained in Schedule IV.

J. himpri

(Chairperson) BHUTAN INFOCOMM & MEDIA AUTHORITY

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CHAPTER 1: Radio Frequency Planning

1.1 Spectrum plan

- (a) Subsection **25**(a) of Act obliges the Authority to plan, supervise, regulate and manage the use of the radio frequency spectrum. Accordingly, the Authority shall prepare a spectrum plan.
- (b) A spectrum plan must:
 - divide into such number of frequency bands as the Authority thinks appropriate such amount of the spectrum as the Authority thinks necessary for the purpose of regulating radiocommunications under these National Radio Regulations;
 - (ii) specify the general purpose or purposes for which each band may be used or reserved; and
 - (iii) be consistent with the existing utilization, international and regional spectrum plans as far as is achievable.
- (c) A spectrum plan prepared under this section must be consistent with the policy directives issued in accordance with Section **16** of the Act.
- (d) A spectrum plan shall be published in accordance with section **1.3** of this chapter.
- (e) The spectrum plan in force at the date of publication of these Radio Rules is contained in Schedule 1, Part IV of the Radio Rules. This schedule may be modified by the Authority from time to time as it sees fit in accordance with section 1.3 of this chapter.

1.2 Frequency band plan

- (a) The Authority shall, by written instrument, prepare frequency band plans, each relating to one or more frequency bands after due consideration of international trends and national needs.
- (b) A frequency band plan must not be in consistent with the spectrum plan adopted pursuant to section **1.1**.
- (c) A frequency band plan:
 - (i) must make provision in relation to the purpose or purposes for which the band or bands may be used or reserved; and
 - (ii) without limiting paragraph (i), may provide for one or more purposes for which any part of a band (including any particular frequency or frequency channel) may be used or reserved; and
 - (iii) may be of general application or may be limited as provided in the plan; and
 - (iv) without limiting paragraph (iii), may apply with respect to a specified area (an allotment plan) and with respect to a specified period; and
 - (v) without limiting paragraph (iii), may apply with respect to a specified period
- (d) The frequency band plan prepared under this section must be consistent with the policy directives issued in accordance with the Section **16** of the Act.
- (e) A frequency band plan must be published in accordance with section **1.3** of this chapter.
- (f) A frequency band plan shall not confer an exclusive right or a monopoly or continued tenure to use frequencies on any particular ICT facility or service.

(g) The frequency band plans in various frequency bands in force at the date of publication of these Radio Rules are contained in Schedule 2, Part IV of these Rules. Such Schedule may be modified from time to time as the Authority sees fit provided that any such modifications are made in accordance with this Section 1.2.

1.3 Publishing plans and hearing

- (a) The Authority shall by notice publish a spectrum plan or frequency band plan for public consultation and shall:
 - (i) invite interested parties to submit their written representations to the address and within such period as may be specified in such notice; and
 - (ii) after the period specified in the notice has elapsed, hold a public hearing in respect of the proposed plan; and
 - (iii) after the hearing and due consideration has been given to any representations received, the Authority shall adopt the plan in question, with or without amendment.
- (b) Any spectrum plan or frequency band plan adopted in accordance with paragraph (a)(iii) must be published as part of the Radio Rules.

1.4 Revocation and variation of plans

- (a) The Authority may, at any time, revoke or vary a spectrum plan or frequency band plan.
- (b) Section **1.3** of this chapter applies to any such a revocation or variation.

1.5 Conversion plan

(a) On publishing a notice designating a specified part of the spectrum to be allocated by issuing spectrum licenses, the

Authority must, by written instrument, prepare a conversion plan that sets out the procedures and timetable for issuing spectrum licenses to replace existing apparatus licenses that authorise the operation of radiocommunications devices:

- (i) at frequencies within that part of the spectrum; and
- (ii) within the area or areas specified in the notice.
- (b) The conversion plan need not require spectrum licenses issued in accordance with it to apply to the whole of the area or areas to which the plan applies.
- (c) The conversion plan may contain such other additional matters as the Authority thinks fit.
- (d) The conversion plan must not be inconsistent with:
 - (i) the spectrum plan; or
 - (ii) a frequency band plan that relates, wholly or partly, to the part of the spectrum to which the conversion plan relates.
- (e) The Authority shall, by making the conversion plan available to the public, invite interested parties to make representations about the draft plan.

1.6 Re-allocation of spectrum

- (a) This section applies if a spectrum re-allocation declaration states that a part or parts of the spectrum should be re-allocated by issuing spectrum licenses.
- (b) The Authority must, by written instrument, prepare a marketing plan for issuing spectrum licenses that authorise the operation of radiocommunications apparatus:
 - (i) at frequencies within that part, or those parts, of the spectrum; and

- (ii) within the area or areas specified in the declaration with respect to that part or those parts.
- (c) The marketing plan must be consistent with the spectrum plan or with a frequency band plan that relates, wholly or partly, to the part or parts of the spectrum to which the marketing plan relates.
- (d) The marketing plan is to apply to spectrum licenses with respect to that part or those parts that might be issued as provided for in section **1.6**.
- (e) In indicating the procedures to be followed for issuing spectrum licenses, the plan may, for example, indicate whether the licenses are to be allocated by auction, by tender, for a pre-determined price or for a negotiated price.

1.7 Varying and publishing conversion and marketing plans

- (a) The Authority may, at any time, vary a conversion plan or a marketing plan.
- (b) After preparing or varying a conversion plan or a marketing plan, the Authority must publish a notice informing members of the public where copies of the plan can be obtained either without charge or purchased at a reasonable price.

CHAPTER 2: Licensing of Radiocommunications

2.1 General

- (a) Outline of this Chapter:
 - (i) This chapter contains five divisions for three different categories of radiocommunications licensing.
 - (ii) Division one deals with unlicensed radiocommunications;
 - (iii) Division two contains the provisions relating to the spectrum licenses;
 - (iv) Division three contains the provisions relating to apparatus licenses;
 - (v) Division four contains the provisions relating to class licenses; and
 - (vi) Division five contains the provisions relating to amateur radio licenses.
- (b) Subject to subsection 2.1 (c), register containing information of the licenses issued pursuant to this chapter, shall be kept up to date and be open to public inspection during normal working hours.
- (c) If the Authority is satisfied in accordance with Section 70 (1) of the Act that it would not be in the commercial interest of any person or in accordance with Section 13 (1) of the Act that it would not be in the national interest for certain licenses or information contained in certain licenses to remain confidential then such licenses or information will not be included in the Register specified in section 2.1 (b)
- (d) Any person may, on payment of such fee as may be prescribed by the Authority, request the Authority to supply

to him a copy of or extract from any part of the register under subsection (\mathbf{b}) , certified by the Authority to be a true copy or extract.

Division One: Unlicensed Matters

2.2 Unlicensed operation or possession

- (a) Unless a person has been granted by the Authority a valid spectrum license, or, apparatus license, or, class license it shall be unlawful for any such person to:
 - (i) establish any radiocommunication station; or
 - (ii) operate any radiocommunication station; or
 - (iii) install any radiocommunication apparatus; or
 - (iv) operate any radiocommunication apparatus; or
 - (v) have an item of radiocommunications apparatus in his or her possession for the purpose of operating the same.

Any such person shall be guilty of an offence punishable in accordance with section **194** of the Act.

- (b) Subsection (**a**) shall not apply if the person has a reasonable excuse, and the defendant shall bear the burden of proof in relation to this matter.
- (c) A person does not contravene the provisions of the National Radio Rules by operating radiocommunications apparatus, or having radiocommunications apparatus in his or her possession, in the reasonable belief that the operation or possession was necessary for the purpose of:
 - (i) securing the safety of a vessel, aircraft or space object that was in danger; or
 - (ii) dealing with an emergency involving a serious threat to the environment.

(d) In proceedings for an offence under subsection (**a**), the defendant shall bear the burden of proof in respect of any of the matters relied upon in subsections (**b**) or (**c**).

Division Two: Spectrum Licenses

Relevant Sections:

- 2.3 Designation of parts of the spectrum for spectrum licenses
- 2.4 Converting apparatus licenses into spectrum licenses
- 2.5 Issuing spectrum licenses
- 2.6 Content of spectrum licenses
- 2.7 Registrations of spectrum licenses
- 2.8 Variation of spectrum licenses
- 2.9 Suspending and cancelling spectrum licenses
- 2.10 Re-issuing spectrum licenses
- 2.11 Transferring spectrum licenses
- 2.12 Modification of spectrum licenses

2.3 Designation of parts of the spectrum for spectrum licenses

- (a) The Authority may designate a specified part of the spectrum to be allocated by issuing spectrum licenses.
- (b) Before designating a specified part of the spectrum under subsection (a), the Authority must give members of the public a reasonable opportunity to make representations to the Authority about the designation of a spectrum that it proposes to make.
- (d) Subsection (b) of this section shall not prevent the Authority from issuing a spectrum license to a licensee who is accepting the offer made under subsection 2.4 (e).
2.4 Converting apparatus licenses into spectrum licenses

- (a) As soon as practicable after preparing a conversion plan, the Authority must, in respect of each apparatus license which conflicts with a spectrum license as a result of the conversion plan, prepare a draft of a spectrum license to replace the apparatus license.
- (b) The draft spectrum license must, in so far as is practicable, authorise the operation of radiocommunications apparatus to the same extent as, or to a greater extent than, the apparatus is authorised under the apparatus license to be replaced.
- (c) The Authority must give a copy of draft spectrum license to the licensee and invite him to make representation before a specified date, but not earlier than one month after the day on which a copy of the draft spectrum license was given to the licensee.
- (d) Provided that the licensee has made representations, before the deadline referred to in subsection (c), the Authority must give due consideration to the representations and may alter the draft spectrum license correspondingly.
- (e) As soon as practicable after the expiry of the deadline given pursuant to subsection (c), the Authority must give the licensee a written offer to issue to the licensee a spectrum license to replace the licensee's apparatus license having specified following information:
 - (i) the amount of the spectrum access fee that the licensee must pay to the Authority; and
 - (ii) the day on which the offer will close, but not earlier than one month after the day on which the offer was delivered to the licensee.

Note – spectrum access fee determined in section 5.3.

- (f) The Authority must revoke the apparatus license and must issue the spectrum license to the licensee if the licensee has given a written notice specifying its acceptance of the license and its agreement to pay the spectrum access charge offered, on or before the date specified pursuant to subsection(e)(ii) above.
- (g) If the holder of an apparatus license notifies the Authority, before the date specified pursuant to subsection (e) (ii), that he does not accept the offer or fails to respond to the Authority on or prior to the date specified pursuant to subsection (e) (ii), the Authority may allocate the spectrum license by following the procedure set out in section 2.5. In such case:
 - (i) Immediately before the spectrum license comes into force, the apparatus license that it was intended to replace ceases to have any force; and
 - (ii) If the licensee had paid a spectrum access fee in accordance with its apparatus license, the Authority must refund to the licensee such amount as corresponds to the part of the period of the apparatus license that had, immediately before the license ceased to be in force, not elapsed; and
 - (iii) If requested by holder of apparatus license, the Authority may propose to grant a spectrum license for the same amount of the other frequency bands that the licensee previously had the right to use, to fulfil the spectrum need of revoked apparatus license; and
 - (iv) The holder of the revoked apparatus license may be compensated, if the Authority is requested by written notice.

2.5 Issuing spectrum licenses

- (a) The Authority must specify, in writing, the procedure to be applied to the allocation of spectrum licenses:
 - (i) by auction (having determined at least: auction type, entry fee for prospective bidders, method of payment for licenses and advertising); or
 - (ii) by tender (having determined at least: tender type, entry fee for prospective bidders, method of payment for licenses and advertising), or
 - (iii) by allocation for a pre-determined price or a negotiated price (having specified at least: the method of determining the prices and the method of payment for licenses and advertising).
- (b) In determining the procedure under subsection (**a**), the Authority may impose limits on the aggregate of the parts of the spectrum that, as a result of the allocation of spectrum licenses may be used. A limit may be expressed to apply in relation to a specified part of the spectrum, and/or, a specified area, and/or a specified population reach.
- (c) The spectrum licenses to be issued under this section must:
 - (i) be consistent with any policy directives promulgated in accordance with the subsections **16**(**7**) of the Act; and
 - (ii) comply with the relevant marketing plan to the extent practicable.
- (d) The Authority must issue the spectrum license to the person to whom it is allocated if:
 - (i) the person pays the spectrum access fee to the Authority; or
 - (ii) Reaches an agreement with the Authority for the payment of such fee

provided that the person satisfies the requirements of subsection 39(2) of the Act.

Note – spectrum access fee determined in section 5.3

- (e) The Authority may defer the issue of the spectrum license until the relevant frequencies become available as a result of the expiry, surrender or cancellation of one or more apparatus licenses that are affected by the spectrum re-allocation declaration concerned.
- (f) The issued spectrum license must be registered in the Register of the Authority in accordance with section **2.7**.

2.6 Content of spectrum licenses

- (a) The parts of the spectrum in which the operation of radiocommunications apparatus is authorised under the license;
- (b) The geographical area within which the operation of radiocommunications apparatus is authorised under the license. The area may be the whole of Bhutan;
- (c) The maximum permitted level of radio emissions that may be caused by the operation of radiocommunications apparatus under the license:
 - (i) In parts of the spectrum outside the spectrum that operation of radiocommunications apparatus is authorised; and
 - (ii) Outside that area wherein operation of radiocommunications apparatus is authorised.
- (d) The date of commencement and expiry of the license provided that the duration of the license is no longer than15 years if no license is granted for a parent "ICT system" or in the event that a parent "ICT" system license is granted then

the spectrum license must be co-terminus with such "ICT system" license.

- (e) The person and any other person authorised by that person to operate radiocommunications apparatus in accordance with the license.
- (f) Conditions relating to the residency of the licensee(s) and special conditions in those cases where the licensee derives income, profits or gains from operating radiocommunications apparatus under the license or from authorising others to do so.
- (g) Operational conditions of radiocommunications apparatus by third parties and by the licensee(s).
- (h) The amount and the relevant payment dates of fees to be paid to the Authority pursuant to subsections 27(3)(j), 27(3)(k) and 27(3)(l) of the Act, including but not limited to the spectrum access fee;
- (i) Without limiting subsection (a), the Authority may employ a progressive and phased authorization of radiocommunications apparatus due to the unavailability of spectrum until the relevant frequencies become available as a result of the expiry, surrender or cancellation of one or more apparatus licenses that are affected by the spectrum re-allocation declaration concerned.
- (j) Conditions in those cases where the Authority exempts radiocommunications transmitters of particular kinds from registration in the Register of the Authority.
- (k) Conditions relating to the transfer, if any, of the spectrum license.

- (1) Conditions relating to the suspension or cancellation of the license under section **2.9**.
- (m) Any other conditions that the Authority considers are necessary to meet the requirements of the Act.

2.7 Registrations of spectrum licenses

- (a) The Register established by the Authority is to contain the following information in respect of each spectrum license:
 - (i) the licensee's name and postal address and other contact details, such as telephone and fax numbers and email addresses;
 - (ii) the date of issue and date of expiry of the license;
 - (iii) such details as the Authority determines, in writing, about the conditions of spectrum licenses;
 - (iv) such details as the Authority determines, in writing, about authorisations by licensees for other persons to operate radiocommunications apparatus under the spectrum license;
 - (v) such details as the Authority determines, in writing, about radiocommunications apparatus that are operated under spectrum licenses; and
 - (vi) such other details about the spectrum license as the Authority considers are necessary or appropriate under the Act.
- (b) The Authority may refuse to register details of a radiocommunications transmitter that is proposed to be operated under a spectrum license if it is satisfied that the operation of such a transmitter could cause an unacceptable level of interference to the operation of other radiocommunications apparatus under that or any other spectrum license, or any other license. In this case, the

Authority shall inform the licensee, by written notice, together with reason of the refusal.

- (c) Before registration, the Authority may require that, there be presented to the Authority a certificate, stating that operation of the radiocommunications apparatus under the license satisfies any conditions that are required to be satisfied.
- (d) The Authority's Register must be updated by the inclusion of details of any act taken in relation to the administration of a spectrum license, including: any type of variation, suspension, cancellation, revocation or trading of the spectrum license.

2.8 Variation of spectrum licenses

- (a) The Authority may, with the written agreement of the holder of a spectrum license registered in accordance with Sections 2.6 and 2.7, vary the license by including additional conditions, or varying, or revoking any existing conditions but may not vary or revoke the items in a spectrum license specified pursuant to subsections 2.6 (a), 2.6 (b) and 2.6 (c).
- (b) In the event that the Minister has issued a recommendation pursuant to subsection 43 (2) of the Act for reasons of the security of Bhutan the Authority shall, by written notice to the licensee, set out the proposed variations required to give effect to the Minister's recommendation while describing relevant reasons for the proposed variations. Notwithstanding that the agreement of the Licensee is not required in respect of variations proposed under this subsection (b) the Licensee shall be given thirty days from the date of the notice in which to make representations about the proposed variation.

- (c) The Authority may vary the spectrum license, if, after considering and having regard to all representations made under subsection (b) the Authority considers the license should be modified:
 - (i) in the manner set out in the notice or
 - (ii) some other manner consistent with the representations made by the licensee which the Authority is satisfied are applicable.
- (e) If the Licensee is aggrieved by a variation made pursuant to subsection (c) he may within thirty days of the receipt of the information under subsection (c) appeal against the decision of the Authority to the Appellate Tribunal in accordance with subsection **43(5)** of the Act.

2.9 Suspension and cancellation of spectrum licenses

(a) The Authority is empowered by Section 51 of the Act to suspend or revoke any license granted under the Act in the circumstances and the manner specified in Section 51, which applies to any license granted pursuant to these National Radio Rules.

2.10 Re-issuing spectrum licenses

- (a) The Authority may re-allocate and issue a spectrum license as determined under section **2.5** (Issuing spectrum licenses), except in case of subsection (**d**).
- (b) The Authority must frequently publish notices containing core information of those spectrum licenses that are due to expire within the two years following the date of publication of the notice and shall invite expressions of interest from those who wish to apply for a spectrum license in the related spectrum.

- (c) During the two years preceding the expiry a spectrum license, the Authority shall prepare draft new spectrum license(s) that may wholly or partially replace the license that is due to expire.
- (d) The Authority may, without following the license allocation procedure specified in subsection 2.5, re-issue a spectrum license to the person to whom it was previously issued in the event that the licensee applied for renewal not earlier than nine months before license expiry and the Authority is satisfied that special circumstances exist as a result of which it is in the public interest for that person to continue to hold the license.
- (e) Notwithstanding a renewal application having been made pursuant to subsection (d) the Authority may refuse to renew the license if the licensee is or has engaged in conduct that materially contravenes or contravened this Act, any Regulations, any directives or any Rules made under this Act or any condition of his original license.
- (f) Where the Authority has reasonable grounds for not renewing a license under sub-section (e), it shall inform the licensee by written notice as soon as practicable of its intention not to renew the license.
- (g) A licensee to whom a notice is served as under subsection (f), the licensee may make written representations to the Authority, not later than thirty days after the date on which the refusal notice was sent by the Authority.
- (h) The Authority shall consider any written representation made under subsection (g) and shall inform the licensee within fifteen days of the receipt of the representations of its decision on the matter.
- (i) The licensee, if aggrieved by the decision under subsection(g), may appeal against such decision of the Authority to the

Appellate Tribunal within thirty days of the receipt of the information under subsection (**h**).

- (j) In those cases where the Authority re-issues a spectrum license under subsection (d) the Authority shall inform the licensee by written notice, as soon as practicable, of its probable intention to re-issue the spectrum license subject to the inclusion of new conditions or the modification of existing conditions and provide the licensee with details of such new or modified conditions.
- (k) Within fifteen day of receipt of notice under subsection (j), the licensee must inform the Authority whether or not it will accept the proposed conditions. In the event of disagreement, the Authority will apply subsection (a).

2.11 Transferring spectrum licenses

- (a) A spectrum license may be transferred, totally or partially, if:
 - (i) The spectrum license contains a condition permitting such transfer; and
 - (ii) The licensee has made a written application to the Authority and the Authority has agreed to such transfer; and
 - (iii) Anything done or proposed to be done by the Authority pursuant to subsection (c) complies with the laws of Bhutan; and
 - (iv) Any changes made to the license in the course of the transfer are recorded in the Register specified in section 2.7.
- (b) Subject to subsection (c), the Authority may approve an application for the transfer of a license made under Subsection (a) where:

- (i) The Authority is satisfied that the proposed transferee meets all the requirements of the Act, including those that are specified in subsection **39** (**2**) of the Act; and
- (ii) The Authority is satisfied that the proposed transferee will be able to undertake the other obligations and conditions contained in the license; and
- (iii) A notice of the proposed transfer has been published by the Authority; and
- (iv) A spectrum license transferring fee is paid to the Authority as required under subsection **5.5** (**h**) (**i**).
- (c) In dealing with an application made under subsection (a), the Authority may do one or more of the following:
 - (i) vary the relevant spectrum license by replacing the name of the licensee with the transferee's name;
 - (ii) vary the conditions of the relevant spectrum license by including one or more additional conditions, or revoking or varying any other conditions of the spectrum license;
 - (iii) issue one or more new spectrum licenses;
 - (iv) cancel one or more existing spectrum licenses.
- (d) Any purported transfer which does not comply with this section 2.11 is invalid and of no legal effect whatsoever. In the event of any such transfer taking place, whether *de jure* or *de facto*, the Authority shall have the power to apply section **2.9** (suspending and cancelling spectrum licenses).
- (e) Any person who is involved in effecting any purported transfer of a license other than in accordance with the terms of this section shall be guilty of the offence of forgery.

- (f) A spectrum license transferred in accordance with this section shall be deemed to be a spectrum license issued by the Authority under these Radio Rules.
- (g) A spectrum license exempted from payment of a spectrum utilization fee, under subsection **5.9**(b) is a non transferable license.

2.12 Modification of spectrum licenses

- (a) The Authority may modify a spectrum license, partially or completely, under an agreement entered into with the licensee. The agreement shall be transparent and it will take effect in accordance with the time table included in.
- (b) The Authority may modify a spectrum license, partially or completely as per section 43 (2) of the Act.
- (c) In case compulsory modification in subsection (b) the Authority shall, by written notice given to the licensee, set out the proposed changes while describing relevant reasons and shall invite licensee to represent its written disagreement during thirty days after the Authority notice delivery days if any.
- (d) The Authority may modify the spectrum license, after considering and having regard to all representations made under subsection (c):
 - (i) in the manner set out in the notice submitted to the license under subsection (c); or
 - (ii) other manner consistent with the representations made by licensee and the Authority is satisfied to be applicable.
- (e) For the modification under the subsection (d), the Authority must publish a pre-acquisition declaration for the spectrum license, or the part of the spectrum license, that it wishes to

modify, containing enough description about the spectrum license and about the part of the license to be modified together with reasons.

- (f) Within fourteen days after publication of declaration under sub-section (e), the Authority must inform its intention by a written notice, and licensee must, within seven days after being so served, give a written notice of the proposed modification to:
 - (i) if the whole of the license is to be modified—each person (if any) authorised by the licensee to operate a radiocommunications apparatus under the license; or
 - (ii) if a part of the license is to be modified—each person (if any) so authorised whose interests would be affected by modification of that part of the license.
- (g) Failure to comply with the requirements of subsection (f) does not affect the validity of the pre-acquisition declaration made under subsection (\mathbf{e}).
- (h) Variations of spectrum licenses under subsection (b) are reviewable by written request of licensee under subsection 43(5) of the Act.
- (i) The Authority shall publish a modification notice and sent a copy of modification notice to the licensee:
 - (i) after the end of pre-acquisition declaration; or
 - (ii) after the end of review period under the subsection (g), if the modification concluded.
- (j) The modification takes effect if the modification notice specifies a day for the purpose and on that given day, or fourteen days after the day on which the modification notice was published.

- (k) Within fourteen days after the modification notice was published, under the subsection 80(4) of the Act, the Authority must give to the licensee a written notice that:
 - (i) sets out particulars of the licensee's right to claim compensation for the modification; and
 - (ii) how a claim is to be made; and

Division Three: Apparatus Licenses

Relevant Sections:

- 2.13 Categories and Types: Transmitter licenses and receiver licenses
- 2.14 Authorization of third party
- 2.15 Issuing apparatus licenses
- 2.16 Price-based issuing of apparatus licenses
- 2.17 Duration of apparatus licenses
- 2.18 Compliance with plans
- 2.19 Conditions of apparatus licenses
- 2.20 Changes to the apparatus license conditions
- 2.21 Qualification of operators of apparatus
- 2.22 Suspension and cancellation of apparatus licenses
- 2.23 Renewal of apparatus licenses
- 2.24 Transfer of apparatus licenses
- 2.25 Registration of apparatus licenses

2.13 Categories and Types: Transmitter licenses and receiver licenses

- (a) The Authority may issue apparatus licenses in following categories:
 - (i) transmitter licenses; and
 - (ii) receiver licenses.
- (b) A transmitter license authorises:
 - (i) the person specified in the license as the licensee; and

(ii) subject to sections **2.14**, any person authorised in writing by that licensee;

to operate specified radiocommunications transmitters, or radiocommunications transmitters of a specified kind.

- (c) A receiver license authorises:
 - (i) the person specified in the license as the licensee; and
 - (ii) subject to sections **2.14**, any person authorised in writing by that licensee;

to operate specified radiocommunications receivers, or radiocommunications receivers of a specified kind.

- (d) Operation of the authorised radiocommunications apparatus must comply with the conditions of the license.
- (e) Different types of transmitter licenses and receiver licenses are set out in schedule **3**, Part **IV**. This schedule is subject to change from time to time if the Authority sees fit.

2.14 Authorization of third party

- (a) The licensee must not authorise a person to operate radiocommunication apparatus if the Authority has issued a written instrument determining that:
 - (i) the licensee must not authorise other persons to operate radiocommunications apparatus; or
 - (ii) that person belongs to the classes of persons who may not be so authorised; or
 - (iii) the license contains a condition or other provisions stipulating that the apparatus may only by operated by a certified person and such a person is not certified ; or
 - (iv) the circumstances are such that those persons may not be so authorised; or

- (b) The licensee must not authorise a person if:
 - (i) the person has been issued an apparatus license that was or is of the same type as the licensee's license; and authorised operation of radiocommunications apparatus of the same kind as those to which the licensee's license relates; and
 - (ii) the person's license is suspended; or cancelled; or has been cancelled within the last two years.
- (c) Authorising other persons does not prevent the licensee from doing anything in accordance with the license in its hand.
- (d) A licensee of an apparatus license who authorises a person under this section must retain the copy of the authorization for at least one year after the authorisation ceases to be in force.
- (e) If the Authority is satisfied that a person authorised under this section has contravened a condition of the license to which the authorisation relates, the Authority may give the licensee a written notice, including reasons, directing the licensee to revoke the authorisation.
- (f) As soon as practicable and, in any event, within seven days after service of the notice under subsection (e), the licensee must revoke the authorisation.
- (g) The authorization of a person under this section, whose similar apparatus license has been suspended or cancelled, is deemed to have been revoked on the day on which the other license is suspended or cancelled.

2.15 Issuing apparatus licenses

a) Subject to subsection (c), upon application being made, the Authority may issue to the applicant an apparatus license of

the type applied for under subsection 2.13(e). An application under this section shall be made in a form approved by the Authority.

- (b) The Authority may approve different forms for the different types of apparatus license.
- (c) The Authority must not process an application for an apparatus license under this section unless the applicant has paid the requisite application fee, upon application, in accordance with the section **5.5**;
- (d) An apparatus license authorising operation of a radiocommunications transmitter for transmitting a broadcasting service cannot be issued unless:
 - (i) The person is a qualified company; and
 - (ii) There is a broadcasting service license in force that authorises the provision of that service; and
 - (iii) The provided network plan is consistent with the national broadcasting plan.
- Note A network plan for broadcasting purpose must contain site survey and radio coverage plan.
- (e) In deciding whether to issue an apparatus license, the Authority must have regard to the following matters:
 - (i) whether the operation of a radiocommunications apparatus needs an ICT service license to be in force; and
 - (ii) whether the operator is a qualified person holding a valid certificate in respect of those license types whose conditions require that the apparatus be operated only by qualified persons; and
 - (iii) whether the requisite administrative and technical information has been delivered to the Authority; and

- iv) whether any specific technical coordination is required in advance; and
- (v) whether the apparatus complies with the approved relevant standards; and
- (vii) whether the applicant owes any amount of unpaid duty regarding any other apparatus licenses currently held or previously held by the applicant; and
- (viii) whether a similar application has been previously made by the applicant and rejected.
- (ix) whether the license held by the applicant in the two years prior to the application had been cancelled.
- (f) Subject to subsection (g), the Authority must not issue an apparatus license that authorises the operation of radiocommunications apparatus at frequencies that are within a part of the spectrum that is designated under section 2.3 to be allocated by means of issuing spectrum licenses.
- (g) The Authority may issue such an apparatus license:
 - (i) to a body covered by any of paragraphs **2.17**(ii) for the purpose of investigations or operations conducted by that body; or
 - (ii) if it is satisfied that the special circumstances of the particular case justify the issuing of the license.
- (h) For the purpose of paragraph (e)(v), the Authority may by written notice request the applicant to:
 - (I) submit to the Authority the radiocommunications apparatus specified in the notice, at a time and place specified in the notice, for testing; or
 - (II) permit the Authority, or a recognised testing authority, to test the radiocommunications apparatus so specified.

- (i) A radiocommunications apparatus submitted under paragraph $(\mathbf{h})(\mathbf{I})$ for testing must be returned to the applicant within a reasonable time.
- (j) If the Authority refuses to issue the license, it must give the applicant written notice of its refusal together with a statement of its reasons.
- (k) Nothing in this Rule prevents two or more apparatus licenses (whether transmitter licenses or receiver licenses or both) from being contained in the same instrument.

Note- Recognised testing authority is defined by section **3.13**.

2.16 Price-based issuing of apparatus licenses

- (a) The Authority may determine in writing a price-based allocation system for allocating and/or issuing specified apparatus licenses and such system may specify one or more limitations of the following type:
 - (i) coverage areas; and
 - (ii) frequencies or frequency ranges; and
 - (iii) payment of particular fees; and
 - (iv) number of apparatus per person; and
 - (v) qualification and eligibility of each person in accordance with the Act or other laws of Bhutan; and
 - (vi) number of total apparatus that may be licensed in this way.
- (b) If an apparatus license is issued under a system determined in accordance with subsection (a), the successful applicant's name and the amount that each applicant has agreed to pay shall be published by the Authority.

2.17 Duration of apparatus licenses

- (a) An apparatus license comes into force on the day on which it is issued or on such later day as is specified in the license for that purpose.
- (b) Subject to subsection (d), an apparatus license remains in force for the period specified in the license.
- (c) The apparatus license may specify any period not exceeding five years.
- (d) An apparatus license issued under subsections 2.15(d)(ii) and 2.15(e)(i):
 - (i) subject to subsection (c), continues in force while the related license referred to in that section remains in force; and
 - (ii) does not have effect while the related license referred to in that section is suspended.

2.18 Compliance with plans

- (a) Subject to subsections (b) and (c), the Authority may issue an apparatus license that is inconsistent with the spectrum plan or any relevant frequency band plan only if:
 - (i) the apparatus license is granted for purposes which relate to an event of international, national or regional significance; or
 - (ii) the apparatus license authorises a body covered by any of the Royal Bhutan Army, or Royal Bhutan Police, or Royal Bhutan Guard to operate specified radiocommunications apparatus, or radiocommunications apparatus of a specified kind, for the purpose of investigations or operations conducted by such body; or

- (iii) the apparatus license is granted to a body that performs functions related to the investigation, prevention or prosecution of serious crime, or of corruption (whether or not the body also performs other functions); and is covered by a written determination made by the Authority for the purposes of this paragraph;
- (b) An apparatus license of a kind mentioned in paragraph (**a**)(**i**) must not be issued for more than sixty days.
- (c) An apparatus license of the type mentioned in paragraph (a)(i) must not be renewed more than once.

2.19 Conditions of apparatus licenses

- (a) Compliance by licensee or by any person authorised by the licensee with the Act; and
- (b) Payment of various charges and fees; and
- (c) Compliance of radiocommunications apparatus with specified standards; and
- (d) Time-table for the progressive authorisation of the operation of the radiocommunications apparatus under the license, if a particular part or parts of the spectrum become available as a result of the expiry, surrender or cancellation of one or more other apparatus licenses; and
- (e) Compliance of the operation, or permitted operation of, the radiocommunications apparatus for a purpose that is consistent with a purpose of a kind specified in the appropriate frequency band plan (if any) under subsection 1.2(c)(i); and
- (f) Conditions relating to containment of interference, or of the likelihood of interference, to other radiocommunications apparatus; and

- (g) Conditions relating to the transmission of an identification signal (if applicable); and
- (h) Conditions that prohibit the operation of the radiocommunications apparatus except on a frequency or frequencies, or on a frequency channel, and at a constancy, specified in the license; and
- (i) Conditions prohibiting the operation, or permitting the operation of, the radiocommunications apparatus for the purpose of harassing a person; and
- (j) Conditions prohibiting the operation or permitting the operation of, the radiocommunications apparatus for broadcasting services unless there is in force a broadcasting service license authorising the provision of that service; and
- (k) Conditions prohibiting the operation of radiocommunications apparatus without obtaining the requisite certificate of qualification in those cases where those persons operating the apparatus are required under section 2.21 to be qualified operators in relation to the license; and
- Compliance with the direction given by members of Royal Bhutan Army, or member of Royal Bhutan Police, or member of Royal Bhutan Guard or by an officer from the class of officers supported by regulation for disaster relief, for the purpose of:
 - (i) securing the safety of a vessel, aircraft or space object that is in danger; or
 - (ii) dealing with an emergency involving a serious threat to the environment; or
 - (iii) dealing with an emergency involving risk of death of, or injury to, persons; or

- (iv) dealing with an emergency involving risk of substantial loss of, or substantial damage to, property.
- (m) Any other operational or technical condition that the Authority is satisfied is necessary for a particular type of apparatus license.

2.20 Changes to the apparatus license conditions

- (a) The Authority may, by notice in writing given to the licensee of an apparatus license:
 - (i) impose one or more further conditions to which the license is subject; or
 - (ii) revoke or vary any condition imposed under paragraph (i); or
 - (iii) revoke or vary any condition specified under subsection 2.19(m); or
 - (iv) if the license is an apparatus license, other than broadcasting transmitter license—vary a condition of the kind referred to in subsections $2.18(\mathbf{e})$, (**f**) or (**h**).
- (b) The Authority shall specify, in the notice given under subsection (a), the reasons for the change.
- (c) A licensee must notify the effect of the notice given under subsection (a), to each person who is currently authorised under section 2.14 in relation to the license, as soon as practicable but not later than seven days after receiving the notice.
- (d) Giving such a notice to the licensee under subsection (a) does not render unlawful anything done by a person authorised by the licensee under section 2.14 before the person is notified under subsection (c).

2.21 Qualification of operators of apparatus

- (a) The Authority may determine, by written instrument, that persons operating apparatus under apparatus licenses included in a class of apparatus licenses specified in the instrument must be qualified operators.
- (b) A person who wishes to be a qualified operator in relation to one or more such classes of apparatus licenses may apply to the Authority for a certificate of proficiency, in a form approved by the Authority.
- (c) The Authority must not issue a certificate of proficiency unless:
 - (i) the Authority is satisfied that the applicant has reached the minimum age in relation to the class of certificates in which the certificate is included; and
 - (ii) the Authority is satisfied that the applicant has achieved satisfactory results in approved examinations or in examinations conducted under the regulations.
- (d) The approved examination is an examination conducted by an approved (delegated by a written instrument of the Authority) body or organization for the purposes of this section or conducted by the Authority. The final decision for certification rests with the Authority in any case.
- (e) If the Authority refuses to issue a certificate of proficiency, it must give the applicant a written notice of the refusal together with a statement of its reasons.
- (f) If the Authority, at any time, has reasonable grounds for believing that a qualified operator will probably be unable to achieve satisfactory results in an examination of the kind referred to in paragraph 2.21(c)(ii), the Authority may invite the operator for re-examination by determining the time and place and other details of the examination.

- (g) The Authority may, by written and reasoned notice given to a qualified operator cancel the operator's certificate of proficiency, in the event that:
 - (i) the Authority is satisfied, that the operator has failed to achieve satisfactory results in an examination or further examination referred to in subsection (g);
 - (ii) the operator has refused or failed, without reasonable excuse, to comply with a request under subsection (g);
 - (iii) the operator has been convicted of an offence under the regulations;
 - (iv) the operator fails to comply with or satisfy any other matters to which the Authority must have regard in deciding whether to issue a certificate of proficiency;
- (h) If the certification of proficiency of a person, who has been certified by the Authority is cancelled under this section, that person must not fail to return the certificate to the Authority, either by hand or by certified mail, within seven days after receiving notification of the cancellation.
- (i) An examination fee paid by the applicant to the Authority or to the body that conducts the examination is nonrefundable, except in case of cancellation of the examination.

2.22 Suspension and cancellation of apparatus licenses

(a) Except for apparatus licenses under the ICT facility license under subsection 2.15(e)(i) and without limiting subsections 5.11(f), 5.11(g) and 5.11(h); an apparatus license may be suspended or cancelled if the Authority is satisfied that the licensee, or a person authorised by the licensee to operate a radiocommunications apparatus under the license, has:

- (i) Contravened a condition of the license, or in any other way contravened the Radio Rules or the Act; or
- (ii) Knowingly operated radiocommunications apparatus or permitted the operation of radiocommunications apparatus, in contravention of any other law of Bhutan.
- (b) In case of an apparatus license under subsection 2.15(e)(i), the contravention will be reported to the ICT service licensee for taking appropriate action.
- (c) The Authority shall give the licensee fourteen days written notice of its intention to suspend or revoke the license, specifying the date and the grounds on which it proposes to do so.
- (d) The period of suspension, which may not be less than thirty days, must be specified in the written notice to the licensee.
- (e) If the licensee fails to:
 - (i) cease the contravention of a condition of the license; or
 - (ii) cease the contravention of the Act or any other law of Bhutan; or
 - (iii) cease the operation of the radiocommunications apparatus which is contravening such a law or national security, or
 - (iv) pay any unpaid fees; and

within the fourteen days given by the notice under subsection (c) and the fourteen day period has not been extended by the Authority's written notice the apparatus license will be suspended or revoked forthwith.

(f) The Authority must notify the licensee in writing of the suspension or revocation made in accordance with subsection (e) and the licensee must give written notice of such suspension or revocation to each person who is currently authorised under section **2.14** in respect of that license.

- (g) In the event of a need to take urgent action pursuant to subsection 51(f) of the Act, the Authority must suspend or revoke the apparatus license forthwith by written notice to the licensee, without following the procedures specified in subsections (c) and (e).
- (h) Within the suspension period specified pursuant to subsection (d), no proceedings for an offence against these Radio Rules or the Act or any other law of Bhutan against the licensee, or against a person authorised by the licensee to operate a radiocommunications apparatus under the license shall be initiated.
- (i) The suspension ceases at the end of the period specified pursuant to subsection (d)), unless the apparatus license or suspension is revoked by the court or by the Authority.
- (j) The licensee may submit to the Authority, within thirty days of the receipt of the written notice issued pursuant to subsection (d) or such longer time, if specified by the Authority, a written statement of objections to the suspension or revocation of the license which the Authority shall take into account before reaching a decision.
- (k) Any person aggrieved by an order of suspension or revocation of a license under this section may opt to appeal within thirty days of the receipt of the order to the Appellate Tribunal.
- (1) The licensee must apply for the cancellation of an issued apparatus license, if the reason(s) for the operation of apparatus license has ceased.

2.23 Renewal of apparatus licenses

- (a) Subject to subsection (b), a licensee of an apparatus license, may, at any time within six months before the expiry of the apparatus license and within seven days after it expires, apply in writing to the Authority for the license to be renewed.
- (b) In case of an apparatus license issued under subsection
 2.15(e) (h) (an apparatus license covered by ICT service license), the renewal of an apparatus license will be under the terms of the ICT service license.
- (c) An application made pursuant to subsection (a) must be in an appropriate form approved by the Authority for that type of apparatus license.
- (d) When an application is made, the Authority may renew the license by issuing to the applicant a new apparatus license and the conditions of the new apparatus license need not be the necessarily same as those of the license that it replaces.
- (e) The Authority must not renew the license if:
 - (i) the license is affected by a spectrum re-allocation declaration under section **1.6**; and
 - (ii) the license is due to expire after the end of the re-allocation period for the spectrum re-allocation declaration.
- (f) If the Authority renews the license by issuing a new apparatus license and the new license is affected by a spectrum re-allocation declaration under section 1.6, then the period specified in the new license for the purposes of subsection 2.17(b) must end before the end of the re-allocation period for the spectrum re-allocation declaration.
- (g) In deciding whether to renew the license, the Authority:

- (i) must have regard to the same matters to which it must have regard under subsections **2.15(e)** in deciding whether to issue such a license; and
- (ii) may have regard to the same matters to which it may have regard under subsection **2.15**(e) (ix) in deciding whether to issue such a license; and
- (h) The new license comes into force, or shall be deemed to have come into force, immediately after the expiry of the license that it replaces.
- (i) If the Authority refuses to renew the license, or renews the license but not on the same conditions the Authority must give the licensee a written notice stating the fact and relevant reasons.
- (j) A licensee referred to under subsection (i) may, within the thirty days after receiving the written notice, make written representations to the Authority in respect of the refusal of renewal.
- (k) The Authority shall consider any written representations made under subsection (j) and shall inform the licensee within fifteen days of the receipt of the submission, of its decision on the matter.
- The licensee, if aggrieved by the decision under subsection (k), may appeal against such decision of the Authority to the Appellate Tribunal within thirty days of the receipt of the information under subsection (k).

2.24 Transfer of apparatus licenses

(a) Subject to subsection (c), a licensee of an apparatus license may, at any time before the license is due to expire, apply in writing to the Authority for the license to be transferred to another person.

- (b) The application must be in a form approved by the Authority and must be signed by both the licensee and the proposed transferee. The Authority may approve different forms for transfer of different types of apparatus license.
- (c) An apparatus license is permitted to be transferred, totally or partially, if:
 - (i) the apparatus license contains a condition allowing such transfer; and
 - (ii) the licensee is given written approval by the Authority, if requested by licensee in written notice; and
 - (iii) any changes to the license made in the course of the license transfer are recorded in the Register; and
 - (iv) an apparatus license transferring fee has been paid to the Authority under paragraph 5.5(h)(ii).
- (d) The transferred license:
 - (i) subject to section **2.22**, continues in force until the end of the period for which the license was issued to the initial licensee; and
 - (ii) subject to section **2.20**, continues on the same conditions as those which applied immediately before the transfer.
- (e) Any purported transfer which does not comply with this section shall be invalid and of no legal effect whatsoever. In the event of any such transfer taking place, whether *de jure* or *de facto*, the Authority shall have the power to suspend or revoke the license in accordance with section **2.22**.
- (f) Any person who is involved in effecting any purported transfer of a license other than in accordance with the terms of this section shall be guilty of the offence of forgery.

- (g) An apparatus license transferred in accordance with this section shall be deemed to be an apparatus license issued by the Authority under these Radio Rules.
- (h) An apparatus license that is exempt from payment of a spectrum utilization fee, under subsection **5.9**(b) is a non transferable license.

2.25 Registration of apparatus licenses

- (a) The Register is to contain the following information for each apparatus license:
 - (i) the licensee's name and postal address and other relevant contact details;
 - (ii) the date of issue and date of expiry of the license;
 - (ii) such details as the Authority determines, in writing, about the conditions of apparatus licenses;
 - (iv) such details as the Authority determines, in writing, about authorisations by licensees for other persons to operate radiocommunications apparatus under apparatus licenses;
 - (v) such details as the Authority determines, in writing, about radiocommunications apparatus that are operated under apparatus licenses; and
 - (vi) if, under section **1.6**, the license is affected by a spectrum re-allocation declaration—a note to that effect.
- (b) The Authority may include in the Register such other details about apparatus licenses as it thinks necessary or convenient for the purposes of these Radio Rules.
- (c) The Authority must, as soon as practicable, make the changes to the information in the Register about an apparatus license that the Authority considers are necessary

or convenient in order to take into account sections 2.20, 2.21, 2.22, 2.23 and 2.24.

Division Four: Class License

Relevant Sections:

- 2.26 Issuing class licenses
- 2.27 Issuing class licenses based on requests
- 2.28 Conditions of class licenses
- 2.29 Varying and revocation of class licenses
- 2.30 Registration of class licenses

2.26 Issuing class licenses

- (a) The Authority may, by a published notice, issue a class license that authorises any person:
 - (i) to operate a radiocommunications apparatus or device of a specified kind; or
 - (ii) to operate a radiocommunications apparatus or device for a specified purpose; or
 - (iii) to operate a radiocommunications apparatus or device of a specified kind for a specified purpose.
- (b) Operation of a radiocommunications apparatus or device is not authorised by a class license if it is not in accordance with the conditions of the license.
- (c) The Authority must not issue a class license that is inconsistent with the any relevant spectrum plan or any relevant frequency band plan.
- (d) A class license comes into force:
 - (i) on the day specified for the purpose in the notice published under subsection (a); or

(ii) if no such day is specified in the notice—on the day on which the notice is published.

2.27 Issuing class licenses based on requests

- (a) A person who operates, or is proposing to operate, a radiocommunications apparatus or device may give to the Authority a written request for advice on whether operation of the apparatus or device is authorized under the class license specified in the request.
- (b) The request may be limited to advice on operation of the apparatus or device in the circumstances specified in the request.
- (c) The circumstances so specified may include the way in which the apparatus or device is operated.
- (d) The Authority is obliged to give to a person who has made a request pursuant to subsection (a) written advice on whether the Authority considers that the operation of the radiocommunications apparatus or device, as specified in the request, is authorised under the class license in question.
- (e) The advice may state that operation of the apparatus or device is authorised under the class license provided that the apparatus or device is operated in the circumstances specified in the advice.
- (f) The circumstances so specified may include the way in which the apparatus or device is operated.
- (g) If the advice states that the operation of the apparatus or device is authorised under the class license and the apparatus or device is operated only in accordance with the advice; neither the Authority nor any other authority may take any action against the person to whom the advice was given, during the period of five years commencing on the

day the advice was given, on the basis that operation of the apparatus or the device is not so authorised.

(h) The radiocommunications apparatus or device that gains authorization under subsection (g) may also be covered by a general class license under section **2.26** after such authorization.

2.28 Conditions of class licenses

- (a) The Authority may include in a class license such conditions as it sees fit.
- (b) The conditions may, for example, include all or any of the following:
 - (i) a condition specifying the frequencies at which operation of radiocommunications apparatus or devices is authorised under the license;
 - (iii) a condition specifying other technical requirements about operation of radiocommunications apparatus or devices under the license;
 - (iv) a condition specifying the area within which operation of radiocommunications apparatus or devices is authorised under the license;
 - (v) a condition specifying the periods during which operation of radiocommunications apparatus or devices is authorised under the license;
 - (vi) a condition that any radiocommunications apparatus or device operated under the license must comply with all the standards applicable to it;
 - (vii) a condition that specifies a registration fee and registration, if applicable.
2.29 Varying and revocation of class licenses

- (a) Subject to subsection (c), the Authority may, by publishing a notice, vary a class license by:
 - (i) including one or more further conditions; or
 - (ii) revoking or varying any conditions of the license.
- (b) Subject to subsection (c), the Authority may, by publishing a notice, revoke a class license.
- (c) Before varying a class license, the Authority may publish a notice that:
 - (i) states the subject matter of the proposed variation; and
 - (ii) specifies a place at which copies of the license and of the proposed variation can be provided; and
 - (iii) invites interested persons to send representations to a given address about the proposed variation by a specified date that is at least thirty days after the date of publication of the notice.
- (d) Before revoking a class license, the Authority must publish a notice that:
 - (i) states that it proposes to revoke the license; and
 - (ii) specifies a place at which copies of the license may be provided; and
 - (iii) invites interested persons to send representations to a given address about the proposed revocation by a specified date that is at least thirty days after the date of publication of the notice.
- (e) The Authority must, before varying or revoking the license, give due consideration to any representations so made.
- (f) Failure to comply strictly with subsection (c) or (d) does not affect the validity of the notice, or the validity of the

variation or revocation of the class license, if the requirements of that subsection are substantially complied with.

(g) Subsections (c), (d) and (e) do not apply to variation or revocation of a class license if the Authority is satisfied that the variation or revocation is a matter of urgency.

2.30 Registration of class licenses

- (a) The Register is to contain, for each class license, such details as the Authority determines, in writing, about class licenses.
- (b) The Authority may include in the Register such other details about class licenses as it thinks necessary or convenient for the purposes of this section.
- (c) The Authority must, as soon as practicable, make the changes to the information in the Register about a class license that the Authority considers are necessary or convenient in order to take into account section **2.29**.

Division Five: Amateur Radio

Relevant Sections:

- 2.31 Kinds of amateur license
- 2.32 Issuing amateur licenses
- 2.33 Overseas amateur licenses
- 2.34 Communication by an amateur station
- 2.35 Restrictions
- 2.36 Content of an amateur station license

2.31 Types of amateur license

- (a) Subject to subsection (**b**), the Authority may issue an apparatus license from amateur type, under Division three of this chapter, and following kinds:
 - (i) Restricted;
 - (ii) General;
 - (iii) Novice.
- (b) The Authority must not issue to a person a certificate of proficiency of 'Restricted' kind unless the applicant has reached the minimum age sixteen and the qualification of the applicant is proven under section **2.21**:
 - (i) on principles of electronics and radiocommunications; and
 - (ii) on regulations of radio, specifically on those parts of the regulations relating to the safety of life.
- (c) The Authority must not issue to a person a certificate of proficiency of 'General' kind unless the applicant has

reached the minimum age sixteen and the qualification of the applicant is proven under section **2.21**:

- (i) on principles of electronics and radiocommunications; and
- (ii) on regulations of an amateur station, specifically on those parts of the regulations relating to the safety of life; and
- (iii) on the ability to correctly send and receive by ear, in Morse code, a message in mixed plain language and figures at a speed of ten words per minute; and
- (iv) holding a valid 'Restricted' certificate of proficiency for at least one year.
- (d) The Authority must not issue to a person a certificate of proficiency of 'Novice' kind unless the applicant has reached the minimum age sixteen and the qualification of the applicant is proven under section **2.21**:
 - (i) on principles of electronics and radiocommunications; and
 - (ii) on regulations of a Novice amateur station, specifically on those parts of the regulations relating to the safety of life; and
 - (iii) on the ability to correctly send and receive by ear, in Morse code, a message in mixed plain language and figures at a speed of five words per minute; and
 - (iv) holding a valid 'Restricted' certificate or an equivalent certificate of proficiency for at least one year.
- (e) The Authority may relax minimum age conditions in subsections (b), (c) and (d) to the age fourteen if:
 - (i) legal responsibility is accepted in writing by one of the parents or legal guardian; and

(ii) the Authority is satisfied that the person has acceptable capability.

2.32 Issuing amateur licenses

- (a) A person must not operate a radiocommunications apparatus in amateur service or in amateur-satellite service otherwise than as authorised by an amateur license of one of types specified in section **2.31**.
- (b) The Authority or the approved body, not later than sixty days prior to the qualifying examination, must cause to be published a notice setting out details:
 - (i) who is eligible to apply for the exam; and
 - (ii) how an eligible person could obtain the application form and how he or she may apply; and
 - (iii) the closing date by which applications must be submitted; and
 - (iv) how much the application fee is and to whom must be paid; and
 - (v) when and where it is planned to hold the examination; and
 - (vi) which specific reference materials will be used for drafting of exam; and
 - (vii) where the materials of paragraph (v) could be obtained or purchased; and
 - (viii) any other details that the Authority is satisfied are necessary.

Note – The application fee shall be in accordance with section 5.5

(c) The theoretical examination of qualification under subsection (b) must be comprised of multiple-choice questions with the duration not longer than ninety minutes.

- (d) If the Authority is satisfied that the applicant is a qualified operator under section **2.31**,the Authority must:
 - (i) issue an apparatus license (in type of amateur license)in one of the kinds specified in section **2.31** and under the section **2.15** (Issuing apparatus licenses); and
 - (ii) assign a call sign from the schedule **6**, Part **IV** to any amateur station; and
 - (iii) register the particulars of the license in the Register of the Authority.

2.33 Overseas amateur licenses

- (a) The Authority, by publishing a written notice, may revoke the application of this section anytime if he is satisfied it is necessary for a given period of time.
- (b) Subject to this section and with a valid amateur license issued by the Authority, the amateur station may be operated by a person who is non-resident and is visiting Bhutan from another country; and who
 - (i) holds an amateur license and call sign, issued by the administration of another country, that has been recognised by the Authority; or
 - (ii) holds an amateur qualification and call sign, issued by the administration of another country, that has been recognised by the Authority for the purpose of operating the amateur station in Bhutan.
- (c) The Authority may provide a list of recognized amateur licenses issued by administration of other countries from time to time.
- (d) If a person claims to operate an amateur station under this section, the person must meet all the relevant conditions.

Otherwise, their operation of an amateur station is unauthorised and will be covered by the Act.

- (f) A person mentioned in subsection (**b**) must produce the evidence, if that person is operating, or has operated an amateur station and is asked by an authorized official to produce evidence of the following:
 - (i) that the person holds, or held at the relevant time, an amateur license or amateur qualification of a type mentioned in subsection (**b**).
- (g) If the person does not produce the evidence under subsection (f), the person is not authorised to operate an amateur station under this section.
- (h) The person under subsection (b) must comply with similar obligations imposed for an amateur who is resident of Bhutan.

2.34 Communication by an amateur station

- (a) The licensee must communicate by an amateur station for intercommunications and solely for the purpose of:
 - (i) self-training in radiocommunications; or
 - (ii) technical investigations into radiocommunications; or
 - (iii) transmitting news and information services related to the operation of amateur stations, as a means of facilitating intercommunication; and
- (b) In the course of any transmission from an amateur station, the licensee must transmit the call sign of any station being called, or communicated with, followed by the call sign of the licensee's amateur station:
 - (i) at the beginning and end of the transmission; and

- (ii) for a transmission that lasts more than ten minutes at least once during each period of ten minutes in the transmission (the ten minutes limit is extendable to thirty minutes in case of participation in emergency services); and
- (iii) by voice (using the English language), by visual image or by an internationally recognised code.
- (c) The licensee is permitted to retransmit a transmission originating from another amateur station, only subject to the consent of the other licensee and transmit the other licensee's call sign at the beginning and the end of each transmission.
- (d) A log of the conducted operations must be managed in the station containing:
 - (i) full name, ID, call sign, license number and address of a person who wants to start an emission before attempt; and
 - (ii) date and time frame during which a person operates amateur station; and
 - (iii) transmitter power and class of emission that used by a person.

2.35 Restrictions

- (a) The licensee must not:
 - (i) communicate by an amateur station for financial gain; or
 - (ii) transmit a message that is, or includes, an advertisement; or
 - (iii) transmit any form of entertainment.

- (b) The licensee must not solicit a message that is to be transmitted on behalf of a third party unless the message relates to a disaster.
- (c) The licensee must not transmit a message on behalf of a third party:
 - (i) enabling any person to obtain a financial gain or other reward, directly or indirectly; or
 - (ii) relating to the commercial or financial affairs of any person.
- (d) The licensee must not transmit messages to an amateur station in a foreign country if the Authority has published a notice to the effect that the government of that country objects to the transmission and reception of messages between amateur stations in that country and amateur stations outside that country.
- (e) The licensee must not operate an amateur station if its operation causes harmful interference to radiocommunications services.
- (f) The licensee must not cause a carrier wave to be emitted from an amateur station unless:
 - (i) the radio wave is subjected to intelligible modulation; or
 - (ii) the radio wave is emitted during a brief test or an adjustment.
- (g) Except for the control of an unattended amateur station, the licensee must not operate an amateur station to transmit signals that are encoded for the purpose of obscuring the meaning of the signals.

- (h) The licensee must not, whether manually or automatically, connect the station to a public telecommunications network such as the internet , unless:
 - (i) the licensee is a General or Novice amateur; and
 - (ii) the licensee has implemented a reasonable procedure to ensure that only licensed persons access the station for operation. In this case the licensee shall advice the person being connected that his or her transmissions may be overheard by other persons and connection shall be disconnected if there is no intention to proceed with the connection.
- (i) The licensee of an amateur station must not authorize another person to operate the station if the other person is not a qualified operator or qualified person of the correct type.
- (j) The licensee must not operate a restricted amateur station using a transmitter that has not been manufactured commercially.

2.36 Content of an amateur station license

- (a) A condition obliging the licensee to comply with Radio Rules and the Act.
- (b) Apparatus license type and amateur license kind.
- (c) Full name, ID, contact information, assigned call sign and photo of licensee.
- (d) The date on which license is issued and the date on which the license validity terminates under section **2.17**.
- (e) Serial number of the relevant Certificate and name of issuing body.

- (f) Technical conditions, based on Schedule 5 Part IV, including:
 - (i) permitted frequency bands; and
 - (ii) permitted emissions; and
 - (iii) permitted power ranges.
- (g) A condition specifying the permitted locations of operation of the amateur station. If the licensee operates in a location not specified in such condition then the licensee may only operate an amateur station at such location for a continuous period of four months.
- (h) A condition specifying the permitted antenna height and antenna type in a fixed location.
- (i) A condition obliging the licensee to meet following limits for spurious emissions:
 - (i) for frequencies less than 30 MHz the lesser of 43 + 10 log(P) dB and 50dB in which P is the peak envelope power in watts supplied to the antenna transmission line; and
 - (ii) for frequencies above 30 MHz the lesser of 43 + 10 log (P) dB and 70 dB in which the P is the mean power in watts supplied to the antenna transmission line.

CHAPTER 3: Permitting Relating to Radiocommunications

3.1 General

- (a) Outline of this Chapter:
 - (i) This chapter is separated into two divisions for seven types of permits. However, there is no limitation on the number of permit types that may be established by amendments to these Rules.
 - (ii) Division one deals with the Permitting Procedure.
 - (iii) Division two deals with various types of Permits.
- (b) For purpose of this chapter, a person is taken, to have an apparatus in his or her possession for the purpose of operation if it is in his or her possession, otherwise than for the purpose of supplying to another person, and can be operated by merely doing one or more of the following:
 - (i) connecting the apparatus to an electric power supply by means of an electric plug or other electric connection;
 - (ii) connecting a microphone to the apparatus by inserting a microphone plug into the device;
 - (iii) switching on the apparatus;
 - (iv) switching on any other equipment relevant to the operation of the apparatus;

- (v) adjusting settings by manipulating the external switches, dials or other controls of the apparatus;
- (vi) connecting the apparatus to an antenna.

Division One: Permitting Procedure

Relevant Sections:

- 3.2 Issuing a permit
- 3.3 Conditions of permits
- 3.4 Duration of permits
- 3.5 Cancelling permits
- 3.6 Transferring permits

3.2 Issuing a permit

- (a) A person may apply to the Authority, in a form approved by the Authority, for a permit under this Chapter for the purpose of:
 - (i) Possessing radiocommunications apparatus for supply; or
 - (ii) Possessing radiocommunications apparatus for export or re-export; or
 - (iii) Possessing and installing radiocommunications apparatus as a station for operation by a person who holds a valid amateur license issued by the Authority; or
 - (iv) Manufacturing radiocommunications apparatus in Bhutan; or
 - (v) Testing radiocommunications apparatus; or
 - (vi) Conducting experiments using radio waves for education or research; or

- (vii) Demonstrating radiocommunications apparatus; or
- (viii) Any other reason for which the Authority determines the need for a permit by written notice,.
- (b) In deciding whether to issue a permit, the Authority must have regard to the protection of the health or safety of persons who:
 - (i) operate devices; or
 - (ii) work on devices; or
 - (iii) use services supplied by means of devices; or
 - (iv) are otherwise reasonably likely to be affected by the operation of the devices.
- (c) A person applying for a permit under subsection (a) must pay the permit fee in accordance with section **5.6** to the Authority before the grant of permit.
- (d) A person must not abuse a permit issued by the Authority under paragraphs (a)(vi), (a)(vii) and (a)(viii) for the purpose of operating radiocommunications apparatus.
- (e) If the Authority refuses to issue the permit, it must give the person a written notice of the refusal, together with a statement of its reasons.

3.3 Conditions of permits

- (a) A permit is subject to the following conditions:
 - (i) a condition that a person must comply with these Radio Rules and the Act; and
 - (ii) any other conditions specified in the permit.
- (b) The Authority may, by written notice given to the person to whom the permit has been issued:
 - (i) add one or more further conditions to the permit; or

(ii) vary or revoke any conditions that have already been imposed pursuant to subsection (a).

3.4 Duration of permits

- (a) A permit comes into force on the day on which it is issued.
- (b) A permit that authorises radio emissions:
 - (i) must specify an expiry date; and
 - (ii) subject to section **3.5**, a permit remains in force until the end of that day.
- (c) Subject to section **3.5**, a permit that does not authorise radio emissions remains in force until the end of the expiry date if an expiry date is specified.
- (d) The Authority may, by written notice to the holder of a permit, declare an expiry date for a permit.
- (e) If the operation of subsection (d) would result in the acquisition of property from a person the holder may make an appeal to the Appellate Tribunal, but not later than fifteen days from the date of notice receipt under subsection (d).
- (f) The Authority is liable to pay compensation of a reasonable amount to the person in respect of the acquisition, if the Appellate Tribunal reaches such decision under subsection (e).
- (g) The day specified in a notice under subsection (d) must be later than the day on which the notice was given to the holder.
- (h) The Authority may extend the duration of a permit declared in subsection (d), if the Authority is satisfied that such an extension is reasonable having received and examined a written request of the permit holder.

3.5 Cancelling permits

- (a) The Authority may, by written notice given to the holder of a permit, cancel the permit.
- (b) The notice must give the reasons for cancelling the permit.
- (c) In deciding whether to cancel a permit, the Authority:
 - (i) must have regard to all matters that it considers relevant; and
 - (ii) must have received and reviewed the records of the permit holder; and
 - (iii) may have regard to whether or not the holder of the permit or an agent of the holder has been convicted of an offence because of contravention of a condition of the permit.
- (d) The records of the activities conducted and maintained by a permit holder must be submitted to the Authority before the permit is cancelled.
- (e) The cancellation of a permit for the reason of contravention of permit conditions is reviewable by the Appellate Tribunal under the subsection 85(5)(b) of the Act.

3.6 Transferring permits

Permits are not transferable.

Division Two: Permits

Relevant sections:

- 3.7 Permit for the possession of radiocommunications apparatus
- 3.8 Possession of non-permitted radiocommunications apparatus
- 3.9 Permit for the supply of radiocommunications apparatus
- 3.10The supply of non-standard radiocommunications apparatus
- 3.11Permit for the manufacture of radiocommunications apparatus
- 3.12Permit for an amateur radiocommunications provider
- 3.13Permit for a testing authority and certification body
- 3.14Permit for research and educational experiments
- 3.15Export permit
- 3.16Permit for the demonstration of radiocommunications apparatus

3.7 Permit for the possession of radiocommunications apparatus

- (a) A person shall possess radiocommunications apparatus if the apparatus is standard and that person:
 - (i) holds a valid license issued by the Authority under subsection 2.13 (a) and the apparatus is kept for the purpose of operation; or
 - (ii) holds a valid permit issued by the Authority for a purpose under the subsection 3.2(a).

- (b) Subject to subsection (c), a person is not entitled for a possession permit for a non-standard apparatus if the apparatus is for the purpose of operation.
- (c) Subject to subsection (d), a person must not cause a radio emission to be made by a transmitter that the person knows is a non-standard transmitter.
- (d) Without limiting subsection (**b**), the Authority may, in writing, issue to the person conditions under which his or her agents:
 - (i) to possess specified non-standard apparatus; and
 - (ii) to possess such apparatuses that make radio emissions.
- (e) A person does not contravene subsection (b) or (c) by causing a radio transmission to be made by a non-standard transmitter, or having a non-standard apparatus in his or her possession, in the reasonable belief that the emission or possession was necessary for the purpose of:
 - (i) securing the safety of a vessel, aircraft or space object that was in danger; or
 - (ii) dealing with an emergency involving a serious threat to the environment; or
 - (iii) dealing with an emergency involving risk of death of, or injury to, persons; or
 - (iv) dealing with an emergency involving risk of substantial loss of, or damage to, property.
- (f) If there is a written statement to prove that apparatus is intended to be used or exported solely outside Bhutan, a person does not contravene subsection (**b**) by having a non-standard apparatus in his or her possession.
- (g) The Authority may issue a permit to a person for possession of radiocommunications apparatus for a short time, not

being longer than three months, only for testing under the section **3.13**.

3.8 Possession of non-permitted radiocommunications apparatus

- (a) Where any radiocommunications apparatus is found in the possession of any person in contravention of a condition of a permit or the Act, the Authority may:
 - (i) cancel the permit under the section **3.5**; or
 - (ii) seal or alter such apparatus or any part thereof in order to prevent the use of that radiocommunications apparatus for the purpose of transmission or reception and re-issue to that person a permit; or
 - (iii) seize such apparatus, whether or not it is sealed pursuant to paragraph (a)(ii), for disposal in terms of subsection (b).
- (b) Radiocommunications apparatus seized under paragraph (a)(iii) shall be held by the Authority until:
 - (i) its possession is authorised in terms of Subsection 3.7(a) or paragraph (a)(ii); or
 - (ii) it is dealt with by the Appellate Tribunal or a Court of competent jurisdiction.

3.9 Permit for the of supply of radiocommunications apparatus

- (a) The Authority may permit a person, who applied in a form approved by the Authority, to supply radiocommunications apparatus under this section.
- (b) A permit issued for supply under this section does not include an export permit (under section **3.15**).

- (c) A permit issued under this section to a supplier, does not relieve the supplier from the requirement to obtain other necessary permissions in accordance with other regulations.
- (d) A supplier who has been granted a permit by the Authority under this section must not supply radiocommunications apparatus, for the purpose of operation in Bhutan to a person having:
 - (i) none of the licenses mentioned in subsection **2.2(a)**; or
 - (ii) no written permission of the Authority for such possession.
- (e) A person must not supply any radiocommunications apparatus, unless:
 - (i) he has an established and registered corporation in Bhutan; and
 - (ii) the supply of radiocommunications apparatus has been included in its legally authorised activities; and
 - (iii) he has an acceptable eligibility and relevant knowledge; and
 - (iv) has been granted a valid permit by the Authority.
- (f) Subsections (d) and (e) do not oblige a person who holds a license under subsection **2.2(a)**, to obtain a radiocommunications apparatus, having an approved standard, directly:
 - (i) from an overseas suppliers; or
 - (ii) from a local manufacturer.
- (g) A supplier who has been granted a permit by the Authority under this section must:

- (i) supply a requesting licensee only with radiocommunications apparatus authorised by the granted license; and
- (ii) keep a written record of all radiocommunications apparatus supplied to licensee to whom he has made a supply; and
- (iii) keep confidential the records maintained pursuant to paragraph (g)(ii) save that these may be disclosed to the Authority.
- (h) A person, who has been granted a supply permit by the Authority, is also responsible for the provision of a maintenance and repair service to a reasonable extent.

3.10 The supply of non-standard radiocommunications apparatus

- (a) A supplier who is granted a permit under this section, must not knowingly supply non-standard radiocommunications apparatus:
 - (i) to any person unless the Authority has provided that person with a written permission; or
 - (ii) to any person except an authorised representative of Royal Bhutan Army, or Royal Bhutan Police, or Royal Bhutan Guard;
 - (iii) unless the supply is in the course of, or in relation to, trade or commerce between Bhutan and places outside Bhutan under subsection (b), subject to section 3.15.
- (b) If there is a written statement to prove that the apparatus is intended to be used or exported solely outside Bhutan, a person does not contravene subsection (a) by supplying non-standard apparatus.

- (c) Subject to providing the Authority with a written declaration, a person does not contravene subsection (a) by supplying non-standard apparatus for the purposes of modifying or altering it so that it would comply with all standards applicable to it at the time of the alteration or modification.
- (d) A person does not contravene subsection (a) by supplying non-standard apparatus if the apparatus was imported for the purposes of re-export.
- (e) Section **88** and Section **90** of the Act are applicable to a person who contravenes this section.

3.11 Permit for the manufacture of radiocommunications apparatus

- (a) The Authority may permit a person, who applied in a form approved by the Authority, to manufacture radiocommunications apparatus under this section;
- (b) A permit issued under this section to a manufacturer, does not relieve that person from the requirement to obtain other necessary permissions in accordance with other regulations.
- (c) A manufacturing permit issued by the Authority includes and covers also:
 - (i) a supply permit under section **3.9**; and
 - (ii) an export permit under section **3.15**.
- (d) A person must not manufacture any radiocommunications apparatus, unless:
 - (i) he has an established and registered corporation in Bhutan; and
 - (ii) the manufacture of radio communication apparatus has been included in its legally authorised activities; and

- (iii) he has an acceptable eligibility; and
- (iv) has been granted a valid permit by the Authority.
- (e) For radiocommunications apparatus that is going to be operated in Bhutan, a manufacturer authorised under this section, must obtain the approval of the Authority that the manufactured radiocommunications apparatus complies with relevant standards or the class license.
- (f) Without limiting subsection (e), the Authority may permit a manufacturer to manufacture non-standard radiocommunications apparatus in relation to the subsection 3.10(a)(ii).
- (g) A licensee under subsection **2.2(a)** may manufacture licensed radiocommunications apparatus subject to the conditions of subsection (e).
- (h) A permit holder under this section must not deliver manufactured radiocommunications apparatus:
 - (i) to a supplier who does not have a valid supply permit; or
 - (ii) to an exporter who does not have a valid export permit; or
 - (iii) to a person who does not have a valid license under subsection **2.2(a)**.
- (i) Section **88** and Section **90** of the Act are applicable to a person who contravenes this section.
- Note Manufacturing for the purpose of this part includes assembling of separate electronic and radio components to produce radiocommunications apparatus.

3.12 Permits for amateur radiocommunications providers

(a) The Authority may issue a permit to a person, if he or she applied in a form approved by the Authority, to establish a fixed amateur station to provide amateur radiocommunications for a person who holds an amateur license under section **2.32**.

- (b) A person who obtains a permit under subsection (a) must not operate amateur radiocommunications station unless:
 - (i) he or she obtains an apparatus license under section **2.15**; or
 - (ii) it is being operated for operational tests if authorized in the permit issued under subsection (**a**).
- (c) A permit issued under subsection (a) must include following conditions:
 - (i) operational frequencies; and
 - (ii) authorized emissions in each frequency; and
 - (iii) range of permitted radiation power; and
 - (iv) antenna type and height; and
 - (v) geographical coordinates of antenna; and
 - (vi) working hours; and
 - (vii) tariff ranges; and
- (d) In addition to the conditions included pursuant to subsection(c), a person authorized under subsection (a), must be responsible:
 - (i) for the implementation of conditions of section **2.19** (Conditions of apparatus licenses); and
 - (ii) for monitoring the consistent observance of operational procedures and conditions given in sections 2.33, 2.34 and 2.35.
- (e) A log of the operations conducted in the station established under subsection (a) must be maintained containing:
 - (i) the full name, ID, call sign, license number and address of a person; and

- (ii) date and time frame that a person operates amateur station; and
- (iii) transmitter power and class of emission used by a person.
- (f) A permit issued under subsection (a), together with its obligations, must be kept in the amateur station in such a way that it is visible for the authorized officials of the Authority as well as the operators.
- (g) Under the subsections 45 (2) © of the Act, an authorized official of the Authority may enter an amateur station to:
 - (i) examine and test any apparatus found on the station; or
 - (ii) require a permit holder to demonstrate compliance with the conditions on which the permit was granted; or
 - (iii) require a licensed operator to display his amateur certificate; or
 - (iv) investigate consistency and sufficiency of the log of activities under subsection (e).
- (h) A person operating under an amateur radiocommunications provider permit must pay a spectrum utilization fee as specified in section **5.10** of Part **III**.
- (i) The permit of a person who obtains an apparatus license under paragraph 3.12(b)(i) must be cancelled by the Authority upon delivery of the apparatus license.

3.13 Permit for a testing authority and a certification body

(a) The Authority may issue a permit to a person or association in Bhutan, if applied in a form approved by the Authority:

- (i) as a testing authority to test a radiocommunications apparatus or any other device that radiates radio waves for compliance with a given standard;
- (ii) as a certification body for the certifying that radiocommunications apparatus or any other device that radiates radio waves complies with a given standard.
- (b) The Authority shall publish permits issued under the subsection(**a**).
- (c) A permit holder authorised under the subsection (a) must submit the table of testing rates together with enough details for the approval by the Authority, before conducting any test. The Authority must issue a written notice of approval or rejection within a reasonable time after receipt of the permit holder's submission..
- (d) After conducting any test:
 - (i) a written testing report, describing the status of apparatus compliance, must be created, signed and stamped and handed to the client; and
 - (ii) a copy of the report in (i) must be retained by the testing authority; and
 - (iii) unless otherwise required by the Authority, the radiocommunications apparatus must be returned to the client.
- (e) A permit holder authorised under the subsection (**a**) must take all practical measures to avoid causing harmful interference with the radiocommunications carried out under these Radio Rules during the conduct of an emission test (for example using of anechoic chamber or power attenuator).

3.14 Permit for research and educational experiments

- (a) The Authority may issue a permit to a person or association in Bhutan, if the application is made in a form approved by the Authority, for research and educational experiments on radiocommunications apparatus solely within the boundaries of the relevant educational establishment or research laboratory.
- (b) This section does not apply to anything done or omitted to be done by a member of the Royal Bhutan Army, or Royal Bhutan Police, or Royal Bhutan Guard, in the performance of his or her functions or duties the purpose of which relates to:
 - (i) research for purposes connected with defence; or
 - (ii) intelligence.
- (c) Under the subsection **3.2**(c) and section **3.3**, the Authority may impose some conditions for the purpose of achievement of an acceptable level of electromagnetic compatibility with the existing spectrum utilization and environmental or human safety.
- (d) A permit holder under the subsection (a) must take all practical measures to avoid causing harmful interference with the radiocommunications carried out under these Radio Rules during the conduct of an emission test (for example using of anechoic chamber or power attenuator).

3.15 Export permit

- (a) The Authority may issue a permit to a person or association in Bhutan, if applied for in a form approved by the Authority, for export of radiocommunications apparatus.
- (b) Without limiting section **3.3**, the Authority may set a condition in an export permit issued under this section that:

- (i) the permit holder must comply with a given standard; and
- (ii) the permit holder must not export a class of radiocommunications apparatus for a specified overseas market.
- (c) The permit holder must keep a list of exported radiocommunications apparatus and the details of the recipient (name and address) for the purpose of probable enquiry by the Authority.

3.16 Permit for the demonstration of radiocommunications apparatus

- (a) The Authority may issue a permit to a person or association in Bhutan, if applied for in a form approved by the Authority, for demonstrating radiocommunications apparatus in an exhibition centre.
- (b) A permit holder under this section shall not cause the radiocommunications apparatus to make an emission during the demonstration, except under a relevant operational license issued under these Radio Rules.
- (c) The validity of a permit issued under this section must be revoked at the end of the demonstration.
- (d) For the duration of the demonstration, a permit issued under this section covers a supply permit under section **3.9** and same requirements and conditions must be met for such supply.

CHAPTER 4: Standards, Enforcement and Penalties

4.1 Outline of this Chapter

- (a) Outline of this Chapter:
 - (i) This chapter contains three divisions and deals with implementation of rules, observing conditions and monitoring of compliance of activities of licensees authorised by these Radio Rules.
 - (ii) Division one deals with standards.
 - (iii) Division two deals with enforcement.
 - (iv) Division three deals with penalties

Division One: Standards

Relevant sections:

- 4.2 Standardization of radiocommunications apparatus
- 4.3 Non-standard radiocommunications apparatus
- 4.4 Use of labels
- 4.5 Sale of devices without labels and label abuse
- 4.6 Prohibited devices

4.2 Standardization of radiocommunications apparatus

- (a) Under the section **68** of the Act, the Authority may, by written instrument:
 - (i) make or adopt standards for the performance of specified radiocommunications apparatus; or
 - (ii) make or adopt standards for the maximum permitted level of radio emissions from devices other than radiocommunications from radiocommunications apparatus within specified parts of the spectrum; or
 - (iii) specify types of apparatus using radio waves the use of which shall not require a standard; or
 - (iv) specify circumstances in which the use of radiocommunications apparatus shall require such a standard.
- (b) Standards are to consist only of such requirements as are necessary or suitable for:
 - (i) containing interference to radiocommunications; or
 - (ii) containing interference to any uses or functions of devices; or

- (iii) establishing for the operation of radiocommunications apparatus, an adequate level of immunity from electromagnetic disturbance caused by the use of devices (including other radiocommunications apparatus); or
- (iv) establishing for the uses or functions of devices, an adequate level of immunity from electromagnetic disturbances caused by the operation of radiocommunications transmitters; or
- (v) establishing for the uses or functions of devices, an adequate level of immunity from electromagnetic disturbances caused by the use of other devices; or
- (vi) protecting the health or safety of persons who operate, or work on radiocommunications apparatus; or
- (vii) protecting the health or safety of persons who use services supplied by means of radiocommunications apparatus or are reasonably likely to be affected by the operation of radiocommunications apparatus.
- (c) The Authority shall publish sufficient particulars of a standard made under this section in such a manner as to be identifiable using:
 - (i) mere reference to a number; or
 - (ii) its technical text; or
 - (iii) any other unique identifier.
- (d) Before making or adopting a standard, the Authority may, if it is satisfied that it is necessary, publish details of the proposed standard so that all interested parties, including associations, may submit their comments on the proposed standard
- (e) A standard takes effect:

- (i) if the instrument making the standard specifies a day for the purpose, on that day; or
- (ii) otherwise—on the day on which a copy of the instrument was published.
- Note- A device for the purpose of this section includes ISM equipments.

4.3 Non-standard radiocommunications apparatus

- (a) Possession of non-standard radiocommunications apparatus is permitted only under the subsections 3.7(d), 3.7(e), 3.7(f) and 3.13(a).
- (b) Emergency operation of non-standard transmitters is permitted only for the purposes specified under subsection 3.7(e).

4.4 Affixing of labels

- (a) The Authority may, by publishing a written notice, require any person who manufactures or imports a device included in a specified class of devices to affix to each such device a label that indicates whether the device meets the requirements of the standards or class license specified in the notice.
- (b) The notice in subsection (a) may require a manufacturer or importer of a device included in a class specified in the notice to conduct quality assurance programs, or to guarantee compliance with such a quality assurance. Having considered the results of the quality assurance, the Authority may require the affixing of a label to the relevant device.
- (c) The label must be in the form specified by the Authority in the notice in subsection (a) and the method of affixing the label must be as specified in the instrument.

- (d) The Authority may state in the notice under subsection (a) that the requirement does not apply to an imported device if there is affixed to that device a label of a specified kind that indicates that the device complies with requirements of:
 - (i) a specified law of a foreign country; or
 - (ii) a specified instrument in force under a law of a foreign country; or
 - (iii) a specified convention, treaty or international agreement; or
 - (iv) a specified instrument in force under a specified convention, treaty or international agreement.
- (e) The notice in subsection (**a**) may determine conditions that must be met before a label can be affixed including (but not limited to):
 - (i) a condition that, before a manufacturer or importer affixes the label, the manufacturer or importer must have obtained a written statement from a certification body certifying that the device complies with the standard or class license; and
 - (ii) a requirement that, before a manufacturer or importer affixes the label, the device must have been tested by a recognised testing authority for compliance with the standard or class license; and
 - (iii) a requirement that, before a manufacturer or importer affixes the label, the manufacturer or importer must make a written declaration in relation to the device, being a declaration in a form specified in the notice.
- Note 1– Recognised testing authority and certification body are defined by section **3.13**.
- (f) The notice in subsection (a) may also specify requirements that must be met after a label has been affixed to a device,

including a requirement that a manufacturer or importer retain for inspection, for the period specified in the notice:

- (i) records of the conducted quality assurance programs and obtained results; and
- (ii) a declaration, or a copy of the declaration, made as mentioned in paragraph (e)(iii).
- (g) For the purposes of this Rule, a label is taken to be affixed to a thing if:
 - (i) the label is affixed to the thing; or
 - (ii) the label is woven in, impressed on, worked into or annexed to the thing; or
 - (iii) the label is affixed to a container, covering, package, case, box or other thing in or with which the first-mentioned thing is supplied; or
 - (iv) the label is affixed to, or incorporated in, an instruction or other document that accompanies the first-mentioned thing.
- Note 2 A device for the purpose of this section includes radiocommunications apparatus and ISM equipments.

4.5 Sale of devices without a label and label abuse

- (a) If a person has manufactured or imported a device and knows that a label in a particular form must be affixed, the person must not supply the device to the national market unless a label in that form has been affixed to the device.
- (b) If a person knows that he or she must satisfy requirements that have been specified under subsection 4.4(e) before affixing a particular label to a device, the person must not affix the label or a label that purports to be such a label before he or she satisfies those requirements.

- (c) Subsections (a) and (b) do not apply if the person has a reasonable excuse.
- (d) A person must not use in relation to a business, trade, profession or occupation, or affix as a trade mark or otherwise, to goods imported, manufactured, produced, sold, offered for sale or let on hire, or use in relation to:
 - (i) goods or services; or
 - (ii) the promotion, by any means, of supply or use of goods or services;
 - (iii) a protected symbol, or

(iv) a symbol so closely resembling a protected symbol as to be likely to be mistaken for it.

- (e) A reference in the subsection (d) to a protected symbol is a reference to a symbol the design of which is set out in a written determination made by the Authority for the purpose to indicate compliance by a device with:
 - (i) any applicable standards; and
 - (ii) any applicable class licenses.
- Note A device for the purpose of this section includes radiocommunications apparatus and ISM equipments.

4.6 Prohibited devices

- (a) Subject to subsection (b), the Authority may, by publishing a notice, declare that operation or supply, or possession for the purpose of operation or supply, of a specified device is prohibited for the reasons set out in the notice.
- (b) Before making the declaration under subsection (a), the Authority may, by publishing a notice specify the reasons of prohibition of a device and invite interested persons to make written representations to a given address about the

proposed declaration within such period, as is specified in the notice.

- (c) The Authority must give due consideration to any representations made under subsection (**b**).
- (d) The prohibited device must be a device that is designed to have an adverse effect on radiocommunications or would be likely substantially to:
 - (i) interfere with radiocommunications; or
 - (ii) disrupt or disturb radiocommunications in any other way; or
- (e) without limiting subsection (d), the prohibited device must be a device that is a radiocommunications transmitter, or a radiocommunications receiver, that would be reasonably likely to have an adverse effect on the health or safety of persons who:
 - (i) operate the device; or
 - (ii) work on the device; or
 - (iii) use services supplied by means of the device; or
 - (iv) are reasonably likely to be affected by the operation of the device.
- Note A device for the purpose of this section includes radiocommunications apparatus and ISM equipments.
Division Two: Enforcement

Relevant sections:

- 4.7 Intentional interference
- 4.8 Transmission of false information
- 4.9 Inspectors
- 4.10Identity cards
- 4.11Inspection

4.7 Intentional interference

- (a) Subject to subsection (d), a person is guilty of an offence if he or she operates a transmitter or uses any other apparatus employing radio waves in a way likely to interfere with any radiocommunications. Depending on the gravity of the offence, a Court may impose an additional fine of up to two thousand days of the daily minimum national wage rate.
- (b) Subject to subsection (d), a person is guilty of an offence if he or she, without the Authority's written permission, operates a transmitter in a way that the person knows is likely to interfere substantially with radiocommunications carried on by or on behalf of an organisation specified in the regulations that is:
 - (i) a fire fighting, civil defence or rescue organisation; or
 - (ii) an organisation providing ambulance services; or
 - (iii) any other organisation the sole or principal purpose of which is to secure the safety of persons during an emergency; or

(iv) the police force.

- (c) Subject to subsection (d), a person must not do any act or thing that the person knows is likely to interfere or disrupt substantially with radiocommunications if the interference, disruption or disturbance is likely to endanger the safety of another person or to cause another person to suffer or incur substantial loss or damage.
- (d) A person does not contravene subsection (**a**), (**b**) and (**c**) by doing anything that the person reasonably believes was necessary for the purpose of:
 - (i) securing the safety of a vessel, aircraft or space object that was in danger; or
 - (ii) dealing with an emergency involving a serious threat to the environment; or
 - (iii) dealing with an emergency involving risk of death of, or injury to, persons; or
 - (iv) dealing with an emergency involving risk of substantial loss of, or substantial damage to, property.

4.8 Transmission of false information

- (a) Under the section **189**(**1**) of the Act, a person must not, in a transmission made by a transmitter operated by the person, make a statement, or convey information, with intention of inducing a false belief that:
 - (i) the person or any other person is dying, has died, is being injured or has been injured, is in distress; or
 - (ii) property is being, or has been, destroyed or damaged; or
 - (iii) there is a risk of the occurrence of an event referred to in paragraph (i) or (ii).

4.9 Inspectors

- (a) Subject to subsection (**b**), a person is an inspector for the purposes of this Rule if the person is:
 - (i) a officer appointed by the Authority, by written instrument, to be an inspector; or
 - (ii) an officer included in a class of officers appointed by the Authority, by written instrument that is published, to be inspectors for the purposes of this Rule; or
 - (iii) a member (other than a special member) of the Police force of a Territory.
- (b) An instrument under paragraph (a)(i) or (a)(ii) may specify provisions of this Rule in relation to which appointments made by the instrument are to apply, and any such limitation has effect accordingly.

4.10 Identity cards

- (a) The Authority may cause an identity card to be issued to an inspector, other than a member of a police force, in a form approved by the Authority by written instrument.
- (b) A person who ceases to be an inspector must, as soon as is practicable, return his or her identity card to the Authority.
- (c) Failure to comply with subsection (**b**) is an offence of strict liability.

4.11 Inspection

- (a) If the Authority is of the opinion that any apparatus does not comply with the requirements applicable to it under a license granted in accordance with subsection 2.2(a), and the operation of the apparatus is:
 - (i) likely to cause; or

(ii) causing

harmful interference with any radiocommunications used for any purpose, including for safety of life service or for any purpose on which the safety of any person or of any vessel, aircraft, vehicle or spacecraft may depend; the Authority may serve a notice, not less than twentyfour hours in advance, demanding access for the inspection of the premises, vehicle, vessel or aircraft, in order to form such an opinion.

- (b) Under the subsection (a), the Authority may serve the person with a written notice requiring that, after a date fixed by the notice, the apparatus shall not be used, whether by the person to whom the notice is given or otherwise, or, if the Authority thinks fit so to frame the notice, shall only be used in such manner, at such times and in such circumstances as may be specified in the notice.
- (c) If there is, after service of a notice demanding inspection under subsection (a), a refusal to give access for inspection, the Authority at its discretion may take action under section 4.16 of this Chapter.
- (d) A notice under subsection (a) may be revoked or modified by a subsequent notice in writing by the Authority served on the person in whose possession the apparatus then is.
- (e) Where a notice under subsection (d) has the effect of imposing any additional restrictions on the use of the apparatus, the provisions of subsection (a) relating to the coming into force of notices shall apply in relation to the notice under subsection (d).
- (f) Any person who, knowing that a notice of the Authority under this section is in force with respect to any apparatus, uses that apparatus, or causes or permits it to be used, in contravention of the notice, shall be guilty of an offence,

which shall be a petty misdemeanour. Depending on the gravity of the offence, a Court may impose an additional fine of up to one thousand days of the daily minimum national wage rate.

- (g) An inspector may:
 - (i) require a person whom he or she has reasonable grounds to suspect has done an act in violation of section 2.14, to produce for inspection the license, authority, certificate or permit or evidence of its existence and contents; and
 - (ii) require the holder of a license whom he or she has reasonable grounds to suspect has given an authority under section **2.14**, to produce a copy of that authority for inspection; and
 - (iii) require a person whom he or she has reasonable grounds to suspect has recorded particulars relating to the supply or delivery of a receiver or transmitter in a document under subsection 3.9(d), 3.10(a) and 3.11(h) to produce that document for inspection; and
 - (vi) require a person who has been required to retain records by a notice under subsection 4.4(a) for a specified period to produce such records at any time during that period.
- (h) Subject to subsection (i), if an inspector has reasonable grounds to believe that a transmitter has been, is being or may be operated so as to cause interference to radiocommunications, the inspector may, for the purpose of investigating the interference or risk of interference, direct a person to operate the transmitter.
- (i) An inspector must not direct that a transmitter be operated if that operation is likely to endanger the safety of a person or cause damage to property.

(j) The operation of a transmitter in accordance with a direction does not give rise to an offence under this Act.

Division Three: Penalties

4.12 General penalties

- (a) For the avoidance of doubt, where any provision of these Rules or of any order made hereunder specifies the class of crime for an offence, the person shall be liable to punishment for that class of crime in accordance with the Penal Code, as well as any additional penalty which may be imposed by a Court in accordance with the Act.
- (b) Any person who contravenes any provision of the Act or of the Regulations or of these Rules or of any order made hereunder for which no penalty is specifically provided shall be guilty of an offence, which shall be a petty misdemeanour.
- (c) Notwithstanding any provisions of these Rules, the civil liability of a licensee shall not exceed two-thirds of the amount of his average gross annual income for the last five years prior to the year in which the offence for which he is convicted was committed.
- (d) As provided by subsection 80(6) of the Act, any person who contravenes any provision of these Radio Rules or causes or permits any radio communication station or radio communication apparatus to be used in contravention of these Radio Rules, shall be guilty of an offence, which shall be a misdemeanour. Depending on the gravity of crime, a Court may impose an additional fine of up to one thousand days of the daily minimum national wage rate.

Note – The term 'use' for the purpose of this section means possession and operation of radiocommunications apparatus and ISM equipments.

4.13 Penalties and legal proceedings

- (a) Any person committing any offence under these Rules shall, if the offence is a contravention of section 2.2(a), and consists of either:
 - (i) the installation or operation, otherwise than in accordance with a license, of any apparatus not designed or adapted for emission (as opposed to reception); or
 - (ii) a contravention, in relation to any such apparatus, of any provisions of Chapter 2 of this Rule;

be guilty and liable for penalty as per section 80 (6) of the Act;

- (b) Any person committing an offence under these Rules shall, if the offence is under Chapter 3, Divisions one and two of Chapter 4 and consists in the use, or in the causing or permitting of the use, or in the selling, offering or advertising for letting on hire, of apparatus in contravention of a notice of the Authority be guilty and liable for penalty as per section 80 (6) of the Act.
- (c) Where a person is convicted of:
 - (i) an offence under these Rules and the Act consisting in any contravention of any of the provisions in 2.2(a) in relation to any radio communication station or any radio communication apparatus or in the use of any apparatus for the purpose of interfering with any radio communication; or
 - (ii) any offence under Chapter 3, Divisions one and two of Chapter 4;

the Court may, in addition to any other penalty, order all or any (of the apparatus of the station, as the case may be) of the apparatus in connection with which the offence was committed, to be forfeited by the Authority. The power conferred by virtue of paragraph (a) above does not apply to radio communication apparatus not designed or adapted for emission (as opposed to reception).

- (d) Apparatus may be ordered to be forfeited under this section notwithstanding that it is not the property of the person by whom the offence giving rise to the forfeiture was committed, and any apparatus ordered to be forfeited under this section may be disposed of, as per Court order, by the Authority in such manner as it thinks fit.
- (e) The Court by which any apparatus is ordered to be forfeited under this Section may also order the person not to dispose of that apparatus except by delivering it up to the Authority within forty-eight hours of the forfeiture order.
- (f) Subject to subsection (g), any person who in the course of business:
 - sells or offers for sale otherwise than for export any radiocommunications apparatus which does not comply with the technical requirements applicable to it under these Rules; or
 - (ii) lets on hire or offers to let on hire any such radiocommunications apparatus; or
 - (iii) indicates (whether by display of the radiocommunications apparatus or by any form of advertisement) his willingness to do anything in relation to any such apparatus that falls within paragraph (i) or (ii) above;

shall be guilty of an offence, which shall be a petty misdemeanour. Depending on the gravity of the offence, a Court may impose an additional fine of up to one thousand days of the daily minimum national wage rate.

(g) Any person who tampers with or breaks an official Authority seal affixed to any radio apparatus, where such a seal is affixed in accordance with these Rules, is guilty of an offence and may be liable to pay a fine of up to 25 price units only or to face imprisonment for a term of six months or both.

Note – Price unit defined in subsection **5.2**(**f**)

CHAPTER 5: Pricing

5.1 Outline of this Chapter

- (a) Outline of this Chapter:
 - (i) General
 - (ii) Spectrum access fee
 - (iii) Registration fee
 - (iv) Application fee
 - (v) Permit fee
 - (vi) Interference resolution fee
 - (vii) International coordination fee
 - (viii)Exemption from fees
 - (ix) Spectrum utilization fee
 - (x) Spectrum utilization fee collection procedure

5.2 General

- (a) The following fees are payable to the Authority under these Radio Rules:
 - (i) Spectrum access fee;
 - (ii) Application fee;
 - (iii) Spectrum utilization fee;
 - (iv) Permit fee;
 - (v) Certification fee;
 - (vi) Examination fee;

(vii) Registration fee;

(viii)Interference resolution fee;

- (ix) International coordination fee;
- (x) Penalties;
- (b) The Authority shall be permitted to utilize the collected fees under the Radio Rules, to such amount as determined by the Authority from time to time but not less than ten percent;
- (c) The Authority may exempt an international treaty organisation from the fees payable under these Rule, based on a bilateral agreement, for example on condition of similar exemption in the signatory country(s);
- (d) A person is obliged to provide the Authority with the written information which is required for the calculation of fees payable under these Rules. In the event that the person fails to do so the Authority is permitted to use such other information to calculate the fees.
- (e) The Authority may review and revise the contents of the tables and fees under these Rules on an annual basis.
- (f) A price unit is equal to the 45 ngultrum (BTN);
- (g) All charges relating to a unit price and rate will affect only new applications and renewal of expired licenses, or reinstatement of revoked licenses.

5.3 Spectrum access fee

- (a) The Authority may allocate parts of radio frequency spectrum under the sections **2.4** and **2.5**.
- (b) The Authority may, by written instrument, make determinations:
 - (i) fixing spectrum access fees payable by licensees for issuing spectrum licenses; and

(ii) specifying the times when spectrum access fees are payable.

5.4 Registration fee

- (a) A licensee is obliged to pay all the expenses of international coordination and registration of an assigned frequency by the international bodies, for example by the ITU, based on international tariffs through a written instrument describing the payable fees, if the Authority is satisfied such registration is mandatory for international coordination and recognition.
- (b) The Authority may require a person to pay a registration fee for use of radiocommunications apparatus under a class license under paragraph 2.28(b)(vii) of the amount published in the notice under the paragraph 2.26(a).
- (c) A person has to pay the registration fee equal to the amount published in the notice under the paragraph 2.26(a), for the renewal of registration of a class license made under the paragraph 2.28(b)(vii) if the valid duration of the class license is limited under the paragraph 2.28(b)(v).
- (d) A fee paid under this section is not refundable.

5.5 Application fee

- (a) An application fee must be paid to the Authority prior to the application for:
 - (i) a spectrum license;
 - (ii) an apparatus license;
 - (iii) the renewal of a valid spectrum or apparatus license;
 - (iv) the modification of a valid spectrum or apparatus license, except its duration;

- (v) a permit;
- (vi) a qualification;
- (vii) duplication of a permit or an apparatus license or certificate;
- (ix) the transfer of a license
- (b) A person who applies for:
 - (i) a new spectrum license;
 - (ii) the renewal of a valid spectrum license; or
 - (iii) the modification of a valid spectrum license

must pay the Authority prior to the application, an application fee equal to the amount payable for obtaining a new apparatus license for one station utilizing all radiofrequency channels from the allocated spectrum having the minimum channel spacing.

- (c) A person who applies for:
 - (i) the renewal; or
 - (ii) the modification; or
 - (iii) the transfer

of a valid apparatus license must pay the Authority prior to the application, an application fee equal to the amount payable for obtaining a new apparatus license for one station utilizing all radiofrequency channels from the allocated spectrum having the minimum channel spacing.

- (d) The application fee for obtaining an apparatus license to utilize a transmitting or receiving radio frequency channel in a station is given in Table **4.2.1**, Schedule **4**, Part **IV**.
- (e) The application fee for obtaining a permit is given in Table **4.2.2**, Schedule **4**, Part **IV**.

- (f) If a permit, an apparatus license or certificate issued to a person under these Radio Rules has been lost or destroyed, the holder of the original document may apply to the Authority for a duplicate. An amount of two price units for each page shall be paid by the applicant.
- (g) The application fee for the qualification of an operator must be determined by the Authority or by the body approved under subsection **2.21(d)** by the Authority.
- (h) The fee for:
 - (i) the transfer of a spectrum license under subsection 2.11(b)(iv); or
 - (ii) an apparatus license transfer under subsection 2.24(c)(iv)

is equal to the amount payable for a new apparatus license for one station utilizing all licensed radiofrequency channels having the minimum channel spacing, or, 15 price units, whichever is higher.

(i) A fee paid under this section is not refundable.

Note – Price unit defined in subsection 5.2(f)

5.6 Permit fee

- (a) The Authority may specify a permit fee to be paid to the Authority before the delivery of permit under the subsection 3.2(d).
- (b) The permit fee is given in Table 4.6, Schedule 4, Part IV.
- (c) A fee paid under this section is not refundable.

5.7 Interference resolution fee

(a) A licensee under this Rule may submit a written interference complaint report, in a format specified by the

Authority, to request the Authority to resolve a harmful interference.

- (b) The Authority may require a licensee to compensate the expenses incurred by the Authority for processing a false interference complaint report submitted by the licensee which has not been proven by technical investigation in the field.
- (c) The expenses mentioned in subsection (b) include the transportation, salary of staff on mission and spectrum monitoring equipment use for the duration of mission.
- (d) Based on the information within the submitted interference complaint report by a licensee and prior to conducting a mission for a technical investigation of the alleged interference in the field, the Authority must consider the registered information to identify the interference source remotely.
- (e) A fee paid under this section is not refundable.
- Note A technical investigation in this section means measurement of technical specifications and finding direction or finding position of interfering emission or any other technical investigation using professional equipments.

5.8 International coordination fee

- (a) An applicant for a spectrum license or an apparatus license which requires the implementation of an international coordination procedure by means of:
 - (i) face to face meetings and discussions in an overseas country; or
 - (ii) the filing of satellite networks by the ITU, based on a cost recovery method; or
 - (iii) coordination calculations made by an expert consultant company

has to pay all expenses of the Authority, based on receipts of the amounts paid to the third parties, including travel and accommodation pursuant to paragraph (i).

- (b) Before undertaking any activity under this section, the Authority must satisfy itself that it is adopting the most cost-effective approach.
- (c) A fee paid under this section is not refundable.

5.9 Exemption from payment of fees

- (a) A person using the following equipment or frequencies is exempt from the payment of a spectrum utilization fee:
 - (i) any ISM equipment;
 - (ii) any radiocommunications apparatus covered by a class license issued by the Authority under these Rules;
 - (iii) any radio frequency channel specified in Table 4.5, Schedule 4, Part IV.
- (b) Without limiting subsection (a), the Authority may confer exemption from subsection 5.10(a), pursuant to Section 80(4)(b) of the Act, to organizations using radio frequency channels:
 - (i) for the purpose of providing emergency services to the public in case of disaster and emergency; and
 - (ii) that have no inter-organizational usage for the conduct of normal activities of exempted organization; and
 - (iii) are not used for the sale of radiocommunications.
- (c) The Authority must publish any decision made under subsection (**b**), specifying reasons.
- (d) A person authorised by a permit granted under section **3.11** (Permits for the manufacture of radiocommunications apparatus) is exempt from the payment of a spectrum

utilization fee under section **5.10** for the testing of any item new radiocommunications apparatus for a period of up to 90 days.

- (e) A person authorised by a permit granted under section 3.13 (Permits for a testing authority and a certification body) is exempt from the payment of a spectrum utilization fee under section 5.10 for the testing of any radiocommunications apparatus provided that he complies with subsection 3.13(e).
- (f) A person authorised by a permit granted under section 3.14 (Permit for research and educational experiments) is exempt from the payment of a spectrum utilization fee under section 5.10 for testing of any radiocommunications apparatus provided that he complies with subsection 3.14(d).

5.10 Spectrum utilization fee

- (a) Any person holding:
 - (i) a valid spectrum license, or
 - (ii) a valid apparatus license, or
 - (iii) a valid amateur radiocommunications provider permit

under these Rules is obliged to pay the Authority annually a spectrum utilization fee in accordance with the methodology of this section.

- (b) The spectrum utilization fee for the first year must be paid to the Authority prior to the delivery of a spectrum license or an apparatus license.
- (c) The elements of the spectrum utilization fee calculation model are:
 - (i) Multiplicand of assigned radio frequency (RF) channel M_{f} , as defined in subsection (d); and

- (ii) Area multiplicand M_{ARA} , as specified in column 3 of Table 4.3,Schedule 4, Part IV; and
- (iii) ICT multiplicand M_{ICT} as specified in column 4 of Table 4.3, Schedule 4, Part IV; and
- (iv) Application multiplicand under any frequency band tabulated in column 4 of Table 4.4.1, Schedule 4, Part IV.
- (d) The multiplicand of paragraph (c)(i) M_f is equal to the biggest of:

(i) Ratio of occupied bandwidth of the assigned radio frequency channel $B_{Assigned \ channel}$ (in kHz) to the given minimum channel spacing X_f in relevant frequency raster (in kHz) in column 3 of Table 4.4.1, Schedule 4, Part IV rose to the power of 0.25 (i.e. $M_f = (B_{Assigned \ channel} / X_f)^{0.25}$); or

- (e) The reference for the selection of the multiplicands (c)(ii) and (c)(iii) for calculation of spectrum utilization fee is the location of installation or usage of relevant station.
- (f) The annual spectrum utilization fee, in price units, for the radio service-applications governed by column 1 of Table 4.4.1, Schedule 4, Part IV is equal to multiplication of all 'Y' marked multiplicands of column 5 of Table 4.4.1, Schedule 4, Part IV.

5.11 Spectrum utilization fee collection procedure

(a) Subject to subsection (**b**), the Authority must calculate the spectrum utilization fee and send an invoice to the address of the holder of an apparatus license for the year one month prior to the expiration of the license.

⁽ii) one (i.e. $M_f = 1$).

- (b) The licensee must pay a spectrum utilization fee not later than one month after the expiration of the license.
- (c) Failing to comply with subsection (b), the licensee shall pay the penalty of Nu.50/day.
- (d) The licensee must give the Authority written notice of any change in the postal address used for subsection (a).
- (e) The:
 - (i) failure of a licensee to comply with subsection (c) or subsection **2.22**(l); or
 - (ii) any disagreement about the invoice submitted under subsection (a)

does not remove or affect the payment deadline under subsection (b).

- (f) In the event that the licensee fails to make a payment under subsection (b) and (c), the Authority must:
 - (i) order the licensee to cease forthwith the utilization of the relevant spectrum by licensed radiocommunications apparatus; and
 - (ii) the license will be cancelled on expiry of the penalty period.

(g) The procedure for collecting payment of a spectrum utilization fee for a spectrum license shall be:

- (i) as specified in the license issued under the subsection
 2.6(h); or
- (ii) in accordance with subsections (a) to (f) of this section, if not provided for in the spectrum license.

END of Part III



NATIONAL RADIO RULES

PART IV

SCHEDULE

BHUTAN INFORMATION, COMMUNICATIONS AND MEDIA AUTHORITY (BICMA)

> Royal Government of Bhutan THIMPHU : October 2011



BHUTAN INFOCOMM & MEDIA AUTHORITY

Royal Government of Bhutan



14th October 2011

FOREWORD

Radio frequency spectrum is a natural asset and national resource with limited amount which have to be managed properly for effective and fair utilization. The demand for application of frequencies is growing daily and it is a predominant need of all equipments which are in operation using energy of electromagnetic waves. Airplanes, ships, satellites, radars, cell phones, sound and TV broadcasters, TV receivers, radio transceivers, microwave links, radio trunk, cordless phones, handsets, wireless apparatus, home appliance, industrial and medical equipments, weather forecasters and many other applications are managed internationally and nationally to take benefit of spectrum.

Table of frequency allocations presented herewith in Schedule 1 constitutes the document for regulation of the frequency allocations and the frequency utilization in the Kingdom of Bhutan by legal entities or persons which engaged in ordering, development, using and purchasing radiocommunication equipment as well as those apparatus utilizing electromagnetic energy. The Table, however, does not present any right for utilization of a frequency band (or a specific frequency) for development, production, import and operation of the relevant equipments without issue of duly completed authorization by appropriate national body, which is empowered for this duty by the Royal Government of Bhutan.

This part consists of several Schedules addressed in different provisions of National Radio Rules which are subject to *change*, time to time, if Authority satisfied to do so.

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A. hipm

(Chairperson) BHUTAN INFOCOMM & MEDIA AUTHORITY

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Schedule 1 – Frequency Allocations Table

Introduction and Legal basis

1.1 Contiguous to the provision 25 of the Bhutan Information, Communications and Media Act – 2006 (hereinafter the Act) and for the purposes of the subsection 1.1(e), PART III of National Radio Rules, the frequency allocations table in the Kingdom of Bhutan is presented here. In all documents of the Radio Rules where the terms *allocation, allotment* and *assignment* are to be used, they shall have the meaning given them in Nos. 1.16 to 1.18, Chapter 1, PART II, Radio Rules. In pursuant to the Act, managing of radio frequency spectrum that planned by the Frequency Allocations Table is the duty of the Bhutan Information, Communications and Media Authority (BICMA).

This Table designates frequency bands to the stations of different radiocommunication services on exclusively or shared basis in the Kingdom of Bhutan. Therefore, each frequency band provides a legal base to operate some licensed consistent radiocommunication stations under the permitted services in accordance with a frequency band plan. The presented allocations are inline with Regional or worldwide utilization of radio spectrum as well as existing applications. To protect the interference-free operation of exiting stations and to provide opportunity for introduction of new applications, there is need to clarify the usage method of each individual frequency band in more detailed frequency band plans together with technical/operational determinations. The updated table as well as current information may be also published in different formats as a part of national radio rules.

NOTE – in this chapter all Nos. **1.2** to **1.565**, except No. **52** 7*bis*), are identical to the ITU-RR Nos. **5.2** to **5.565**. No. **1.1** is also fits ITU-RR No.**5.1**. Definition of terms is available in PART **II** or National Radio Rules

Section I - Regions and areas

1.2 For the allocation of frequencies the world has been divided into three Regions¹ as shown on the following map and described in Nos. **1.3** to **1.9**:



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

The shaded part represents the Tropical Zones as defined in Nos. **1.16** to **1.20** and **1.21**. Different Regions and Tropical Zones are distinguished in accordance to the following definitions in detail:

- **1.3** *Region 1:* Region 1 includes the area limited on the east by line A (lines A, B and C are defined below) and on the west by line B, excluding any of the territory of the Islamic Republic of Iran which lies between these limits. It also includes the whole of the territory of Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russian Federation which lies between lines A and C.
- **1.4** *Region 2:* Region 2 includes the area limited on the east by line B and on the west by line C.
- **1.5** *Region 3:* Region 3 includes the area limited on the east by line C and on the west by line A, except any of the territory of Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan, Turkey and Ukraine and the area to the north of Russian Federation. It also includes that part of the territory of the Islamic Republic of Iran lying outside of those limits.
- **1.6** The lines A, B and C are defined as follows:
- **1.7** *Line A*: Line A extends from the North Pole along meridian 40° East of Greenwich to parallel 40° North; thence by great circle arc to the intersection of meridian 60° East and the Tropic of Cancer; thence along the meridian 60° East to the South Pole.
- **1.8** *Line B:* Line B extends from the North Pole along meridian 10° West of Greenwich to its intersection with parallel 72° North; thence by great circle arc to the intersection of meridian 50° West and parallel 40° North; thence by great circle arc to the intersection of meridian 20° West and parallel 10° South; thence along meridian 20° West to the South Pole.
- **1.9** *Line C:* Line C extends from the North Pole by great circle arc to the intersection of parallel 65° 30' North with the international boundary in Bering Strait; thence by great circle arc to the intersection of meridian 165° East of Greenwich and parallel 50° North; thence by great circle arc to the intersection of meridian 170° West and parallel 10° North; thence along parallel 10° North to its intersection with meridian 120° West; thence along meridian 120° West to the South Pole.
- **1.10** For the purposes of these Regulations, the term "African Broadcasting Area" means:
- **1.11** *a)* African countries, parts of countries, territories and groups of territories situated between the parallels 40° South and 30° North;
- **1.12** b) islands in the Indian Ocean west of meridian 60° East of Greenwich, situated between the parallel 40° South and the great circle arc joining the points 45° East, 11° 30' North and 60° East, 15° North;
- **1.13** c) islands in the Atlantic Ocean east of line B defined in No. **1.8** of this Chapter, situated between the parallels 40° South and 30° North.
- **1.14** The "European Broadcasting Area" is bounded on the west by the western boundary of Region 1, on the east by the meridian 40° East of Greenwich and on the south by the parallel 30° North so as to include the northern part of Saudi Arabia and that part of those countries bordering the Mediterranean within these limits. In addition, Armenia, Azerbaijan, Georgia and those parts of the territories of Iraq, Jordan, Syrian Arab Republic, Turkey and Ukraine lying outside the above limits are included in the European Broadcasting Area. (WRC-07)
- **1.15** The "European Maritime Area" is bounded to the north by a line extending along parallel 72° North from its intersection with meridian 55° East of Greenwich to its intersection with meridian 5° West, then along meridian 5° West to its intersection with parallel 67° North, thence along parallel 67° North to its intersection with 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 meridian 43° East; to the east by a line extending along meridian 55° East and thence along meridian 55° East to its intersection with meridian 43° East; to the east by a line extending along meridian 55° East and thence along meridian 55° East to its intersection with parallel 60° North, thence along parallel 60° North to its intersection with meridian 55° East to its intersection with parallel 72° North.
- **1.16** 1) The "Tropical Zone" (see map in No. **1.2**) is defined as:
- 1.17 *a)* the whole of that area in Region 2 between the Tropics of Cancer and Capricorn;
- **1.18** b) the whole of that area in Regions 1 and 3 contained between the parallels 30° North and 35° South with the addition of:

- **1.19** i) The area contained between the meridians 40° East and 80° East of Greenwich and the parallels 30° North and 40° North;
- **1.20** ii) that part of Libyan Arab Jamahiriya north of parallel 30° North.
- **1.21** 2) In Region 2, the Tropical Zone may be extended to parallel 33° North, subject to special agreements between the countries concerned in that Region (see ITU-RR Article 6).
- **1.22** A sub-Region is an area consisting of two or more countries in the same Region.

Section II – Categories of services and allocations

- **1.23** *Primary and secondary services*
- **1.24** 1) Where, in a box of the Table in Section IV of this Chapter, 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:
- **1.25** *a)* services the names of which are printed in "capitals" (example: FIXED); these are called "primary" services;
- **1.26** b) services the names of which are printed in "normal characters" (example: Mobile); these are called "secondary" services (see Nos. **1.28** to **1.31**).
- **1.27** 2) Additional remarks shall be printed in normal characters (example: MOBILE except aeronautical mobile).
- **1.28** 3) Stations of a secondary service:
- **1.29** *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;
- **1.30** 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;
- **1.31** *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.
- 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. 1.28 to 1.31).
- **1.33** 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.
- **1.34** Additional allocations
- 1.35 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. 1.36).
- **1.36** 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.
- **1.37** 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.
- **1.38** Alternative allocations
- **1.39** 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. **1.40**).
- **1.40** 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.

- **1.41** 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.
- **1.42** *Miscellaneous provisions*
- 1.43 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)
- **1.43A** 1*bis*) Where it is indicated in these Regulations that a service or stations in a service may operate in a specific frequency band subject to not claiming protection from another service or from another station in the same service, this means also that the service which is subject to not claiming protection shall not cause harmful interference to the other service or other station in the same service. (WRC-2000)
- **1.44** 2) Except if otherwise specified in a footnote, the term "fixed service", where appearing in Section IV of this Chapter, does not include systems using ionospheric scatter propagation.
- 1.45 Not used.

Section III - Description of the Table of Frequency Allocations

- **1.46** 1) The heading of the Table in Section IV of this Chapter includes four columns, each of three left which corresponds to one of the Regions (see No. **1.2**) and the fourth column presents national frequency allocations. Where an allocation occupies the three left columns of the Table or only one or two of the three columns, this is a worldwide allocation or a Regional allocation, respectively.
- **1.47** 2) The frequency band referred to in each allocation is indicated in the left-hand top corner of the part of the Table concerned.
- **1.48** 3) Within each of the categories specified in Nos. **1.25** and **1.26**, services are listed in alphabetical order according to the French language. The order of listing does not indicate relative priority within each category.
- **1.49** 4) In the case where there is a parenthetical addition to an allocation in the Table, that service allocation is restricted to the type of operation so indicated.
- **1.50** 5) The footnote references which appear in the Table below the allocated service or services apply to more than one of the allocated services, or to the whole of the allocation concerned. (WRC-2000)
- **1.51** 6) The footnote references which appear to the right of the name of a service are applicable only to that particular service.
- **1.52** 7) In certain cases, the names of countries appearing in the footnotes have been simplified in order to shorten the text.
 - *7bis*) The most relevant Region 3 footnotes referenced under the corresponding bands in the fourth column and relevant texts are provided in the Section V. In addition to the regional footnotes in column four, national footnotes may appear, starting from No. **1.601** and underlined, to presents local concerns. Text of national footnotes is presented in Section VI.

Section IV – Table of Regional and National Frequency Allocations

This table, in several pages, presents the national frequency allocations. The element of table explained in Section **III** of this chapter.

TABLE OF FREQUENCY ALLOCATIONS TO RADIO SERVICES OF THE DEMOCRATIC KINGDOM OF BHUTAN

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
Below 9	(Not allocated) 1.53 1.54	•	Below 9 (Not allocated)
9-14	RADIONAVIGATION		9-14 RADIONAVIGATION
14-19.95	FIXED MARITIME MOBILE 1.57 1.55 1.56		14-19.95 FIXED 1.56
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 1.57 1.56 1.58		20.05-70 FIXED 1.56
70-72 RADIONAVIGATION 1.60	70-90 FIXED MARITIME MOBILE 1.57 MARITIME RADIO- NAVIGATION 1.60	70-72 RADIONAVIGATION 1.60 Fixed Maritime mobile 1.57 1.59	70-72 RADIONAVIGATION 1.60 Fixed
72-84 FIXED MARITIME MOBILE 1.57 RADIONAVIGATION 1.60 1.56	Radiolocation	72-84 FIXED MARITIME MOBILE 1.57 RADIONAVIGATION 1.60	72-84 FIXED RADIONAVIGATION 1.60
84-86 RADIONAVIGATION 1.60		84-86 RADIONAVIGATION 1.60 Fixed Maritime mobile 1.57 1.59	84-86 RADIONAVIGATION 1.60 Fixed
86-90 FIXED MARITIME MOBILE 1.57 RADIONAVIGATION 1.56	1.61	86-90 FIXED MARITIME MOBILE 1.57 RADIONAVIGATION 1.60	86-90 FIXED RADIONAVIGATION 1.60
90-110	RADIONAVIGATION	1.62	90-110 Radionavigation 1.62
Fixed			Fixed
110-112 FIXED MARITIME MOBILE RADIONAVIGATION	110-130 FIXED MARITIME MOBILE MARITIME RADIO- NAVIGATION 1.60	110-112 FIXED MARITIME MOBILE RADIONAVIGATION 1.60	110-112 FIXED RADIONAVIGATION 1.60
1.64 112-115 RADIONAVIGATION 1.60 115-117.6	Radiolocation	1.64 112-117.6 RADIONAVIGATION 1.60 Fixed	1.64 112-117.6 RADIONAVIGATION 1.60 Fixed
RADIONAVIGATION 1.60 Fixed Maritime mobile 1.64 1.66		Maritime mobile	1 64
117.6-126 FIXED MARITIME MOBILE RADIONAVIGATION 1.60		117.6-126 FIXED MARITIME MOBILE RADIONAVIGATION 1.60	107 117.6-126 FIXED RADIONAVIGATION 1.60
	1.61 1.64		

9 – 130 kHz

126 – 405 kHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
126-129 RADIONAVIGATION 1.60		126-129 RADIONAVIGATION 1.60 Fixed Maritime mobile	126-129 RADIONAVIGATION 1.60 Fixed
129-130 FIXED		1.64 1.65 129-130 FIXED	1.64 129-130 FIXED
MARITIME MOBILE RADIONAVIGATION 1.60		MARITIME MOBILE RADIONAVIGATION 1.60	RADIONAVIGATION 1.60
1.64		1.64	1.64
130-135.7 FIXED MARITIME MOBILE	130-135.7 FIXED MARITIME MOBILE	130-135.7 FIXED MARITIME MOBILE RADIONAVIGATION	130-135.7 FIXED RADIONAVIGATION
1.64 1.67	1.64	1.64	1.64
135.7-137.8 FIXED MARITIME MOBILE Amateur 1.67A	135.7-137.8 FIXED MARITIME MOBILE Amateur 1.67A	135.7-137.8 FIXED MARITIME MOBILE RADIONAVIGATION Amateur 1.67A 1 64	135.7-137.8 FIXED RADIONAVIGATION Amateur 1.67A
137.8-148.5 FIXED MARITIME MOBILE 1.64 1.67	137.8-160 FIXED MARITIME MOBILE	137.8-160 FIXED MARITIME MOBILE RADIONAVIGATION	137.8-160 FIXED RADIONAVIGATION
148.5-255	1.64	1.64	1.64
BROADCASTING	160-190 FIXED	160-190 FIXED Aeronautical radionavigation	160-190 FIXED Aeronautical radionavigation
	190-200 AERONAUTICAL RADIONAVIGATION		190-200 AERONAUTICAL RADIONAVIGATION
1.68 1.69 1.70	200-275 MARITIME RADIONAVIGATION	200-285 MARITIME RADIONAVIGATION	200-285 AERONAUTICAL MOBILE
255-283.5 BROADCASTING AERONAUTICAL RADIONAVIGATION 1.70 1.71 283.5-315	Aeronautical mobile 275-285 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)	Aeronautical mobile	
AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 1.73 1.72 1.74	285-315 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 1.73		285-315 AERONAUTICAL RADIONAVIGATION
315-325 AERONAUTICAL RADIONAVIGATION Maritime radionavigation (radiobeacons) 1.73 1.72 1.75	315-325 MARITIME RADIONAVIGATION (radiobeacons) 1.73 Aeronautical radionavigation	315-325 AERONAUTICAL RADIONAVIGATION MARITIME RADIONAVIGATION (radiobeacons) 1.73	315-325 AERONAUTICAL RADIONAVIGATION
325-405 AERONAUTICAL RADIONAVIGATION	325-335 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Maritime radionavigation (radiobeacons)	325-405 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	325-405 AERONAUTICAL RADIONAVIGATION Aeronautical mobile

	335-405	
	AERONAUTICAL	
	RADIONAVIGATION	
1.72	Aeronautical mobile	

$405 - 1\ 800\ kHz$

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
405-415 RADIONAVIGATION 1.76 1.72	405-415 RADIONAVIGATION Aeronautical mobile	1.76	405-415 RADIONAVIGATION 1.76 Aeronautical mobile
415-435 MARITIME MOBILE 1.79 AERONAUTICAL RADIONAVIGATION 1.72	415-495 MARITIME MOBILE 1.79 1.79A Aeronautical radionavigation 1.80		415-495 AERONAUTICAL RADIONAVIGATION
435-495 MARITIME MOBILE 1.79 1.79A Aeronautical radionavigation			
1.72 1.82	1.77 1.78 1.82		1.77 1.79A 1.82
495-505	MOBILE 1.82A 1.82B		495-505 MOBILE (distress and calling) 1.82B
505-526.5 MARITIME MOBILE 1.79 1.79A 1.84 AERONAUTICAL RADIONAVIGATION	505-510 MARITIME MOBILE 1.79	505-526.5 MARITIME MOBILE 1.79 1.79A 1.84 AERONAUTICAL RADIONAVIGATION Aeronautical mobile	505-526.5 AERONAUTICAL RADIONAVIGATION Aeronautical mobile Land mobile
1.72	510-525 MOBILE 1.79A 1.84 AERONAUTICAL RADIONAVIGATION 525-535	Land mobile	1.70.4
526.5-1 606.5 BROADCASTING	BROADCASTING 1.86 AERONAUTICAL RADIONAVIGATION	526.5-535 BROADCASTING Mobile 1.88	526.5-535 BROADCASTING Mobile
1 87 1 87 4	535-1 605 BROADCASTING	535-1 606.5 BROADCASTING	535-1 606.5 BROADCASTING
1 606.5-1 625 FIXED MARITIME MOBILE 1.90 LAND MOBILE	BROADCASTING 1.89	1 606.5-1 800 FIXED MOBILE RADIOLOCATION RADIONAVIGATION	1 606.5-1 800 FIXED MOBILE RADIOLOCATION RADIONAVIGATION
1.92	1.90		
1 625-1 635 RADIOLOCATION 1.93 1 635-1 800	1 625-1 705 FIXED MOBILE BROADCASTING 1.89		
FIXED MARITIME MOBILE 1.90 LAND MOBILE	Radiolocation 1.90 1 705-1 800 FIXED MOBILE RADIOLOCATION		
1.92 1.96	AERONAUTICAL	1.91	

RADIONAVIGATION

1 800 - 2 501 kHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
1 800-1 810 RADIOLOCATION 1.93 1 810-1 850	1 800-1 850 Amateur	1 800-2 000 AMATEUR FIXED MOBILE except aeronautical mobile	1 800-1 825 Amateur
AMATEUR		RADIONAVIGATION Padiologation	1 825-2 000
1 850-2 000 FIXED MOBILE except aeronautical mobile	1 850-2 000 AMATEUR FIXED MOBILE except aeronautical mobile RADIOLOCATION RADIONAVIGATION	Kanoiocation	FIXED LAND MOBILE RADIONAVIGATION Radiolocation
1.92 1.96 1.103	1.102	1.97	1.92
2 000-2 025 FIXED MOBILE except aeronautical mobile (R) 1.92 1.103 2 025-2 045 FIXED MOBILE except aeronautical mobile (R) Meteorological aids 1.104 1.92 1.103 2 045-2 160	2 000-2 065 FIXED MOBILE		2 000-2 065 FIXED MOBILE
FIXED	2 065-2 107		2 065-2 107
MARITIME MOBILE LAND MOBILE	MARITIME MOBILE 1.105 1.106		FIXED <u>1.601</u> 1.106
1.92	2 107-2 170		2 107-2 170
2 160-2 170 RADIOLOCATION 1.93 1.107			FIXED MOBILE
2 170-2 173.5	MARITIME MOBILE		2 170-2 173.5 LAND MOBILE <u>1.602</u>
2 173.5-2 190.5 MOBILE (distress and calling) 1.108 1.109 1.110 1.111		2 173.5-2 190.5 MOBILE (distress and calling) 1.108 1.109 1.110 1.111	
2 190.5-2 194	4 MARITIME MOBILE		2 190.5-2 194 LAND MOBILE 1.602
2 194-2 300	2 194-2 300		2 194-2 300
FIXED MOBILE except aeronautical mobile (R)	FIXED MOBILE		FIXED MOBILE
1.92 1.103 1.112	1.112		
2 300-2 498	2 300-2 495		2 300-2 495
MOBILE except aeronautical mobile (R)	HXED MOBILE BROADCASTING 1.113		MOBILE BROADCASTING 1.113
BROADCASTING 1.113 1.103	2 495-2 501		2 495-2 501
2 501 - 4 000 kHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
2 501-2 502	STANDARD FREQU Space Research	2 501-2 502 STANDARD FREQUENCY AND TIME SIGNAL Space Research		
2 502-2 625 FIXED MOBILE except aeronautical	2 502-2 505 Standard Frequi	2 502-2 505 STANDARD FREQUENCY AND TIME SIGNAL		
mobile (R) 1.92 1.103 1.114 2 625-2 650	2 505-2 850 FIXED MOBILE		2 505-2 850 FIXED MOBILE	
MARITIME MOBILE MARITIME RADIONAVIGATION 1.92				
2 650-2 850 FIXED MOBILE except aeronautical mobile (R)				
1.92 1.103			2.050.2.025	
2 850-3 025	AERONAUTICAL MOBILE (R)		2 850-3 025 AERONAUTICAL MOBILE (R)	
3 025-3 155	AERONAUTICAL MOBILE (OR)		3 025-3 155 AERONAUTICAL MOBILE (OR)	
3 155-3 200	FIXED MOBILE except aeronautical mobile (R)		3 155-3 200 FIXED MOBILE except aeronautical mobile (R)	
3 200-3 230	1.116 1.117 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 1.113		3 200-3 230 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 1.113 1.116	
3 230-3 400	FIXED MOBILE except aeronautical mobile BROADCASTING 1.113 1.116 1.118		3 230-3 400 FIXED LAND MOBILE BROADCASTING 1.113 1.116	
3 400-3 500	AERONAUTICAL MOBILE (R)		3 400-3 500 AERONAUTICAL MOBILE (R)	
3 500-3 800	3 500-3 750	3 500-3 900	3 500-3 900	
AMATEUR	AMATEUR	AMATEUR	AMATEUR	
MOBILE except aeronautical mobile	1.119	MOBILE	MOBILE	
1.92	3 750-4 000			
3 800-3 900 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	AMATEUR FIXED MOBILE except aeronautical mobile (R)			

3 900-3 950
AERONAUTICAL MOBILE
(OR)
1.123

1.122 1.125

3 900-3 950	3 900-3 950
AERONAUTICAL MOBILE	AERONAUTICAL MOBILE
BROADCASTING	BROADCASTING

3	950	- 5	680	kHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
3 950-4 000 FIXED BROADCASTING		3 950-4 000 FIXED BROADCASTING 1.126	3 950-4 000 FIXED BROADCASTING 1.126	
4 000-4 063	FIXED MARITIME MOBIL 1.126	E 1.127	4 000-4 063 FIXED 1.126	
4 063-4 438	MARITIME MOBILI 1.131 1.132	E 1.79A 1.109 1.110 1.130	4 063-4 438 FIXED 1.128	
	1.128		<u>1.603</u>	
4 438-4 650 FIXED MOBILE except aerona	autical mobile (R)	4 438-4 650 FIXED MOBILE except aeronautical mobile	4 438-4 650 FIXED MOBILE except aeronautical mobile (R)	
4 650-4 700	AERONAUTICAL M	IOBILE (R)	4 650-4 700 AERONAUTICAL MOBILE (R)	
4 700-4 750	AERONAUTICAL N	IOBILE (OR)	4 700-4 750 AERONAUTICAL MOBILE (OR)	
4 750-4 850 FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE BROADCASTING 1.113	4 750-4 850 FIXED MOBILE except aeronautical mobile (R) BROADCASTING 1.113	4 750-4 850 FIXED BROADCASTING 1.113 Land mobile	4 750-4 850 FIXED BROADCASTING 1.113 Land mobile	
4 850-4 995 FIXED LAND MOBILE BROADCASTING 1.113			4 850-4 995 FIXED LAND MOBILE BROADCASTING 1.113	
4 995-5 003 STANDARD FREQUENCY AND TIME SIGNAL (5 000 kHz)		4 995-5 003 STANDARD FREQUENCY AND TIME SIGNAL (5 000 kHz)		
5 003-5 005 STANDARD FREQUENCY AND TIME SIGNAL Space research		5 003-5 005 STANDARD FREQUENCY AND TIME SIGNAL Space research		
5 005-5 060 FIXED BROADCASTING 1.113		5 005-5 060 BROADCASTING 1.113 <u>1.605</u>		
5 060-5 250 FIXED Mobile except aeronautical mobile 1.133		5 060-5 250 FIXED Land mobile		
5 250-5 450 FIXED MOBILE except aeronautical mobile		5 250-5 450 FIXED LAND MOBILE		
5 450-5 480	5 450-5 480	5 450-5 480	5 450-5 480	
FIXED AERONAUTICAL MOBILE (OR)	AERONAUTICAL MOBILE (R)	FIXED AERONAUTICAL MOBILE (OR)	FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	
LAND MOBILE		LAND MOBILE		
5 480-5 680 AERONAUTICAL MOBILE (R) 1.111 1.115			5 480-5 680 AERONAUTICAL MOBILE (R) 1.111 1.115	

	5 000		
REGION 1	REGION 2	REGION 3	BHUTAN
5 680-5 730	AERONAUTICAL MOBILE (OR)		5 680-5 730
			AERONAUTICAL MOBILE (OR)
	1.111 1.115		1.111 1.115
5 730-5 900	5 730-5 900	5 730-5 900	5 730-5 900
FIXED	FIXED	FIXED	FIXED
LAND MOBILE	MOBILE except aeronautical	Mobile except aeronautical	Mobile except aeronautical
5 000 5 050			5 000 5 050
5 900-5 950	DROADCASTING	1.154	BROADCASTING 1 134
	1.136		1.136
5 950-6 200	BROADCASTING		5 950-6 200
			BROADCASTING
6 200-6 525	MARITIME MOBIL	E 1.109 1.110 1.130 1.132	6 200-6 525
			FIXED 1.137
	1.137		<u>1.603</u>
6 525-6 685	AERONAUTICAL M	MOBILE (R)	6 525-6 685
			AERONAUTICAL MOBILE (R)
6 685-6 765	AERONAUTICAL N	AOBILE (OR)	6 685-6 765
			AERONAUTICAL MOBILE (OR)
6 765-7 000	FIXED		6 765-7 000
	MOBILE except aero	onautical mobile (R)	FIXED
			MOBILE except aeronautical mobile (R)
1.138 1.138A 1.139			1.138 1.138A
7 000-7 100 AMATEUR		7 000-7 100	
AMATEUR-SATELLITE		AMATEUR	
		AMATEUR-SATELLITE	
	1.140 1.141 1.141A		
7 100-7 200	AMATEUR		7 100-7 200
	1.141A 1.141B 1.14	IC 1.142	AMATEUR 1 141B 1 141C 1 142
7 200-7 300	7 200-7 300	7 200-7 300	7 200-7 300
BROADCASTING	AMATEUR	BROADCASTING	BROADCASTING
	1.142		
7 300-7 400	BROADCASTING	1.134	7 300-7 400
			BROADCASTING 1.134
	1.143 1.143A 1.143	B 1.143C 1.143D	1.143 1.143A
7 400-7 450	7 400-7 450	7 400-7 450	7 400-7 450
BROADCASTING	FIXED	BROADCASTING	BROADCASTING
1.143B 1.143C	mobile (R)	1.143A 1.143C	1 1/34
7 450-8 100	EIVED		7 450-8 100
MOBILE except aeronautical mobile (R)		FIXED	
		MOBILE except aeronautical	
			mobile (R)
0 100 0 107	1.143E 1.144		1.143E
8 100-8 195	ΓΙΧΕ Ο Μαριτινε μόρη	F	8 100-8 195 FIXED
	WIAKIT IWIE WOODIL	L	LAND MOBILE
			1.604

5 680 – 8 195 kHz

8 195 – 12 230 kHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
8 195-8 815	MARITIME MOBILE	1.109 1.110 1.132 1.145	8 195-8 815
	1.111		LAND MOBILE 1.606
8 815-8 965	AERONAUTICAL MO	OBILE (R)	8 815-8 965
8 965-9 040	AERONAUTICAL MO	AERONAUTICAL MOBILE (OR)	
9 040-9 400	FIXED	FIXED	
			FIXED
9 400-9 500	BROADCASTING 1.1	134	9 400-9 500
	1.146		1.146
9 500-9 900	BROADCASTING		9 500-9 900
	1.147		BROADCASTING
9 900-9 995	FIXED		9 900-9 995
7 700-7 775	TIALD		FIXED
9 995-10 003	STANDARD FREQUE	ENCY AND TIME SIGNAL	9 995-10 003
	(10 000 KHZ)		STANDARD FREQUENCY AND TIME SIGNAL (10 000 kHz)
	1.111		1.111
10 003-10 005	STANDARD FREQUE	ENCY AND TIME SIGNAL	10 003-10 005
	Space research		STANDARD FREQUENCY AND TIME SIGNAL
			Space research
10.005.10.100			1.111
10 003-10 100	AERONAU TICAL MC	DBILE (K)	AERONAUTICAL MOBILE (R)
	1.111		1.111
10 100-10 150	FIXED		10 100-10 150
	Amateur		Amateur
10 150-11 175	FIXED		10 150-11 175
	Mobile except aeronaut	tical mobile (R)	FIXED
			Mobile except aeronautical mobile (R)
11 175-11 275	AERONAUTICAL MOBILE (OR)		11 175-11 275
11 000 11 400			AERONAUTICAL MOBILE (OR)
11 2/5-11 400	AERONAUTICAL MC	JBILE (R)	AERONAUTICAL MOBILE (R)
11 400-11 600	11 400-11 600 FIXED		11 400-11 600
			FIXED
11 600-11 650	BROADCASTING 1.1	134	11 600-11 650 BROADCASTING 1 134
	1.146		1.146
11 650-12 050	BROADCASTING		11 650-12 050
	1.147		BROADCASTING 1 147
12 050-12 100	BROADCASTING 1 134		12 050-12 100
			BROADCASTING 1.134
	1.146		1.146
12 100-12 230	FIXED		12 100-12 230 FIXED

12 230 – 16 360 kHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
12 230-13 200	MARITIME MOBILE 1.109 1.110 1.132 1.145		12 230-13 200 FIXED LAND MOBILE <u>1.604</u>
13 200-13 260	AERONAUTICAL MC	AERONAUTICAL MOBILE (OR)	
13 260-13 360	AERONAUTICAL MO	OBILE (R)	13 260-13 360 AERONAUTICAL MOBILE (R)
13 360-13 410	FIXED RADIO ASTRONOMY 1.149		13 360-13 410 FIXED RADIO ASTRONOMY 1 149
13 410-13 570	FIXED Mobile except aeronaut 1.150	FIXED Mobile except aeronautical mobile (R) 1.150	
13 570-13 600	BROADCASTING 1.1	134	13 570-13 600 BROADCASTING 1.134 1.151
13 600-13 800	BROADCASTING	BROADCASTING	
13 800-13 870	BROADCASTING 1.134 1.151		13 800-13 870 BROADCASTING 1.134 1.151
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 1.152		14 250-14 350 AMATEUR
14 350-14 990	FIXED Mobile except aeronaut	cical mobile (R)	14 350-14 990 FIXED Mobile except aeronautical mobile (R)
14 990-15 005	STANDARD FREQUENCY AND TIME SIGNAL (15 000 kHz)		14 990-15 005 STANDARD FREQUENCY AND TIME SIGNAL (15 000 kHz) 1.111
15 005-15 010 SIGNAL	1.111 STANDARD FREQUENCY AND TIME 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		15 100-15 600 BROADCASTING
15 600-15 800	BROADCASTING 1.1	134	15 600-15 800 BROADCASTING 1.134
15 800-16 360	1.146 FIXED		1.146 15 800-16 360
	1.153		FIXED 1.153

16 360 - 21 450 kHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
16 360-17 410	MARITIME MOBILE	1.109 1.110 1.132 1.145	16 360-17 410 FIXED LAND MOBILE <u>1.604</u>
17 410-17 480	FIXED	FIXED	
17 480-17 550	BROADCASTING 1.134 1.146		17 480-17 550 BROADCASTING 1.134 1.146
17 550-17 900	BROADCASTING	BROADCASTING	
17 900-17 970	AERONAUTICAL MO	OBILE (R)	17 900-17 970 AERONAUTICAL MOBILE (R)
17 970-18 030	AERONAUTICAL MC	OBILE (OR)	17 970-18 030 AERONAUTICAL MOBILE (OR)
18 030-18 052	FIXED		18 030-18 052 FIXED
18 052-18 068	FIXED Space research	FIXED Space research	
18 068-18 168	AMATEUR AMATEUR-SATELLITE 1.154		18 068-18 168 AMATEUR AMATEUR-SATELLITE
18 168-18 780	FIXED Mobile except aeronautical mobile		18 168-18 780 FIXED Land mobile
18 780-18 900	MARITIME MOBILE		18 780-18 900 LAND MOBILE <u>1.602</u>
18 900-19 020	BROADCASTING 1.134		18 900-19 020 BROADCASTING 1.134 1.146
19 020-19 680	FIXED		19 020-19 680 FIXED
19 680-19 800	MARITIME MOBILE 1.132		19 680-19 800 LAND MOBILE <u>1.602</u>
19 800-19 990	FIXED		19 800-19 990 FIXED
19 990-19 995	STANDARD FREQUENCY AND TIME SIGNAL Space research		19 990-19 995 STANDARD FREQUENCY AND TIME SIGNAL Space research
	1.111		1.111
19 995-20 010	STANDARD FREQUENCY AND TIME SIGNAL (20 000 kHz)		19 995-20 010 STANDARD FREQUENCY AND TIME SIGNAL (20 000 kHz)
20.010.21.000			1.111
20 010-21 000	FIXED Mobile		20 010-21 000 FIXED Mobile

21 000-21 450

21 000-21 450 AMATEUR

AMATEUR-SATELLITE

21 450 – 26 175 kHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
21 450-21 850	BROADCASTING		21 450-21 850
21 850-21 870	FIXED 1 155A		21 850-21 870
	1.155		FIXED
21 870-21 924	FIXED 1.155B		21 870-21 924
21 924-22 000	AFRONALITICAL MO	BILE (R)	FIXED 1.155B
21 927-22 000			AERONAUTICAL MOBILE (R)
22 000-22 855	MARITIME MOBILE	1.132	22 000-22 855
			FIXED LAND MOBILE
	1.156		1.604
22 855-23 000	FIXED		22 855-23 000
23 000-23 200	I.ID0 FIXED		FIXED 23 000-23 200
25 000-25 200	Mobile except aeronaut	ical mobile (R)	FIXED
	1.156		Mobile except aeronautical mobile (R)
23 200-23 350	FIXED 1.156A		23 200-23 350 EIVED 1 1564
	AERONAU HCAL MO	DILLE (OK)	AERONAUTICAL MOBILE (OR)
23 350-24 000	FIXED		23 350-24 000
	MOBILE except aerona	utical mobile 1.157	LAND MOBILE
24 000-24 890	24 000-24 890 FIXED		24 000-24 890
	LAND MOBILE		FIXED LAND MOBILE
24 890-24 990	AMATEUR AMATEUR-SATELLITE		24 890-24 990
			AMATEUR
24 990-25 005	4 990-25 005 STANDARD FREQUENCY AND TIME SIGNAL (25 000 kHz)		AMATEUR-SATELLITE 24 990-25 005
24 770-25 005			STANDARD FREQUENCY AND TIME
25 005 25 010		NCV AND TIME	SIGNAL (25 000 kHz)
25 005-25 010	SIGNAL	NCT AND TIME	STANDARD FREQUENCY AND TIME
	Space research		SIGNAL Space research
25 010-25 070	FIXED		25 010-25 070
	MOBILE except aerona	utical mobile	FIXED
25 070-25 210	MARITIME MOBILE		25 070-25 210
			FIXED
			LAND MOBILE
25 210-25 550	FIXED		25 210-25 550
MOBILE except aeronautical mobile		utical mobile	FIXED
		,	LAND MOBILE
25 550-25 670 RADIO ASTRONOMY			25 550-25 670 RADIO ASTRONOMY
	1.149		1.149
25 670-26 100	BROADCASTING		25 670-26 100 BROADCASTING

26 100-26 175	MARITIME MOBILE 1.132	26 100-26 175 FIXED LAND MOBILE
		1.604

26.175 - 0	68 MHz
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ALLOCATION TO SERVICES					
REGION 1	R EGION 2	REGION 3	BHUTAN		
26 175-27 500	FIXED MOBILE except aerona 1.150	utical mobile	26 175-27 500 FIXED LAND MOBILE 1.150		
27.5-28	METEOROLOGICAL / FIXED MOBILE	27.5-28 METEOROLOGICAL AIDS FIXED MOBILE			
28-29.7	AMATEUR AMATEUR-SATELLIT	28-29.7 AMATEUR AMATEUR-SATELLITE			
29.7-30.005	FIXED MOBILE	29.7-30.005 FIXED MOBILE			
30.005-30.01	SPACE OPERATION (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		37.5-38.25 FIXED MOBILE Radio astronomy		
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		40.02-40.98 FIXED MOBILE 1.150		
40.98-41.015	FIXED MOBILE Space research 1.160 1.161		40.98-41.015 FIXED MOBILE Space research		
41.015-44	FIXED MOBILE 1.160 1.161		41.015-44 FIXED MOBILE		
44-47	FIXED MOBILE 1.162 1.162A	44-47 FIXED MOBILE 1.162			
47-68 BROADCASTING	47-50 FIXED MOBILE	47-50 FIXED MOBILE BROADCASTING 1.162A	47-50 FIXED MOBILE 1.162A		
	50-54 AMATEUR 1.162A 1.166 1.167 1.167	A 1.168 1.170	50-54 AMATEUR 1.162A 1.167 1.168		
	BROADCASTING Fixed	FIXED MOBILE	FIXED MOBILE		

1.162A 1.163 1.164 1.165	Mobile	BROADCASTING	BROADCASTING
1.169 1.171	1.172	1.162A	1.162A

68 – 137 MHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
68-74.8 FIXED MOBILE except aeronautical mobile	68-72 BROADCASTING Fixed Mobile 1.173 72-73 FIXED MOBILE 73-74.6 RADIO ASTRONOMY 1.178 74.6-74.8 FIXED	68-74.8 FIXED MOBILE	68-74.8 FIXED MOBILE	
1.149 1.175 1.177 1.179	MOBILE	1.149 1.176 1.179	1.149 1.176 1.179	
74.8-75.2 AERONAUTICAL RADIONAVIGATION			74.8-75.2 AERONAUTICAL RADIONAVIGATION	
	1.180 1.181		1.180	
75.2-87.5 FIXED MOBILE except aeronautical mobile	75.2-75.4 FIXED MOBILE 1.179		75.2-75.4 FIXED MOBILE 1.179	
	72.4-76 FIXED MOBILE 76-88 BROADCASTING Fixed Mobile	72.4-87 FIXED MOBILE	75.4-87 FIXED MOBILE	
		1.182 1.83 1.188	1.188	
1.175 1.179 1.187 87.5-100 BROADCASTING	1.185 88-100	87-100 FIXED MOBILE BROADCASTING	87-100 FIXED MOBILE BROADCASTING	
1.190	BROADCASTING		100-108	
100-100	1.192 1.194		BROADCASTING	
108-117.975	AERONAUTICAL RADIONAVIGATION		108-117.975 AERONAUTICAL RADIONAVIGATION 1.197A	
117.975-137	AERONAUTICAL MC	02	117.975-137 AERONAUTICAL MOBILE (R)	
	1.111 1.200			

137 – 143.6 MHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
137-137.025	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 1.208A 1.208B 1.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R)		137-137.025 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to- Earth) 1.208A 1.208B 1.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R)	
	1.204 1.205 1.206 1.207 1.20	08	1.204 1.208	
137.025-137.175	SPACE OPERATION (space-t METEOROLOGICAL-SATEI SPACE RESEARCH (space-to Fixed Mobile-satellite (space-to-Eart Mobile except aeronautical mo	137.025-137.175 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Mobile-satellite (space-to-Earth) 1.208A 1.208B 1.209 Fixed Mobile except aeronautical mobile (R)		
	1.204 1.205 1.206 1.207 1.20	08	1.204 1.208	
137.175-137.825	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 1.208A 1.208B 1.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R)		 137.175-137.825 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 1.208A 1.208B 1.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) 	
	1.204 1.205 1.206 1.207 1.20	08	1.204 1.208	
137.825-138	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth) 1.208A 1.208B 1.209 Mobile except aeronautical mobile (R)		137.825-138 SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Mobile-satellite (space-to-Earth) 1.208A 1.208B 1.209 Fixed Mobile except aeronautical mobile (R)	
	1.204 1.205 1.206 1.207 1.20	08	1.204 1.208	
138-143.6 AERONAUTICAL MOBILE (OR)	138-143.6 FIXED MOBILE RADIOLOCATION	138-143.6 FIXED MOBILE Space research (space- to-Earth)	138-143.6 FIXED MOBILE Space research (space-to-Earth)	
1.210 1.211 1.212 1.214	Space research (space-to-Earth)	1.207 1.213	1.213	

143.6 – 174 MHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
143.6-143.65 AERONAUTICAL MOBILE (OR) SPACE RESEARCH (space-to-Earth)	143.6-143.65 FIXED MOBILE RADIOLOCATION SPACE RESEARCH	143.6-143.65 FIXED MOBILE SPACE RESEARCH (space-to-Earth)	143.6-143.65 FIXED MOBILE SPACE RESEARCH (space-to-Earth)	
1.211 1.212 1.214	(space-to-Earth)	1.207 1.213	1.213	
143.65-144 AERONAUTICAL MOBILE (OR) 1.210 1.211 1.212 1.214	143.65-144 FIXED MOBILE RADIOLOCATION Space research (space-to-Earth)	143.65-144 FIXED MOBILE Space research (space-to-Earth) 1.207 1.213	143.65-144 FIXED MOBILE Space research (space-to-Earth) 1.213	
144-146	AMATEUR AMATEUR-SATELL 1.216	ITE	144-146 AMATEUR AMATEUR-SATELLITE 1.216	
146-148 FIXED MOBILE except aeronautical mobile (R)	146-148 146-148 AMATEUR AMATEUR FIXED MOBILE 1 217 1 217		146-148 FIXED MOBILE	
148-149.9 FIXED MOBILE except aeronautical mobile (R) MOBILE-SATELLITE (Earth-to-space) 1.209	148-149.9 FIXED MOBILE MOBILE-SATELLITE (148-149.9 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 1.209		
1.218 1.219 1.221 149.9-150.05	1.218 1.219 1.221 149.9-150.05 MOBILE-SATELLITE (Earth- to-space) 1.209 1.224A RADIONAVIGATION- SATELLITE 1.224B 1.220 1.222 1.223			
150.05-153 FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY 1.149 153-154 FIXED MOBILE except aeronautical mobile (R) Meteorological Aids 154-156.4875 EIXED	150.05-156.7625 FIXED MOBILE	150.05-174 FIXED MOBILE		
MOBILE except aeronautical mobile (R) 1.226 156.4875-156.5625	1.225 1.226 MARITIME MOBILE	(distress and calling)		
	1.111 1.226 1.227			
156. 5625-156.7625 FIXED MOBILE except aeronautical mobile (R) 1.226	156. 5625-156.7625 FIXED MOBILE 1.225 1.226		1.111 1.226 1.227A 1.230 1.231	

156.7625 – 267 MHz

	ALLOCATIO	N TO SERVICES	
REGION 1	REGION 2	REGION 3	BHUTAN
156.7625-156.8375	MARITIME MOBILE	(distress and calling)	
	1.111 1.226		
156.8375-174 FIXED MOBILE except aeronautical mobile	156.8375-174 FIXED MOBILE		
1.226 1.227A 1.229	1.226 1.227A 1.230 1.	231 1.232	
174-223 BROADCASTING	174-216 BROADCASTING Fixed Mobile 1.234	174-223 FIXED MOBILE BROADCASTING	174-223 BROADCASTING
	216-220 FIXED MARITIME MOBILE Radiolocation 1.241 1.242		
1.235 1.237 1.243	220-225	1.233 1.238 1.240 1.245	
223-230 BROADCASTING Fixed Mobile	AMATEUR FIXED MOBILE Radiolocation 1.241	223-230 FIXED MOBILE BROADCASTING AERONAUTICAL RADIONAVIGATION	223-230 BROADCASTING
	225-235 FIXED	Radiolocation	
1.243 1.246 1.247	MOBILE	1.250	
230-235 FIXED MOBILE		230-235 FIXED MOBILE AERONAUTICAL RADIONAVIGATION	230-235 FIXED MOBILE
1.247 1.251 1.252		1.250	
235-267	FIXED MOBILE		235-267 FIXED MOBILE
	1 111 1 252 1 254 1	256 1.256A	1 111 1 254 1 256

267 – 400.05 MHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
267-272	FIXED MOBILE Space operation (space-to-Eau 1.254 1.257	th)	267-272 FIXED MOBILE Space operation (space-to-Earth) 1.254 1.257	
272-273	SPACE OPERATION (space- FIXED MOBILE 1.254	to-Earth)	272-273 SPACE OPERATION (space-to- Earth) FIXED MOBILE 1.254	
273-312	FIXED MOBILE 1.254		273-312 FIXED MOBILE 1.254	
312-315	FIXED MOBILE Mobile-satellite (Earth-to-spac	e) 1.254 1.255	312-315 FIXED MOBILE Mobile-satellite (Earth-to-space) 1.254 1.255	
315-322	FIXED MOBILE 1.254		315-322 FIXED MOBILE 1.254	
322-328.6	FIXED MOBILE RADIO ASTRONOMY 1.149		322-328.6 FIXED MOBILE RADIO ASTRONOMY 1.149	
328.6-332.4	AERONAUTICAL RADION	AVIGATION 1.258	328.6-332.4 AERONAUTICAL RADIONAVIGATION 1.258	
332.4-387	FIXED MOBILE		332.4-380 FIXED MOBILE 1.254 380-387 MOBILE	
	1.254		1.254 <u>1.607</u>	
387-390	FIXED MOBILE Mobile-satellite (space-to-Eart	h) 1.208A 1.208B 1.254 1.255	387-390 MOBILE Mobile-satellite (space-to-Earth) 1.208A 1.208B 1.254 1.255 <u>1.607</u>	
390-399.9	FIXED MOBILE 1.254		390-399.9 MOBILE	
399.9-400.05	MOBILE-SATELLITE (Earth RADIONAVIGATION-SATE 1.220	-to-space) 1.209 1.224A ELLITE 1.222 1.224B 1.260	399.9-400.05 MOBILE-SATELLITE (Earth-to- space) 1.209 1.224A RADIONAVIGATION-SATELLITE 1.222 1.224B 1.260 1.220	

$400.05-430\ MHz$

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
400.05-400.15	STANDARD FREQUENCY A SATELLITE (* 1.261 1.262	AND TIME SIGNAL- 400.1 MHz)	400.05-400.15 STANDARD FREQUENCY AND TIME SIGNAL-SATELLITE (400.1 MHz) 1.261	
400.15-401	METEOROLOGICAL AIDS METEOROLOGICAL-SATE MOBILE-SATELLITE (space SPACE RESEARCH (space-to Space operation (space-to-Eau 1.262 1.264	400.15-401 METEOROLOGICAL AIDS METEOROLOGICAL- SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to- Earth) 1.208A 1.208B 1.209 SPACE RESEARCH (space-to- Earth) 1.263 Space operation (space-to-Earth) 1.264		
401-402	METEOROLOGICAL AIDS SPACE OPERATION (space- EARTH EXPLORATION-SA METEOROLOGICAL-SATE Fixed Mobile except aeronautical mo	401-402 METEOROLOGICAL AIDS SPACE OPERATION (space-to- Earth) EARTH EXPLORATION- SATELLITE (Earth-to-space) METEOROLOGICAL- SATELLITE (Earth-to-space) Fixed Land mobile		
402-403	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) Fixed Mobile except aeronautical mobile		402-403 METEOROLOGICAL AIDS EARTH EXPLORATION- SATELLITE (Earth-to-space) METEOROLOGICAL- SATELLITE (Earth-to-space) Fixed Land mobile	
403-406	METEOROLOGICAL AIDS Fixed Mobile except aeronautical mo	obile	403-406 METEOROLOGICAL AIDS Fixed Land mobile	
406-406.1	MOBILE-SATELLITE (Earth	-to-space)	406-406.1 MOBILE-SATELLITE (Earth-to- space) 1.266 1.267	
406.1-410	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY		406.1-410 FIXED LAND MOBILE RADIO ASTRONOMY 1.149	
410-420	FIXED MOBILE except aeronautical SPACE RESEARCH (space-to	mobile o-space) 1.268	410-420 FIXED LAND MOBILE 1.607	
420-430	FIXED MOBILE except aeronautical Radiolocation	mobile	420-430 FIXED LAND MOBILE	
	1.207 1.270 1.271		1.2,1 1.007	

$430 - 460 \mathrm{~MHz}$

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
430-432	430-432		430-432	
AMATEUR	RADIOLOCATION		RADIOLOCATION	
RADIOLOCATION	Amateur		Amateur	
1 271 1 272 1 272 1 274				
1.271 1.272 1.273 1.274	1 271 1 276 1 277 1 2	78 1 279	1 276	
432-438	432-438	10 1.27)	432-438	
AMATEUR	RADIOLOCATION		RADIOLOCATION	
RADIOLOCATION	Amateur		Amateur	
Earth exploration-satellite	Earth exploration-satelli	te (active) 1.279A	Earth exploration-satellite	
(active) 1.279A			(active) 1.279A	
1.138 1.271 1.272 1.276				
1.277 1.280 1.281 1.282	1.271 1.276 1.277 1.27	78 1.279 1.281 1.282	1.271 1.282	
438-440	438-440		438-440	
AMATEUR	RADIOLOCATION		RADIOLOCATION	
RADIOLOCATION	Amateur		Amateur	
1.271 1.273 1.274 1.275		1.070	1.071	
1.276 1.277 1.283	1.2/1 1.2/6 1.2/7 1.2	/8 1.2/9	1.271	
440-450 FIXED MOBILE excent correspondence in a file			440-450 EIVED	
	Radiolocation	moone	LAND MOBILE	
	Rudiolocution		Radiolocation	
	1.269 1.270 1.271 1.284 1.2	285 1.286	1.269 1.271 1.286	
450-455	FIXED		450-455	
	MOBILE 1.286AA		MOBILE 1.286AA	
	1.209 1.271 1.286 1.286A 1	.286B 1.286C 1.286D 1.286E	1.209 1.271 1.286 1.286A 1.286E	
455-456	455-456	455-456	455-456	
FIXED	FIXED	FIXED	MOBILE 1.286AA	
MOBILE 1.286AA	MOBILE 1.286AA	MOBILE 1.286AA		
	MOBILE-SATELLITE			
1 200 1 271 1 20 4 1 20 5	(Earth-to-space) 1.286A	1 200 1 271 1 204 1 204		
1.209 1.271 1.286A 1.286B	1.286B 1.286C	1.209 1.271 1.286A 1.286B		
1.286C 1.286E	1.209	1.286C 1.286E	1.209 1.271 1.286A 1.286E	
456-459	FIXED		456-459	
	MOBILE 1.286AA		MOBILE 1.286AA	
	1.271 1.287 1.288		1.271	
459-460	459-460	459-460	459-460	
FIXED	FIXED	FIXED	MOBILE 1.286AA	
MOBILE 1.286AA	MOBILE 1.286AA	MOBILE 1.286AA		
	MOBILE-SATELLITE			
	(Earth-to-space) 1.286A			
	1.286B 1.286C			
1.209 1.271 1.286A 1.286B		1.209 1.271 1.286A 1.286B		
1.286C 1.286E	1.209	1.286C 1.286E	1.209 1.271 1.286A 1.286E	

460 – 942 MHz

ALLOCATION TO SERVICES				
R EGION 1	REGION 2	REGION 3	BHUTAN	
460-470	0-470 FIXED MOBILE 1.286A Meteorological-Sat		460-470 MOBILE 1.286AA Meteorological-Satellite (spac to-Earth)	
	1.287 1.288 1.289	1.290		
470-790 BROADCASTING	470-512 BROADCASTING Fixed Mobile	470-585 FIXED MOBILE BROADCASTING	470-610 BROADCASTING	
	1.292 1.293 512-608 BROADCASTING	1.291 1.298		
1 149 1 2914 1 294 1 296	1.297 608-614 RADIO ASTRONOMY Mobile-satellite except aeronautical mobile-satellite (Farth-to-space)	585-610 FIXED MOBILE BROADCASTING RADIONAVIGATION		
1.300 1.302 1.304 1.306		1.149 1.305 1.306 1.307	1.149 1.305 1.307	
1.311A 1.312 790-862 FIXED BROADCASTING	614-698 BROADCASTING Fixed Mobile 1.293 1.309 1.311A	610-890 FIXED MOBILE 1.313A 1.317A BROADCASTING	610-870 FIXED MOBILE 1.313A 1.317A	
	698-806 BROADCASTING MOBILE 1.313B 1.317A Fixed 1.293 1.309 1.311A 806-890			
1.312 1.314 1.315 1.316 1.319 1.321	MOBILE 1.317A BROADCASTING			
862-890 FIXED MOBILE except aeronautical mobile 1.317A BROADCASTING 1.322			1.149 1.320 870-876 FIXED MOBILE 1.317A	
1.319 1.323	1.317 1.318	1.149 1.305 1.306 1.307 1.311A 1.320	1.320 <u>1.607</u> 876-915 LAND MOBILE 1.317A	
890-942 FIXED MOBILE except aeronautical mobile 1.317A BROADCASTING 1.322 Radiolocation	890-902 FIXED MOBILE except aeronautical mobile 1.317A Radiolocation 1.318 1.325	890-942 FIXED MOBILE 1.317A BROADCASTING Radiolocation		
	l			

902 – 1 350 MHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
	902-928 FIXED Amateur Mobile except aeronautical mobile 1.325A Radiolocation		915-921 FIXED MOBILE 1.317A Radiolocation 1.320 <u>1.607</u>	
	1.150 1.325 1.326 928-942 FIXED MOBILE except aeronautical mobile 1.317A Radiolocation 1.325		921-960 LAND MOBILE 1.317A	
942-960 FIXED MOBILE except aeronautical mobile 1.317A BROADCASTING 1.322	942-960 FIXED MOBILE 1.317A	942-960 FIXED MOBILE 1.317A BROADCASTING		
1.323		1.320	1.320 <u>1.608</u>	
960-1 164	AERONAUTICAL RADIO AERONAUTICAL MOBIL	NAVIGATION 1.328 E (R) 1.327A	960-1 164 AERONAUTICAL RADIONAVIGATION 1.328 AERONAUTICAL MOBILE (R) 1.327A	
1 164-1 215	AERONAUTICAL RADIO RADIONAVIGATION-SAT (space-to	1 164-1 215 AERONAUTICAL RADIONAVIGATION 1.328 RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 1 328B		
	1.328A		1.328B 1.328A	
1 215-1 240	EARTH EXPLORATION-S RADIOLOCATION RADIONAVIGATION-SAT (space-to-spa SPACE RESEARCH (active 1.330 1.331 1.332	I 215-I 240 EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 1.328B 1.329 1.329A SPACE RESEARCH (active) 1.330 1.331 1.332		
1 240-1 300	EARTH EXPLORATION-S RADIOLOCATION RADIONA VIGATION-SAT (space-to-spa SPACE RESEARCH (active Amateur	1 240-1 300 EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-to-space) 1.328B 1.329 1.329A SPACE RESEARCH (active) Amateur		
	1.282 1.330 1.331 1.332 1	.335 1.335A	1.282 1.330 1.331 1.332 1.335A	
1 300-1 350	AERONAUTICAL RADIO RADIOLOCATION RADIONAVIGATION SAT	NAVIGATION 1.337	1 300-1 350 AERONAUTICAL RADIONAVIGATION 1.337 RADIOLOCATION RADIONAVIGATION SATELLITE (Earth-to-space)	

1.149 1.337A

1.149 1.337A

1 350 – 1 530 MHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
1 350-1 400 FIXED MOBILE	1 350-1 400 RADIOLOCATION 1.3	338A	1 350-1 400 RADIOLOCATION 1.338A
RADIOLOCATION 1.149 1.338 1.338A 1.339	1.149 1.334 1.339		1.149 1.339
1 400-1 427 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)			1 400-1 427 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)
1 407 1 400	1.340 1.341		1.340 1.341
1 427-1 429	SPACE OPERATION (FIXED MOBILE except aerona	Earth-to-space) nutical mobile	1 427-1 429 SPACE OPERATION (Earth-to- space) FIXED LAND MOBILE
	1.338A 1.341		1.341
1 429-1 452 FIXED MOBILE except aeronautical mobile	1 429-1 452 FIXED MOBILE 1.343		1 429-1 452 FIXED MOBILE
1.338A 1.341 1.342	1.338A 1.341		1.338A 1.341
1 452-1 492 FIXED MOBILE except aeronautical mobile BROADCASTING 1.345 BROADCASTING-	1 452-1 492 FIXED MOBILE 1.343 BROADCASTING 1.345 BROADCASTING-SATELLITE 1.208B 1.345		1 452-1 492 FIXED MOBILE BROADCASTING 1.345 BROADCASTING-SATELLITE 1.208B 1.345
1.341 1.342	1.341 1.344		1.341
1 492-1 518 FIXED MOBILE except aeronautical mobile	1 492-1 518 FIXED MOBILE 1.343	1 492-1 518 FIXED MOBILE	1 492-1 518 FIXED MOBILE
1 518-1 525	1 518-1 525	1 518-1 525	1 518-1 525
FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) 1.348 1.348A 1.348B 1.351A 1.341 1.342	FIXED MOBILE 1.343 MOBILE-SATELLITE (space-to-Earth) 1.348 1.348A 1.348B 1.351A 1.341 1.344	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 1.348 1.348A 1.348B 1.351A 1.341	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 1.348 1.348A 1.351A 1.341
1 525-1 530	1 525-1 530	1 525-1 530	1 525-1 530
SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 1.208B 1.351A Earth exploration-satellite Mobile except aeronautical mobile 1.349	SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 1.208B 1.351A Earth exploration-satellite Fixed Mobile 1.343	SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 1.208B 1.351A Earth exploration-satellite Mobile 1.349	SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) 1.208B 1.351A Earth exploration-satellite Mobile
1.352A 1.354	1.341 1.351 1.354	1.341 1.351 1.352A 1.354	1.341 1.351 1.352A 1.354

1 530 – 1 626.5 MHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
1 530-1 535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 1.208B 1.351A 1.353A Earth exploration-satellite Fixed Mobile except aeronautical mobile	1 530-1 535 SPACE OPERATION (sp MOBILE-SATELLITE (s Earth exploration-satellite Fixed Mobile 1.343	pace-to-Earth) space-to-Earth) 1.208B 1.351A 1.353A	1 530-1 535 SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) 1.208B 1.351A 1.353A Earth exploration-satellite Fixed Mobile
1.341 1.342 1.351 1.354	1.341 1.351 1.354		1.341 1.351 1.354
1 535-1 559	MOBILE-SATELLITE (space 1.341 1.351 1.353A 1.354 1. 1.362A	-to-Earth) 1.208B 1.351A 355 1.356 1.357 1.357A 1.359	1 535-1 550 MOBILE-SATELLITE (space- to-Earth) 1.208B 1.351A 1.341 1.351 1.353A 1.354 1.356 1.357 1.357A
1 559-1 610	AERONAUTICAL RADIONA RADIONAVIGATION-SATE (space-to-space) 1. 1.341 1.362B 1.362C	1 559-1 610 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION- SATELLITE (space-to- Earth) (space-to-space) 1.208B 1.328B 1.329A 1.341	
1 610-1 610.6	1 610-1 610.6	1 610-1 610.6	1 610-1 610.6
MOBILE-SATELLITE (Earth-to-space) 1.351A AERONAUTICAL RADIONAVIGATION 1.341 1.355 1.359 1.364 1.366 1.367 1.368 1.369	MOBILE-SATELLITE (Earth-to-space) 1.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) 1.341 1.364 1.366 1.367	MOBILE-SATELLITE (Earth-to-space) 1.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 1.341 1.355 1.359 1.364 1.366 1.367 1.368 1.369	MOBILE-SATELLITE (Earth-to-space) 1.351A AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 1.341 1.364 1.366 1.367
1.371 1.372	1.368 1.370 1.372	1.372	1.368 1.369
1 610.6-1 613.8 MOBILE-SATELLITE (Earth-to-space) 1.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION 1.149 1.341 1.355 1.359 1.364 1.366 1.367 1.368 1.369 1.371 1.372	1 610.6-1 613.8 MOBILE-SATELLITE (Earth-to-space) 1.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) 1.149 1.341 1.364 1.366 1.367 1.368 1.370 1.372	1 010.6-1 013.8MOBILE-SATELLITE (Earth-to-space) 1.351ARADIO ASTRONOMYAERONAUTICAL RADIONAVIGATIONRadiodetermination-satellite (Earth-to-space)1.149 1.341 1.355 1.3591.364 1.366 1.367 1.3681.369 1.372	1 610.6-1 613.8 MOBILE-SATELLITE (Earth-to-space) 1.351A RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) 1.149 1.341 1.364 1.366 1.367 1.368 1.369
1 613.8-1 626.5 MOBILE-SATELLITE (Earth-to-space) 1.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 1.208B 1.341 1.355 1.359 1.364 1.365 1.366 1.367 1.368 1.369 1.371 1.372	1 613.8-1 626.5 MOBILE-SATELLITE (Earth-to-space) 1.351A AERONAUTICAL RADIONAVIGATION RADIODETERMINATION- SATELLITE (Earth-to-space) Mobile-satellite (space-to-Earth) 1.208B 1.341 1.364 1.365 1.366 1.367 1.368 1.370 1.372	1 613.8-1 626.5 MOBILE-SATELLITE (Earth-to-space) 1.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 1.208B Radiodetermination-satellite (Earth-to-space) 1.341 1.355 1.359 1.364 1.365 1.366 1.367 1.368 1.369 1.372	1 613.8-1 626.5 MOBILE-SATELLITE (Earth-to-space) 1.351A AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) 1.208B Radiodetermination-satellite (Earth-to-space) 1.341 1.364 1.365 1.366 1.367 1.368 1.369

1 626.5 – 1 675 MHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	R EGION 3	BHUTAN
1 626.5-1 660	MOBILE-SATELLITE (Earth	-to-space) 1.351A	1 626.5-1 660 MOBILE-SATELLITE (Earth-to- space) 1.351A
	1.341 1.351 1.353A 1.354 1 1.362A 1.374 1.375 1	.355 1.357A 1.359 .376	1.341 1.351 1.353A 1.354 1.357A 1.374 1.375 1.376
1 660-1 660.5	MOBILE-SATELLITE (Earth-to-spa RADIO ASTRONOMY	ce) 1.351A	1 660-1 660.5 MOBILE-SATELLITE (Earth-to- space) 1.351A RADIO ASTRONOMY
· · · · · · · · · · · · · · · · · · ·	1.149 1.341 1.351 1.354 1.362A 1	.376A	1.149 1.341 1.351 1.354 1.376A
1 660.5-1 668	RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 1.149 1.341 1.379 1.379A		1 660.5-1 668 RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Land mobile
1 668-1 668.4	MOBILE-SATELLITE (Earth-to-spa 1.379C RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile 1.149 1.341 1.379 1.379A	ce) 1.351A 1.379B	1 668-1 668.4 MOBILE-SATELLITE (Earth-to- space) 1.351A 1.379B 1.379C RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Land mobile 1.149 1.341 1.379 1.379A
1 668.4-1 670	METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-spa 1.351A 1.379B RADIO ASTRONOMY 1.149 1.341 1.379D 1.379E	ce) 1.379C	1 668.4-1 670 METEOROLOGICAL AIDS FIXED LAND MOBILE MOBILE-SATELLITE (Earth-to- space) 1.351A 1.379B 1.379C RADIO ASTRONOMY 1.149 1.341 1.379D 1.379E
1 670-1 675	METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE MOBILE MOBILE-SATELLITE (Earth-to-spa 1.341 1.379D 1.379E 1.380A	(space-to-Earth) ce) 1.351A 1.379B	1 670-1 675 FIXED METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (Earth-to- space) 1.351A 1.379B 1.341 1.379D 1.379E 1.380A

1 675 – 2 010 MHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
1 675-1 690 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 1.341			1 675-1 690 METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) LAND MOBILE 1.341
1 690-1 700 METEOROLOGICAL AIDS METEOROLOGICAL- SATELLITE (space-to-Ea Fixed Mobile except aeronautical mobile	1 690-1 700 S METEOROLOGIC METEOROLOGIC urth)	CAL AIDS CAL-SATELLITE (space-to-Earth)	1 690-1 700 METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth)
1.289 1.341 1.382	1.289 1.341 1.3	381	1.289 1.341 1.381
1700-17101700-1710FIXEDFIXEDMETEOROLOGICAL-SATELLITE (space-to- Earth)METEOROLOGICAL-SATELLMOBILE except aeronautical mobileMOBILE ex mobile		1 700-1 710 FIXED METEOROLOGICAL- SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 1.289 1.341 1.384	1 700-1 710 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) LAND MOBILE 1.289 1.341 1.384
1 710-1 930 FIXED			1 710-1 785
HXED MOBILE 1.384A 1.388A 1.388B			LAND MOBILE 1.384A 1.149 1.341 1.385 1.386 <u>1.608</u> 1 785-1 800 FIXED MOBILE 1.384A 1.386 1 800-1 880 MOBILE 1.384A <u>1.608</u> 1.386 1 880-1 885 FIXED MOBILE 1.384A
	1.149 1.341 1.385 1	.386 1.387 1.388	1 885-1 980
1 930-1 970 FIXED MOBILE 1.388A 1.388B	1 930-1 970 FIXED MOBILE 1.388A 1.388B Mobile-satellite (Earth-to- space)	1 930-1 970 FIXED MOBILE 1.388A 1.388B	MOBILE 1.388A
1.388	1.388	1.388	
1 970-1 980	FIXED MOBILE 1.388A 1. 1.388	388B	1.388
1 980-2 010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) 1.351A			1 980-2 010 FIXED MOBILE MOBILE-SATELLITE (Earth-to-space)

	1.351A
1.388 1.389A 1.389B 1.389F	1.388 1.389A

2 010 – 2 290 MHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
2 010-2 025	2 010-2 025	2 010-2 025	2 010-2 025
FIXED	FIXED	FIXED	FIXED
MOBILE 1.388A 1.388B	MOBILE	MOBILE 1.388A 1.388B	MOBILE 1.388A 1.388B
	MOBILE-SATELLITE		
	(Earm-to-space)		
1.388	1.388 1.389C 1.389E	1.388	1.388
2 025-2 110	SPACE OPERATION (Ea	rth-to-space) (space-to-space)	2 025-2 110
	EARTH EXPLORATION	-SATELLITE (Earth-to-space)	SPACE OPERATION (Earth-to-
	(space-to-spa	ace)	FARTH FXPI OR ATION-
	FIXED		SATELLITE (Earth-to-space)
	MOBILE 1.391		(space-to-space)
	SPACE RESEARCH (Ear	tn-to-space) (space-to-space)	FIXED
			MOBILE 1.391
	1 202		SPACE RESEARCH (Earth-to-
	1.392		1 392
2 110-2 120	FIXED		2 110-2 120
	MOBILE 1.388A 1.38	8B	MOBILE 1.388A 1.388B
	SPACE RESEARCH (d	leep space) (Earth-to-space)	SPACE RESEARCH (deep space)
			(Earth-to-space)
	1.388		1.388
2 120-2 160	2 120-2 160	2 120-2 160	2 120-2 170
FIXED	FIXED	FIXED	MOBILE 1.388A 1.388B
MOBILE 1.388A 1.388B	MOBILE 1.388A 1.388B Mobile-satellite (space-to-Fa	MOBILE 1.388A 1.388B	
1.388	1 388	1.388	
2 160-2 170	2 160-2 170	2 160-2 170	
FIXED	FIXED	FIXED	
MOBILE 1.388A 1.388B	MOBILE	MOBILE 1.388A 1.388B	
	MOBILE-SATELLITE		
1 200 1 200 4	(space-to-Earth)	1 200	1 200
1.388 1.392A	1.388 1.389C 1.389E	1.388	1.388
2 1/V-2 20V	MOBILE		FIXED
	MOBILE-SATELLITE	(space-to-Earth) 1.351A	MOBILE
		· · · · · · · · · · · · · · · · · · ·	MOBILE-SATELLITE (space-to-
			Earth) 1.351A
	1.388 1.389A 1.389F		1.388 1.389A
2 200-2 290	SPACE OPERATION (space-to-Earth) (space-to-space)	2 200-2 290
	EARTH EXPLORATIC	DN-SATELLITE (space-to-Earth)	SPACE OPERATION (space-to- Earth) (space-to-space)
	FIXED	-,	EARTH EXPLORATION-
	MOBILE 1.391		SATELLITE (space-to-Earth)
	SPACE RESEARCH (s	pace-to-Earth) (space-to-space)	(space-to-space)
			FIXED MODILE 1 201
			SPACE RESEARCH (space-to-
			Earth) (space-to-space)
	1.392		1.392

2 290 – 2 520 MHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
2 290-2 300	FIXED MOBILE except aeronau SPACE RESEARCH (de	tical mobile ep space) (space-to-Earth)	2 290-2 300 FIXED LAND MOBILE SPACE RESEARCH (deep space) (space-to-Earth)
2 300-2 450 FIXED MOBILE 1.384A Amateur Radiolocation	2 300-2 450 FIXED MOBILE 1.384A RADIOLOCATION Amateur		2 300-2 400 FIXED MOBILE 1.384A RADIOLOCATION Amateur
1.150 1.282 1.395	1.150 1.282 1.393 1.	394 1.396	2 400-2 450 FIXED MOBILE 1.384A RADIOLOCATION Amateur 1.150 1.282
2 450-2 483.5	2 450-2 483.5		2 450-2 483.5
FIXED MOBILE Radiolocation 1.150 1.397	FIXED MOBILE RADIOLOCATION 1.150		FIXED MOBILE RADIOLOCATION 1.150
2 483.5-2 500	2 483.5-2 500	2 483.5-2 500	2 483.5-2 500
FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 1.351A Radiolocation	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 1.351A RADIOLOCATION RADIODETERMINATION- SATELLITE (space-to-Earth) 1.398	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 1.351A RADIOLOCATION Radiodetermination-satellite (space-to-Earth) 1.398	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 1.351A RADIOLOCATION Radiodetermination-satellite (space-to-Earth) 1.398
1.150 1.371 1.397 1.398 1.399 1.400 1.402	1.150 1.402	1.150 1.400 1.402	1.150 1.400 1.402
2 500-2 520 FIXED 1.410 MOBILE except aeronautical mobile 1.384A MOBILE-SATELLITE (space-to-Earth) 1.351A 1.403	2 500-2 520 FIXED 1.410 FIXED-SATELLITE (space- to-Earth) 1.415 MOBILE except aeronautical mobile 1.384A	2 500-2 520 FIXED 1.410 FIXED-SATELLITE (space- to-Earth) 1.415 MOBILE except aeronautical mobile 1.384A MOBILE-SATELLITE (space-to-Earth) 1.351A 1.407 1.414 1.414A	2 500-2 520 FIXED 1.410 FIXED-SATELLITE (space-to-Earth) 1.415 LAND MOBILE 1.384A MOBILE-SATELLITE (space-to-Earth) 1.351A 1.407 1.414 1.414A

2 520 – 3 100 MHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
2 520-2 655 FIXED 1.410 MOBILE except aeronautical mobile 1.384A BROADCASTING- SATELLITE 1.413 1.416	2 520-2 655 FIXED 1.410 FIXED-SATELLITE (space-to-Earth) 1.415 MOBILE except aeronautical mobile 1.384A BROADCASTING- SATELLITE 1.413 1.416	2 520-2 535 FIXED 1.410 FIXED-SATELLITE (space-to-Earth) 1.415 MOBILE except aeronautical mobile 1.384A BROADCASTING-SATELLITE 1.413 1.416	2 520-2 535 FIXED 1.410 FIXED-SATELLITE (space-to-Earth) 1.415 LAND MOBILE 1.384A BROADCASTING- SATELLITE 1.413 1.416
		1.403 1.414A 1.415A 2 535-2 655 FIXED 1.410 MOBILE except aeronautical mobile 1.384A BROADCASTING-SATELLITE 1.413 1.416	1.403 1.415A 2 535-2 655 FIXED 1.410 LAND MOBILE 1.384A BROADCASTING-SATELLITE 1.413 1.416
1.339 1.405 1.412 1.417C 1.417D 1.418B 1.418C	1.339 1.417C 1.417D 1.418B 1.418C	1.415 1.410 1.339 1.417A 1.417B 1.417C 1.417D 1.418 1.418A 1.418B 1.418C	1.339 1.417C 1.417D 1.418 1.418A 1.418B 1.418C
2 655-2 670 FIXED 1.410 MOBILE except aeronautical mobile 1.384A BROADCASTING- SATELLITE 1.208B 1.413 1.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2 655-2 670 FIXED 1.410 FIXED-SATELLITE (Earth-to- space) (space-to-Earth) 1.415 MOBILE except aeronautical mobile 1.384A BROADCASTING-SATELLITE 1.208B 1.413 1.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2 655-2 670 FIXED 1.410 FIXED-SATELLITE (Earth-to-space) 1.415 MOBILE except aeronautical mobile 1.384A BROADCASTING-SATELLITE 1.413 1.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2 655-2 670 FIXED 1.410 FIXED-SATELLITE (Earth-to-space) 1.415 LAND MOBILE 1.384A BROADCASTING-SATELLITE 1.413 1.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)
2670-2690 FIXED 1.410 MOBILE except aeronautical mobile 1.384A Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2 670-2 690 FIXED 1.410 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 1.208B 1.415 MOBILE except aeronautical mobile 1.384A Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2670-2690 FIXED 1.410 FIXED-SATELLITE (Earth-to-space) 1.415 MOBILE except aeronautical mobile 1.384A MOBILE-SATELLITE (Earth-to-space) 1.351A 1.419 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2 670-2 690 FIXED 1.410 FIXED-SATELLITE (Earth-to-space) 1.415 LAND MOBILE 1.384A MOBILE-SATELLITE (Earth-to-space) 1.351A 1.419 Earth exploration-satellite (passive) Radio astronomy Space research (passive)
1.149 1.412	1.149	1.149	1.149
2 690-2 700 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340 1.422		2 690-2 700 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340	
2 700-2 900	AERONAUTICAL R Radiolocation 1.423 1.424	ADIONAVIGATION 1.337	2 700-2 900 AERONAUTICAL RADIONAVIGATION 1.337 Radiolocation 1.423
2 900-3 100	RADIOLOCATION RADIONAVIGATIO 1.425 1.427	1.424A N 1.426	2 900-3 100 RADIOLOCATION 1.424A RADIONAVIGATION 1.426 1.425 1.427

3 100 – 5 010 MHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
3 100-3 300	RADIOLOCATIO	N	3 100-3 300	
	Earth exploration-s	atellite (active)	RADIOLOCATION	
	Space research (act	ive)	Earth exploration-satellite (active)	
	1 140 1 429		Space research (active)	
2 200 2 400	1.149 1.428	2 200 2 400	1.149	
3 300-3 400 RADIOLOCATION	3 300-3 400 RADIOLOCATION	5 500-5 400 RADIOLOCATION	3 300-3 400 PADIOLOCATION	
RADIOLOCATION	Amateur	Amateur	Amateur	
	Fixed	Amacui	Aniacui	
	Mobile			
1.149 1.429 1.430	1.149	1.149 1.429	1.149 1.429	
3 400-3 600	3 400-3 500	3 400-3 500	3 400-3 500	
FIXED	FIXED	FIXED	FIXED <u>1.609</u>	
FIXED-SATELLITE	FIXED-SATELLITE	FIXED-SATELLITE	FIXED-SATELLITE (space-to-Earth)	
(space-to-Earth)	(space-to-Earth)	(space-to-Earth)	Mobile 1.432B	
Mobile 1.430A	Amateur	Amateur		
Radiolocation	Mobile 1.431A Rediclosofter 1.422	Mobile 1.432B		
	1 282	1 282 1 432 1 432A	1.282, 1.433	
1 431	3 500-3 700	3 500-3 600	3 500-3 700	
3 600-4 200	FIXED	FIXED	FIXED 1 609	
FIXED	FIXED-SATELLITE	FIXED-SATELLITE	FIXED-SATELLITE (space-to-Earth)	
FIXED-SATELLITE	(space-to-Earth)	(space-to-Earth)	LAND MOBILE	
(space-to-Earth)	MOBILE except	MOBILE except		
Mobile	aeronautical mobile	aeronautical mobile		
	Radiolocation 1.433	Radiolocation 1.433		
		3 600-3 700		
		FIXED SATELLITE		
		(space-to-Earth)		
		MOBILE except		
		aeronautical mobile		
		Radiolocation		
		1.435	1.433	
	3 700-4 200		3 700-4 200	
	FIXED EIVED SATELLITE	(space to Earth)	FIXED FIVED SATELLITE (space to Farth)	
	MOBILE except aeror	(space-to-Dattif)	LAND MOBILE	
4 200-4 400	AERONAUTICAL RA	DIONAVIGATION 1.438	4 200-4 400	
			AERONAUTICAL	
			RADIONAVIGATION 1.438	
	1.439 1.440		1.440	
4 400-4 500	FIXED		4 400-4 500	
	MOBILE 1.440A		FIXED	
4 500 4 000			MOBILE	
4 500-4 800	FIXED	need to Earth) 1 441	4 500-4 800 EIVED	
	MOBILE 1 440A		FIXED-SATELLITE (space-to-Earth)	
			1.441	
			MOBILE	
4 800-4 990	FIXED		4 800-4 990	
	MOBILE 1.440A 1.44	42	FIXED	
	Radio astronomy		MOBILE Redia estremente	
	1 149 1 339 1 443		1 140	
4 990-5 000	FIXED		4 990-5 000	
4 7 7 0 - 2 000	MOBILE except aerona	utical mobile	FIXED	
	RADIO ASTRONOMY	r	LAND MOBILE	
	Space research (passive)	RADIO ASTRONOMY	
	- * *		Space research (passive)	
	1.149		1.149	
5 000-5 010	AERONAUTICAL RA	DIONAVIGATION	5 000-5 010	
	RADIONAVIGATION	-SATELLITE	AERONAUTICAL	
		(Latur-to-space)	RADIONAVIGATION RADIONAVIGATION-SATELLITE	
			IN DIVINA I DATION-SATELLITE	

	(Earth-to-space)
1.367	1.367

$5\ 010 - 5\ 650\ MHz$

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
5 010-5 030	AERONAUTICAL RADION RADIONAVIGATION-SATE (space-spa 1.367	IAVIGATION ELLITE (space-to-Earth) ace) 1.328B 1.443B	5 010-5 030 AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) (space-space) 1.328B 1.443B 1.367
5 030-5 091	AERONAUTICAL RADION	IAVIGATION	5 030-5 150 AERONAUTICAL RADIONAVIGATION 1.367 1.444
5 091-5 150	AERONAUTICAL RADIONAVIGATION AERONAUTICAL MOBILE 1.444B		5 030-5 150 AERONAUTICAL RADIONAVIGATION AERONAUTICAL MOBILE 1.444B 1.367 1.444 1.444A
5 150-5 250	AERONAUTICAL RADION	AVIGATION	5 150-5 250
	FIXED-SATELLITE (Earth-to MOBILE except aeronautical	o-space) 1.447A mobile 1.446A 1.446B	AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE (Earth-to-space) 1.447A
	1.446 1.446C 1.447 1.447B	1.447C	LAND MOBILE 1.446A 1.446B 1.446 1.447B 1.447C
5 250-5 255	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 1.447D MOBILE except aeronautical mobile 1.446A 1.447F		5 250-5 255 EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION SPACE RESEARCH 1.447D
	1.447E 1.448 1.448A		LAND MOBILE 1.446A 1.447F 1.447E 1.448A
5 255- 5 350	EARTH EXPLORATION-SATH RADIOLOCATION SPACE RESEARCH (active) MOBILE except aeronautical mo	ELLITE (active) obile 1.446A 1.447F	5 255- 5 350 EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) LAND MOBILE 1.446A 1.447F 1.447E 1.448A
5 350-5 460	EARTH EXPLORATION-SATI SPACE RESEARCH (active) 1. AERONAUTICAL RADIONA RADIOLOCATION 1.448D	ELLITE (active) 1.448B .448C VIGATION 1.449	5 350-5 460 EARTH EXPLORATION- SATELLITE (active) 1.448B SPACE RESEARCH (active) 1.448C AERONAUTICAL RADIONAVIGATION 1.449 RADIOLOCATION 1.448D
5 460-5 470	RADIONAVIGATION 1.449 EARTH EXPLORATION-SATH SPACE RESEARCH (active) RADIOLOCATION 1.448D 1.448B	ELLITE (active)	5 460-5 470 RADIONAVIGATION 1.449 EARTH EXPLORATION- SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 1.448D 1.448B
5 470-5 570	MARITIME RADIONAVIGAT MOBILE except aeronautical mo EARTH EXPLORATION-SATH SPACE RESEARCH (active) RADIOLOCATION 1.450B	TION obile 1.446A 1.450A ELLITE (active)	5 470-5 570 LAND MOBILE 1.446A 1.450A EARTH EXPLORATION- SATELLITE (active) SPACE RESEARCH (active) RADIOLOCATION 1.450B 1.448B
5 570-5 650	MARITIME RADIONAVIGAT MOBILE except aeronautical mo RADIOLOCATION 1.450B 1.450 1.451 1.452	FION obile 1.446A 1.450A	5 570-5 650 LAND MOBILE 1.446A 1.450A RADIOLOCATION 1.450B 1.452

$5\ 650 - 7\ 300\ MHz$

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
5 650-5 725	RADIOLOCATION MOBILE except aeronautical n Amateur Space research (deep space)	nobile 1.446A 1.450A	5 650-5 725 LAND MOBILE 1.446A 1.450A RADIOLOCATION Amateur Space research (deep space)	
	1.282 1.451 1.453 1.454 1.4	55	1.282 1.453	
5 725-5 830 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur	5 725-5 830 RADIOLOCATION Amateur		5 725-5 830 RADIOLOCATION Amateur	
1.150 1.451 1.453 1.455 1.456	1.150 1.453 1.455		1.150 1.453	
5 830-3 850 FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur	RADIOLOCATION Amateur Amateur-satellite (spac	e-to-Earth)	RADIOLOCATION Amateur Amateur-satellite (space-to-Earth)	
Amateur-satellite (space-to-Earth) 1.150 1.451 1.453 1.455 1.456	1.150 1.453 1.455		1.150 1.453	
5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	5 850-5 925 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE	
	Amateur Radiolocation	Radiolocation	Radiolocation	
1.150	1.150	1.150	1.150	
5 925-6 700	FIXED FIXED-SATELLITE (Earth-to-space) 1.457A 1.457B MOBILE		5 925-6 700 FIXED FIXED-SATELLITE (Earth-to- space) 1.457A 1.457B MOBILE 1 149 1 440 1 458	
6 700-7 075	FIXED FIXED-SATELLITE (Earth-to-s MOBILE	FIXED FIXED-SATELLITE (Earth-to-space) (space-to-Earth) 1.441 MOBILE		
7 075-7 145	FIXED MOBILE		7 075-7 145 FIXED MOBILE 1 458	
7 145-7 235	FIXED MOBILE SPACE RESEARCH (Earth-to-space) 1.460		7 145-7 235 FIXED MOBILE SPACE RESEARCH (Earth-to- space) 1.460	
	1.458 1.459		1.458	
7 235-7 250	FIXED MOBILE 1.458		7 235-7 250 FIXED MOBILE 1.458	
7 250-7 300	FIXED FIXED-SATELLITE (space-to-F MOBILE	Earth)	7 250-7 300 FIXED FIXED-SATELLITE (space-to- Earth) MOBILE	
	1.461		1.461	

7 300 – 8 500 MHz

ALLOCATION TO SERVICES					
REGION 1	REGION 2	REGION 3	BHUTAN		
7 300-7 450	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 1.461		7 300-7 450 FIXED FIXED-SATELLITE (space-to-Earth) LAND MOBILE 1.461		
7 450-7 550	FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile 1.461A		7 450-7 550 FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) LAND MOBILE 1.461A		
7 550-7 750	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile		7 550-7 750 FIXED FIXED-SATELLITE (space-to-Earth) LAND MOBILE		
7 750-7 850	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 1.461B MOBILE except aeronautical mobile		7 750-7 850 FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) 1.461B LAND MOBILE		
7 850-7 900	FIXED MOBILE except aeronautical mo	bile	7 850-7 900 FIXED LAND MOBILE		
7 900-8 025	FIXED FIXED-SATELLITE (Earth-to-sp MOBILE 1.461	pace)	7 900-8 025 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 1.461		
8 025-8 175	EARTH EXPLORATION-SATE FIXED FIXED-SATELLITE (Earth-to-sp MOBILE 1.463 1.462A	LLITE (space-to-Earth)	8 025-8 175 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 1.463 1.462A		
8 175-8 215	EARTH EXPLORATION-SATE FIXED FIXED-SATELLITE (Earth-to-sp METEOROLOGICAL-SATELL MOBILE 1.463 1.462A	ELLITE (space-to-Earth) pace) ITE (Earth-to-space)	8 175-8 215 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE 1.463 1.462A		
8 215-8 400	EARTH EXPLORATION-SATE FIXED FIXED-SATELLITE (Earth-to-sp MOBILE 1.463	LLITE (space-to-Earth)	8 215-8 400 EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE 1.463 1.462A		
8 400-8 500	FIXED MOBILE except aeronautical mo SPACE RESEARCH (space-to-E	bile Earth) 1.465 1.466	8 400-8 500 FIXED LAND MOBILE SPACE RESEARCH (space-to-Earth) 1.465		

$8\;500-10\;000\;MHz$

ALLOCATION TO SERVICES					
REGION 1	REGION 2	REGION 3	BHUTAN		
8 500-8 550	RADIOLOCATION		8 500-8 550 BADIOLOGATION		
	1.468 1.469		1.468		
8 550-8 650	EARTH EXPLORATION-SA	TELLITE (active)	8 550-8 650		
	RADIOLOCATION		EARTH EXPLORATION-SATELLITE		
	SPACE RESEARCH (active)		(active)		
			SPACE RESEARCH (active)		
	1.468 1.469 1.469A		1.468 1.469A		
8 650-8 750	RADIOLOCATION		8 650-8 750		
			RADIOLOCATION		
	1.468 1.469		1.468		
8 750-8 850	RADIOLOCATION		8 750-8 850		
	AERONAUTICAL RADIONAVIGATION 1.470		RADIOLOCATION		
			1.470		
	1.471		1.471		
8 850-9 000	RADIOLOCATION		8 850-9 000		
	MARITIME RADIONAVIGA	ATION 1.472	RADIOLOCATION		
	1.473				
9 000-9 200	AERONAUTICAL RADION	AVIGATION 1.337	9 000-9 200		
	RADIOLOCATION		AERONAUTICAL RADIONAVIGATION 1.337		
			RADIOLOCATION		
	1.471 1.473A		1.471 1.473A		
9 200-9 300	RADIOLOCATION		9 200-9 300		
	MARITIME RADIONAVIGA	ATION 1.472	RADIOLOCATION		
	1.473 1.474		1.474		
9 300-9 500	RADIONAVIGATION		9 300-9 500		
	SPACE RESEARCH (active)	TELLITE (active)	RADIONAVIGATION FARTH EXPLORATION-SATELLITE		
	RADIOLOCATION		(active)		
			SPACE RESEARCH (active)		
	1.427 1.474 1.475 1.475A	1.475B 1.476A	1.427 1.474 1.475 1.475A 1.475B 1.476A		
9 500-9 800	EARTH EXPLORATION-SA	TELLITE (active)	9 500-9 800		
	RADIOLOCATION		EARTH EXPLORATION-SATELLITE		
	RADIONAVIGATION		(active) RADIOLOCATION		
	SPACE RESEARCH (active)		RADIONAVIGATION		
			SPACE RESEARCH (active)		
	1.476A		1.476A		
9 800-9 900	RADIOLOCATION		9 800-10 000		
	Earth exploration -satellite (ac	ctive)	RADIOLOCATION		
	Fixed		Space research (active)		
			Fixed		
	1.477 1.478 1.478A 1.478B		1.477 1.478A 1.478B		
9 900-10 000	RADIOLOCATION		9 800-10 000		
	Fixed		RADIOLOCATION		
	1.477 1.478 1.479		1.477 1.479		
			1		
10 – 12.5 GHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
10-10.45 FIXED MOBILE RADIOLOCATION Amateur 1.479 10.45-10.5	10-10.45 RADIOLOCATION Amateur 1.479 1.480 RADIOLOCATION Amateur Amateur-satellite	10-10.45 FIXED MOBILE RADIOLOCATION Amateur 1.479	10-10.45 FIXED MOBILE RADIOLOCATION Amateur 1.479 10.45-10.5 RADIOLOCATION Amateur Amateur-satellite	
	1.481			
10.5-10.55 FIXED MOBILE Radiolocation 10.55-10.6	10.5-10.55 FIXED MOBILE RADIOLOCATION FIXED MOBILE except aeronautica	10.5-10.55 FIXED MOBILE RADIOLOCATION FIXED MOBILE except aeronautical mobile		
10.6.10.69	Radiolocation	ATELLITE (passive)	LAND MOBILE Radiolocation	
10.6-10.68 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation Radiolocation			IO.6-10.68 EARTH EXPLORATION- SATELLITE (passive) FIXED LAND MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) Radiolocation 1.149 1.482 1.482A	
10.68-10.7	68-10.7 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)		10.68-10.7 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340	
10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 1.441 1.484A (Earth-to-space) 1.484 MOBILE except aeronautical mobile	10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 1.441 1.484A MOBILE except aeronautical mobile		10.7-11.7 FIXED FIXED-SATELLITE (space-to-Earth) 1.441 1.484A LAND MOBILE	
11.7-12.5 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING- SATELLITE 1.492	11.7-12.1 FIXED 1.486 FIXED-SATELLITE (space-to-Earth) 1.484A 1.488 Mobile except aeronautical mobile 1.485 12.1-12.2 FIXED-SATELLITE (space-to-Earth) 1.484A 1.488 1.485 1.489	11.7-12.2 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING- SATELLITE 1.492	11.7-12.2 FIXED LAND MOBILE BROADCASTING BROADCASTING-SATELLITE 1.492 1.487 1.487A	
1.487 1.487A		1	<u></u>	

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
	12.2-12.7 FIXED MOBILE except aeronautical mobile BROADCASTING BROADCASTING-SATELLITE 1.492	12.2-12.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile BROADCASTING	12.2-12.5 FIXED FIXED-SATELLITE (space-to-Earth) LAND MOBILE BROADCASTING
12.5-12.75	1.487A 1.488 1.490	12.5-12.75	12.5-12.75
FIXED-SATELLITE (space-to-Earth) 1.484A (Earth-to-space)	12.7-12.75 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE except aeronautical mobile	FIXED FIXED-SATELLITE (space-to-Earth) 1.484A MOBILE except aeronautical mobile BROADCASTING-	FIXED FIXED-SATELLITE (space-to-Earth) 1.484A LAND MOBILE BROADCASTING- SATELLITE 1.493
1.494 1.495 1.496	EIXED	SATELLITE 1.493	12 75 13 25
12.75-13.25	FIXED FIXED-SATELLITE (Earth-to-space) 1.441 MOBILE Space research (deep space) (space-to-Earth)		FIXED FIXED-SATELLITE (Earth-to- space) 1.441 MOBILE Space research (deep space) (space-to-Earth)
13.25-13.4	EARTH EXPLORATION-SATELLITE (active) AERONAUTICAL RADIONAVIGATION 1.497 SPACE RESEARCH (active) 1.498A 1.499		13.25-13.4 EARTH EXPLORATION- SATELLITE (active) AERONAUTICAL RADIONAVIGATION 1.497 SPACE RESEARCH (active) 1.498A
13.4-13.75	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH 1.501A Standard frequency and time signal-satellite (Earth-to-space)		13.4-13.75 EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION SPACE RESEARCH 1.501A Standard frequency and time signal-satellite (Earth-to-space) 1.499 1.501B
13.75-14	FIXED-SATELLITE (Earth-to-space) 1.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 1.499 1.500 1.501 1.502 1.503		13.75-14 FIXED-SATELLITE (Earth-to- space) 1.484A RADIOLOCATION Earth exploration-satellite Standard frequency and time signal-satellite (Earth-to-space) Space research 1.499 1.502 1.503
14-14.25	FIXED-SATELLITE (Earth-to-space) 1.457A 1.457B 1.484A 1.506 1.506B RADIONAVIGATION 1.504 Mobile-satellite (Earth-to-space) 1.504B 1.504C 1.506A Space research		14-14.25 FIXED-SATELLITE (Earth-to- space) 1.457A 1.484A 1.506 RADIONAVIGATION 1.504 Mobile-satellite (Earth-to-space) 1.504B 1.504C 1.506A Space research

12.2 – 14.25 GHz

14.25 – 15.43 GHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
14.25-14.3	FIXED-SATELLITE (Earth-to-space) 1.457A 1.457B 1.484A 1.506 1.506B RADIONAVIGATION 1.504 Mobile-satellite (Earth-to-space) 1.504B 1.506A 1.508A Space research		14.25-14.3 FIXED-SATELLITE (Earth-to- space) 1.457A 1.484A 1.506 RADIONAVIGATION 1.504 Mobile-satellite (Earth-to-space) 1.504B 1.506A 1.508A Space research 1.504A 1.505
14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 1.457A 1.457B 1.484A 1.506 1.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 1.504B 1.506A 1.509A Radionavigation-satellite	14.3-14.4 FIXED-SATELLITE (Earth-to-space) 1.484A 1.506B Mobile-satellite 1.506A Radionavigation-satellite	14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 1.457A 1.484A 1.506 1.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to- space) 1.504B 1.506A 1.509A Radionavigation-satellite	14.3-14.4 FIXED FIXED-SATELLITE (Earth-to-space) 1.457A 1.484A 1.506 LAND MOBILE Mobile-satellite (Earth-to-space) 1.504B 1.506A 1.509A Radionavigation-satellite
1.504A 14.4-14.47	1.504A 1.504A FIXED FIXED-SATELLITE (Earth-to-space) 1.457A 1.457B 1.484A 1.506 1.506B MOBILE except aeronautical mobile MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 1.504B 1.506A 1.509A Space research (space-to-Earth) Interval Interval Interval Interval		1.504A 14.4-14.47 FIXED FIXED-SATELLITE (Earth-to- space) 1.457A 1.484A 1.506 LAND MOBILE Mobile-satellite (Earth-to-space) 1.504B 1.506A 1.509A Space research (space-to-Earth) 1.504A
14.47-14.5	FIXED FIXED-SATELLITE (Earth-to-space) 1.457A 1.457B 1.484A 1.506 1.506B MOBILE except aeronautical mobile Mobile-satellite (Earth-to-space) 1.504B 1.506A 1.509A Radio astronomy		14.47-14.5 FIXED FIXED-SATELLITE (Earth-to- space) 1.457A 1.484A 1.506 LAND MOBILE Mobile-satellite (Earth-to-space) 1.504B 1.506A Radio astronomy 1.149 1.504A
14.5-14.8	FIXED FIXED-SATELLITE (Earth-to-space) 1.510 MOBILE Space research		14.5-14.8 FIXED FIXED-SATELLITE (Earth-to- space) 1.510 MOBILE Space research
14.8-15.35	FIXED MOBILE Space research 1.339		14.8-15.35 FIXED MOBILE Space research 1.339
15.35-15.4	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)		15.35-15.4 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340
15.4-15.43	1.340 1.511 AERONAUTICAL RADIONAVIGATION		15.4-15.43 AERONAUTICAL RADIONAVIGATION 1.511D

15.43 – 18.4 GHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
15.43-15.63	FIXED-SATELLITE (Earth-to-s AERONAUTICAL RADIONAV	pace) 1.511A /IGATION	15.43-15.63 FIXED-SATELLITE (Earth-to- space) 1.511A AERONAUTICAL RADIONAVIGATION
15.63-15.7	AERONAUTICAL RADIONAN	/IGATION	15.63-15.7
	1.511D		AERONAUTICAL RADIONAVIGATION 1.511D
15.7-16.6	RADIOLOCATION		15.7-16.6 RADIOLOCATION
	1.512 1.513		1.512
16.6-17.1	RADIOLOCATION Space research (deep space) (Ear	th-to-space)	16.6-17.1 RADIOLOCATION Space research (deep space) (Earth-to-space)
	1.512 1.513		1.512
17.1-17.2	RADIOLOCATION		17.1-17.2 RADIOLOCATION
	1.512 1.513		1.512
17.2-17.3	EARTH EXPLORATION-SATE RADIOLOCATION SPACE RESEARCH (active)	17.2-17.3 EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) 1.512 1.513A	
17.3-17.7	17.3-17.7	17.3-17.7	17.3-17.7
FIXED-SATELLITE (Earth-to-space) 1.516 (space-to-Earth) 1.516A 1.516B Radiolocation	FIXED-SATELLITE (Earth-to-space) 1.516 BROADCASTING- SATELLITE Radiolocation	FIXED-SATELLITE (Earth-to-space) 1.516 Radiolocation	FIXED-SATELLITE (Earth-to-space) 1.516 Radiolocation
1.514	1.514 1.515	1.514	1.514
17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 1.484A (Earth-to-space) 1.516 MOBILE	17.7-17.8 FIXED FIXED-SATELLITE (space-to-Earth) 1.517 (Earth-to-space) 1.516 BROADCASTING- SATELLITE Mobile 1.515	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 1.484A (Earth-to-space) 1.516 MOBILE	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 1.484A (Earth-to-space) 1.516 MOBILE
	17.8-18.1 FIXED FIXED-SATELLITE (space-to-Earth) 1.484A (Earth-to-space) 1.516 MOBILE		
18.1-18.4	FIXED FIXED-SATELLITE (space-to-Earth) 1.484A 1.516B (Earth-to-space) 1.520 MOBILE 1.519 1.521		18.1-18.4 FIXED FIXED-SATELLITE (space-to- Earth) 1.484A 1.516B (Earth-to-space) 1.520 MOBILE 1.519

18.4 – 22 GHz

ALLOCATION TO SERVICES			
REGION 1	REGION 2	REGION 3	BHUTAN
18.4-18.6	FIXED FIXED-SATELLITE (space-to MOBILE	p-Earth) 1.484A 1.516B	18.4-18.6 FIXED FIXED-SATELLITE (space-to- Earth) 1.484A 1.516B MOBILE
18.6-18.8 EARTH EXPLORATION- SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 1.522B MOBILE except aeronautical mobile Space research (passive) 1.522A 1.522C	18.6-18.8 EARTH EXPLORATION- SATELLITE (passive) FIXED FIXED-SATELLITE (space-to- Earth) 1.516B 1.522B MOBILE except aeronautical mobile SPACE RESEARCH (passive) 1.522A	18.6-18.8 EARTH EXPLORATION- SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 1.522B MOBILE except aeronautical mobile Space research (passive) 1.522A	18.6-18.8 EARTH EXPLORATION- SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) 1.522B LAND MOBILE Space research (passive) 1.522A
18.8-19.3	FIXED FIXED-SATELLITE (space-to MOBILE	o-Earth) 1.516B 1.523A	18.8-19.3 FIXED FIXED-SATELLITE (space-to- Earth) 1.516B 1.523A MOBILE
19.3-19.7	FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) 1.523B 1.523C 1.523D 1.523E MOBILE		19.3-19.7 FIXED FIXED-SATELLITE (space-to- Earth) (Earth-to-space) 1.523B 1.523C 1.523D 1.523E MOBILE
19.7-20.1 FIXED-SATELLITE (space-to-Earth) 1.484A 1.516B Mobile-satellite (space-to- Earth)	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 1.484A 1.516B MOBILE-SATELLITE (space-to-Earth) 1.524 1.525 1.526 1.527	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 1.484A 1.516B Mobile-satellite (space-to- Earth)	19.7-20.1 FIXED-SATELLITE (space-to-Earth) 1.484A 1.516B Mobile-satellite (space-to-Earth)
1.524 20.1-20.2	1.528 1.524 FIXED-SATELLITE (space-to-Earth) 1.484A MOBILE-SATELLITE (space-to-Earth)		1.524 20.1-20.2 FIXED-SATELLITE (space-to- Earth) 1.484A 1.516B MOBILE-SATELLITE (space-to- Earth)
20.2-21.2	1.524 1.525 1.526 1.527 1.528 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth)		1.524 1.525 1.526 1.527 1.528 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	1.524 EARTH EXPLORATION-SATELLITE (passive) FIXED		1.524 21.2-21.4 EARTH EXPLORATION-
	MOBILE SPACE RESEARCH (passive)		SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)
21.4-22 FIXED MOBILE BROADCASTING- SATELLITE 1.208B 1.530	21.4-22 FIXED MOBILE	21.4-22 FIXED MOBILE BROADCASTING- SATELLITE 1.208B 1.530 1.531	21.4-22 FIXED MOBILE BROADCASTING-SATELLITE 1.208B 1.530

22 – 25.25 GHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
22-22.21	FIXED MOBILE except aerona	utical mobile	22-22.21 FIXED LAND MOBILE	
22.21-22.5	EARTH EXPLORATIO FIXED MOBILE except aerona RADIO ASTRONOMY SPACE RESEARCH (p	22.21-22.5 EARTH EXPLORATION- SATELLITE (passive) FIXED LAND MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 1 149 1 532		
22.5-22.55	FIXED MOBILE		22.5-22.55 FIXED MOBILE	
22.55-23.55	FIXED INTER-SATELLITE MOBILE 1.149		22.55-23.55 FIXED INTER-SATELLITE MOBILE 1.149	
23.55-23.6	23.55-23.6 FIXED MOBILE			
23.6-24 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)			23.6-24 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340	
24-24.05 AMATEUR AMATEUR-SATELLITE			24-24.05 AMATEUR AMATEUR-SATELLITE 1.150	
24.05-24.25	RADIOLOCATION Amateur Earth exploration-satelli 1.150	ite (active)	24.05-24.25 RADIOLOCATION Amateur Earth exploration-satellite (active) 1.150	
24.25-24.45 FIXED	24.25-24.45 RADIONAVIGATION	24.25-24.45 RADIONAVIGATION FIXED MOBILE	24.25-24.45 RADIONAVIGATION FIXED MOBILE	
24.45-24.65 FIXED INTER-SATELLITE	24.45-24.65 INTER-SATELLITE RADIONAVIGATION 1.533	24.45-24.65 FIXED INTER-SATELLITE MOBILE RADIONAVIGATION 1.533	24.45-24.65 FIXED INTER-SATELLITE MOBILE RADIONAVIGATION 1.533	
24.65-24.75 FIXED INTER-SATELLITE	24.65-24.75 INTER-SATELLITE RADIOLOCATION- SATELLITE (Earth-to-space)	24.65-24.75 FIXED INTER-SATELLITE MOBILE 1.533	24.65-24.75 FIXED INTER-SATELLITE MOBILE 1.533	
24.75-25.25 FIXED	24.75-25.25 FIXED-SATELLITE (Earth-to-space) 1.535	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 1.535	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) 1.535	

	MOBILE	MOBILE

25.25 – 29.5 GHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
25.25-25.5	FIXED INTER-SATELLITE 1.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)		25.25-25.5 FIXED INTER-SATELLITE 1.536 MOBILE Standard frequency and time signal- satellite (Earth-to-space)	
25.5-27	EARTH EXPLORATION-SATELLITE (space-to Earth) 1.536B FIXED INTER-SATELLITE 1.536 MOBILE SPACE RESEARCH (space-to-Earth) 1.536C Standard frequency and time signal-satellite (Earth-to-space)		25.5-27 EARTH EXPLORATION- SATELLITE (space-to Earth) 1.536B FIXED INTER-SATELLITE 1.536 MOBILE SPACE RESEARCH (space-to- Earth) 1.536C Standard frequency and time signal- satellite (Earth-to-space)	
	1.536A		1.536A	
27-27.5 FIXED INTER-SATELLITE 1.536 MOBILE	27-27.5 FIXED FIXED-SATELLITE (Ea INTER-SATELLITE 1.3 MOBILE	urth-to-space) 536 1.537	27-27.5 FIXED FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE 1.536 1.537 MOBILE	
27.5-28.5	FIXED 1.537A FIXED-SATELLITE (Earth-to 1.539 MOBILE	o-space) 1.484A 1.516B	27.5-28.5 FIXED <u>1.537A</u> FIXED-SATELLITE (Earth-to- space) 1.484A 1.516B 1.539 MOBILE	
29.5.20.1	1.538 1.540		1.538 1.540	
20.3-29.1	FIXED FIXED-SATELLITE (Earth-to 1.484A 1.5 MOBILE Earth exploration-satellite (Ea	p-space) 16B 1.523A 1.539 rth-to-space) 1.541	 26.5-29.1 FIXED FIXED-SATELLITE (Earth-to-space) 1.484A 1.516B 1.523A 1.539 MOBILE Earth exploration-satellite (Earth-to-space) 1.541 	
20.1.20.5	1.540		1.540	
29.1-29.5	FIXED FIXED-SATELLITE (Earth-to 1.523E 1.535A 1. MOBILE Earth exploration-satellite (Ea 1.540	o-space) 1.516B 1.523C 539 1.541A rth-to-space) 1.541	 29.1-29.5 FIXED FIXED-SATELLITE (Earth-to-space) 1.516B 1.523C 1.523E 1.535A 1.539 1.541A MOBILE Earth exploration-satellite (Earth-to-space) 1.541 1.540 	

29.5 – 32 GHz

ALLOCATION TO SERVICES			
REGION 2	REGION 3	BHUTAN	
29.5-29.9 FIXED-SATELLITE (Earth-to-space) 1.484A 1.516B 1.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 1.541	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 1.484A 1.516B 1.539 Earth exploration-satellite (Earth-to-space) 1.541 Mobile-satellite (Earth-to-space)	29.5-29.9 FIXED-SATELLITE (Earth-to-space) 1.484A 1.516B 1.539 Earth exploration-satellite (Earth-to-space) 1.541 Mobile-satellite (Earth-to-space)	
1.525 1.526 1.527 1.529 1.540 1.542	1.540 1.542	1.540	
FIXED-SATELLITE (Earth-to-space) 1.484A 1.516B 1.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 1.541 1.543		 29.9-30 FIXED-SATELLITE (Earth-to-space) 1.484A 1.516B 1.539 MOBILE-SATELLITE (Earth-to-space) Earth exploration-satellite (Earth-to-space) 1.541 1.543 	
1.525 1.526 1.527 1.538 1	.540 1.542	1.525 1.526 1.527 1.538 1.540 1.542	
FIXED-SATELLITE (Earth-to-space) 1.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth)		30-31 FIXED-SATELLITE (Earth-to-space) 1.338A MOBILE-SATELLITE (Earth-to-space) Standard frequency and time signal-satellite (space-to-Earth)	
FIXED 1.338A 1.543A MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 1.544 1.545		31-31.3 FIXED 1.338A <u>1.543A</u> MOBILE Standard frequency and time signal-satellite (space-to-Earth) Space research 1.544 1.149	
EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)		31.3-31.5 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340	
31.5-31.831.5-31.8EARTH EXPLORATION- SATELLITE (passive)EARTH EXPLORATION- SATELLITE (passive)RADIO ASTRONOMYRADIO ASTRONOMYSPACE RESEARCH (passive)SPACE RESEARCH (passive)Fixed Mobile except aeronautical mobile1.3401.149FIXED 1.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth)		 31.5-31.8 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Land mobile 1.149 31.8-32 FIXED 1.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 1.547 	
	REGION 2 29.5-29.9 FIXED-SATELLITE (Earth-to-space) 1.484A 1.516B 1.539 MOBILE-SATELLITE (Earth-to-space) 1.541 1.525 1.526 1.527 1.529 1.540 1.542 FIXED-SATELLITE (Earth-to-space) 1.541 1.525 1.526 1.527 1.529 1.540 1.542 FIXED-SATELLITE (Earth-to-space) 1.541 MOBILE-SATELLITE (Earth-to-space) 1.541 MOBILE-SATELLITE (Earth-to-space) 1.525 MOBILE-SATELLITE (Earth-to-space) 1.525 MOBILE-SATELLITE (Earth-to-space) 1.541 MOBILE-SATELLITE (Earth-to-space) and time Standard frequency and time Space research 1.544 1.543 MOBILE Standard frequency and time Space research 1.544 1.545 1.149 EARTH EXPLORATION-S RADIO ASTRONOMY SPACE RESEARCH (passive) RADIO ASTRONOMY SPACE RESEARCH (composition) SPACE RESEARCH (deep state) 1.340 FIXED 1.547A RADIONAVIGATION SPACE RESEARCH (deep state) 1.547 1.547B 1.548	REGION 2 REGION 3 29.5-29.9 FIXED-SATELLITE (Earth-to-space) 1.484A 1.510B 1.539 FIXED-SATELLITE (Earth-to-space) 1.484A 1.510B 1.539 MOBILE-SATELLITE (Earth-to-space) 1.541 Earth exploration-satellite (Earth-to-space) 1.541 Earth exploration-satellite (Earth-to-space) 1.541 1.540 1.525 1.526 1.527 1.529 1.540 1.542 FIXED-SATELLITE (Earth-to-space) 1.484A 1.510B 1.539 MOBILE-SATELLITE (Earth-to-space) 1.484A 1.510B 1.539 MOBILE-SATELLITE (Earth-to-space) 1.541 1.543 FIXED-SATELLITE (Earth-to-space) 1.541 1.543 MOBILE-SATELLITE (Earth-to-space) 1.338A Spa	

32 – 37.5 GHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
32-32.3	FIXED 1.547A RADIONAVIGATI SPACE RESEARCI 1.547 1.547C 1.54	ON H (deep space) (space-to-Earth) 8	32-32.3 FIXED 1.547A RADIONAVIGATION SPACE RESEARCH (deep space) (space-to-Earth) 1.547 1.548	
32.3-33 FIXED 1.547A INTER-SATELLITE RADIONAVIGATION 1.547 1.547D 1.548		32.3-33 FIXED 1.547A INTER-SATELLITE RADIONAVIGATION 1.547 1.548		
33-33.4	FIXED 1.547A RADIONAVIGATION		33-33.4 FIXED 1.547A RADIONAVIGATION 1.547	
33.4-34.2	RADIOLOCATION	[33.4-34.2 RADIOLOCATION	
34.2-34.7	RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space)		34.2-34.7 RADIOLOCATION SPACE RESEARCH (deep space) (Earth-to-space)	
34.7-31.2	1.549 RADIOLOCATION Space research 1.550		34.7-35.2 RADIOLOCATION Space research	
35.2-35.5	METEOROLOGICAL AIDS RADIOLOCATION		35.2-35.5 METEOROLOGICAL AIDS RADIOLOCATION	
35.5-36	METEOROLOGICAL AIDS EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active)		35.5-36 METEOROLOGICAL AIDS EARTH EXPLORATION- SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active)	
	1.549 1.549A		1.549A	
36-37	EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)		36-37 EARTH EXPLORATION- SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)	
37-37.5	1.149 1.550A FIXED MOBILE SPACE RESEARCH (space-to-Earth) 1.547		1.149 1.550A 37-37.5 FIXED MOBILE SPACE RESEARCH (space-to- Earth) 1.547	

37.5 – 42.5 GHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
37.5-38	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite (space-to-Earth)		37.5-38 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE SPACE RESEARCH (space-to-Earth) Earth exploration-satellite	
	1.547	(space-to-Earth) 1.547		
38-39.5	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth) 1 547		38-39.5 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE Earth exploration-satellite (space-to-Earth) 1.547	
39.5-40	FIXED FIXED-SATELLITE (space-to-Earth) 1.516B MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth)		39.5-40 FIXED FIXED-SATELLITE (space-to-Earth) 1.516B MOBILE MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (space-to-Earth)	
	1.547		1.547	
40-40.5 EARTH EXPLORATION-SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 1.516B MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)			40-40.5 EARTH EXPLORATION- SATELLITE (Earth-to-space) FIXED FIXED-SATELLITE (space-to-Earth) 1.516B MOBILE MOBILE-SATELLITE (space-to-Earth) SPACE RESEARCH (Earth-to-space) Earth exploration-satellite (space-to-Earth)	
40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING- SATELLITE Mobile 1.547	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) 1.516B BROADCASTING BROADCASTING- SATELLITE Mobile Mobile-satellite (space-to-Earth) 1.547	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING- SATELLITE Mobile 1.547	40.5-41 FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile	
41-42.5	FIXED		41-42.5	
FIXED-SATELLITE (space-to-Earth) 1.516B BROADCASTING BROADCASTING-SATELLITE Mobile 1.547 1.551F 1.551H 1.551I			FIXED FIXED-SATELLITE (space-to- Earth) 1.516B BROADCASTING BROADCASTING-SATELLITE Mobile 1.547 1.551H 1.551I	

42.5 – 50.2 GHz

ALLOCATION TO SERVICES				
REGION 1	R EGION 2	REGION 3	BHUTAN	
42.5-43.5	FIXED FIXED-SATELLITE (Earth-to-s MOBILE except aeronautical me RADIO ASTRONOMY 1.149 1.547	space) 1.552 obile	42.5-43.5 FIXED FIXED-SATELLITE (Earth-to-space) 1.552 LAND MOBILE RADIO ASTRONOMY 1.149 1.547	
43.5-47	MOBILE 1.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 1.554		43.5-47 MOBILE 1.553 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE 1.554	
47-47.2	AMATEUR AMATEUR-SATELLITE		47-47.2 AMATEUR AMATEUR-SATELLITE	
47.2-47.5	FIXED FIXED-SATELLITE (Earth-to-space) 1.552 MOBILE		47.2-47.5 FIXED FIXED-SATELLITE (Earth-to-space) 1.552 MOBILE 1.552A	
47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 1.552 (space-to-Earth) 1.516B 1.554A MOBILE	47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-sp MOBILE	pace) 1.552	47.5-47.9 FIXED FIXED-SATELLITE (Earth-to-space) 1.552 MOBILE	
47.9-48.2	FIXED FIXED-SATELLITE (Earth-to-s MOBILE	space) 1.552	47.9-48.2 FIXED FIXED-SATELLITE (Earth-to-space) 1.552 MOBILE	
	1.552A		1.552A	
48.2-48.54 FIXED FIXED-SATELLITE (Earth-to-space) 1.552 (space-to-Earth) 1.516B 1.554A 1.555B MOBILE 48.54-49.44 FIXED FIXED-SATELLITE (Earth-to-space) 1.552 MOBILE	48.2-50.2 FIXED FIXED-SATELLITE MOBILE	(Earth-to-space) 1.516B 1.552	48.2-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 1.516B 1.552 MOBILE	
MOBILE 1.149 1.340 1.555 49.44-50.2 FIXED FIXED-SATELLITE (Earth-to-space) 1.538A 1.552 (space-to-Earth) 1.516B 1.554A 1.555B MOBILE	1.149 1.340 1.555		1.149 1.340 1.555	

$50.2-59 \; GHz$

ALLOCATION TO SERVICES				
REGION 1	R EGION 2	REGION 3	BHUTAN	
50.2-50.4	EARTH EXPLORATION-SA SPACE RESEARCH (passive)	TELLITE (passive))	50.2-50.4 EARTH EXPLORATION- SATELLITE (passive) SPACE RESEARCH (passive) 1.340	
50.4-51.4	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Mobile-satellite (Earth-to-space)		50.4-51.4 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Mobile-satellite (Earth-to-space)	
51.4-52.6	FIXED MOBILE 1.547 1.556		51.4-52.6 FIXED MOBILE 1.547 1.556	
52.6-54.25	EARTH EXPLORATION-SA SPACE RESEARCH (passive) 1.340 1.556	TELLITE (passive))	52.6-54.25 EARTH EXPLORATION- SATELLITE (passive) SPACE RESEARCH (passive) 1.340 1.556	
54.25-55.78	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 1.556A SPACE RESEARCH (passive)		54.25-55.78 EARTH EXPLORATION- SATELLITE (passive) INTER-SATELLITE 1.556A SPACE RESEARCH (passive)	
55.78-56.9	EARTH EXPLORATION-SA FIXED 1.557A INTER-SATELLITE 1.556A MOBILE 1.558 SPACE RESEARCH (passive) 1.547 1.557	TELLITE (passive)	55.78-56.9 EARTH EXPLORATION- SATELLITE (passive) FIXED 1.557A INTER-SATELLITE 1.556A MOBILE 1.558 SPACE RESEARCH (passive) 1.547	
56.9-57	EARTH EXPLORATION-SA FIXED INTER-SATELLITE 1.558A MOBILE 1.558 SPACE RESEARCH (passive) 1.547 1.557	TELLITE (passive)	56.9-57 EARTH EXPLORATION- SATELLITE (passive) FIXED INTER-SATELLITE 1.558A MOBILE 1.558 SPACE RESEARCH (passive) 1.547	
57-58.2	EARTH EXPLORATION-SA FIXED INTER-SATELLITE 1.556A MOBILE 1.558 SPACE RESEARCH (passive) 1.547 1.557	TELLITE (passive)	57-58.2 EARTH EXPLORATION- SATELLITE (passive) FIXED INTER-SATELLITE 1.556A MOBILE 1.558 SPACE RESEARCH (passive) 1.547	
58.2-59	EARTH EXPLORATION-SA FIXED MOBILE SPACE RESEARCH (passive)	TELLITE (passive)	58.2-59 EARTH EXPLORATION- SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) 1.547 1.556	

59 – 76 GHz

ALLOCATION TO SERVICES					
REGION 1	REGION 2	REGION 3	BHUTAN		
59-59.3	EARTH EXPLORATION-SATELLITE (passive) FIXED INTER-SATELLITE 1.556A MOBILE 1.558 RADIOLOCATION 1.559 SPACE RESEARCH (passive)		59-59.3 EARTH EXPLORATION- SATELLITE (passive) FIXED INTER-SATELLITE 1.556A MOBILE 1.558 RADIOLOCATION 1.559 SPACE RESEARCH (passive)		
59.3-64	FIXED INTER-SATELLITE MOBILE 1.558 RADIOLOCATION 1.559 1.138		59.3-64 FIXED INTER-SATELLITE MOBILE 1.558 RADIOLOCATION 1.559 1.138		
64-65	FIXED INTER-SATELLITE MOBILE except aeronautical 1.547 1.556	mobile	64-65 FIXED INTER-SATELLITE LAND MOBILE 1.547 1.556		
65-66	EARTH EXPLORATION-SATELLITE FIXED INTER-SATELLITE MOBILE except aeronautical mobile SPACE RESEARCH		65-66 EARTH EXPLORATION- SATELLITE FIXED INTER-SATELLITE LAND MOBILE SPACE RESEARCH 1.547		
66-71	INTER-SATELLITE MOBILE 1.553 1.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE		66-71 INTER-SATELLITE MOBILE 1.553 1.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE		
71-74	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth)		71-74 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to- Earth)		
74-76	FIXED FIXED-SATELLITE (space-to MOBILE BROADCASTING BROADCASTING-SATELLI Space research (space-to-Earth	o-Earth) TE 1)	74-76 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE BROADCASTING BROADCASTING-SATELLITE Space research (space-to-Earth) 1.561		

76 – 94 GHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
76-77.5	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-E 1.149	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth)		
77.5-78	AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) 1.149		77.5-78 AMATEUR AMATEUR-SATELLITE Radio astronomy Space research (space-to-Earth) 1.149	
78-79	RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-E 1.149 1.560	RADIOLOCATION Amateur Amateur-satellite Radio astronomy Space research (space-to-Earth)		
79-81	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-E 1.149	Earth)	79-81 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite Space research (space-to-Earth) 1.149	
81-84	FIXED FIXED-SATELLITE (Eart MOBILE MOBILE-SATELLITE (E RADIO ASTRONOMY Space research (space-to-E	th-to-space) arth-to-space) Earth)	81-84 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE MOBILE-SATELLITE (Earth-to- space) RADIO ASTRONOMY Space research (space-to-Earth)	
84-86	1.149 1.561A FIXED FIXED-SATELLITE (Eart MOBILE RADIO ASTRONOMY	th-to-space) 1.561B	1.1491.561A84-86FIXEDFIXED-SATELLITE (Earth-to-space)MOBILERADIO ASTRONOMY	
	1.149		1.149	
86-92	EARTH EXPLORATION RADIO ASTRONOMY SPACE RESEARCH (pass 1.340	-SATELLITE (passive sive)	 86-92 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340 	
92-94	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 1.149		92-94 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 1.149	

94 – 116 GHz

ALLOCATION TO SERVICES					
REGION 1	REGION 2	REGION 3	BHUTAN		
94-94.1	EARTH EXPLORATION-SATE RADIOLOCATION SPACE RESEARCH (active) Radio astronomy	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Radio astronomy			
94.1-95	1.562 1.562A FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION	1.562 1.562A FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION			
95-100	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELL	1.149 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE			
100-102	EARTH EXPLORATION-SATE RADIO ASTRONOMY SPACE RESEARCH (passive)	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)			
102-105	FIXED MOBILE RADIO ASTRONOMY	FIXED MOBILE RADIO ASTRONOMY			
105-109.5	FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 1.	1.149 1.341 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 1.562B			
109.5-111.8	EARTH EXPLORATION-SATEI RADIO ASTRONOMY SPACE RESEARCH (passive)	1.149 1.341 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)			
111.8-114.25	FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 1.562B		111.8-114.25 FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 1.562B		
114.25-116	EARTH EXPLORATION-SATE RADIO ASTRONOMY SPACE RESEARCH (passive)	LLITE (passive)	1.149 1.341 114.25-116 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340, 1.341		

116 – 151.5 GHz

ALLOCATION TO SERVICES				
REGION 1	R EGION 2	REGION 3	BHUTAN	
116-119.98	EARTH EXPLORATION-SATI INTER-SATELLITE 1.562C SPACE RESEARCH (passive)	ELLITE (passive)	116-119.98 EARTH EXPLORATION- SATELLITE (passive) INTER-SATELLITE 1.562C SPACE RESEARCH (passive) 1.341	
119.98-122.25	EARTH EXPLORATION-SATI INTER-SATELLITE 1.562C SPACE RESEARCH (passive) 1.138 1.341	119.98-122.25 EARTH EXPLORATION- SATELLITE (passive) INTER-SATELLITE 1.562C SPACE RESEARCH (passive) 1.138 1.341		
122.25-123	FIXED INTER-SATELLITE MOBILE 1.558 Amateur 1.138	122.25-123 FIXED INTER-SATELLITE MOBILE 1.558 Amateur 1.138		
123-130	FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy 1.562D		123-130 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to- Earth) RADIONAVIGATION RADIONAVIGATION-SATELLITE Radio astronomy	
	1.149 1.554		1.149 1.554	
130-134	EARTH EXPLORATION-SATELLITE (active) 1.562E FIXED INTER-SATELLITE MOBILE 1.558 RADIO ASTRONOMY		130-134 EARTH EXPLORATION- SATELLITE (active) 1.562E FIXED INTER-SATELLITE MOBILE 1.558 RADIO ASTRONOMY 1.149 1.562A	
134-136	AMATEUR AMATEUR-SATELLITE Radio astronomy		134-136 AMATEUR AMATEUR-SATELLITE Radio astronomy	
136-141	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 1.149		136-141 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 1.149	
141-148.5	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 1.149		141-148.5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION 1.149	
148.5-151.5	EARTH EXPLORATION-SATI RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340	ELLITE (passive)	148.5-151.5 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340	

151.5 – 191.8 GHz

ALLOCATION TO SERVICES					
REGION 1	REGION 2	REGION 3	BHUTAN		
151.5-155.5	FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION		151.5-155.5 FIXED MOBILE RADIO ASTRONOMY RADIOLOCATION		
155.5-158.5	EARTH EXPLORATION-SATEL FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 1.5 1.149 1.562F 1.562G	1.149 EARTH EXPLORATION-SATELLITE (passive) 1.562F FIXED MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 1.562B 1.149 1.562F 1.562G			
158.5-164 164-167	FIXED FIXED-SATELLITE (space-to-Ea MOBILE MOBILE-SATELLITE (space-to-F EARTH EXPLORATION-SATEL RADIO ASTRONOMY SPACE RESEARCH (passive)	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE MOBILE-SATELLITE (space-to-Earth) EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)			
167-174.5	1.340 FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MOBILE 1.558		SPACE RESEARCH (passive) 1.340 167-174.5 FIXED FIXED-SATELLITE (space-to-Earth) INTER-SATELLITE MODULE 1550		
174.5-174.8	1.149 1.562D FIXED INTER-SATELLITE MOBILE 1.558	1.149 1.562D FIXED INTER-SATELLITE MOBILE 1.558			
174.8-182	EARTH EXPLORATION-SATEL INTER-SATELLITE 1.562H SPACE RESEARCH (passive)	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 1.562H SPACE RESEARCH (passive)			
182-185	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340		182-185 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340		
185-190	EARTH EXPLORATION-SATEL INTER-SATELLITE 1.562H SPACE RESEARCH (passive)	EARTH EXPLORATION-SATELLITE (passive) INTER-SATELLITE 1.562H SPACE RESEARCH (passive)			
190-191.8	EARTH EXPLORATION-SATEL SPACE RESEARCH (passive)	LITE (passive)	190-191.8 EARTH EXPLORATION-SATELLITE (passive) SPACE RESEARCH (passive)		

1.340

1.340

191.8 -	238	GHz
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ALLOCATION TO SERVICES					
REGION 1	REGION 2	REGION 3	BHUTAN		
191.8-200	FIXED INTER-SATELLITE MOBILE 1.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATEL	191.8-200 FIXED INTER-SATELLITE MOBILE 1.558 MOBILE-SATELLITE RADIONAVIGATION RADIONAVIGATION-SATELLITE			
	1.149 1.341 1.554		1.149 1.341 1.554		
200-202	EARTH EXPLORATION-SATI RADIO ASTRONOMY SPACE RESEARCH (passive)	200-202 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340 1.341 1.563A			
202-209	EARTH EXPLORATION-SAT	ELLITE (passive)	202-209		
	RADIO ASTRONOMY SPACE RESEARCH (passive)	EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1 340 1 341 1 563 A			
209-217	1.340 1.341 1.563A FIXED		1.340 1.341 1.303A 209-217		
	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY		FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY		
	1.149 1.341		1.149 1.341		
217-226	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 1.562B		217-226 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY SPACE RESEARCH (passive) 1.562B		
	1.149 1.341		1.149 1.341		
226-231.5	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)		226-231.5 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)		
231.5-232	1.340 FIXED MOBILE Radiolocation		231.5-232 FIXED MOBILE Radiolocation		
232-235	FIXED FIXED-SATELLITE (space-to-Earth) 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)		EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive)		235-238 EARTH EXPLORATION- SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) SPACE RESEARCH (passive)
	1.563A 1.563B		1.563A 1.563B		

238 – 275 GHz

ALLOCATION TO SERVICES				
REGION 1	REGION 2	REGION 3	BHUTAN	
238-240	FIXED FIXED-SATELLITE (space-to-F MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATEL	238-240 FIXED FIXED-SATELLITE (space-to-Earth) MOBILE RADIOLOCATION RADIONAVIGATION RADIONAVIGATION-SATELLITE		
240-241	FIXED MOBILE RADIOLOCATION	240-241 FIXED MOBILE RADIOLOCATION		
241-248	RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite		241-248 RADIO ASTRONOMY RADIOLOCATION Amateur Amateur-satellite 1.138 1.149	
248-250	AMATEUR AMATEUR-SATELLITE Radio astronomy 1.149		248-250 AMATEUR AMATEUR-SATELLITE Radio astronomy 1.149	
250-252	EARTH EXPLORATION-SATH RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340 1.563A	ELLITE (passive)	250-252 EARTH EXPLORATION- SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) 1.340 1.563A	
252-265	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 1.149 1.554		252-265 FIXED MOBILE MOBILE-SATELLITE (Earth-to- space) RADIO ASTRONOMY RADIONAVIGATION RADIONAVIGATION-SATELLITE 1.149 1.554	
265-275	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 1.149 1.563A		265-275 FIXED FIXED-SATELLITE (Earth-to-space) MOBILE RADIO ASTRONOMY 1.149 1.563A	
275-1 000	(Not allocated) 1.565		275-1 000 (Not allocated) 1.565	

Section V – Footnotes referenced in the three left columns of the table

The footnotes referenced in the Regional columns (Regions 1, 2 and 3. See Figure 1) of table of national frequency allocation in the format "1.*nnn*" provided here from Article **5**, Vol.1, ITU-RR (see also No. **1.1**). Therefore, same notation has been kept intact to ease for further investigation in ITU legal documents, except change of beginning **5** into **1**. Other references could be found in different Articles of ITU-RR.

- **1.53** Administrations authorizing the use of frequencies below 9 kHz shall ensure that no harmful interference is caused thereby to the services to which the bands above 9 kHz are allocated.
- **1.54** Administrations conducting scientific research using frequencies below 9 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.
- **1.55** *Additional allocation:* in Armenia, Azerbaijan, the Russian Federation, Georgia, Kyrgyzstan, Tajikistan and Turkmenistan, the band 14-17 kHz is also allocated to the radionavigation service on a primary basis. (WRC-07)
- **1.56** 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, Bulgaria, the Russian Federation, Georgia, Kazakhstan, Mongolia, Kyrgyzstan, Slovakia, Tajikistan and Turkmenistan, the frequencies 25 kHz and 50 kHz will be used for this purpose under the same conditions. (WRC-07)
- **1.57** 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.
- **1.58** *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)
- **1.59** *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. **1.33**). (WRC-2000)
- **1.60** 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.
- **1.61** 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 ITU-RR 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.
- **1.62** 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.
- **1.63** (SUP WRC-97)
- 1.64 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.
- **1.65** *Different category of service:* in Bangladesh, the allocation of the bands 112-117.6 kHz and 126-129 kHz to the fixed and maritime mobile services is on a primary basis (see No. **1.33**). (WRC-2000)
- **1.66** *Different category of service:* in Germany, the allocation of the band 115-117.6 kHz to the fixed and maritime mobile services is on a primary basis (see No. **1.33**) and to the radionavigation service on a secondary basis (see No. **1.32**).
- **1.67** *Additional allocation:* in Mongolia, Kyrgyzstan and Turkmenistan, the band 130-148.5 kHz is also allocated to the radionavigation service on a secondary basis. Within and between these countries this service shall have an equal right to operate. (WRC-07)

- **1.67A** 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. **1.67**. (WRC-07)
- **1.67B** The use of the band 135.7-137.8 kHz in Algeria, Egypt, Iran (Islamic Republic of), Iraq, Libyan Arab Jamahiriya, Lebanon, Syrian Arab Republic, Sudan and Tunisia is limited to the fixed and maritime mobile services. The amateur service shall not be used in the above-mentioned countries in the band 135.7-137.8 kHz, and this should be taken into account by the countries authorizing such use. (WRC-07)
- **1.68** *Alternative allocation:* in Angola, Burundi, Congo (Rep. of the), Malawi, the Dem. Rep. of the Congo, Rwanda and South Africa, the band 160-200 kHz is allocated to the fixed service on a primary basis. (WRC-03)
- **1.69** Additional allocation: in Somalia, the band 200-255 kHz is also allocated to the aeronautical radionavigation service on a primary basis.
- **1.70** *Alternative allocation:* in Angola, Botswana, Burundi, the Central African Rep., Congo (Rep. of the), Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mozambique, Namibia, Nigeria, Oman, the Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland, Tanzania, Chad, Zambia and Zimbabwe, the band 200-283.5 kHz is allocated to the aeronautical radionavigation service on a primary basis. (WRC-07)
- **1.71** *Alternative allocation:* in Tunisia, the band 255-283.5 kHz is allocated to the broadcasting service on a primary basis.
- **1.72** Norwegian stations of the fixed service situated in northern areas (north of 60° N) subject to auroral disturbances are allowed to continue operation on four frequencies in the bands 283.5-490 kHz and 510-526.5 kHz.
- **1.73** The band 285-325 kHz (283.5-325 kHz in Region 1) in the maritime radionavigation service may be used to transmit supplementary navigational information using narrow-band techniques, on condition that no harmful interference is caused to radiobeacon stations operating in the radionavigation service. (WRC-97)
- **1.74** *Additional Allocation:* in Region 1, the frequency band 285.3-285.7 kHz is also allocated to the maritime radionavigation service (other than radiobeacons) on a primary basis.
- 1.75 Different category of service: in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Moldova, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine and the Black Sea areas of Romania, the allocation of the band 315-325 kHz to the maritime radionavigation service is on a primary basis under the condition that in the Baltic Sea area, the assignment of frequencies in this band to new stations in the maritime or aeronautical radionavigation services shall be subject to prior consultation between the administrations concerned. (WRC-07)
- **1.76** 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.
- 1.77 Different category of service: in Australia, China, the French overseas communities of Region 3, India, Iran (Islamic Republic of), Japan, Pakistan, Papua New Guinea and Sri Lanka, the allocation of the band 415-495 kHz to the aeronautical radionavigation service is on a primary basis. Administrations in these countries shall take all practical steps necessary to ensure that aeronautical radionavigation stations in the band 435-495 kHz do not cause interference to reception by coast stations of ship stations transmitting on frequencies designated for ship stations on a worldwide basis (see No. 52.39). (WRC-07)
- **1.78** *Different category of service:* in Cuba, the United States of America and Mexico, the allocation of the band 415-435 kHz to the aeronautical radionavigation service is on a primary basis.
- **1.79** The use of the bands 415-495 kHz and 505-526.5 kHz (505-510 kHz in Region 2) by the maritime mobile service is limited to radiotelegraphy.
- **1.79A** When establishing coast stations in the NAVTEX service on the frequencies 490 kHz, 518 kHz and 4209.5 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)
- **1.80** 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.
- **1.81** (SUP WRC-2000)
- **1.82** 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 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. (WRC-07)

- **1.82A** The use of the band 495-505 kHz is limited to radiotelegraphy. (WRC-07)
- **1.82B** Administrations authorizing the use of frequencies in the band 495-505 kHz by services other than the maritime mobile service shall ensure that no harmful interference is caused to the maritime mobile service in this band or to the services having allocations in the adjacent bands, noting in particular the conditions of use of the frequencies 490 kHz and 518 kHz, as prescribed in Articles **31** and **52**. (WRC-07)
- **1.83** (SUP WRC-07)
- **1.84** The conditions for the use of the frequency 518 kHz by the maritime mobile service are prescribed in ITU-RR Articles **31** and **52**. (WRC-07)
- **1.85** Not used.
- **1.86** 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.
- **1.87** *Additional allocation:* in Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland and Zimbabwe, the band 526.5-535 kHz is also allocated to the mobile service on a secondary basis. (WRC-03)
- **1.87A** *Additional allocation:* in Uzbekistan, the band 526.5-1 606.5 kHz is also allocated to the radionavigation service on a primary basis. Such use is subject to agreement obtained under ITU-RR No. **9.21** with administrations concerned and limited to ground-based radiobeacons in operation on 27 October 1997 until the end of their lifetime. (WRC-97)
- **1.88** *Additional allocation:* in China, the band 526.5-535 kHz is also allocated to the aeronautical radionavigation service on a secondary basis.
- **1.89** 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).

- **1.90** 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.
- **1.91** *Additional allocation:* in the Philippines and Sri Lanka, the band 1 606.5-1 705 kHz is also allocated to the broadcasting service on a secondary basis. (WRC-97)
- 1.92 Some countries of Region 1 use radiodetermination systems in the bands 1 606.5-1 625 kHz, 1 635-1 800 kHz, 1 850-2 160 kHz, 2 194-2 300 kHz, 2 502-2 850 kHz and 3 500-3 800 kHz, subject to agreement obtained under ITU-RR No. 9.21. The radiated mean power of these stations shall not exceed 50 W.
- 1.93 Additional allocation: in Angola, Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Mongolia, Nigeria, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Tajikistan, Chad, Turkmenistan and Ukraine, the bands 1 625-1 635 kHz, 1 800-1 810 kHz and 2 160-2 170 kHz are also allocated to the fixed and land mobile services on a primary basis, subject to agreement obtained under ITU-RR No. 9.21. (WRC-07)
- 1.94 and 1.95 Not used.
- 1.96 In Germany, Armenia, Austria, Azerbaijan, Belarus, Denmark, Estonia, the Russian Federation, Finland, Georgia, Hungary, Ireland, Iceland, Israel, Kazakhstan, Latvia, Liechtenstein, Lithuania, Malta, Moldova, Norway, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., the United Kingdom, Sweden, Switzerland, Tajikistan, Turkmenistan and Ukraine, administrations may allocate up to 200 kHz to their amateur service in the bands 1 715-1 800 kHz and 1 850-2 000 kHz. However, when allocating the bands within this range to their amateur service, administrations shall, after prior consultation with administrations of neighbouring countries, take such steps as may be necessary to prevent harmful interference from their amateur service to the fixed and mobile services of other countries. The mean power of any amateur station shall not exceed 10 W. (WRC-03)
- **1.97** In Region 3, the Loran system operates either on 1 850 kHz or 1 950 kHz, the bands occupied being 1 825-1 875 kHz and 1 925-1 975 kHz respectively. Other services to which the band 1 800-2 000 kHz is allocated may use any frequency therein on condition that no harmful interference is caused to the Loran system operating on 1 850 kHz or 1 950 kHz.

- 1.98 Alternative allocation: in Angola, Armenia, Azerbaijan, Belarus, Belgium, Cameroon, Congo (Rep. of the), Denmark, Egypt, Eritrea, Spain, Ethiopia, the Russian Federation, Georgia, Greece, Italy, Kazakhstan, Lebanon, Lithuania, Moldova, the Syrian Arab Republic, Kyrgyzstan, Somalia, Tajikistan, Tunisia, Turkmenistan, Turkey and Ukraine, the band 1 810-1 830 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)
- **1.99** *Additional allocation:* in Saudi Arabia, Austria, Iraq, the Libyan Arab Jamahiriya, Uzbekistan, Slovakia, Romania, Serbia, Slovenia, Chad, and Togo, the band 1 810-1 830 kHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)
- **1.100** In Region 1, the authorization to use the band 1 810-1 830 kHz by the amateur service in countries situated totally or partially north of 40° N shall be given only after consultation with the countries mentioned in Nos. **1.98** and **1.99** to define the necessary steps to be taken to prevent harmful interference between amateur stations and stations of other services operating in accordance with Nos. **1.98** and **1.99**.
- **1.101** *Alternative allocation:* in Burundi and Lesotho, the band 1 810-1 850 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.
- **1.102** *Alternative allocation:* in Bolivia, Chile, Mexico, Paraguay, Peru and Uruguay, the band 1 850-2 000 kHz is allocated to the fixed, mobile except aeronautical mobile, radiolocation and radionavigation services on a primary basis. (WRC-07)
- **1.103** In Region 1, in making assignments to stations in the fixed and mobile services in the bands 1 850-2 045 kHz, 2 194-2 498 kHz, 2 502-2 625 kHz and 2 650-2 850 kHz, administrations should bear in mind the special requirements of the maritime mobile service.
- **1.104** In Region 1, the use of the band 2 025-2 045 kHz by the meteorological aids service is limited to oceanographic buoy stations.
- 1.105 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 ITU-RR No. 52.165.
- **1.106** 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.
- **1.107** *Additional allocation:* in Saudi Arabia, Eritrea, Ethiopia, Iraq, the Libyan Arab Jamahiriya, Lesotho, Somalia and Swaziland, the band 2 160-2 170 kHz is also allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis. The mean power of stations in these services shall not exceed 50 W. (WRC-03)
- **1.108** 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 ITU-RR Articles **31** and **52**. (WRC-07)
- **1.109** 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**.
- **1.110** 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**.
- **1.111** The carrier frequencies 2182 kHz, 3023 kHz, 5680 kHz, 8364 kHz and the frequencies 121.5 MHz, 156.525 MHz, 156.8 MHz and 243 MHz may also be used, in accordance with the procedures in force for terrestrial radiocommunication services, for search and rescue operations concerning manned space vehicles. The conditions for the use of the frequencies are prescribed in Article **31**.

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

1.112 *Alternative allocation:* in Denmark, Malta, Serbia and Sri Lanka, the band 2 194-2 300 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)

- 1.113 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. 1.16 to 1.20, 1.21 (definition of the *Tropical Zone* in the section 1.1 of this chapter) and ITU-RR Nos. 23.3 to 23.10.
- **1.114** *Alternative allocation:* in Denmark, Iraq, Malta and Serbia, the band 2 502-2 625 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)
- 1.115 The carrier (reference) frequencies 3 023 kHz and 5 680 kHz may also be used, in accordance with ITU-RR Article 31 by stations of the maritime mobile service engaged in coordinated search and rescue operations. (WRC-07)
- **1.116** 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.

- **1.117** *Alternative allocation:* in Côte d'Ivoire, Denmark, Egypt, Liberia, Malta, Serbia, Sri Lanka and Togo, the band 3 155-3 200 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)
- **1.118** *Additional allocation:* in the United States, Mexico, Peru and Uruguay, the band 3 230-3 400 kHz is also allocated to the radiolocation service on a secondary basis. (WRC-03)
- **1.119** Additional allocation: in Honduras, Mexico and Peru, the band 3 500-3 750 kHz is also allocated to the fixed and mobile services on a primary basis. (WRC-07)
- 1.120 (SUP WRC-2000)
- 1.121 Not used.
- **1.122** *Alternative allocation:* in Bolivia, Chile, Ecuador, Paraguay, Peru and Uruguay, the band 3750-4000 kHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)
- **1.123** Additional allocation: in Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe, the band 3 900-3 950 kHz is also allocated to the broadcasting service on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**.
- 1.124 (SUP WRC-2000)
- **1.125** *Additional allocation:* in Greenland, the band 3 950-4 000 kHz is also allocated to the broadcasting service on a primary basis. The power of the broadcasting stations operating in this band shall not exceed that necessary for a national service and shall in no case exceed 5 kW.
- **1.126** In Region 3, the stations of those services to which the band 3 995-4 005 kHz is allocated may transmit standard frequency and time signals.
- **1.127** The use of the band 4 000-4 063 kHz by the maritime mobile service is limited to ship stations using radiotelephony (see ITU-RR No. **52.220** and ITU-RR Appendix **17**).
- **1.128** Frequencies in the bands 4063-4123 kHz and 4130-4438 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, Azerbaijan, Belarus, Botswana, Burkina Faso, the Central African Rep., China, the Russian Federation, Georgia, India, Kazakhstan, Mali, Niger, Kyrgyzstan, Tajikistan, Chad, Turkmenistan and Ukraine, in the bands 4063-4123 kHz, 4130-4133 kHz and 4408-4438 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-07)
- **1.129** (SUP WRC-07)
- **1.130** The conditions for the use of the carrier frequencies 4 125 kHz and 6 215 kHz are prescribed in ITU-RR Articles **31** and **52**. (WRC-07)
- **1.131** The frequency 4 209.5 kHz is used exclusively for the transmission by coast stations of meteorological and navigational warnings and urgent information to ships by means of narrow-band direct-printing techniques. (WRC-97)

- **1.132** 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 ITU-RR Appendix **17**).
- 1.133 Different category of service: in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Latvia, Lithuania, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 5 130-5 250 kHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. 1.33). (WRC-07)
- 1.134 The use of the bands 5900-5950 kHz, 7300-7350 kHz, 9400-9500 kHz, 11600-11650 kHz, 12050-12100 kHz, 13570-13600 kHz, 13800-13870 kHz, 15600-15800 kHz, 17480-17550 kHz and 18900-19020 kHz by the broadcasting service is subject to the application of the procedure of Article 12. Administrations are encouraged to use these bands to facilitate the introduction of digitally modulated emissions in accordance with the provisions of ITU-R Resolution 517 (Rev.WRC-03). (WRC-07)
- 1.135 (SUP WRC-97)
- **1.136** *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)
- **1.137** 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.
- **1.138** 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. 1.280 ,
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.

- **1.138A** Until 29 March 2009, the band 6 765-7 000 kHz is allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis. After this date, this band is allocated to the fixed and the mobile except aeronautical mobile (R) services on a primary basis. (WRC-03)
- 1.139 Different category of service: until 29 March 2009, in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Latvia, Lithuania, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 6765-7000 kHz to the land mobile service is on a primary basis (see No. 1.33). (WRC-07)
- **1.140** *Additional allocation:* in Angola, Iraq, Kenya, Rwanda, Somalia and Togo, the band 7 000-7 050 kHz is also allocated to the fixed service on a primary basis. (WRC-03)
- **1.141** *Alternative allocation:* in Egypt, Eritrea, Ethiopia, Guinea, the Libyan Arab Jamahiriya and Madagascar, the band 7 000-7 050 kHz is allocated to the fixed service on a primary basis. (WRC-97)
- **1.141A** Additional allocation: in Uzbekistan and Kyrgyzstan, the bands 7 000-7 100 kHz and 7 100-7 200 kHz are also allocated to the fixed and land mobile services on a secondary basis. (WRC-03)
- **1.141B** Additional allocation: after 29 March 2009, in Algeria, Saudi Arabia, Australia, Bahrain, Botswana, Brunei Darussalam, China, Comoros, Korea (Rep. of), Diego Garcia, Djibouti, Egypt, United Arab Emirates, Eritrea, Indonesia, Iran (Islamic Republic of), Japan, Jordan, Kuwait, the Libyan Arab Jamahiriya, Morocco,

Mauritania, New Zealand, Oman, Papua New Guinea, Qatar, the Syrian Arab Republic, Singapore, Sudan, Tunisia, Viet Nam and Yemen, the band 7 100-7 200 kHz is also allocated to the fixed and the mobile, except aeronautical mobile (R), services on a primary basis. (WRC-03)

- **1.141C** In Regions 1 and 3, the band 7 100-7 200 kHz is allocated to the broadcasting service until 29 March 2009 on a primary basis. (WRC-03)
- 1.142 Until 29 March 2009, the use of the band 7 100-7 300 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. After 29 March 2009 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-03)
- **1.143** *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)
- **1.143A** In Region 3, the band 7 350-7 450 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, frequencies in this band may be used by stations in the above-mentioned services, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. 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-03)
- **1.143B** In Region 1, the band 7 350-7 450 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, on condition that harmful interference is not caused to the broadcasting service, frequencies in the band 7 350-7 450 kHz may be used by stations in the fixed and land mobile services communicating only within the boundary of the country in which they are located, each station using a total radiated power that shall not exceed 24 dBW. (WRC-03)
- 1.143C Additional allocation: after 29 March 2009 in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, Jordan, Kuwait, Morocco, Mauritania, Oman, Qatar, the Syrian Arab Republic, Sudan, Tunisia and Yemen, the bands 7 350-7 400 kHz and 7 400-7 450 kHz are also allocated to the fixed service on a primary basis. (WRC-03)
- **1.143D** In Region 2, the band 7 350-7 400 kHz is allocated, until 29 March 2009, to the fixed service on a primary basis and to the land mobile service on a secondary basis. After 29 March 2009, frequencies in this band may be used by stations in the above-mentioned services, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. 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-03)
- **1.143E** Until 29 March 2009, the band 7 450-8 100 kHz is allocated to the fixed service on a primary basis and to the land mobile service on a secondary basis. (WRC-03)
- **1.144** In Region 3, the stations of those services to which the band 7 995-8 005 kHz is allocated may transmit standard frequency and time signals. (WRC-07)
- 1.145 The conditions for the use of the carrier frequencies 8 291 kHz, 12 290 kHz and 16 420 kHz are prescribed in ITU-RR Articles 31 and 52. . (WRC-07)
- **1.146** *Additional allocation:* frequencies in the bands 9400-9500 kHz, 11600-11650 kHz, 12050-12100 kHz, 15600-15800 kHz, 17480-17550 kHz and 18900-19020 kHz may be used by stations in the fixed service, communicating only within the boundary of the country in which they are located, on condition that harmful interference is not caused to the broadcasting service. When using frequencies in the fixed service, administrations are urged to use the minimum power required and to take account of the seasonal use of frequencies by the broadcasting service published in accordance with the Radio Regulations. (WRC-07)
- **1.147** 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.

1.148 (SUP - WRC-97)

1.149	In making	assignments (to stations	of other	services to	o which the b	ands:

13 360-13 410 kHz,	4 950-4 990 MHz,	102-109.5 GHz,
25 550-25 670 kHz,	4 990-5 000 MHz,	111.8-114.25 GHz,
37.5-38.25 MHz,	6 650-6 675.2 MHz,	128.33-128.59 GHz,
73-74.6 MHz in Regions 1 and 3,	10.6-10.68 GHz,	129.23-129.49 GHz,
150.05-153 MHz in Region 1,	14.47-14.5 GHz,	130-134 GHz,
322-328.6 MHz,	22.01-22.21 GHz,	136-148.5 GHz,
406.1-410 MHz,	22.21-22.5 GHz,	151.5-158.5 GHz,
608-614 MHz in Regions 1 and 3,	22.81-22.86 GHz,	168.59-168.93 GHz,
1 330-1 400 MHz,	23.07-23.12 GHz,	171.11-171.45 GHz,
1 610.6-1 613.8 MHz,	31.2-31.3 GHz,	172.31-172.65 GHz,
1 660-1 670 MHz,	31.5-31.8 GHz in Regions 1 and 3,	173.52-173.85 GHz,
1718.8-1722.2 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 ITU-RR No. **4.5** and **4.6** and ITU-RR Article **29**). (WRC-07)

1.150 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 ITU-RR No. **15.13**.

- **1.151** *Additional allocation:* frequencies in the bands 13570-13600 kHz and 13800-13870 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)
- 1.152 Additional allocation: in Armenia, Azerbaijan, China, Côte d'Ivoire, the Russian Federation, Georgia, Iran (Islamic Republic of), Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 14 250-14 350 kHz is also allocated to the fixed service on a primary basis. Stations of the fixed service shall not use a radiated power exceeding 24 dBW. (WRC-03)

- **1.153** In Region 3, the stations of those services to which the band 15 995-16 005 kHz is allocated may transmit standard frequency and time signals.
- **1.154** *Additional allocation:* in Armenia, Azerbaijan, the Russian Federation, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 18 068-18 168 kHz is also allocated to the fixed service on a primary basis for use within their boundaries, with a peak envelope power not exceeding 1 kW. (WRC-03)
- **1.155** *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the band 21850-21870 kHz is also allocated to the aeronautical mobile (R) service on a primary basis. (WRC-07)
- **1.155A** In Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the use of the band 21 850-21 870 kHz by the fixed service is limited to provision of services related to aircraft flight safety. (WRC-07)
- **1.155B** The band 21 870-21 924 kHz is used by the fixed service for provision of services related to aircraft flight safety.
- **1.156** *Additional allocation:* in Nigeria, the band 22 720-23 200 kHz is also allocated to the meteorological aids service (radiosondes) on a primary basis.
- **1.156A** 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.
- **1.157** The use of the band 23 350-24 000 kHz by the maritime mobile service is limited to inter-ship radiotelegraphy.
- 1.158 and 1.159 Not used.
- **1.160** Additional allocation: in Botswana, Burundi, Lesotho, Malawi, Dem. Rep. of the Congo, Rwanda and Swaziland, the band 41-44 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-2000)
- **1.161** Additional allocation: in Iran (Islamic Republic of) and Japan, the band 41-44 MHz is also allocated to the radiolocation service on a secondary basis.
- **1.162** Additional allocation: in Australia and New Zealand, the band 44-47 MHz is also allocated to the broadcasting service on a primary basis.
- **1.162A** *Additional allocation:* in Germany, Austria, Belgium, Bosnia and Herzegovina, China, Vatican, Denmark, Spain, Estonia, the Russian Federation, Finland, France, Ireland, Iceland, Italy, Latvia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Lithuania, Luxembourg, Monaco, Montenegro, Norway, the Netherlands, Poland, Portugal, Slovakia, the Czech Rep., the United Kingdom, Serbia, Slovenia, Sweden and Switzerland the band 46-68 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with ITU-R Resolution **217 (WRC-97)**. (WRC-07)
- **1.163** *Additional allocation:* in Armenia, Belarus, the Russian Federation, Georgia, Hungary, Kazakhstan, Latvia, Lithuania, Moldova, Uzbekistan, Kyrgyzstan, Slovakia, the Czech Rep., Tajikistan, Turkmenistan and Ukraine, the bands 47-48.5 MHz and 56.5-58 MHz are also allocated to the fixed and land mobile services on a secondary basis. (WRC-07)
- **1.164** *Additional allocation:* in Albania, Germany, Austria, Belgium, Bosnia and Herzegovina, Botswana, Bulgaria, Côte d'Ivoire, Denmark, Spain, Estonia, Finland, France, Gabon, Greece, Ireland, Israel, Italy, the Libyan Arab Jamahiriya, Jordan, Lebanon, Liechtenstein, Luxembourg, Madagascar, Mali, Malta, Morocco, Mauritania, Monaco, Montenegro, Nigeria, Norway, the Netherlands, Poland, Syrian Arab Republic, Romania, the United Kingdom, Serbia, Slovenia, Sweden, Switzerland, Swaziland, Chad, Togo, Tunisia and Turkey, the band 47-68 MHz, in South Africa the band 47-50 MHz, in the Czech Rep. the band 66-68 MHz, and in Latvia and Lithuania the band 48.5-56.5 MHz, are also allocated to the land mobile service on a primary basis. However, stations of the land mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations of countries other than those mentioned in connection with the band. (WRC-07)
- **1.165** *Additional allocation:* in Angola, Cameroon, Congo (Rep. of the), Madagascar, Mozambique, Somalia, Sudan, Tanzania and Chad, the band 47-68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.
- **1.166** *Alternative allocation:* in New Zealand, the band 50-51 MHz is allocated to the fixed, mobile and broadcasting services on a primary basis; the band 53-54 MHz is allocated to the fixed and mobile services on a primary basis.

- **1.167** Alternative allocation: in Bangladesh, Brunei Darussalam, India, Iran (Islamic Republic of), Pakistan, Singapore and Thailand, the band 50-54 MHz is allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-07)
- **1.167A** *Additional allocation:* in Indonesia, the band 50-54 MHz is also allocated to the fixed, mobile and broadcasting services on a primary basis. (WRC-07)
- **1.168** Additional allocation: in Australia, China and the Dem. People's Rep. of Korea, the band 50-54 MHz is also allocated to the broadcasting service on a primary basis.
- **1.169** *Alternative allocation:* in Botswana, Burundi, Lesotho, Malawi, Namibia, the Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland, Zambia and Zimbabwe, the band 50-54 MHz is allocated to the amateur service on a primary basis.
- **1.170** Additional allocation: in New Zealand, the band 51-53 MHz is also allocated to the fixed and mobile services on a primary basis.
- **1.171** *Additional allocation:* in Botswana, Burundi, Lesotho, Malawi, Mali, Namibia, Dem. Rep. of the Congo, Rwanda, South Africa, Swaziland and Zimbabwe, the band 54-68 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.
- **1.172** *Different category of service:* in the French Overseas Departments in Region 2, Guyana, Jamaica and Mexico, the allocation of the band 54-68 MHz to the fixed and mobile services is on a primary basis (see No. **1.33**).
- **1.173** *Different category of service:* in the French Overseas Departments in Region 2, Guyana, Jamaica and Mexico, the allocation of the band 68-72 MHz to the fixed and mobile services is on a primary basis (see No. **1.33**).
- 1.174 (SUP WRC-07)
- **1.175** *Alternative allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Moldova, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the bands 68-73 MHz and 76-87.5 MHz are allocated to the broadcasting service on a primary basis. In Latvia and Lithuania, the bands 68-73 MHz and 76-87.5 MHz are allocated to the broadcasting and mobile, except aeronautical mobile, services on a primary basis. The services to which these bands are allocated in other countries and the broadcasting service in the countries listed above are subject to agreements with the neighbouring countries concerned. (WRC-07)
- **1.176** *Additional allocation:* in Australia, China, Korea (Rep. of), the Philippines, the Dem. People's Rep. of Korea and Samoa, the band 68-74 MHz is also allocated to the broadcasting service on a primary basis. (WRC-07)
- **1.177** *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 73-74 MHz is also allocated to the broadcasting service on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**. (WRC-07)
- **1.178** *Additional allocation:* in Colombia, Costa Rica, Cuba, El Salvador, Guatemala, Guyana, Honduras and Nicaragua, the band 73-74.6 MHz is also allocated to the fixed and mobile services on a secondary basis.
- **1.179** *Additional allocation:* in Armenia, Azerbaijan, Belarus, China, the Russian Federation, Georgia, Kazakhstan, Lithuania, Mongolia, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the bands 74.6-74.8 MHz and 75.2-75.4 MHz are also allocated to the aeronautical radionavigation service, on a primary basis, for ground-based transmitters only. (WRC-07)
- **1.180** 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.

- **1.181** Additional allocation: in Egypt, Israel and the Syrian Arab Republic, the band 74.8-75.2 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under ITU-RR No. **9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under ITU-RR No. **9.21**. (WRC-03)
- **1.182** Additional allocation: in Western Samoa, the band 75.4-87 MHz is also allocated to the broadcasting service on a primary basis.

- **1.183** Additional allocation: in China, Korea (Rep. of), Japan, the Philippines and the Dem. People's Rep. of Korea, the band 76-87 MHz is also allocated to the broadcasting service on a primary basis.
- 1.184 (SUP WRC-07)
- **1.185** *Different category of service:* in the United States, the French Overseas Departments in Region 2, Guyana, Jamaica, Mexico and Paraguay, the allocation of the band 76-88 MHz to the fixed and mobile services is on a primary basis (see No. **1.33**).
- **1.186** (SUP WRC-97)
- **1.187** *Alternative allocation:* in Albania, the band 81-87.5 MHz is allocated to the broadcasting service on a primary basis and used in accordance with the decisions contained in the Final Acts of the Special Regional Conference (Geneva, 1960).
- **1.188** Additional allocation: in Australia, the band 85-87 MHz is also allocated to the broadcasting service on a primary basis. The introduction of the broadcasting service in Australia is subject to special agreements between the administrations concerned.
- 1.189 Not used.
- **1.190** Additional allocation: in Monaco, the band 87.5-88 MHz is also allocated to the land mobile service on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**. (WRC-97)
- 1.191 Not used.
- **1.192** Additional allocation: in China and Korea (Rep. of), the band 100-108 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-97)
- 1.193 Not used.
- **1.194** *Additional allocation:* in Azerbaijan, Kyrgyzstan, Somalia and Turkmenistan, the band 104-108 MHz is also allocated to the mobile, except aeronautical mobile (R), service on a secondary basis. (WRC-07)
- 1.195 and 1.196 Not used.
- **1.197** Additional allocation: in Pakistan and the Syrian Arab Republic, the band 108-111.975 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under ITU-RR No. **9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedures invoked under ITU-RR No. **9.21**. (WRC-07)
- **1.197A** Additional allocation: the band 108-117.975 MHz is also allocated on a primary basis to the aeronautical mobile (R) service, limited to systems operating in accordance with recognized international aeronautical standards. Such use shall be in accordance with ITU-R Resolution **413** (WRC-03). The use of the band 108-112 MHz by the aeronautical mobile (R) service shall be limited to systems composed of ground-based transmitters and associated receivers that provide navigational information in support of air navigation functions in accordance with recognized international aeronautical standards. (WRC-07)
- 1.198 (SUP WRC-07)
- **1.199** (SUP WRC-07)
- 1.200 In the band 117.975-137 MHz, the frequency 121.5 MHz is the aeronautical emergency frequency and, where required, the frequency 123.1 MHz is the aeronautical frequency auxiliary to 121.5 MHz. Mobile stations of the maritime mobile service may communicate on these frequencies under the conditions laid down in ITU-RR Article 31 for distress and safety purposes with stations of the aeronautical mobile service. (WRC-07)
- **1.201** *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Japan, Kazakhstan, Latvia, Moldova, Mongolia, Mozambique, Uzbekistan, Papua New Guinea, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 132-136 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC-97)
- **1.202** Additional allocation: in Saudi Arabia, Armenia, Azerbaijan, Belarus, Bulgaria, the United Arab Emirates, the Russian Federation, Georgia, Iran (Islamic Republic of), Jordan, Latvia, Moldova, Oman, Uzbekistan, Poland,

the Syrian Arab Republic, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 136-137 MHz is also allocated to the aeronautical mobile (OR) service on a primary basis. In assigning frequencies to stations of the aeronautical mobile (OR) service, the administration shall take account of the frequencies assigned to stations in the aeronautical mobile (R) service. (WRC-2000)

- **1.203** (SUP WRC-07)
- **1.203A** (SUP WRC-07)
- **1.203B** (SUP WRC-07)
- **1.204** *Different category of service:* in Afghanistan, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Cuba, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Kuwait, Montenegro, Oman, Pakistan, the Philippines, Qatar, Serbia, Singapore, Thailand and Yemen, the band 137-138 MHz is allocated to the fixed and mobile, except aeronautical mobile (R), services on a primary basis (see No. 1.33). (WRC-07)
- **1.205** *Different category of service:* in Israel and Jordan, the allocation of the band 137-138 MHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. **1.33**).
- **1.206** *Different category of service:* in Armenia, Azerbaijan, Belarus, Bulgaria, Egypt, the Russian Federation, Finland, France, Georgia, Greece, Kazakhstan, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, the Syrian Arab Republic, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 137-138 MHz to the aeronautical mobile (OR) service is on a primary basis (see No. 1.33). (WRC-2000)
- **1.207** Additional allocation: in Australia, the band 137-144 MHz is also allocated to the broadcasting service on a primary basis until that service can be accommodated within regional broadcasting allocations.
- **1.208** The use of the band 137-138 MHz by the mobile-satellite service is subject to coordination under ITU-RR No. **9.11A**. (WRC-97)
- **1.208A** In making assignments to space stations in the mobile-satellite service in the bands 137-138 MHz, 387-390 MHz and 400.15-401 MHz, administrations shall take all practicable steps to protect the radio astronomy service in the bands 150.05-153 MHz, 322-328.6 MHz, 406.1-410 MHz and 608-614 MHz from harmful interference from unwanted emissions. The threshold levels of interference detrimental to the radio astronomy service are shown in the relevant ITU-R Recommendation. (WRC-07)
- **1.208B**^{*} In the bands:

137-138 MHz, 387-390 MHz, 400.15-401 MHz, 1452-1492 MHz, 1525-1610 MHz, 1613.8-1626.5 MHz, 2655-2690 MHz, 21.4-22 GHz,

ITU-RR Resolution 739 (Rev.WRC-07) applies. (WRC-07)

- **1.209** The use of the bands 137-138 MHz, 148-150.05 MHz, 399.9-400.05 MHz, 400.15-401 MHz, 454-456 MHz and 459-460 MHz by the mobile-satellite service is limited to non-geostationary-satellite systems. (WRC-97)
- **1.210** Additional allocation: in Italy, the Czech Rep. and the United Kingdom, the bands 138-143.6 MHz and 143.65-144 MHz are also allocated to the space research service (space-to-Earth) on a secondary basis. (WRC-07)
- 1.211 Additional allocation: in Germany, Saudi Arabia, Austria, Bahrain, Belgium, Denmark, the United Arab Emirates, Spain, Finland, Greece, Ireland, Israel, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lebanon, Liechtenstein, Luxembourg, Mali, Malta, Montenegro, Norway, the Netherlands, Qatar, the United Kingdom, Serbia, Slovenia, Somalia, Sweden, Switzerland, Tanzania, Tunisia and Turkey, the band 138-144 MHz is also allocated to the maritime mobile and land mobile services on a primary basis. (WRC-07)
- **1.212** Alternative allocation: in Angola, Botswana, Burundi, Cameroon, the Central African Rep., Congo (Rep. of the), Gabon, Gambia, Ghana, Guinea, Iraq, Libyan Arab Jamahiriya, Jordan, Lesotho, Liberia, Malawi,

^{*} This provision was previously numbered as No. 2.347A. It was renumbered to preserve the sequential order.

Mozambique, Namibia, Oman, Uganda, Syrian Arab Republic, the Dem. Rep. of the Congo, Rwanda, Sierra Leone, South Africa, Swaziland, Chad, Togo, Zambia and Zimbabwe, the band 138-144 MHz is allocated to the fixed and mobile services on a primary basis. (WRC-07)

- **1.213** Additional allocation: in China, the band 138-144 MHz is also allocated to the radiolocation service on a primary basis.
- **1.214** *Additional allocation:* in Eritrea, Ethiopia, Kenya, The Former Yugoslav Republic of Macedonia, Malta, Montenegro, Serbia, Somalia, Sudan and Tanzania, the band 138-144 MHz is also allocated to the fixed service on a primary basis. (WRC-07)
- 1.215 Not used.
- **1.216** Additional allocation: in China, the band 144-146 MHz is also allocated to the aeronautical mobile (OR) service on a secondary basis.
- **1.217** Alternative allocation: in Afghanistan, Bangladesh, Cuba, Guyana and India, the band 146-148 MHz is allocated to the fixed and mobile services on a primary basis.
- **1.218** Additional allocation: the band 148-149.9 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**. The bandwidth of any individual transmission shall not exceed \pm 25 kHz.
- **1.219** The use of the band 148-149.9 MHz by the mobile-satellite service is subject to coordination under ITU-RR No. **9.11A**. The mobile-satellite service shall not constrain the development and use of the fixed, mobile and space operation services in the band 148-149.9 MHz.
- **1.220** The use of the bands 149.9-150.05 MHz and 399.9-400.05 MHz by the mobile-satellite service is subject to coordination under ITU-RR No. **9.11A**. The mobile-satellite service shall not constrain the development and use of the radionavigation-satellite service in the bands 149.9-150.05 MHz and 399.9-400.05 MHz. (WRC-97)
- 1.221 Stations of the mobile-satellite service in the band 148-149.9 MHz shall not cause harmful interference to, or claim protection from, stations of the fixed or mobile services operating in accordance with the Table of Frequency Allocations in the following countries: Albania, Algeria, Germany, Saudi Arabia, Australia, Austria, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Benin, Bosnia and Herzegovina, Botswana, Brunei Darussalam, Bulgaria, Cameroon, China, Cyprus, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Croatia, Cuba, Denmark, Egypt, the United Arab Emirates, Eritrea, Spain, Estonia, Ethiopia, the Russian Federation, Finland, France, Gabon, Ghana, Greece, Guinea, Guinea Bissau, Hungary, India, Iran (Islamic Republic of), Ireland, Iceland, Israel, Italy, the Libyan Arab Jamahiriya, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malaysia, Mali, Malta, Mauritania, Moldova, Mongolia, Montenegro, Mozambique, Namibia, Norway, New Zealand, Oman, Uganda, Uzbekistan, Pakistan, Panama, Papua New Guinea, Paraguay, the Netherlands, the Philippines, Poland, Portugal, Qatar, the Syrian Arab Republic, Kyrgyzstan, Dem. People's Rep. of Korea, Slovakia, Romania, the United Kingdom, Senegal, Serbia, Sierra Leone, Singapore, Slovenia, Sri Lanka, South Africa, Sweden, Switzerland, Swaziland, Tanzania, Chad, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Viet Nam, Yemen, Zambia and Zimbabwe. (WRC-07)
- **1.222** Emissions of the radionavigation-satellite service in the bands 149.9-150.05 MHz and 399.9-400.05 MHz may also be used by receiving earth stations of the space research service.
- **1.223** Recognizing that the use of the band 149.9-150.05 MHz by the fixed and mobile services may cause harmful interference to the radionavigation-satellite service, administrations are urged not to authorize such use in application of ITU-RR No. **4.4**.
- 1.224 (SUP WRC-97)
- **1.224A** The use of the bands 149.9-150.05 MHz and 399.9-400.05 MHz by the mobile-satellite service (Earth-to-space) is limited to the land mobile-satellite service (Earth-to-space) until 1 January 2015. (WRC-97)
- **1.224B** The allocation of the bands 149.9-150.05 MHz and 399.9-400.05 MHz to the radionavigation-satellite service shall be effective until 1 January 2015. (WRC-97)
- **1.225** Additional allocation: in Australia and India, the band 150.05-153 MHz is also allocated to the radio astronomy service on a primary basis.
- **1.226** 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**.

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)

- **1.227** *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 radio-communication service. (WRC-07)
- **1.227A** Additional allocation: the bands 161.9625-161.9875 MHz and 162.0125-162.0375 MHz are also allocated to the mobile-satellite service (Earth-to-space) on a secondary basis for the reception of automatic identification system (AIS) emissions from stations operating in the maritime-mobile service (see Appendix **18**). (WRC-07)
- 1.228 Not used.
- **1.229** *Alternative allocation:* in Morocco, the band 162-174 MHz is allocated to the broadcasting service on a primary basis. The use of this band shall be subject to agreement with administrations having services, operating or planned, in accordance with the Table which are likely to be affected. Stations in existence on 1 January 1981, with their technical characteristics as of that date, are not affected by such agreement.
- **1.230** Additional allocation: in China, the band 163-167 MHz is also allocated to the space operation service (space-to-Earth) on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**.
- **1.231** *Additional allocation:* in Afghanistan, China and Pakistan, the band 167-174 MHz is also allocated to the broadcasting service on a primary basis. The introduction of the broadcasting service into this band shall be subject to agreement with the neighbouring countries in Region 3 whose services are likely to be affected.
- **1.232** Additional allocation: in Japan, the band 170-174 MHz is also allocated to the broadcasting service on a primary basis.
- **1.233** Additional allocation: in China, the band 174-184 MHz is also allocated to the space research (space-to-Earth) and the space operation (space-to-Earth) services on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**. These services shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations.
- **1.234** *Different category of service:* in Mexico, the allocation of the band 174-216 MHz to the fixed and mobile services is on a primary basis (see No. **1.33**).
- **1.235** *Additional allocation:* in Germany, Austria, Belgium, Denmark, Spain, Finland, France, Israel, Italy, Liechtenstein, Malta, Monaco, Norway, the Netherlands, the United Kingdom, Sweden and Switzerland, the band 174-223 MHz is also allocated to the land mobile service on a primary basis. However, the stations of the land mobile service shall not cause harmful interference to, or claim protection from, broadcasting stations, existing or planned, in countries other than those listed in this footnote.
- 1.236 Not used.
- **1.237** *Additional allocation:* in Congo (Rep. of the), Eritrea, Ethiopia, Gambia, Guinea, the Libyan Arab Jamahiriya, Malawi, Mali, Sierra Leone, Somalia and Chad, the band 174-223 MHz is also allocated to the fixed and mobile services on a secondary basis. (WRC-07)
- **1.238** Additional allocation: in Bangladesh, India, Pakistan and the Philippines, the band 200-216 MHz is also allocated to the aeronautical radionavigation service on a primary basis.
- 1.239 Not used.
- **1.240** Additional allocation: in China and India, the band 216-223 MHz is also allocated to the aeronautical radionavigation service on a primary basis and to the radiolocation service on a secondary basis.

- **1.241** 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.
- **1.242** Additional allocation: in Canada, the band 216-220 MHz is also allocated to the land mobile service on a primary basis.
- **1.243** Additional allocation: in Somalia, the band 216-225 MHz is also allocated to the aeronautical radionavigation service on a primary basis, subject to not causing harmful interference to existing or planned broadcasting services in other countries.
- **1.244** (SUP WRC-97)
- **1.245** *Additional allocation:* in Japan, the band 222-223 MHz is also allocated to the aeronautical radionavigation service on a primary basis and to the radiolocation service on a secondary basis.
- **1.246** Alternative allocation: in Spain, France, Israel and Monaco, the band 223-230 MHz is allocated to the broadcasting and land mobile services on a primary basis (see No. **1.33**) on the basis that, in the preparation of frequency plans, the broadcasting service shall have prior choice of frequencies; and allocated to the fixed and mobile, except land mobile, services on a secondary basis. However, the stations of the land mobile service shall not cause harmful interference to, or claim protection from, existing or planned broadcasting stations in Morocco and Algeria.
- **1.247** *Additional allocation:* in Saudi Arabia, Bahrain, the United Arab Emirates, Jordan, Oman, Qatar and Syrian Arab Republic, the band 223-235 MHz is also allocated to the aeronautical radionavigation service on a primary basis.
- 1.248 and 1.249 Not used.
- **1.250** Additional allocation: in China, the band 225-235 MHz is also allocated to the radio astronomy service on a secondary basis.
- **1.251** Additional allocation: in Nigeria, the band 230-235 MHz is also allocated to the aeronautical radionavigation service on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**.
- **1.252** Alternative allocation: in Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe, the bands 230-238 MHz and 246-254 MHz are allocated to the broadcasting service on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**.
- 1.253 Not used.
- **1.254** The bands 235-322 MHz and 335.4-399.9 MHz may be used by the mobile-satellite service, subject to agreement obtained under ITU-RR 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. **1.256A**. (WRC-03)
- **1.255** 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 ITU-RR No. **9.11A**.
- **1.256** The frequency 243 MHz is the frequency in this band for use by survival craft stations and equipment used for survival purposes. (WRC-07)
- **1.256A** *Additional allocation:* in China, the Russian Federation, Kazakhstan and Ukraine, the band 258-261 MHz is also allocated to the space research service (Earth-to-space) and space operation service (Earth-to-space) on a primary basis. Stations in the space research service (Earth-to-space) and space operation service (Earth-to-space) shall not cause harmful interference to, nor claim protection from, nor constrain the use and development of the mobile service systems and mobile-satellite service systems operating in the band. Stations in space research service (Earth-to-space) shall not constrain the future development of fixed service systems of other countries. (WRC-03)
- **1.257** 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 ITU-RR No. **9.21**.
- **1.258** The use of the band 328.6-335.4 MHz by the aeronautical radionavigation service is limited to Instrument Landing Systems (glide path).
- **1.259** Additional allocation: in Egypt, Israel and the Syrian Arab Republic, the band 328.6-335.4 MHz is also allocated to the mobile service on a secondary basis, subject to agreement obtained under No. **9.21**. In order to ensure that harmful interference is not caused to stations of the aeronautical radionavigation service, stations of
the mobile service shall not be introduced in the band until it is no longer required for the aeronautical radionavigation service by any administration which may be identified in the application of the procedure invoked under No. **9.21**. (WRC-07)

- **1.260** Recognizing that the use of the band 399.9-400.05 MHz by the fixed and mobile services may cause harmful interference to the radionavigation satellite service, administrations are urged not to authorize such use in application of ITU-RR No. **4.4**.
- **1.261** Emissions shall be confined in a band of \pm 25 kHz about the standard frequency 400.1 MHz.
- **1.262** *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Botswana, Colombia, Costa Rica, Cuba, Egypt, the United Arab Emirates, Ecuador, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Liberia, Malaysia, Moldova, Uzbekistan, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Kyrgyzstan, Romania, Singapore, Somalia, Tajikistan, Turkmenistan and Ukraine, the band 400.05-401 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-07)
- **1.263** 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.
- 1.264 The use of the band 400.15-401 MHz by the mobile-satellite service is subject to coordination under ITU-RR No. 9.11A. The power flux-density limit indicated in Annex 1 of ITU-RR Appendix 5 shall apply until such time as a competent world radiocommunication conference revises it.
- 1.265 Not used.
- **1.266** The use of the band 406-406.1 MHz by the mobile-satellite service is limited to low power satellite emergency position-indicating radiobeacons (see also Article **31**). (WRC-07)
- **1.267** Any emission capable of causing harmful interference to the authorized uses of the band 406-406.1 MHz is prohibited.
- **1.268** Use of the band 410-420 MHz by the space research service is limited to communications within 5 km of an orbiting, manned space vehicle. The power flux-density at the surface of the Earth produced by emissions from extra-vehicular activities shall not exceed $-153 \text{ dB}(\text{W/m}^2)$ for $0^\circ \le \delta \le 5^\circ$, $-153 + 0.077 (\delta 5) \text{ dB}(\text{W/m}^2)$ for $5^\circ \le \delta \le 70^\circ$ and $-148 \text{ dB}(\text{W/m}^2)$ for $70^\circ \le \delta \le 90^\circ$, where δ is the angle of arrival of the radio-frequency wave and the reference bandwidth is 4 kHz. ITU-RR No. **4.10** does not apply to extra-vehicular activities. In this frequency band the space research (space-to-space) service shall not claim protection from, nor constrain the use and development of, stations of the fixed and mobile services. (WRC-97)
- **1.269** *Different category of service:* in Australia, the United States, India, Japan and the United Kingdom, the allocation of the bands 420-430 MHz and 440-450 MHz to the radiolocation service is on a primary basis (see No. **1.33**).
- **1.270** Additional allocation: in Australia, the United States, Jamaica and the Philippines, the bands 420-430 MHz and 440-450 MHz are also allocated to the amateur service on a secondary basis.
- **1.271** Additional allocation: in Azerbaijan, Belarus, China, India, Latvia, Lithuania, Kyrgyzstan and Turkmenistan, the band 420-460 MHz is also allocated to the aeronautical radionavigation service (radio altimeters) on a secondary basis. (WRC-03)
- **1.272** *Different category of service:* in France, the allocation of the band 430-434 MHz to the amateur service is on a secondary basis (see No. **1.32**).
- **1.273** *Different category of service:* in the Libyan Arab Jamahiriya, the allocation of the bands 430-432 MHz and 438-440 MHz to the radiolocation service is on a secondary basis (see No. **1.32**). (WRC-03)
- **1.274** Alternative allocation: in Denmark, Norway and Sweden, the bands 430-432 MHz and 438-440 MHz are allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.
- **1.275** *Additional allocation:* in Croatia, Estonia, Finland, Libyan Arab Jamahiriya, The Former Yugoslav Republic of Macedonia, Montenegro, Serbia and Slovenia, the bands 430-432 MHz and 438-440 MHz are also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)
- **1.276** Additional allocation: in Afghanistan, Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burkina Faso, Burundi, Egypt, the United Arab Emirates, Ecuador, Eritrea, Ethiopia, Greece, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Italy, Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Lebanon,

Malaysia, Malta, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Switzerland, Tanzania, Thailand, Togo, Turkey and Yemen, the band 430-440 MHz is also allocated to the fixed service on a primary basis and the bands 430-435 MHz and 438-440 MHz are also allocated to the mobile, except aeronautical mobile, service on a primary basis. (WRC-07)

- **1.277** *Additional allocation:* in Angola, Armenia, Azerbaijan, Belarus, Cameroon, Congo (Rep. of the), Djibouti, the Russian Federation, Georgia, Hungary, Israel, Kazakhstan, Mali, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, Romania, Rwanda, Tajikistan, Chad, Turkmenistan and Ukraine, the band 430-440 MHz is also allocated to the fixed service on a primary basis. (WRC-07)
- **1.278** *Different category of service:* in Argentina, Colombia, Costa Rica, Cuba, Guyana, Honduras, Panama and Venezuela, the allocation of the band 430-440 MHz to the amateur service is on a primary basis (see No. 1.33).
- **1.279** Additional allocation: in Mexico, the bands 430-435 MHz and 438-440 MHz are also allocated on a primary basis to the land mobile service, subject to agreement obtained under ITU-RR No. **9.21**.
- **1.279A** The use of this band by sensors in the Earth exploration-satellite service (active) shall be in accordance with Recommendation ITU-R SA.1260-1. Additionally, the Earth exploration-satellite service (active) in the 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. **1.29** and **1.30**. (WRC-03)
- 1.280 In Germany, Austria, Bosnia and Herzegovina, Croatia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Montenegro, Portugal, Serbia, Slovenia and Switzerland, the band 433.05-434.79 MHz (centre frequency 433.92 MHz) is designated for industrial, scientific and medical (ISM) applications. Radiocommunication services of these countries operating within this band must accept harmful interference which may be caused by these applications. ISM equipment operating in this band is subject to the provisions of No. 15.13. (WRC-07)
- **1.281** Additional allocation: in the French Overseas Departments in Region 2 and India, the band 433.75-434.25 MHz is also allocated to the space operation service (Earth-to-space) on a primary basis. In France and in Brazil, the band is allocated to the same service on a secondary basis.
- **1.282** 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. **1.43**). 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 ITU-RR No. **25.11**. The use of the bands 1 260-1 270 MHz and 5 650-5 670 MHz by the amateur-satellite service is limited to the Earth-to-space direction.
- **1.283** Additional allocation: in Austria, the band 438-440 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis.
- **1.284** Additional allocation: in Canada, the band 440-450 MHz is also allocated to the amateur service on a secondary basis.
- **1.285** *Different category of service:* in Canada, the allocation of the band 440-450 MHz to the radiolocation service is on a primary basis (see No. **1.33**).
- **1.286** 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 ITU-RR No. **9.21**.
- **1.286A** The use of the bands 454-456 MHz and 459-460 MHz by the mobile-satellite service is subject to coordination under ITU-RR No. **9.11A**. (WRC-97)
- **1.286AA** The band 450-470 MHz is identified for use by administrations wishing to implement International Mobile Telecommunications (IMT). See Resolution **224** (**Rev.WRC-07**). This identification does not preclude the use of this band by any application of the services to which it is allocated and does not establish priority in the Radio Regulations. (WRC-07)
- 1.286B The use of the band 454-455 MHz in the countries listed in No. 1.286D, 455-456 MHz and 459-460 MHz in Region 2, and 454-456 MHz and 459-460 MHz in the countries listed in No. 1.286E, 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)
- **1.286C** The use of the band 454-455 MHz in the countries listed in No. **1.286D**, 455-456 MHz and 459-460 MHz in Region 2, and 454-456 MHz and 459-460 MHz in the countries listed in No. **1.286E**, 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)

- **1.286D** Additional allocation: in Canada, the United States and Panama, the band 454-455 MHz is also allocated to the mobile-satellite service (Earth-to-space) on a primary basis. (WRC-07)
- **1.286E** *allocation:* in Cape Verde, Nepal and Nigeria, the bands 454-456 MHz and 459-460 MHz are also allocated to the mobile-satellite (Earth-to-space) service on a primary basis. (WRC-07)
- **1.287** In the maritime mobile service, the frequencies 457.525 MHz, 457.550 MHz, 457.575 MHz, 467.525 MHz, 467.550 MHz and 467.575 MHz may be used by on-board communication stations. Where needed, equipment designed for 12.5 kHz channel spacing using also the additional frequencies 457.5375 MHz, 457.5625 MHz, 467.5375 MHz and 467.5625 MHz may be introduced for on-board communications. The use of these frequencies in territorial waters may be subject to the national regulations of the administration concerned. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-2. (WRC-07)
- **1.288** In the territorial waters of the United States and the Philippines, the preferred frequencies for use by on-board communication stations shall be 457.525 MHz, 457.550 MHz, 457.575 MHz and 457.600 MHz paired, respectively, with 467.750 MHz, 467.775 MHz, 467.800 MHz and 467.825 MHz. The characteristics of the equipment used shall conform to those specified in Recommendation ITU-R M.1174-1. (WRC-03)
- **1.289** 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.
- **1.290** *Different category of service:* in Afghanistan, Azerbaijan, Belarus, China, the Russian Federation, Japan, Mongolia, Kyrgyzstan, Slovakia, Tajikistan, Turkmenistan and Ukraine, the allocation of the band 460-470 MHz to the meteorological-satellite service (space-to-Earth) is on a primary basis (see No. **1.33**), subject to agreement obtained under ITU-RR No. **9.21**. (WRC-07)
- **1.291** Additional allocation: in China, the band 470-485 MHz is also allocated to the space research (space-to-Earth) and the space operation (space-to-Earth) services on a primary basis subject to agreement obtained under ITU-RR No. **9.21** and subject to not causing harmful interference to existing and planned broadcasting stations.
- **1.291A** Additional allocation: in Germany, Austria, Denmark, Estonia, Finland, Liechtenstein, Norway, Netherlands, the Czech Rep. and Switzerland, the band 470-494 MHz is also allocated to the radiolocation service on a secondary basis. This use is limited to the operation of wind profiler radars in accordance with ITU-R Resolution **217 (WRC-97)**. (WRC-97)
- **1.292** *Different category of service:* in Mexico, the allocation of the band 470-512 MHz to the fixed and mobile services, and in Argentina, Uruguay and Venezuela to the mobile service, is on a primary basis (see No. **1.33**), subject to agreement obtained under ITU-RR No. **9.21**. (WRC-07)
- 1.293 Different category of service: in Canada, Chile, Colombia, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, Panama and Peru, the allocation of the bands 470-512 MHz and 614-806 MHz to the fixed service is on a primary basis (see No. 1.33), subject to agreement obtained under ITU-RR No. 9.21. In Canada, Chile, Colombia, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, Panama and Peru, the allocation of the bands 470-512 MHz and 614-698 MHz to the mobile service is on a primary basis (see No. 1.33), subject to agreement obtained under ITU-RR No. 9.21. In Canada, Chile, Colombia, Cuba, the United States, Guyana, Honduras, Jamaica, Mexico, Panama and Peru, the allocation of the bands 470-512 MHz and 614-698 MHz to the mobile service is on a primary basis (see No. 1.33), subject to agreement obtained under ITU-RR No. 9.21. In Argentina and Ecuador, the allocation of the band 470-512 MHz to the fixed and mobile services is on a primary basis (see No. 1.33), subject to agreement obtained under ITU-RR No. 9.21. (WRC-07)
- **1.294** *Additional allocation:* in Saudi Arabia, Burundi, Cameroon, Côte d'Ivoire, Egypt, Ethiopia, Israel, the Libyan Arab Jamahiriya, Kenya, Malawi, the Syrian Arab Republic, Sudan, Chad and Yemen, the band 470-582 MHz is also allocated to the fixed service on a secondary basis. (WRC-07)
- 1.295 Not used.
- **1.296** *Additional allocation:* in Germany, Saudi Arabia, Austria, Belgium, Côte d'Ivoire, Denmark, Egypt, Spain, Finland, France, Ireland, Israel, Italy, the Libyan Arab Jamahiriya, Jordan, Lithuania, Malta, Morocco, Monaco, Norway, Oman, the Netherlands, Portugal, the Syrian Arab Republic, the United Kingdom, Sweden, Switzerland, Swaziland and Tunisia, the band 470-790 MHz is also allocated on a secondary basis to the land mobile service, intended for applications ancillary to broadcasting. Stations of the land mobile service in the countries listed in this footnote shall not cause harmful interference to existing or planned stations operating in accordance with the Table in countries other than those listed in this footnote. (WRC-07)

- **1.297** *Additional allocation:* in Canada, Costa Rica, Cuba, El Salvador, the United States, Guatemala, Guyana, Honduras, Jamaica and Mexico, the band 512-608 MHz is also allocated to the fixed and mobile services on a primary basis, subject to agreement obtained under ITU-R No. **9.21**. (WRC-07)
- **1.298** Additional allocation: in India, the band 549.75-550.25 MHz is also allocated to the space operation service (space-to-Earth) on a secondary basis.
- 1.299 Not used.
- **1.300** *Additional allocation:* in Saudi Arabia, Egypt, Israel, the Libyan Arab Jamahiriya, Jordan, Oman, the Syrian Arab Republic and Sudan, the band 582-790 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC-07)
- 1.301 Not used.
- **1.302** *Additional allocation:* in the United Kingdom, the band 590-598 MHz is also allocated to the aeronautical radionavigation service on a primary basis. All new assignments to stations in the aeronautical radionavigation service, including those transferred from the adjacent bands, shall be subject to coordination with the Administrations of the following countries: Germany, Belgium, Denmark, Spain, France, Ireland, Luxembourg, Morocco, Norway and the Netherlands.
- 1.303 Not used.
- **1.304** *Additional allocation:* in the African Broadcasting Area (see Nos. **1.10** to **1.13**), the band 606-614 MHz is also allocated to the radio astronomy service on a primary basis.
- **1.305** Additional allocation: in China, the band 606-614 MHz is also allocated to the radio astronomy service on a primary basis.
- **1.306** Additional allocation: in Region 1, except in the African Broadcasting Area (see Nos. **1.10** to **1.13**), and in Region 3, the band 608-614 MHz is also allocated to the radio astronomy service on a secondary basis.
- **1.307** Additional allocation: in India, the band 608-614 MHz is also allocated to the radio astronomy service on a primary basis.
- 1.308 Not used.
- **1.309** *Different category of service*: in Costa Rica, El Salvador and Honduras, the allocation of the band 614-806 MHz to the fixed service is on a primary basis (see No. **1.33**), subject to agreement obtained under ITU-RR No. **9.21**.
- 1.310 (SUP WRC-97)
- **1.311** (SUP WRC-07)
- **1.311A** For the frequency band 620-790 MHz, see also ITU-R Resolution **549** (WRC-07). (WRC-07)
- **1.312** Additional allocation: in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Georgia, Hungary, Kazakhstan, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Slovakia, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 645-862 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-03)
- 1.313 (SUP WRC-97)
- **1.313A** The band, or portions of the band 698-790 MHz, in Bangladesh, China, Korea (Rep. of), India, Japan, New Zealand, Papua New Guinea, Philippines and Singapore are identified for use by these administrations wishing to implement International Mobile Telecommunications (IMT). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. In China, the use of IMT in this band will not start until 2015. (WRC-07)
- **1.314** *Additional allocation*: in Austria, Italy, Moldova, Uzbekistan, Kyrgyzstan, the United Kingdom and Swaziland, the band 790-862 MHz is also allocated to the land mobile service on a secondary basis. (WRC-07)
- **1.315** *Alternative allocation*: in Greece, Italy and Tunisia, the band 790-838 MHz is allocated to the broadcasting service on a primary basis. (WRC-2000)
- 1.316 Additional allocation: in Germany, Saudi Arabia, Bosnia and Herzegovina, Burkina Faso, Cameroon, Côte d'Ivoire, Croatia, Denmark, Egypt, Finland, Greece, Israel, the Libyan Arab Jamahiriya, Jordan, Kenya, The Former Yugoslav Republic of Macedonia, Liechtenstein, Mali, Monaco, Montenegro, Norway, the Netherlands, Portugal, the United Kingdom, the Syrian Arab Republic, Serbia, Sweden and Switzerland, the band 790-830 MHz, and in these same countries and in Spain, France, Gabon and Malta, the band 830-862 MHz, are also

allocated to the mobile, except aeronautical mobile, service on a primary basis. However, stations of the mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause harmful interference to, or claim protection from, stations of services operating in accordance with the Table in countries other than those mentioned in connection with the band. This allocation is effective until 16 June 2015. (WRC-07)

- **1.316A** Additional allocation: in Spain, France, Gabon and Malta, the band 790-830 MHz, in Angola, Bahrain, Benin, Botswana, Congo (Rep. of the), French overseas departments and communities of Region 1, Gambia, Ghana, Guinea, Kuwait, Lesotho, Lebanon, Malawi, Morocco, Mauritania, Mozambique, Namibia, Niger, Oman, Uganda, Poland, Qatar, Rwanda, Senegal, Sudan, South Africa, Swaziland, Tanzania, Chad, Togo, Yemen, Zambia and Zimbabwe, the band 790-862 MHz, in Georgia, the band 806-862 MHz, and in Lithuania, the band 830-862 MHz is also allocated to the mobile, except aeronautical mobile, service on a primary basis subject to the agreement by the administrations concerned obtained under No. ITU-RR **9.21** and under the GE06 Agreement, as appropriate, including those administrations mentioned in No. **1.312** where appropriate. However, stations of the mobile service in the countries mentioned in connection with each band referred to in this footnote shall not cause unacceptable interference to, nor claim protection from, stations of services operating in accordance with the Table in countries other than those mentioned in connection with the band. Frequency assignments to the mobile service under this allocation in Lithuania and Poland shall not be used without the agreement of the Russian Federation and Belarus. This allocation is effective until 16 June 2015. (WRC-07)
- 1.316B In Region 1, the allocation to the mobile, except aeronautical mobile, service on a primary basis in the frequency band 790-862 MHz shall come into effect from 17 June 2015 and shall be subject to agreement obtained under ITU-RR No. 9.21 with respect to the aeronautical radionavigation service in countries mentioned in No. 1.312. For countries party to the GE06 Agreement, the use of stations of the mobile service is also subject to the successful application of the procedures of that Agreement. ITU-R Resolutions 224 (Rev.WRC-07) and 749 (WRC-07) shall apply. (WRC-07)
- **1.317** *Additional allocation*: in Region 2 (except Brazil and the United States), the band 806-890 MHz is also allocated to the mobile-satellite service on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**. The use of this service is intended for operation within national boundaries.
- 1.317A Those parts of the band 698-960 MHz in Region 2 and the band 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 ITU-R Resolutions 224 (Rev.WRC-07) and 749 (WRC-07). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-07)
- **1.318** Additional allocation: in Canada, the United States and Mexico, the bands 849-851 MHz and 894-896 MHz are also allocated to the aeronautical mobile service on a primary basis, for public correspondence with aircraft. The use of the band 849-851 MHz is limited to transmissions from aeronautical stations and the use of the band 894-896 MHz is limited to transmissions from aircraft stations.
- **1.319** *Additional allocation*: in Belarus, the Russian Federation and Ukraine, the bands 806-840 MHz (Earth-to-space) and 856-890 MHz (space-to-Earth) are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service. The use of these bands by this service shall not cause harmful interference to, or claim protection from, services in other countries operating in accordance with the Table of Frequency Allocations and is subject to special agreements between the administrations concerned.
- **1.320** Additional allocation: in Region 3, the bands 806-890 MHz and 942-960 MHz are also allocated to the mobile-satellite, except aeronautical mobile-satellite (R), service on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**. The use of this service is limited to operation within national boundaries. In seeking such agreement, appropriate protection shall be afforded to services operating in accordance with the Table, to ensure that no harmful interference is caused to such services.
- **1.321** Alternative allocation: in Italy, the band 838-854 MHz is allocated to the broadcasting service on a primary basis as from 1 January 1995.
- 1.322 In Region 1, in the band 862-960 MHz, stations of the broadcasting service shall be operated only in the African Broadcasting Area (see Nos. 1.10 to 1.13) excluding Algeria, Egypt, Spain, the Libyan Arab Jamahiriya, Morocco, Namibia, Nigeria, South Africa, Tanzania, Zimbabwe and Zambia, subject to agreement obtained under ITU-RR No. 9.21. (WRC-2000)
- **1.323** Additional allocation: in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Hungary, Kazakhstan, Moldova, Uzbekistan, Poland, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the band 862-960 MHz is also allocated to the aeronautical radionavigation service on a primary basis. Such use is

subject to agreement obtained under ITU-RR No. **9.21** with administrations concerned and limited to ground-based radiobeacons in operation on 27 October 1997 until the end of their lifetime. (WRC-07)

- 1.324 Not used.
- **1.325** *Different category of service*: in the United States, the allocation of the band 890-942 MHz to the radiolocation service is on a primary basis (see No. **1.33**), subject to agreement obtained under ITU-RR No. **9.21**.
- **1.325A** *Different category of service:* in Cuba, the allocation of the band 902-915 MHz to the land mobile service is on a primary basis. (WRC-2000)
- **1.326** *Different category of service*: in Chile, the band 903-905 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**.
- **1.327** *Different category of service*: in Australia, the allocation of the band 915-928 MHz to the radiolocation service is on a primary basis (see No. **1.33**).
- **1.327A** The use of the band 960-1164 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 ITU-R Resolution **417 (WRC-07)**. (WRC-07)
- **1.328** 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)
- **1.328A** Stations in the radionavigation-satellite service in the band 1164-1215 MHz shall operate in accordance with the provisions of ITU-R Resolution **609** (**Rev.WRC-07**) and shall not claim protection from stations in the aeronautical radionavigation service in the band 960-1215 MHz. No. **1.43A** does not apply. The provisions of ITU-RR No. **21.18** shall apply. (WRC-07)
- 1.328B 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 ITU-RR Nos. 9.12, 9.12A and 9.13. ITU-R Resolution 610 (WRC-03) shall also apply; however, in the case of radionavigation-satellite service (space-to-space) networks and systems, ITU-R Resolution 610 (WRC-03) shall only apply to transmitting space stations. In accordance with No. 1.329A, for systems and networks in the radionavigation-satellite service (space-to-space) in the bands 1 215-1 300 MHz and 1 559-1 610 MHz, the provisions of ITU-RR 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)
- 1.329 Use of the radionavigation-satellite service in the 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. 1.331. Furthermore, the use of the radionavigation-satellite service in the band 1 215-1 300 MHz shall be subject to the condition that no harmful interference is caused to the radiolocation service. No. 1.43 shall not apply in respect of the radiolocation service. ITU-R Resolution 608 (WRC-03) shall apply. (WRC-03)
- **1.329A** 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)
- **1.330** *Additional allocation:* in Angola, Saudi Arabia, Bahrain, Bangladesh, Cameroon, China, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Japan, Jordan, Kuwait, Lebanon, Mozambique, Nepal, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, Somalia, Sudan, Chad, Togo and Yemen, the band 1 215-1 300 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-03)
- 1.331 Additional allocation: in Algeria, Germany, Saudi Arabia, Australia, Australia, Bahrain, Belarus, Belgium, Benin, Bosnia and Herzegovina, Brazil, Burkina Faso, Burundi, Cameroon, China, Korea (Rep. of), Croatia, Denmark, Egypt, the United Arab Emirates, Estonia, the Russian Federation, Finland, France, Ghana, Greece, Guinea, Equatorial Guinea, Hungary, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Jordan, Kenya, Kuwait, The Former Yugoslav Republic of Macedonia, Lesotho, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Madagascar, Mali, Mauritania, Montenegro, Nigeria, Norway, Oman, the Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Dem. People's Rep. of Korea, Slovakia, the United Kingdom, Serbia, Slovenia, Somalia, Sudan, Sri Lanka, South Africa, Sweden, Switzerland, Thailand, Togo, Turkey, Venezuela

and Viet Nam, the band 1 215-1 300 MHz is also allocated to the radionavigation service on a primary basis. In Canada and the United States, the band 1 240-1 300 MHz is also allocated to the radionavigation service, and use of the radionavigation service shall be limited to the aeronautical radionavigation service. (WRC-07)

- **1.332** 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)
- 1.333 (SUP WRC-97)
- **1.334** Additional allocation: in Canada and the United States, the band 1 350-1_370 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-03)
- **1.335** In Canada and the United States in the band 1 240-1 300 MHz, active spaceborne sensors in the earth exploration-satellite and space research services shall not cause interference to, claim protection from, or otherwise impose constraints on operation or development of the aeronautical radionavigation service. (WRC-97)
- **1.335A** 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)
- 1.336 Not used.
- **1.337** 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.
- **1.337A** 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)
- **1.338** In Mongolia, Kyrgyzstan, Slovakia, the Czech Rep. and Turkmenistan, existing installations of the radionavigation service may continue to operate in the band 1 350-1 400 MHz. (WRC-07)
- **5.338A** In the bands 1 350-1 400 MHz, 1 427-1 452 MHz, 22.55-23.55 GHz, 30-31.3 GHz, 49.7-50.2 GHz, 50.4-50.9 GHz and 51.4-52.6 GHz, Resolution **750** (**WRC-07**) applies. (WRC-07)
- **1.339** In the bands 1 350-1 400 MHz, 1 427-1 452 MHz, 22.55-23.55 GHz, 30-31.3 GHz, 49.7-50.2 GHz, 50.4-50.9 GHz and 51.4-52.6 GHz, ITU-R Resolution **750** (WRC-07) applies. (WRC-07)
- **1.339A** (SUP WRC-07)

1.340 All emissions are prohibited in the following bands:

1 400-1 427 MHz, 2 690-2 700 MHz, 10.68-10.7 GHz, 15.35-15.4 GHz, 23.6-24 GHz, 31.3-31.5 GHz,	except those provided for by No. 1.422 except those provided for by No. 1.483 except those provided for by No. 1.511
31.5-31.8 GHz, 48.94-49.04 GHz, 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,	in Region 2, from airborne stations

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

164-167 GHz, 182-185 GHz, 190-191.8 GHz, 200-209 GHz, 226-231.5 GHz, 250-252 GHz. (WRC-03)

- **1.341** 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.
- **1.342** Additional allocation: in Armenia, Azerbaijan, Belarus, Bulgaria, the Russian Federation, Uzbekistan, Kyrgystan and Ukraine, the band 1 429-1 535 MHz is also allocated to the aeronautical mobile service on a primary basis exclusively for the purposes of aeronautical telemetry within the national territory. As of 1 April 2007, the use of the band 1 452-1 492 MHz is subject to agreement between the administrations concerned. (WRC-2000)
- **1.343** 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.
- **1.344** *Alternative allocation:* in the United States, the band 1 452-1 525 MHz is allocated to the fixed and mobile services on a primary basis (see also No. **1.343**).
- **1.345** Use of the 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 ITU-R Resolution **528** (WARC-92)^{*}.
- 1.346 Not used.
- 1.347 (SUP WRC-07)
- **1.347A**^{**} (SUP WRC-07)
- 1.348 The use of the band 1 518-1 525 MHz by the mobile-satellite service is subject to coordination under ITU-RR 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. 1.43A does not apply. (WRC-03)
- 1.348A 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 ITU-RR No. 9.11A for space stations in the mobile-satellite (space-to-Earth) service, with respect to the land mobile service use for specialized mobile radios or used in conjunction with public switched telecommunication networks (PSTN) operating within the territory of Japan, shall be 150 dB(W/m²) in any 4 kHz band for all angles of arrival, instead of those given in Table 5-2 of ITU-RR 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. 1.43A does not apply. (WRC-03)
- 1.348B 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. 1.343 and 1.344) and in the countries listed in No. 1.342. No. 1.43A does not apply. (WRC-03)
- **1.348C** (SUP WRC-07)
- 1.349 Different category of service: in Saudi Arabia, Azerbaijan, Bahrain, Cameroon, Egypt, France, Iran (Islamic Republic of), Iraq, Israel, Kazakhstan, Kuwait, The Former Yugoslav Republic of Macedonia, Lebanon, Morocco, Qatar, Syrian Arab Republic, Kyrgyzstan, Turkmenistan and Yemen, the allocation of the band 1 525-1 530 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. 1.33). (WRC-07)
- **1.350** Additional allocation: in Azerbaijan, Kyrgyzstan and Turkmenistan, the band 1 525-1 530 MHz is also allocated to the aeronautical mobile service on a primary basis. (WRC-2000)
- **1.351** 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.

^{*} Note by the Secretariat: This Resolution was revised by WRC-03.

^{**} *Note by the Secretariat:* This provision has been modified by WRC-07, and subsequently renumbered No. **5.208B** in order to preserve the sequential order.

- 1.351A For the use of the bands 1518-1544 MHz, 1545-1559 MHz, 1610-1 645.5 MHz, 1646.5-1660.5 MHz, 1668-1675 MHz, 1980-2010 MHz, 2170-2200 MHz, 2483.5-2520 MHz and 2670-2690 MHz by the mobile-satellite service, see ITU-R Resolutions 212 (Rev.WRC-07) and 225 (Rev.WRC-07). (WRC-07)
- 1.352 (SUP WRC-97)
- **1.352A** In the band 1 525-1 530 MHz, stations in the mobile-satellite service, except stations in the maritime mobile-satellite service, shall not cause harmful interference to, or claim protection from, stations of the fixed service in France and French overseas territories in Region 3, Algeria, Saudi Arabia, Egypt, Guinea, India, Israel, Italy, Jordan, Kuwait, Mali, Malta, Morocco, Mauritania, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Tanzania, Viet Nam and Yemen notified prior to 1 April 1998. (WRC-97)

1.353 (SUP - WRC-97)

- **1.353A** In applying the procedures of Section II of ITU-RR 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 ITU-R Resolution **222** (WRC-2000) shall apply.) (WRC-2000)
- **1.354** 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 ITU-RR No. **9.11A**.
- 1.355 Additional allocation: in Bahrain, Bangladesh, Congo (Rep. of the), Egypt, Eritrea, Iraq, Israel, Kuwait, Lebanon, Malta, Qatar, Syrian Arab Republic, Somalia, Sudan, Chad, Togo and Yemen, the bands 1 540-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are also allocated to the fixed service on a secondary basis. (WRC-03)
- **1.356** 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 ITU-RR Article **31**).
- **1.357** 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.
- **1.357A** In applying the procedures of Section II of ITU-RR Article **9** to the mobile-satellite service in the 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 ITU-RR Article **44**. Aeronautical mobile-satellite (R) service communications with priority 1 to 6 in ITU-RR 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 (R) service communications with priority 1 to 6 in ITU-RR Article **46**. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (The provisions of ITU-R Resolution **222** (WRC-2000) shall apply.) (WRC-2000)
- 1.358 (SUP WRC-97)
- **1.359** *Additional allocation:* in Germany, Saudi Arabia, Armenia, Austria, Azerbaijan, Belarus, Benin, Bulgaria, Cameroon, Spain, the Russian Federation, France, Gabon, Georgia, Greece, Guinea, Guinea-Bissau, the Libyan Arab Jamahiriya, Jordan, Kazakhstan, Kuwait, Lebanon, Lithuania, Mauritania, Moldova, Uganda, Uzbekistan, Pakistan, Poland, the Syrian Arab Republic, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Swaziland, Tajikistan, Tanzania, Tunisia, Turkmenistan and Ukraine, the bands 1 550-1 559 MHz, 1 610-1 645.5 MHz and 1 646.5-1 660 MHz are also allocated to the fixed service on a primary basis. Administrations are urged to make all practicable efforts to avoid the implementation of new fixed-service stations in these bands. (WRC-07)
- 1.360 to 1.362 (SUP WRC-97)
- **1.362A** In the United States, in the bands 1 555-1 559 MHz and 1 656.5-1 660.5 MHz, the aeronautical mobile-satellite (R) service 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 ITU-RR Article **44**. Account shall be taken of the priority of safety-related communications in the other mobile-satellite services. (WRC-97)

- **1.362B** Additional allocation: The band 1 559-1 610 MHz is also allocated to the fixed service on a primary basis until 1 January 2010 in Algeria, Saudi Arabia, Cameroon, Libyan Arab Jamahiriya, Jordan, Mali, Mauritania, Syrian Arab Republic and Tunisia. After this date, the fixed service may continue to operate on a secondary basis until 1 January 2015, at which time this allocation shall no longer be valid. The band 1 559-1 610 MHz is also allocated to the fixed service on a secondary basis in Algeria, Germany, Armenia, Azerbaijan, Belarus, Benin, Bulgaria, Spain, Russian Federation, France, Gabon, Georgia, Guinea, Guinea-Bissau, Kazakhstan, Lithuania, Moldova, Nigeria, Uganda, Uzbekistan, Pakistan, Poland, Kyrgyzstan, Dem. People's Rep. of Korea, Romania, Senegal, Swaziland, Tajikistan, Tanzania, Turkmenistan and Ukraine until 1 January 2015, at which time this allocation shall no longer be valid. Administrations are urged to take all practicable steps to protect the radionavigation-satellite service and the aeronautical radionavigation service and not authorize new frequency assignments to fixed-service systems in this band. (WRC-07)
- **1.362C** Additional allocation: in Congo (Rep. of the), Egypt, Eritrea, Iraq, Israel, Jordan, Malta, Qatar, the Syrian Arab Republic, Somalia, Sudan, Chad, Togo and Yemen, the band 1 559-1 610 MHz is also allocated to the fixed service on a secondary basis until 1 January 2015, at which time this allocation shall no longer be valid. Administrations are urged to take all practicable steps to protect the radionavigation-satellite service and not authorize new frequency assignments to fixed-service systems in this band. (WRC-07)
- 1.363 (SUP WRC-07)
- **1.364** 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 ITU-RR 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. **1.366** (to which ITU-RR 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. **1.366** and stations in the fixed service operating in accordance with the provisions of No. **1.359**. 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. **1.366**.
- **1.365** 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 ITU-RR No. **9.11A**.
- **1.366** 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 ITU-RR No. **9.21**.
- **1.367** Additional allocation: The bands 1 610-1 626.5 MHz and 5 000-5 150 MHz are also allocated to the aeronautical mobile-satellite (R) service on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**.
- **1.368** With respect to the radiodetermination-satellite and mobile-satellite services the provisions of ITU-RR No. **4.10** do not apply in the band 1 610-1 626.5 MHz, with the exception of the aeronautical radionavigation-satellite service.
- 1.369 Different category of service: in Angola, Australia, Burundi, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), Israel, the Libyan Arab Jamahiriya, Lebanon, Liberia, Madagascar, Mali, Pakistan, Papua New Guinea, Syrian Arab Republic, the Dem. Rep. of the Congo, Sudan, Swaziland, Togo and Zambia, the allocation of the band 1 610-1 626.5 MHz to the radiodetermination-satellite service (Earth-to-space) is on a primary basis (see No. 1.33), subject to agreement obtained under ITU-RR No. 9.21 from countries not listed in this provision. (WRC-03)
- **1.370** *Different category of service:* in Venezuela, the allocation to the radiodetermination-satellite service in the band 1 610-1 626.5 MHz (Earth-to-space) is on a secondary basis.
- **1.371** Additional allocation: in Region 1, the bands 1 610-1 626.5 MHz (Earth-to-space) and 2 483.5-2 500 MHz (space-to-Earth) are also allocated to the radiodetermination-satellite service on a secondary basis, subject to agreement obtained under ITU-RR No. **9.21**.

- **1.372** Harmful interference shall not be caused to stations of the radio astronomy service using the band 1 610.6-1 613.8 MHz by stations of the radiodetermination-satellite and mobile-satellite services (ITU-RR No. **29.13** applies).
- 1.373 Not used.
- **1.373A** (SUP WRC-97)
- 1.374 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. 1.359. (WRC-97)
- **1.375** The use of the band 1 645.5-1 646.5 MHz by the mobile-satellite service (Earth-to-space) and for inter-satellite links is limited to distress and safety communications (see ITU-RR Article **31**).
- **1.376** 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.
- **1.376A** 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)
- 1.377 (SUP WRC-03)
- 1.378 Not used.
- **1.379** Additional allocation: in Bangladesh, India, Indonesia, Nigeria and Pakistan, the band 1 660.5-1 668.4 MHz is also allocated to the meteorological aids service on a secondary basis.
- **1.379A** 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.
- **1.379B** 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, ITU-R Resolution 904 (WRC-07) shall apply. (WRC-07)
- **1.379C** In order to protect the radio astronomy service in the band 1 668-1 670 MHz, the aggregate power fluxdensity values produced by mobile earth stations in a network of the mobile-satellite service operating in this band shall not exceed $-181 \text{ dB}(\text{W/m}^2)$ in 10 MHz and $-194 \text{ dB}(\text{W/m}^2)$ in any 20 kHz at any radio astronomy station recorded in the Master International Frequency Register, for more than 2% of integration periods of 2 000 s. (WRC-03)
- **1.379D** For sharing of the band 1 668.4-1 675 MHz between the mobile-satellite service and the fixed and mobile services, ITU-R Resolution **744** (**Rev.WRC-07**) shall apply. (WRC-07)
- **1.379E** In the band 1 668.4-1 675 MHz, stations in the mobile-satellite service shall not cause harmful interference to stations in the meteorological aids service in China, Iran (Islamic Republic of), Japan and Uzbekistan. In the band 1 668.4-1 675 MHz, administrations are urged not to implement new systems in the meteorological aids service and are encouraged to migrate existing meteorological aids service operations to other bands as soon as practicable. (WRC-03)
- 1.380 (SUP WRC-07)
- **1.380A** 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)
- **1.381** Additional allocation: in Afghanistan, Costa Rica, Cuba, India, Iran (Islamic Republic of) and Pakistan, the band 1 690-1 700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-03)
- **1.382** *Different category of service:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, the Russian Federation, Guinea, Iraq, Israel, Jordan, Kazakhstan, Kuwait, the Former Yugoslav Republic of Macedonia, Lebanon, Mauritania, Moldova, Mongolia, Oman, Uzbekistan, Poland, Qatar, the Syrian Arab Republic, Kyrgyzstan, Serbia, Somalia, Tajikistan, Tanzania, Turkmenistan, Ukraine and Yemen, the allocation of the band 1 690-1 700 MHz to the fixed and mobile, except

aeronautical mobile, services is on a primary basis (see No. **1.33**), and in the Dem. People's Rep. of Korea, the allocation of the band 1 690-1 700 MHz to the fixed service is on a primary basis (see No. **1.33**) and to the mobile, except aeronautical mobile, service on a secondary basis. (WRC-07)

- 1.383 Not used.
- **1.384** *Additional allocation:* in India, Indonesia and Japan, the band 1 700-1 710 MHz is also allocated to the space research service (space-to-Earth) on a primary basis. (WRC-97)
- **1.384A** The bands, or portions of the bands, 1710-1885 MHz, 2300-2400 MHz and 2500-2690 MHz, are identified for use by administrations wishing to implement International Mobile Telecommunications (IMT) in accordance with ITU-R Resolution **223** (**Rev.WRC-07**). This identification does not preclude the use of these bands by any application of the services to which they are allocated and does not establish priority in the Radio Regulations. (WRC-07)
- **1.385** Additional allocation: the band 1 718.8-1 722.2 MHz is also allocated to the radio astronomy service on a secondary basis for spectral line observations. (WRC-2000)
- **1.386** Additional allocation: the band 1 750-1 850 MHz is also allocated to the space operation (Earth-to-space) and space research (Earth-to-space) services in Region 2, in Australia, Guam, India, Indonesia and Japan on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**, having particular regard to troposcatter systems. (WRC-03)
- **1.387** Additional allocation: in Belarus, Georgia, Kazakhstan, Mongolia, Kyrgyzstan, Slovakia, Romania, Tajikistan and Turkmenistan, the band 1 770-1 790 MHz is also allocated to the meteorological-satellite service on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**. (WRC-07)
- 1.388 The 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-2000 (IMT-2000). Such use does not preclude the use of these bands by other services to which they are allocated. The bands should be made available for IMT-2000 in accordance with ITU-R Resolution 212 (Rev.WRC-97). (See also ITU-R Resolution 223 (WRC-2000).) (WRC-2000)
- 1.388A 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-2000 (IMT-2000), in accordance with ITU-R Resolution 221 (Rev.WRC-03). Their use by IMT-2000 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-03)
- **1.388B** In Algeria, Saudi Arabia, Bahrain, Benin, Burkina Faso, Cameroon, Comoros, Côte d'Ivoire, China, Cuba, Djibouti, Egypt, United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, India, Iran (Islamic Republic of), Israel, the Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Mali, Morocco, Mauritania, Nigeria, Oman, Uganda, Qatar, the Syrian Arab Republic, Senegal, Singapore, Sudan, Tanzania, Chad, Togo, Tunisia, Yemen, Zambia and Zimbabwe, for the purpose of protecting fixed and mobile services, including IMT-2000 mobile stations, in their territories from co-channel interference, a high altitude platform station (HAPS) operating as an IMT-2000 base station in neighbouring countries, in the bands referred to in No. **1.388A**, shall not exceed a co-channel power flux-density of $-127 \text{ dB}(W/(m^2 \cdot \text{MHz}))$ at the Earth's surface outside a country's borders unless explicit agreement of the affected administration is provided at the time of the notification of HAPS. (WRC-03)
- 1.389 Not used.
- 1.389A The use of the bands 1 980-2010 MHz and 2170-2200 MHz by the mobile-satellite service is subject to coordination under ITU-RR No. 9.11A and to the provisions of ITU-R Resolution 716 (Rev.WRC-2000). (WRC-07)
- **1.389B** The use of the band 1 980-1 990 MHz by the mobile-satellite service shall not cause harmful interference to or constrain the development of the fixed and mobile services in Argentina, Brazil, Canada, Chile, Ecuador, the United States, Honduras, Jamaica, Mexico, Peru, Suriname, Trinidad and Tobago, Uruguay and Venezuela.
- 1.389C The use of the bands 2010-2025 MHz and 2160-2170 MHz in Region 2 by the mobile-satellite service is subject to coordination under ITU-RR No. 9.11A and to the provisions of ITU-R Resolution 716 (Rev.WRC-2000). (WRC-07)
- **1.389D** (SUP WRC-03)

- **1.389E** 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.
- **1.389F** In Algeria, Benin, Cape Verde, Egypt, Iran (Islamic Republic of), Mali, Syrian Arab Republic and Tunisia, the use of the bands 1 980-2 010 MHz and 2 170-2 200 MHz by the mobile-satellite service shall neither cause harmful interference to the fixed and mobile services, nor hamper the development of those services prior to 1 January 2005, nor shall the former service request protection from the latter services. (WRC-2000)
- **1.390** (SUP WRC-07)
- 1.391 In making assignments to the mobile service in the 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, and shall take that Recommendation into account for the introduction of any other type of mobile system. (WRC-97)
- **1.392** 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.
- **1.392A** (SUP WRC-07)
- 1.393 Additional allocation: in Canada, the United States, India and Mexico, the band 2310-2360 MHz is also allocated to the broadcasting-satellite service (sound) and complementary terrestrial sound broadcasting service on a primary basis. Such use is limited to digital audio broadcasting and is subject to the provisions of ITU-R Resolution 528 (Rev.WRC-03), with the exception of *resolves* 3 in regard to the limitation on broadcasting-satellite systems in the upper 25 MHz. (WRC-07)
- **1.394** In the United States, the use of the band 2 300-2 390 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. In Canada, the use of the band 2 360-2 400 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile services. (WRC-07)
- **1.395** In France and Turkey, the use of the band 2 310-2 360 MHz by the aeronautical mobile service for telemetry has priority over other uses by the mobile service. (WRC-03)
- 1.396 Space stations of the broadcasting-satellite service in the band 2 310-2 360 MHz operating in accordance with No. 1.393 that may affect the services to which this band is allocated in other countries shall be coordinated and notified in accordance with ITU-R Resolution 33 (Rev.WRC-97)*. Complementary terrestrial broadcasting stations shall be subject to bilateral coordination with neighbouring countries prior to their bringing into use.
- **1.397** *Different category of service:* in France, the band 2 450-2 500 MHz is allocated on a primary basis to the radiolocation service (see No. **1.33**). Such use is subject to agreement with administrations having services operating or planned to operate in accordance with the Table of Frequency Allocations which may be affected.
- **1.398** In respect of the radiodetermination-satellite service in the band 2 483.5-2 500 MHz, the provisions of ITU-RR No. **4.10** do not apply.
- **1.399** In Region 1, in countries other than those listed in No. **1.400**, harmful interference shall not be caused to, or protection shall not be claimed from, stations of the radiolocation service by stations of the radiodetermination satellite service.
- **1.400** *Different category of service:* in Angola, Australia, Bangladesh, Burundi, China, Eritrea, Ethiopia, India, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, Lebanon, Liberia, Madagascar, Mali, Pakistan, Papua New Guinea, the Dem. Rep. of the Congo, the Syrian Arab Republic, Sudan, Swaziland, Togo and Zambia, the allocation of the band 2 483.5-2 500 MHz to the radiodetermination-satellite service (space-to-Earth) is on a primary basis (see No. **1.33**), subject to agreement obtained under ITU-RR No. **9.21** from countries not listed in this provision. (WRC-03)
- 1.401 Not used.
- **1.402** 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 ITU-RR 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.

- **1.403** Subject to agreement obtained under ITU-RR No. **9.21**, the band 2520-2535 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 ITU-RR No. **9.11A** apply. (WRC-07)
- **1.404** *Additional allocation:* in India and Iran (Islamic Republic of), the band 2 500-2 516.5 MHz may also be used for the radiodetermination-satellite service (space-to-Earth) for operation limited to within national boundaries, subject to agreement obtained under ITU-RR No. **9.21**.
- **1.405** *Additional allocation:* in France, the band 2 500-2 550 MHz is also allocated to the radiolocation service on a primary basis. Such use is subject to agreement with the administrations having services operating or planned to operate in accordance with the Table which may be affected.
- 1.406 Not used.
- **1.407** 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 $-152 \text{ dB}(W/(m^2 \cdot 4 \text{ kHz}))$ in Argentina, unless otherwise agreed by the administrations concerned.
- 1.408 (SUP WRC-2000)
- **1.409** (SUP WRC-07)
- **1.410** The band 2 500-2 690 MHz may be used for tropospheric scatter systems in Region 1, subject to agreement obtained under ITU-RR No. **9.21**. Administrations shall make all practicable efforts to avoid developing new tropospheric scatter systems in this band. When planning new tropospheric scatter radio-relay links in this band, all possible measures shall be taken to avoid directing the antennas of these links towards the geostationary-satellite orbit. (WRC-07)
- 1.411 (SUP WRC-07)
- **1.412** *Alternative allocation:* in Azerbaijan, Kyrgyzstan and Turkmenistan, the band 2 500-2 690 MHz is allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-07)
- **1.413** 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.
- 1.414 The allocation of the frequency band 2 500-2 520 MHz to the mobile-satellite service (space-to-Earth) is subject to coordination under ITU-RR No. 9.11A. (WRC-07)
- **1.414A** In Japan and India, the use of the bands 2 500-2 520 MHz and 2 520-2 535 MHz, under No. **1.403**, by a satellite network in the mobile-satellite service (space-to-Earth) is limited to operation within national boundaries and subject to the application of ITU-RR No. **9.11A**. The following pfd values shall be used as a threshold for coordination under ITU-RR No. **9.11A**, for all conditions and for all methods of modulation, in an area of 1 000 km around the territory of the administration notifying the mobile-satellite service network:

-136 dB(W/(m ² · MHz))	for	$0^{\circ} \le \theta \le 5^{\circ}$
$-136 + 0.55 (\theta - 5) dB(W/(m^2 \cdot MHz))$	for	$5^\circ < \theta \leq 25^\circ$
-125 dB(W/(m ² · MHz))	for	$25^\circ < \theta \le 90^\circ$

where θ is the angle of arrival of the incident wave above the horizontal plane, in degrees. Outside this area ITU-RR Table **21-4** of Article **21** shall apply. Furthermore, the coordination thresholds in Table 5-2 of Annex 1 to Appendix **5** of the Radio Regulations (Edition of 2004), in conjunction with the applicable provisions of Articles **9** and **11** associated with ITU-RR No. **9.11A**, shall apply to systems for which complete notification information has been received by the Radicommunication Bureau by 14 November 2007 and that have been brought into use by that date. (WRC-07)

- 1.415 The use of the bands 2500-2690 MHz in Region 2 and 2500-2535 MHz and 2655-2690 MHz in Region 3 by the fixed-satellite service is limited to national and regional systems, subject to agreement obtained under ITU-RR No. 9.21, giving particular attention to the broadcasting-satellite service in Region 1. (WRC-07)
- 1.415A Additional allocation: in India and Japan, subject to agreement obtained under ITU-RR No. 9.21, the band 2 515-2 535 MHz may also be used for the aeronautical mobile-satellite service (space-to-Earth) for operation limited to within their national boundaries. (WRC-2000)
- **1.416** 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 ITU-RR No. **9.21**. The provisions of

ITU-RR No. **9.19** shall be applied by administrations in this band in their bilateral and multilateral negotiations. (WRC-07)

- **1.417** (SUP WRC-2000)
- 1.417A In applying provision No. 1.418, in Korea (Rep. of) and Japan, *resolves* 3 of ITU-R Resolution 528 (Rev.WRC-03) is relaxed to allow the broadcasting-satellite service (sound) and the complementary terrestrial broadcasting service to additionally operate on a primary basis in the band 2 605-2 630 MHz. This use is limited to systems intended for national coverage. An administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. 1.416. The provisions of No. 1.416 and Table 21-4 of ITU-RR Article 21 do not apply. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) in the band 2 605-2 630 MHz is subject to the provisions of ITU-R Resolution 539 (Rev.WRC-03). The power flux-density at the Earth's surface produced by emissions from a geostationary broadcasting-satellite service (sound) space station operating in the band 2 605-2 630 MHz for which complete ITU-RR Appendix 4 coordination information, or notification information, has been received after 4 July 2003, for all conditions and for all methods of modulation, shall not exceed the following limits:

-130	$dB(W/(m^2 \cdot$	MHz))	for	$0^{\circ} \le \theta \le 5^{\circ}$
-130 +	$0.4 (\theta - 5)$	$dB(W/(m^2 \cdot MHz))$	for	$5^{\circ} < \theta \le 25^{\circ}$
-122	$dB(W/(m^2 \cdot$	MHz))	for	$25^\circ < \theta \le 90^\circ$

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. In the case of the broadcasting-satellite service (sound) networks of Korea (Rep. of), as an exception to the limits above, the power flux-density value of $-122 \text{ dB}(W/(m^2 \cdot \text{MHz}))$ shall be used as a threshold for coordination under ITU-RR No. **9.11** in an area of 1 000 km around the territory of the administration notifying the broadcasting-satellite service (sound) system, for angles of arrival greater than 35°. (WRC-03)

- **1.417B** In Korea (Rep. of) and Japan, use of the band 2 605-2 630 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **1.417A**, for which complete ITU-RR Appendix **4** coordination information, or notification information, has been received after 4 July 2003, is subject to the application of the provisions of ITU-RR No. **9.12A**, in respect of geostationary-satellite networks for which complete ITU-RR Appendix **4** coordination information, or notification information, or notification information, is considered to have been received after 4 July 2003, and ITU-RR No. **22.2** does not apply. ITU-RR No. **22.2** shall continue to apply with respect to geostationary-satellite networks for which complete ITU-RR Appendix **4** coordination, or notification information, is considered to have been received before 5 July 2003. (WRC-03)
- **1.417C** Use of the band 2 605-2 630 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **1.417A**, for which complete ITU-RR Appendix **4** coordination information, or notification information, has been received after 4 July 2003, is subject to the application of the provisions of ITU-RR No. **9.12**. (WRC-03)
- 1.417D Use of the band 2 605-2 630 MHz by geostationary-satellite networks for which complete ITU-RR Appendix 4 coordination information, or notification information, has been received after 4 July 2003 is subject to the application of the provisions of ITU-RR No. 9.13 with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 1.417A, and ITU-RR No. 22.2 does not apply. (WRC-03)
- 1.418 Additional allocation: in Korea (Rep. of), India, Japan, Pakistan and Thailand, the 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 ITU-R Resolution 528 (Rev.WRC-03). The provisions of No. 1.416 and Table 21-4 of Article 21 of the ITU-RR, do not apply to this additional allocation. Use of non-geostationary-satellite systems in the broadcasting-satellite service (sound) is subject to ITU-R Resolution 539 (Rev.WRC-03). Geostationary broadcasting-satellite service (sound) systems for which complete ITU-RR 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 band 2 630-2 655 MHz, and for which complete ITU-RR 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:

$-130 dB(W/(m^2 \cdot MHz))$	for	$0^{\circ} \leq \theta \leq 5^{\circ}$
$-130 + 0.4 (\theta - 5) dB(W/(m^2 \cdot MHz))$	for	$5^{\circ} < \theta \le 25^{\circ}$
-122 dB(W/(m ² · MHz))	for	$25^{\circ} < \theta \le 90^{\circ}$

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 $-122 \text{ dB}(W/(\text{m}^2 \cdot \text{MHz}))$ shall be used as a threshold for coordination under ITU-RR No. **9.11** in an area of 1 500 km around the territory of the administration notifying the broadcasting-satellite service (sound) system.

In addition, an administration listed in this provision shall not have simultaneously two overlapping frequency assignments, one under this provision and the other under No. **1.416** for systems for which complete ITU-RR Appendix **4** coordination information has been received after 1 June 2005. (WRC-07)

- 1.418A In certain Region 3 countries listed in No. 1.418, use of the band 2 630-2 655 MHz by non-geostationarysatellite systems in the broadcasting-satellite service (sound) for which complete ITU-RR Appendix 4 coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of ITU-RR No. 9.12A, in respect of geostationary-satellite networks for which complete ITU-RR Appendix 4 coordination information, or notification information, is considered to have been received after 2 June 2000, and ITU-RR No. 22.2 does not apply. ITU-RR No. 22.2 shall continue to apply with respect to geostationary-satellite networks for which complete ITU-RR Appendix 4 coordination information, or notification information, is considered to have been received before 3 June 2000. (WRC-03)
- **1.418B** Use of the band 2 630-2 655 MHz by non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. **1.418**, for which complete ITU-RR Appendix **4** coordination information, or notification information, has been received after 2 June 2000, is subject to the application of the provisions of ITU-RR No. **9.12**. (WRC-03)
- 1.418C Use of the band 2 630-2 655 MHz by geostationary-satellite networks for which complete ITU-RR Appendix 4 coordination information, or notification information, has been received after 2 June 2000 is subject to the application of the provisions of ITU-RR No. 9.13 with respect to non-geostationary-satellite systems in the broadcasting-satellite service (sound), pursuant to No. 1.418 and ITU-RR No. 22.2 does not apply. (WRC-03)
- **1.419** 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 ITU-RR No. **9.11A**. (WRC-07)
- 1.420 The band 2655-2670 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 ITU-RR No. 9.21. The coordination under ITU-RR No. 9.11A applies. (WRC-07)
- 1.420A (SUP WRC-07)
- **1.421** (SUP WRC-03)
- 1.422 Additional allocation: in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, Brunei Darussalam, Congo (Rep. of the), Côte d'Ivoire, Cuba, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Georgia, Guinea, Guinea-Bissau, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Mauritania, Moldova, Mongolia, Montenegro, Nigeria, Oman, Pakistan, the Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, the Dem. Rep. of the Congo, Romania, Somalia, Tajikistan, Tunisia, Turkmenistan, Ukraine and Yemen, the band 2 690-2 700 MHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985. (WRC-07)
- **1.423** 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.
- **1.424** Additional allocation: in Canada, the band 2 850-2 900 MHz is also allocated to the maritime radionavigation service, on a primary basis, for use by shore-based radars.
- **1.424A** 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)
- **1.425** 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.

- **1.426** The use of the band 2 900-3 100 MHz by the aeronautical radionavigation service is limited to ground-based radars.
- **1.427** 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 ITU-RR No. **4.9**.
- **1.428** *Additional allocation:* in Azerbaijan, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 3100-3300 MHz is also allocated to the radionavigation service on a primary basis. (WRC-07)
- **1.429** *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, the United Arab Emirates, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Japan, Jordan, Kenya, Kuwait, Lebanon, Malaysia, Oman, Uganda, Pakistan, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea and Yemen, the band 3 300-3 400 MHz is also allocated to the fixed and mobile services on a primary basis. The countries bordering the Mediterranean shall not claim protection for their fixed and mobile services from the radiolocation service. (WRC-07)
- **1.430** Additional allocation: in Azerbaijan, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 3 300-3 400 MHz is also allocated to the radionavigation service on a primary basis. (WRC-07)
- Different category of service: in Albania, Algeria, Germany, Andorra, Saudi Arabia, Austria, Azerbaijan, 1.430A Bahrain, Belgium, Benin, Bosnia and Herzegovina, Botswana, Bulgaria, Burkina Faso, Cameroon, Cyprus, Vatican, Congo (Rep. of the), Côte d'Ivoire, Croatia, Denmark, Egypt, Spain, Estonia, Finland, France and French overseas departments and communities in Region 1, Gabon, Georgia, Greece, Guinea, Hungary, Ireland, Iceland, Israel, Italy, Jordan, Kuwait, Lesotho, Latvia, The Former Yugoslav Republic of Macedonia, Liechtenstein, Lithuania, Malawi, Mali, Malta, Morocco, Mauritania, Moldova, Monaco, Mongolia, Montenegro, Mozambique, Namibia, Niger, Norway, Oman, Netherlands, Poland, Portugal, Qatar, the Syrian Arab Republic, Slovakia, Czech Rep., Romania, United Kingdom, San Marino, Senegal, Serbia, Sierra Leone, Slovenia, South Africa, Sweden, Switzerland, Swaziland, Chad, Togo, Tunisia, Turkey, Ukraine, Zambia and Zimbabwe, the band 3400-3600 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis subject to agreement obtained under ITU-RR No. 9.21 with other administrations and is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this 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 ITU-RR Nos. 9.17 and 9.18 also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band, it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed -154.5 dB(W/(m² · 4 kHz)) for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the band 3 400-3 600 MHz shall not claim more protection from space stations than that provided in ITU-RR Table 21-4 of the Radio Regulations (Edition of 2004). This allocation is effective from 17 November 2010. (WRC-07)
- **1.431** Additional allocation: in Germany, Israel and the United Kingdom, the band 3 400-3 475 MHz is also allocated to the amateur service on a secondary basis. (WRC-03)
- 1.431A Different category of service: in Argentina, Brazil, Chile, Costa Rica, Cuba, Dominican Republic, El Salvador, Guatemala, Mexico, Paraguay, Suriname, Uruguay, Venezuela and French overseas departments and communities in Region 2, the band 3 400-3 500 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under ITU-RR No. 9.21. Stations of the mobile service in the band 3 400-3 500 MHz shall not claim more protection from space stations than that provided in ITU-RR Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-07)
- **1.432** *Different category of service:* in Korea (Rep. of), Japan and Pakistan, the allocation of the band 3 400-3 500 MHz to the mobile, except aeronautical mobile, service is on a primary basis (see No. **1.33**). (WRC-2000)
- 1.432A In Korea (Rep. of), Japan and Pakistan, the band 3400-3500 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this 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 ITU-RR Nos. 9.17 and 9.18 also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band it shall ensure that the power flux-density (pfd)

produced at 3 m above ground does not exceed $-154.5 \text{ dB}(W/(\text{m}^2 \cdot 4 \text{ kHz}))$ for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the band 3 400-3 500 MHz shall not claim more protection from space stations than that provided in ITU-RR Table **21-4** of the Radio Regulations (Edition of 2004). (WRC-07)

- Different category of service: in Bangladesh, China, India, Iran (Islamic Republic of), New Zealand, 1.432B Singapore and French overseas communities in Region 3, the band 3 400-3 500 MHz is allocated to the mobile, except aeronautical mobile, service on a primary basis, subject to agreement obtained under ITU-RR No. 9.21 with other administrations and is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this 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 ITU-RR Nos. 9.17 and 9.18 also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed $-154.5 \text{ dB}(\text{W}/(\text{m}^2 \cdot 4 \text{ kHz}))$ for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station) with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the band 3 400-3 500 MHz shall not claim more protection from space stations than that provided in ITU-RR Table 21-4 of the Radio Regulations (Edition of 2004). This allocation is effective from 17 November 2010. (WRC-07)
- **1.433** 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.
- 1.433A In Bangladesh, China, Korea (Rep. of), India, Iran (Islamic Republic of), Japan, New Zealand, Pakistan and French overseas communities in Region 3, the band 3 500-3 600 MHz is identified for International Mobile Telecommunications (IMT). This identification does not preclude the use of this 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 ITU-RR Nos. 9.17 and 9.18 also apply. Before an administration brings into use a (base or mobile) station of the mobile service in this band it shall ensure that the power flux-density (pfd) produced at 3 m above ground does not exceed $-154.5 \text{ dB}(W/(m^2 \cdot 4 \text{ kHz}))$ for more than 20% of time at the border of the territory of any other administration. This limit may be exceeded on the territory of any country whose administration has so agreed. In order to ensure that the pfd limit at the border of the territory of any other administration is met, the calculations and verification shall be made, taking into account all relevant information, with the mutual agreement of both administrations (the administration responsible for the terrestrial station and the administration responsible for the earth station), with the assistance of the Bureau if so requested. In case of disagreement, the calculation and verification of the pfd shall be made by the Bureau, taking into account the information referred to above. Stations of the mobile service in the band 3 500-3 600 MHz shall not claim more protection from space stations than that provided in ITU-RR Table 21-4 of the Radio Regulations (Edition of 2004). (WRC-07)
- **1.434** (SUP WRC-97)
- 1.435 In Japan, in the band 3 620-3 700 MHz, the radiolocation service is excluded.
- 1.436 Not used.
- 1.437 (SUP WRC-2000)
- **1.438** Use of the 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. However, passive sensing in the Earth exploration-satellite and space research services may be authorized in this band on a secondary basis (no protection is provided by the radio altimeters).

- **1.439** *Additional allocation:* in Iran (Islamic Republic of) and Libyan Arab Jamahiriya, the band 4 200-4 400 MHz is also allocated to the fixed service on a secondary basis. (WRC-2000)
- **1.440** 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 \pm 2 MHz of these frequencies, subject to agreement obtained under ITU-RR No. 9.21.
- 1.440A 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 ITU-RR No. 1.83). Such use shall be in accordance with ITU-R 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 these bands by other mobile service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority in the Radio Regulations. (WRC-07)
- 1.441 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 ITU-RR 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 ITU-RR 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 ITU-RR No. 9.12 for coordination with other 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 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)
- 1.442 In the 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, Paraguay, Uruguay and Venezuela), and in Australia, the 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 ITU-R Resolution 416 (WRC-07) and shall not cause harmful interference to the fixed service. (WRC-07)
- **1.443** *Different category of service:* in Argentina, Australia and Canada, the allocation of the bands 4 825-4 835 MHz and 4 950-4 990 MHz to the radio astronomy service is on a primary basis (see No. **1.33**).
- **1.443A** (SUP WRC-03)
- **1.443B** 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 band 5 030-5 150 MHz by all the space stations within any radionavigation-satellite service system (space-to-Earth) operating in the band 5 010-5 030 MHz shall not exceed $-124.5 \text{ dB}(\text{W/m}^2)$ in a 150 kHz band. In order not to cause harmful interference to the radio astronomy service in the band 4 990-5 000 MHz, radionavigation-satellite service systems operating in the band 5 010-5 030 MHz shall comply with the limits in the band 4 990-5 000 MHz defined in ITU-R Resolution **741 (WRC-03)**. (WRC-03)
- **1.444** The band 5030-5150 MHz is to be used for the operation of the international standard system (microwave landing system) for precision approach and landing. In the band 5030-5091 MHz, the requirements of this system shall take precedence over other uses of this band. For the use of the band 5091-5150 MHz, No. **1.444A** and ITU-R Resolution **114** (**Rev.WRC-03**) apply. (WRC-07)
- **1.444A** *Additional allocation:* the band 5 091-5 150 MHz is also allocated to the fixed-satellite service (Earth-to-space) on a primary basis. This allocation is limited to feeder links of non-geostationary mobile-satellite systems in the mobile-satellite service and is subject to coordination under ITU-RR No. **9.11A**.
 - In the band 5 091-5 150 MHz, the following conditions also apply:
 - prior to 1 January 2018, the use of the band 5 091-5 150 MHz by feeder links of non-geostationarysatellite systems in the mobile-satellite service shall be made in accordance with ITU-R Resolution 114 (Rev.WRC-03);

- after 1 January 2016, no new assignments shall be made to earth stations providing feeder links of non-geostationary mobile-satellite systems;
- after 1 January 2018, the fixed-satellite service will become secondary to the aeronautical radionavigation service. (WRC-07)
- **1.444B** The use of the 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 ITU-R Resolution 748 (WRC-07);
 - aeronautical telemetry transmissions from aircraft stations (see ITU-RR No. 1.83) in accordance with ITU-R Resolution 418 (WRC-07);
 - aeronautical security transmissions. Such use shall be in accordance with ITU-R Resolution 419 (WRC-07). (WRC-07)
- 1.445 Not used.
- **1.446** *Additional allocation:* in the countries listed in Nos. **1.369** and **1.400**, the band 5 150-5 216 MHz is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**. In Region 2, the band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a primary basis. In Regions 1 and 3, except those countries listed in Nos. **1.369** and **1.400**, the band is also allocated to the radiodetermination-satellite service (space-to-Earth) on a secondary basis. The use by the radiodetermination-satellite service is limited to feeder links in conjunction with the radiodetermination-satellite service operating in the bands 1 610-1 626.5 MHz and/or 2 483.5-2 500 MHz. The total power flux-density at the Earth's surface shall in no case exceed –159 dB(W/m²) in any 4 kHz band for all angles of arrival.
- **1.446A** The use of the bands 5150-5350 MHz and 5470-5725 MHz by the stations in the mobile, except aeronautical mobile, service shall be in accordance with ITU-R Resolution **229** (WRC-03). (WRC-07)
- **1.446B** 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. **1.43A** does not apply to the mobile service with respect to fixed-satellite service earth stations. (WRC-03)
- 1.446C Additional allocation: in Region 1 (except in Algeria, Saudi Arabia, Bahrain, Egypt, United Arab Emirates, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Syrian Arab Republic, Sudan and Tunisia) and in Brazil, the band 5 150-5 250 MHz is also allocated to the aeronautical mobile service on a primary basis, limited to aeronautical telemetry transmissions from aircraft stations (see No. ITU-RR 1.83), in accordance with ITU-R Resolution 418 (WRC-07). These stations shall not claim protection from other stations operating in accordance with Article 5 of ITU-RR. No. 1.43A does not apply. (WRC-07)
- **1.447** *Additional allocation:* in Côte d'Ivoire, Israel, Lebanon, Pakistan, the Syrian Arab Republic and Tunisia, the band 5 150-5 250 MHz is also allocated to the mobile service, on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**. In this case, the provisions of ITU-R Resolution **229** (WRC-03) do not apply. (WRC-07)
- **1.447A** The allocation to the fixed-satellite service (Earth-to-space) is limited to feeder links of non-geostationary-satellite systems in the mobile-satellite service and is subject to coordination under ITU-RR No. **9.11A**.
- 1.447B 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 ITU-RR 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.
- 1.447C Administrations responsible for fixed-satellite service networks in the band 5 150-5 250 MHz operated under Nos. 1.447A and 1.447B shall coordinate on an equal basis in accordance with ITU-RR No. 9.11A with administrations responsible for non-geostationary-satellite networks operated under No. 1.446 and brought into use prior to 17 November 1995. Satellite networks operated under No. 1.446 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. 1.447A and 1.447B.
- **1.447D** 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)

- **1.447E** Additional allocation: The band 5 250-5 350 MHz is also allocated to the fixed service on a primary basis in the following countries in Region 3: Australia, Korea (Rep. of), India, Indonesia, Iran (Islamic Republic of), Japan, Malaysia, Papua New Guinea, the Philippines, Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam. The use of this band by the fixed service is intended for the implementation of fixed wireless access systems and shall comply with Recommendation ITU-R F.1613. In addition, the fixed service shall not claim protection from the radiodetermination, Earth exploration-satellite (active) and space research (active) services, but the provisions of No. **1.43A** do not apply to the fixed service with respect to the Earth exploration-satellite (active) and space research (active) services. After implementation of fixed wireless access systems in the fixed service with protection for the existing radiodetermination systems, no more stringent constraints should be imposed on the fixed wireless access systems by future radiodeterminations. (WRC-07)
- **1.447F** In the 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). These services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendations ITU-R M.1638 and ITU-R SA.1632. (WRC-03)
- **1.448** *Additional allocation:* in Azerbaijan, Libyan Arab Jamahiriya, Mongolia, Kyrgyzstan, Slovakia, Romania and Turkmenistan, the band 5 250-5 350 MHz is also allocated to the radionavigation service on a primary basis. (WRC-03)
- **1.448A** 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. **1.43A** does not apply. (WRC-03)
- **1.448B** 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)
- **1.448C** 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)
- **1.448D** 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. **1.449**. (WRC-03)
- **1.449** The use of the band 5 350-5 470 MHz by the aeronautical radionavigation service is limited to airborne radars and associated airborne beacons.
- **1.450** *Additional allocation:* in Austria, Azerbaijan, Iran (Islamic Republic of), Mongolia, Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 5 470-5 650 MHz is also allocated to the aeronautical radionavigation service on a primary basis. (WRC-03)
- **1.450A** In the band 5 470-5 725 MHz, stations in the mobile service shall not claim protection from radiodetermination services. Radiodetermination services shall not impose on the mobile service more stringent protection criteria, based on system characteristics and interference criteria, than those stated in Recommendation ITU-R M.1638. (WRC-03)
- **1.450B** 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)
- 1.451 Additional allocation: in the United Kingdom, the band 5 470-5 850 MHz is also allocated to the land mobile service on a secondary basis. The power limits specified in ITU-RR Nos. 21.2, 21.3, 21.4 and 21.5 shall apply in the band 5 725-5 850 MHz.
- **1.452** 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.
- 1.453 Additional allocation: in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Côte d'Ivoire, Egypt, the United Arab Emirates, Gabon, Guinea, Equatorial Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Japan, Jordan, Kenya, Kuwait, Lebanon, Madagascar, Malaysia, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Sri Lanka, Swaziland, Tanzania, Chad, Thailand, Togo, Viet Nam and Yemen, the band 5 650-5 850 MHz is also allocated to the fixed and mobile services on a primary basis. In this case, the provisions of ITU-R Resolution 229 (WRC-03) do not apply. (WRC-03)

- **1.454** *Different category of service:* in Azerbaijan, the Russian Federation, Georgia, Mongolia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 5 670-5725 MHz to the space research service is on a primary basis (see No. **1.33**). (WRC-07)
- **1.455** *Additional allocation:* in Armenia, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Kazakhstan, Moldova, Mongolia, Uzbekistan, Kyrgyzstan, Tajikistan, Turkmenistan and Ukraine, the band 5 670-5 850 MHz is also allocated to the fixed service on a primary basis. (WRC-07)
- **1.456** Additional allocation: in Cameroon, the band 5 755-5 850 MHz is also allocated to the fixed service on a primary basis. (WRC-03)
- 1.457 Not used.
- 1.457A In the 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 ITU-R Resolution 902 (WRC-03). (WRC-03)
- **1.457B** In the bands 5 925-6 425 MHz and 14-14.5 GHz, earth stations located on board vessels may operate with the characteristics and under the conditions contained in ITU-R Resolution **902** (**WRC-03**) in Algeria, Saudi Arabia, Bahrain, Comoros, Djibouti, Egypt, United Arab Emirates, the Libyan Arab Jamahiriya, Jordan, Kuwait, Morocco, Mauritania, Oman, Qatar, the Syrian Arab Republic, Sudan, Tunisia and Yemen, in the maritime mobile-satellite service on a secondary basis. Such use shall be in accordance with ITU-R Resolution **902** (**WRC-03**). (WRC-03)
- 1.457C In Region 2 (except Brazil, Cuba, French overseas departments and communities, Guatemala, Paraguay, Uruguay and Venezuela), the band 5 925-6 700 MHz may be used for aeronautical mobile telemetry for flight testing by aircraft stations (see ITU-RR No. 1.83). Such use shall be in accordance with ITU-R 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 these bands by other mobile service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority in the Radio Regulations. (WRC-07)
- 1.458 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 6 425-7 025 MHz and 7 075-7 250 MHz.
- **1.458A** 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.
- 1.458B 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 ITU-RR 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 ITU-RR No. 22.2.
- **1.458C** Administrations making submissions in the band 7 025-7 075 MHz (Earth-to-space) for geostationarysatellite systems in the fixed-satellite service after 17 November 1995 shall consult on the basis of relevant ITU-R Recommendations with the administrations that have notified and brought into use non-geostationarysatellite systems in this frequency band before 18 November 1995 upon request of the latter administrations. This consultation shall be with a view to facilitating shared operation of both geostationary-satellite systems in the fixed-satellite service and non-geostationary-satellite systems in this band.
- **1.459** Additional allocation: in the Russian Federation, the frequency bands 7 100-7 155 MHz and 7 190-7 235 MHz are also allocated to the space operation service (Earth-to-space) on a primary basis, subject to agreement obtained under ITU-RR No. **9.21**. (WRC-97)
- **1.460** The use of the band 7 145-7 190 MHz by the space research service (Earth-to-space) is restricted to deep space; no emissions to deep space shall be effected in the band 7 190-7 235 MHz. Geostationary satellites in the space research service operating in the band 7 190-7 235 MHz shall not claim protection from existing and future stations of the fixed and mobile services and No. **1.43A** does not apply. (WRC-03)
- **1.461** 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 ITU-RR No. **9.21**.

- **1.461A** 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)
- **1.461B** The use of the band 7 750-7 850 MHz by the meteorological-satellite service (space-to-Earth) is limited to non-geostationary satellite systems. (WRC-97)
- **1.462** (SUP WRC-97)
- **1.462A** In Regions 1 and 3 (except for Japan), in the band 8 025-8 400 MHz, the Earth exploration-satellite service using geostationary satellites shall not produce a power flux-density in excess of the following provisional values for angles of arrival (θ), without the consent of the affected administration:

$-174 \text{ dB}(\text{W/m}^2)$ in a 4 kHz band	for	$0^{\circ} \leq \theta < 5^{\circ}$
$-174+0.5~(\theta-5)~dB(W/m^2)$ in a 4 kHz band	for	$5^{\circ} \leq \theta < 25^{\circ}$
$-164 \text{ dB}(\text{W/m}^2)$ in a 4 kHz band	for	$25^{\circ} \le \theta \le 90^{\circ}$

These values are subject to study under ITU-R Resolution **124** (WRC-97)^{*}. (WRC-97)

- **1.463** Aircraft stations are not permitted to transmit in the band 8 025-8 400 MHz. (WRC-97)
- 1.464 (SUP WRC-97)
- 1.465 In the space research service, the use of the band 8 400-8 450 MHz is limited to deep space.
- **1.466** *Different category of service:* in Israel, Singapore and Sri Lanka, the allocation of the band 8 400-8 500 MHz to the space research service is on a secondary basis (see No. **1.32**). (WRC-03)
- **1.467** (SUP WRC-03)
- 1.468 Additional allocation: in Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Burundi, Cameroon, China, Congo (Rep. of the), Costa Rica, Egypt, the United Arab Emirates, Gabon, Guyana, Indonesia, Iran (Islamic Republic of), Iraq, the Libyan Arab Jamahiriya, Jamaica, Jordan, Kenya, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Senegal, Singapore, Somalia, Swaziland, Tanzania, Chad, Togo, Tunisia and Yemen, the band 8 500-8 750 MHz is also allocated to the fixed and mobile services on a primary basis. (WRC-03)
- **1.469** *Additional allocation:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Hungary, Lithuania, Moldova, Mongolia, Uzbekistan, Poland, Kyrgyzstan, the Czech Rep., Romania, Tajikistan, Turkmenistan and Ukraine, the band 8 500-8 750 MHz is also allocated to the land mobile and radionavigation services on a primary basis. (WRC-03)
- **1.469A** 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)
- **1.470** 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.
- 1.471 Additional allocation: in Algeria, Germany, Bahrain, Belgium, China, Egypt, the United Arab Emirates, France, Greece, Indonesia, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, the Netherlands, Qatar and Sudan, the bands 8 825-8 850 MHz and 9 000-9 200 MHz are also allocated to the maritime radionavigation service, on a primary basis, for use by shore-based radars only. (WRC-07)
- **1.472** In the bands 8 850-9 000 MHz and 9 200-9 225 MHz, the maritime radionavigation service is limited to shore-based radars.
- **1.473** *Additional allocation:* in Armenia, Austria, Azerbaijan, Belarus, Cuba, the Russian Federation, Georgia, Hungary, Mongolia, Uzbekistan, Poland, Kyrgyzstan, Romania, Tajikistan, Turkmenistan and Ukraine, the bands 8 850-9 000 MHz and 9 200-9 300 MHz are also allocated to the radionavigation service on a primary basis. (WRC-07)

^{*} Note by the Secretariat: This Resolution was revised by WRC-2000.

- **1.473A** In the band 9000-9200 MHz, stations operating in the radiolocation service shall not cause harmful interference to, nor claim protection from, systems identified in No. **1.337** 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. **1.471**. (WRC-07)
- **1.474** 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 ITU-RR Article **31**).
- **1.475** 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)
- **1.475A** 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)
- **1.475B** In the band 9300-9500 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)
- 1.476 (SUP WRC-07)
- **1.476A** 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)
- 1.477 Different category of service: in Algeria, Saudi Arabia, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guyana, India, Indonesia, Iran (Islamic Republic of), Iraq, Jamaica, Japan, Jordan, Kuwait, Lebanon, Liberia, Malaysia, Nigeria, Oman, Pakistan, Qatar, Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Trinidad and Tobago, and Yemen, the allocation of the band 9 800-10 000 MHz to the fixed service is on a primary basis (see No. 1.33). (WRC-07)
- **1.478** *Additional allocation:* in Azerbaijan, Mongolia, Kyrgyzstan, Romania, Turkmenistan and Ukraine, the band 9 800-10 000 MHz is also allocated to the radionavigation service on a primary basis. (WRC-07)
- **1.478A** The use of the band 9800-9900 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 9300-9800 MHz band. (WRC-07)
- **1.478B** 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)
- **1.479** The band 9 975-10 025 MHz is also allocated to the meteorological-satellite service on a secondary basis for use by weather radars.
- **1.480** *Additional allocation:* in Argentina, Brazil, Chile, Costa Rica, Cuba, El Salvador, Ecuador, Guatemala, Honduras, Mexico, Paraguay, the Netherlands Antilles, Peru and Uruguay, the band 10-10.45 GHz is also allocated to the fixed and mobile services on a primary basis. In Venezuela, the band 10-10.45 GHz is also allocated to the fixed service on a primary basis. (WRC-07)
- **1.481** *Additional allocation:* in Germany, Angola, Brazil, China, Costa Rica, Côte d'Ivoire, El Salvador, Ecuador, Spain, Guatemala, Hungary, Japan, Kenya, Morocco, Nigeria, Oman, Uzbekistan, Paraguay, Peru, the Dem. People's Rep. of Korea, Romania, Tanzania, Thailand and Uruguay, the band 10.45-10.5 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-07)
- 1.482 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 ITU-RR 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, Libyan Arab Jamahiriya, Kazakhstan, Kuwait, Lebanon, Morocco, Mauritania, Moldova, Nigeria, Oman, Uzbekistan, Pakistan, Philippines, Qatar, Syrian Arab Republic, Kyrgyzstan, Singapore, Tajikistan, Turisia, Turkmenistan and Viet Nam, this restriction on the fixed and mobile, except aeronautical mobile, service is not applicable. (WRC-07)

- **1.482A** 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, ITU-R Resolution **751** (WRC-07) applies. (WRC-07)
- **1.483** *Additional allocation:* in Saudi Arabia, Armenia, Azerbaijan, Bahrain, Belarus, China, Colombia, Korea (Rep. of), Costa Rica, Egypt, the United Arab Emirates, Georgia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kazakhstan, Kuwait, Lebanon, Mongolia, Qatar, Kyrgyzstan, the Dem. People's Rep. of Korea, Romania, Tajikistan, Turkmenistan and Yemen, the band 10.68-10.7 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. Such use is limited to equipment in operation by 1 January 1985. (WRC-07)
- **1.484** In Region 1, the use of the band 10.7-11.7 GHz by the fixed-satellite service (Earth-to-space) is limited to feeder links for the broadcasting-satellite service.
- 1.484A 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 ITU-RR No. 9.12 for coordination with other 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 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)
- **1.485** 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.
- **1.486** *Different category of service:* in Mexico and the United States, the allocation of the band 11.7-12.1 GHz to the fixed service is on a secondary basis (see No. **1.32**).
- 1.487 In the band 11.7-12.5 GHz in Regions 1 and 3, the fixed, fixed-satellite, mobile, except aeronautical mobile, and broadcasting services, in accordance with their respective allocations, shall not cause harmful interference to, or claim protection from, broadcasting-satellite stations operating in accordance with the Regions 1 and 3 Plan in ITU-RR Appendix 30. (WRC-03)
- 1.487A Additional allocation: in Region 1, the band 11.7-12.5 GHz, in Region 2, the band 12.2-12.7 GHz and, in Region 3, the band 11.7-12.2 GHz, are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis, limited to non-geostationary systems and subject to application of the provisions of ITU-RR No. 9.12 for coordination with other non-geostationary-satellite systems in the fixed-satellite service. Non-geostationary-satellite service shall not claim protection from geostationary-satellite networks in the broadcasting-satellite service operating in accordance with the Radio Regulations, irrespective of the dates of receipt by the Bureau of the complete coordination or notification information, as appropriate, for the non-geostationary-satellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 1.43A does not apply. Non-geostationary-satellite systems in the fixed-satellite service in the above bands shall be operated in such a way that any unacceptable interference that may occur during their operation shall be rapidly eliminated. (WRC-03)
- **1.488** 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 ITU-RR 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 ITU-RR Appendix **30**. (WRC-03)
- **1.489** Additional allocation: in Peru, the band 12.1-12.2 GHz is also allocated to the fixed service on a primary basis.
- 1.490 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 ITU-RR Appendix 30.
- 1.491 (SUP WRC-03)

- 1.492 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 ITU-RR 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)
- **1.493** The broadcasting-satellite service in the band 12.5-12.75 GHz in Region 3 is limited to a power flux-density not exceeding $-111 \text{ dB}(W/(\text{m}^2 \cdot 27 \text{ MHz}))$ for all conditions and for all methods of modulation at the edge of the service area. (WRC-97)
- **1.494** *Additional allocation:* in Algeria, Angola, Saudi Arabia, Bahrain, Cameroon, the Central African Rep., Congo (Rep. of the), Côte d'Ivoire, Egypt, the United Arab Emirates, Eritrea, Ethiopia, Gabon, Ghana, Guinea, Iraq, Israel, the Libyan Arab Jamahiriya, Jordan, Kuwait, Lebanon, Madagascar, Mali, Morocco, Mongolia, Nigeria, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Somalia, Sudan, Chad, Togo and Yemen, the band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a primary basis. (WRC-03)
- **1.495** *Additional allocation:* in Bosnia and Herzegovina, France, Greece, Liechtenstein, Monaco, Montenegro, Uganda, Romania, Serbia, Switzerland, Tanzania and Tunisia, the band 12.5-12.75 GHz is also allocated to the fixed and mobile, except aeronautical mobile, services on a secondary basis. (WRC-07)
- **1.496** *Additional allocation:* in Austria, Azerbaijan, Kyrgyzstan and Turkmenistan, the band 12.5-12.75 GHz is also allocated to the fixed service and the mobile, except aeronautical mobile, service on a primary basis. However, stations in these services shall not cause harmful interference to fixed-satellite service earth stations of countries in Region 1 other than those listed in this footnote. Coordination of these earth stations is not required with stations of the fixed and mobile services of the countries listed in this footnote. The power flux-density limit at the Earth's surface given in Table **21-4** of Article **21** of ITU-RR, for the fixed-satellite service shall apply on the territory of the countries listed in this footnote. (WRC-2000)
- **1.497** The use of the band 13.25-13.4 GHz by the aeronautical radionavigation service is limited to Doppler navigation aids.
- 1.498 (SUP WRC-97)
- **1.498A** 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)
- **1.499** Additional allocation: in Bangladesh, India and Pakistan, the band 13.25-14 GHz is also allocated to the fixed service on a primary basis.
- **1.500** *Additional allocation:* in Algeria, Angola, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Jordan, Kuwait, Lebanon, Madagascar, Malaysia, Mali, Malta, Morocco, Mauritania, Nigeria, Pakistan, Qatar, the Syrian Arab Republic, Singapore, Sudan, Chad and Tunisia, the band 13.4-14 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-03)
- **1.501** *Additional allocation:* in Azerbaijan, Hungary, Japan, Mongolia, Kyrgyzstan, Romania and Turkmenistan, the band 13.4-14 GHz is also allocated to the radionavigation service on a primary basis. (WRC-07)
- **1.501A** The allocation of the band 13.4-13.75 GHz 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)
- **1.501B** 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)
- **1.502** 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 size 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;
 - $-115 \text{ dB}(\text{W}/(\text{m}^2 \cdot 10 \text{ MHz}))$ 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)

- **1.503** 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) $49.2 + 20 \log(D/4.5) dB(W/40 \text{ kHz})$, 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) fixedsatellite 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)

1.503A (SUP - WRC-03)

- **1.504** 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.
- **1.504A** 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. **1.29**, **1.30** and **1.31** apply. (WRC-03)
- **1.504B** Aircraft earth stations operating in the aeronautical mobile-satellite service in the band 14-14.5 GHz shall comply with the provisions of Annex 1, Part C of Recommendation ITU-R M.1643, with respect to any radio astronomy station performing observations in the 14.47-14.5 GHz band located on the territory of Spain, France, India, Italy, the United Kingdom and South Africa. (WRC-03)
- **1.504C** In the band 14-14.25 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, Côte d'Ivoire, Egypt, Guinea, India, Iran (Islamic Republic of), Kuwait, Lesotho, Nigeria, Oman, the Syrian Arab Republic and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **1.29**. (WRC-03)

- **1.505** *Additional allocation:* in Algeria, Angola, Saudi Arabia, Bahrain, Botswana, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Korea (Rep. of), Egypt, the United Arab Emirates, Gabon, Guinea, India, Indonesia, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lesotho, Lebanon, Malaysia, Mali, Morocco, Mauritania, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Swaziland, Tanzania, Chad, Viet Nam and Yemen, the band 14-14.3 GHz is also allocated to the fixed service on a primary basis. (WRC-07)
- **1.506** 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.
- 1.506A 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 ITU-R Resolution 902 (WRC-03). This footnote shall not apply to ship earth stations for which the complete ITU-RR Appendix 4 information has been received by the Bureau prior to 5 July 2003. (WRC-03)
- **1.506B** 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, Greece and Malta, within the minimum distance given in ITU-R Resolution **902** (WRC-03) from these countries. (WRC-03)
- 1.507 Not used.
- **1.508** *Additional allocation:* in Germany, Bosnia and Herzegovina, France, Italy, Libyan Arab Jamahiriya, The Former Yugoslav Rep. of Macedonia and the United Kingdom, the band 14.25-14.3 GHz is also allocated to the fixed service on a primary basis. (WRC-07)
- **1.508A** In the band 14.25-14.3 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, China, Côte d'Ivoire, Egypt, France, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Lesotho, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom and Tunisia by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **1.29**. (WRC-03)
- 1.509 (SUP WRC-07)
- **1.509A** In the band 14.3-14.5 GHz, the power flux-density produced on the territory of the countries of Saudi Arabia, Botswana, Cameroon, China, Côte d'Ivoire, Egypt, France, Gabon, Guinea, India, Iran (Islamic Republic of), Italy, Kuwait, Lesotho, Morocco, Nigeria, Oman, the Syrian Arab Republic, the United Kingdom, Sri Lanka, Tunisia and Viet Nam by any aircraft earth station in the aeronautical mobile-satellite service shall not exceed the limits given in Annex 1, Part B of Recommendation ITU-R M.1643, unless otherwise specifically agreed by the affected administration(s). The provisions of this footnote in no way derogate the obligations of the aeronautical mobile-satellite service to operate as a secondary service in accordance with No. **1.29**. (WRC-03)
- **1.510** The use of the 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.
- **1.511** *Additional allocation:* in Saudi Arabia, Bahrain, Bosnia and Herzegovina, Cameroon, Egypt, the United Arab Emirates, Guinea, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Kuwait, Lebanon, Pakistan, Qatar, the Syrian Arab Republic and Somalia, the band 15.35-15.4 GHz is also allocated to the fixed and mobile services on a secondary basis. (WRC-07)
- **1.511A** The band 15.43-15.63 GHz is also allocated to the fixed-satellite service (space-to-Earth) on a primary basis. Use of the band 15.43-15.63 GHz by the fixed-satellite service (space-to-Earth and Earth-to-space) is limited to feeder links of non-geostationary systems in the mobile-satellite service, subject to coordination under ITU-RR No. **9.11A**. The use of the frequency band 15.43-15.63 GHz by the fixed-satellite service (space-to-Earth) is limited to feeder links of non-geostationary systems in the mobile-satellite service for which advance publication information has been received by the Bureau prior to 2 June 2000. In the space-to-Earth direction, the minimum earth station elevation angle above and gain towards the local horizontal plane and the minimum coordination ITU-R S.1341. In order to protect the radio astronomy service in the band 15.35-15.4 GHz, the aggregate power flux-density radiated in the 15.35-15.4 GHz band by all the space stations within any feeder-link of a non-geostationary system in the mobile-satellite service (space-to-Earth) operating in the 15.43-15.63 GHz band shall not exceed the level of -156 dB(W/m²) in a 50 MHz bandwidth, into any radio astronomy observatory site for more than 2% of the time. (WRC-2000)

1.511B (SUP - WRC-97)

- **1.511C** Stations operating in the aeronautical radionavigation service shall limit the effective e.i.r.p. in accordance with Recommendation ITU-R S.1340. The minimum coordination distance required to protect the aeronautical radionavigation stations (ITU-RR 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. (WRC-97)
- **1.511D** Fixed-satellite service systems for which complete information for advance publication has been received by the Bureau by 21 November 1997 may operate in the bands 15.4-15.43 GHz and 15.63-15.7 GHz in the space-to-Earth direction and 15.63-15.65 GHz in the Earth-to-space direction. In the bands 15.4-15.43 GHz and 15.65-15.7 GHz, emissions from a non-geostationary space station shall not exceed the power flux-density limits at the Earth's surface of $-146 \text{ dB}(\text{W}/(\text{m}^2 \cdot \text{MHz}))$ for any angle of arrival. In the band 15.63-15.65 GHz, where an administration plans emissions from a non-geostationary space station that exceed $-146 \text{ dB}(\text{W}/(\text{m}^2 \cdot \text{MHz}))$ for any angle of arrival, it shall coordinate under ITU-RR No. **9.11A** with the affected administrations. Stations in the fixed-satellite service operating in the band 15.63-15.65 GHz in the Earth-to-space direction shall not cause harmful interference to stations in the aeronautical radionavigation service (ITU-RR No. **4.10** applies). (WRC-97)
- **1.512** *Additional allocation:* in Algeria, Angola, Saudi Arabia, Austria, Bahrain, Bangladesh, Brunei Darussalam, Cameroon, Congo (Rep. of the), Costa Rica, Egypt, El Salvador, the United Arab Emirates, Eritrea, Finland, Guatemala, India, Indonesia, Iran (Islamic Republic of), the Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Montenegro, Mozambique, Nepal, Nicaragua, Oman, Pakistan, Qatar, Syrian Arab Republic, Serbia, Singapore, Somalia, Sudan, Swaziland, Tanzania, Chad, Togo and Yemen, the band 15.7-17.3 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-07)

1.513 *Additional allocation:* in Israel, the band 15.7-17.3 GHz is also allocated to the fixed and mobile services on a primary basis. These services shall not claim protection from or cause harmful interference to services operating in accordance with the Table in countries other than those included in No. **1.512**.

- **1.513A** 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)
- **1.514** *Additional allocation:* in Algeria, Angola, Saudi Arabia, Bahrain, Bangladesh, Cameroon, Costa Rica, El Salvador, the United Arab Emirates, Guatemala, India, Iran (Islamic Republic of), Iraq, Israel, Italy, the Libyan Arab Jamahiriya, Japan, Jordan, Kuwait, Lithuania, Nepal, Nicaragua, Nigeria, Oman, Uzbekistan, Pakistan, Qatar, Kyrgyzstan and Sudan, the band 17.3-17.7 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits given in ITU-RR Nos. **21.3** and **21.5** shall apply. (WRC-07)
- **1.515** 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 ITU-RR Appendix **30A**.
- 1.516 The use of the band 17.3-18.1 GHz by geostationary-satellite systems in the fixed-satellite service (Earth-tospace) is limited to feeder links for the broadcasting-satellite service. The use of the band 17.3-17.8 GHz in Region 2 by systems in the fixed-satellite service (Earth-to-space) is limited to geostationary satellites. For the use of the band 17.3-17.8 GHz in Region 2 by feeder links for the broadcasting-satellite service in the band 12.2-12.7 GHz, see ITU-RR 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 ITU-RR No. 9.12 for coordination with other non-geostationarysatellite 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 fixedsatellite service and of the complete coordination or notification information, as appropriate, for the geostationary-satellite networks, and No. 1.43A does not apply. Non-geostationary-satellite systems in the fixedsatellite 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)
- **1.516A** In the band 17.3-17.7 GHz, earth stations of the fixed-satellite service (space-to-Earth) in Region 1 shall not claim protection from the broadcasting-satellite service feeder-link earth stations operating under ITU-RR Appendix **30A**, nor put any limitations or restrictions on the locations of the broadcasting-satellite service feeder-link earth stations anywhere within the service area of the feeder link. (WRC-03)
- **1.516B** 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 bands by other fixed-satellite service applications or by other services to which these bands are allocated on a co-primary basis and does not establish priority in these Radio Regulations among users of the bands. Administrations should take this into account when considering regulatory provisions in relation to these bands. See ITU-R Resolution **143** (WRC-03). (WRC-03)

- **1.517** 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)
- 1.518 (SUP WRC-07)
- **1.519** Additional allocation: the bands 18-18.3 GHz in Region 2 and 18.1-18.4 GHz in Regions 1 and 3 are also allocated to the meteorological-satellite service (space-to-Earth) on a primary basis. Their use is limited to geostationary satellites. (WRC-07)
- **1.520** 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)
- **1.521** *Alternative allocation:* in Germany, Denmark, the United Arab Emirates and Greece, the band 18.1-18.4 GHz is allocated to the fixed, fixed-satellite (space-to-Earth) and mobile services on a primary basis (see No. **1.33**). The provisions of No. **1.519** also apply. (WRC-03)
- 1.522 (SUP WRC-2000)
- **1.522A** 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 ITU-RR No. **21.5A** and **21.16.2**, respectively. (WRC-2000)
- **1.522B** 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)
- **1.522C** In the band 18.6-18.8 GHz, in Algeria, Saudi Arabia, Bahrain, Egypt, the United Arab Emirates, the Libyan Arab Jamahiriya, Jordan, Lebanon, Morocco, Oman, Qatar, the Syrian Arab Republic, Tunisia and Yemen, fixed-service systems in operation at the date of entry into force of the Final Acts of WRC-2000 are not subject to the limits of ITU-RR No. **21.5A**. (WRC-2000)
- 1.523 (SUP WRC-2000)
- 1.523A 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 ITU-RR No. 9.11A and ITU-RR 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 ITU-RR 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 ITU-RR Appendix **4** notification information is considered as having been received by the Bureau prior to 18 November 1995. (WRC-97)

- **1.523B** 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 ITU-RR No. **9.11A**, and ITU-RR No. **22.2** does not apply.
- 1.523C ITU-RR 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 ITU-RR Appendix 4 coordination information, or notification information, is considered as having been received by the Bureau prior to 18 November 1995. (WRC-97)
- 1.523D 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 ITU-RR No. 9.11A, but not subject to the provisions of ITU-RR No. 22.2. The use of this band for other non-geostationary fixed-satellite service systems, or for the cases indicated in Nos. 1.523C and 1.523E, is not subject to the provisions of ITU-RR No. 9.11A and shall continue to be subject to ITU-RR Articles 9 (except ITU-RR No. 9.11A) and 11 procedures, and to the provisions of ITU-RR No. 22.2. (WRC-97)
- **1.523E** ITU-RR 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 ITU-RR Appendix **4** coordination information, or notification information, is considered as having been received by the Bureau by 21 November 1997. (WRC-97)
- **1.524** *Additional allocation:* in Afghanistan, Algeria, Angola, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Costa Rica, Egypt, the United Arab Emirates, Gabon, Guatemala, Guinea, India, Iran (Islamic Republic of), Iraq, Israel, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, the Dem. People's Rep. of Korea, Singapore, Somalia, Sudan, Tanzania, Chad, Togo and Tunisia, the band 19.7-21.2 GHz is also allocated to the fixed and mobile services on a primary basis. This additional use shall not impose any limitation on the power flux-density of space stations in the fixed-satellite service in the band 19.7-21.2 GHz and of space stations in the mobile-satellite service in the band 19.7-21.2 GHz where the allocation to the mobile-satellite service is on a primary basis in the latter band. (WRC-07)
- **1.525** 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.
- **1.526** In the bands 19.7-20.2 GHz and 29.5-30 GHz in Region 2, and in the bands 20.1-20.2 GHz and 29.9-30 GHz in Regions 1 and 3, networks which are both in the fixed-satellite service and in the mobile-satellite service may include links between earth stations at specified or unspecified points or while in motion, through one or more satellites for point-to-point and point-to-multipoint communications.
- **1.527** In the bands 19.7-20.2 GHz and 29.5-30 GHz, the provisions of ITU-RR No. **4.10** do not apply with respect to the mobile-satellite service.
- **1.528** The allocation to the mobile-satellite service is intended for use by networks which use narrow spot-beam antennas and other advanced technology at the space stations. Administrations operating systems in the mobile-satellite service in the band 19.7-20.1 GHz in Region 2 and in the band 20.1-20.2 GHz shall take all practicable steps to ensure the continued availability of these bands for administrations operating fixed and mobile systems in accordance with the provisions of No. **1.524**.
- **1.529** 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. **1.526**.
- 1.530 In Regions 1 and 3, the use of the band 21.4-22 GHz by the broadcasting-satellite service is subject to the provisions of ITU-R Resolution 525 (Rev.WRC-07). (WRC-07)
- **1.531** Additional allocation: in Japan, the band 21.4-22 GHz is also allocated to the broadcasting service on a primary basis.

- **1.532** 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.
- **1.533** The inter-satellite service shall not claim protection from harmful interference from airport surface detection equipment stations of the radionavigation service.
- 1.534 (SUP WRC-03)
- **1.535** 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.
- 1.535A 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 ITU-RR No. 9.11A, but not subject to the provisions of ITU-RR No. 22.2, except as indicated in Nos. 1.523C and 1.523E where such use is not subject to the provisions of ITU-RR No. 9.11A and shall continue to be subject to ITU-RR Articles 9 (except ITU-RR No. 9.11A) and 11 procedures, and to the provisions of ITU-RR No. 22.2. (WRC-97)
- **1.536** 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.
- **1.536A** 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 Recommendations ITU-R SA.1278 and ITU-R SA.1625, respectively. (WRC-03)
- **1.536B** In Germany, Saudi Arabia, Austria, Belgium, Brazil, Bulgaria, China, Korea (Rep. of), Denmark, Egypt, United Arab Emirates, Spain, Estonia, Finland, France, Hungary, India, Iran (Islamic Republic of), Ireland, Israel, Italy, the Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Lebanon, Liechtenstein, Lithuania, Moldova, Norway, Oman, Uganda, Pakistan, the Philippines, Poland, Portugal, the Syrian Arab Republic, Dem. People's Rep. of Korea, Slovakia, the Czech Rep., Romania, the United Kingdom, Singapore, Sweden, Switzerland, Tanzania, Turkey, Viet Nam and Zimbabwe, earth stations operating in the Earth exploration-satellite service in the band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. (WRC-07)
- **1.536C** In Algeria, Saudi Arabia, Bahrain, Botswana, Brazil, Cameroon, Comoros, Cuba, Djibouti, Egypt, United Arab Emirates, Estonia, Finland, Iran (Islamic Republic of), Israel, Jordan, Kenya, Kuwait, Lithuania, Malaysia, Morocco, Nigeria, Oman, Qatar, Syrian Arab Republic, Somalia, Sudan, Tanzania, Tunisia, Uruguay, Zambia and Zimbabwe, earth stations operating in the space research service in the band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. (WRC-03)
- **1.537** 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 ITU-RR No. **22.2**.
- **1.537A** In Bhutan, Cameroon, Korea (Rep. of), the Russian Federation, India, Indonesia, Iran (Islamic Republic of), Japan, Kazakhstan, Lesotho, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 27.9-28.2 GHz may also be used by high altitude platform stations (HAPS) within the territory of these countries. Such use of 300 MHz of the fixed-service allocation by HAPS in the above countries is further limited to operation in the HAPS-to-ground direction and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services. Furthermore, the development of these other services shall not be constrained by HAPS. See ITU-R Resolution **145 (Rev.WRC-07)**. (WRC-07)
- **1.538** *Additional allocation:* the bands 27.500-27.501 GHz and 29.999-30.000 GHz are also allocated to the fixed-satellite service (space-to-Earth) on a primary basis for the beacon transmissions intended for up-link power control. Such space-to-Earth transmissions shall not exceed an equivalent isotropically radiated power (e.i.r.p.) of +10 dBW in the direction of adjacent satellites on the geostationary-satellite orbit. (WRC-07)
- **1.539** 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.
- **1.540** *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.

- **1.541** 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.
- 1.541A 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 ITU-RR 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 ITU-RR Appendix 4 information for coordination before this date are encouraged to utilize these techniques to the extent practicable. (WRC-2000)
- 1.542 Additional allocation: in Algeria, Saudi Arabia, Bahrain, Brunei Darussalam, Cameroon, China, Congo (Rep. of the), Egypt, the United Arab Emirates, Eritrea, Ethiopia, Guinea, India, Iran (Islamic Republic of), Iraq, Japan, Jordan, Kuwait, Lebanon, Malaysia, Mali, Morocco, Mauritania, Nepal, Pakistan, Philippines, Qatar, the Syrian Arab Republic, the Dem. People's Rep. of Korea, Somalia, Sudan, Sri Lanka and Chad, the band 29.5-31 GHz is also allocated to the fixed and mobile services on a secondary basis. The power limits specified in ITU-RR Nos. 21.3 and 21.5 shall apply. (WRC-07)
- **1.543** 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.
- 1.543A In Bhutan, Cameroon, Korea (Rep. of), the Russian Federation, India, Indonesia, Iran (Islamic Republic of), Japan, Kazakhstan, Lesotho, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 31-31.3 GHz may also be used by systems using high altitude platform stations (HAPS) in the ground-to-HAPS direction. The use of the band 31-31.3 GHz by systems using HAPS is limited to the territory of the countries listed above and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems, systems in the mobile service and systems operated under No. 1.545. Furthermore, the development of these services shall not be constrained by HAPS. Systems using HAPS in the band 31-31.3 GHz shall not cause harmful interference to the radio astronomy service having a primary allocation in the band 31.3-31.8 GHz, taking into account the protection criterion as given in Recommendation ITU-R RA.769. In order to ensure the protection of satellite passive services, the level of unwanted power density into a HAPS ground station antenna in the band 31.3-31.8 GHz shall be limited to -106 dB(W/MHz) under clear-sky conditions, and may be increased up to -100 dB(W/MHz) under rainy conditions to mitigate fading due to rain, provided the effective impact on the passive satellite does not exceed the impact under clearsky conditions. See ITU-R Resolution 145 (Rev.WRC-07). (WRC-07)
- **1.544** In the band 31-31.3 GHz the power flux-density limits specified in ITU-RR Article **21**, Table **21-4** shall apply to the space research service.
- **1.545** *Different category of service:* in Armenia, Georgia, Mongolia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 31-31.3 GHz to the space research service is on a primary basis (see No. **1.33**). (WRC-07)
- 5.546 Different category of service: in Saudi Arabia, Armenia, Azerbaijan, Belarus, Egypt, the United Arab Emirates, Spain, Estonia, the Russian Federation, Georgia, Hungary, Iran (Islamic Republic of), Israel, Jordan, Lebanon, Moldova, Mongolia, Uzbekistan, Poland, the Syrian Arab Republic, Kyrgyzstan, Romania, the United Kingdom, South Africa, Tajikistan, Turkmenistan and Turkey, the allocation of the band 31.5-31.8 GHz to the fixed and mobile, except aeronautical mobile, services is on a primary basis (see No. 1.33). (WRC-07)
- 1.547 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 ITU-R 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. 1.516B), administrations should further take into account potential constraints to high-density applications in the fixed service, as appropriate. (WRC-07)
- **1.547A** 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)
- **1.547B** *Alternative allocation*: in the United States, the band 31.8-32 GHz is allocated to the radionavigation and space research (deep space) (space-to-Earth) services on a primary basis. (WRC-97)

- **1.547C** *Alternative allocation*: in the United States, the band 32-32.3 GHz is allocated to the radionavigation and space research (deep space) (space-to-Earth) services on a primary basis. (WRC-03)
- **1.547D** *Alternative allocation*: in the United States, the band 32.3-33 GHz is allocated to the inter-satellite and radionavigation services on a primary basis. (WRC-97)
- **1.547E** *Alternative allocation*: in the United States, the band 33-33.4 GHz is allocated to the radionavigation service on a primary basis. (WRC-97)
- **1.548** 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 ITU-R Recommendation **707**). (WRC-03)
- **1.549** *Additional allocation:* in Saudi Arabia, Bahrain, Bangladesh, Egypt, the United Arab Emirates, Gabon, Indonesia, Iran (Islamic Republic of), Iraq, Israel, the Libyan Arab Jamahiriya, Jordan, Kuwait, Lebanon, Malaysia, Mali, Malta, Morocco, Mauritania, Nepal, Nigeria, Oman, Pakistan, the Philippines, Qatar, the Syrian Arab Republic, the Dem. Rep. of the Congo, Singapore, Somalia, Sudan, Sri Lanka, Togo, Tunisia and Yemen, the band 33.4-36 GHz is also allocated to the fixed and mobile services on a primary basis. (WRC-03)
- **1.549A** 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 $-73.3 \text{ dB}(\text{W/m}^2)$ in this band. (WRC-03)
- **1.550** *Different category of service:* in Armenia, Azerbaijan, Belarus, the Russian Federation, Georgia, Mongolia, Kyrgyzstan, Tajikistan and Turkmenistan, the allocation of the band 34.7-35.2 GHz to the space research service is on a primary basis (see No. 1.33). (WRC-07)
- **1.550A** For sharing of the band 36-37 GHz between the Earth exploration-satellite (passive) service and the fixed and mobile services, ITU-R Resolution **752** (WRC-07) shall apply. (WRC-07)
- **1.551** (SUP WRC-97)
- **1.551A** (SUP WRC-03)
- 1.551AA (SUP WRC-03)
- **1.551B** (SUP WRC-2000)
- **1.551C** (SUP WRC-2000)
- **1.551D** (SUP WRC-2000)
- **1.551E** (SUP WRC-2000)
- **1.551F** *Different category of service*: in Japan, the allocation of the band 41.5-42.5 GHz to the mobile service is on a primary basis (see No. **1.33**). (WRC-97)
- **1.551G** (SUP WRC-03)
- **1.551H** The equivalent power flux-density (epfd) produced in the 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 42-42.5 GHz band, shall not exceed the following values at the site of any radio astronomy station for more than 2% of the time:

 $-230 \text{ dB}(\text{W/m}^2)$ in 1 GHz and $-246 \text{ dB}(\text{W/m}^2)$ in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a single-dish telescope; and

 $-209 \text{ dB}(\text{W/m}^2)$ in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a very long baseline interferometry station.

These epfd 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 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 ITU-RR 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, ITU-R 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-07)

1.551I 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 (space-to-Earth) operating in the 42-42.5 GHz band, shall not exceed the following values at the site of any radio astronomy station:

 $-137 \text{ dB}(\text{W/m}^2)$ in 1 GHz and $-153 \text{ dB}(\text{W/m}^2)$ in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a single-dish telescope; and

 $-116 \text{ dB}(\text{W/m}^2)$ in any 500 kHz of the 42.5-43.5 GHz band at the site of any radio astronomy station registered as a very long baseline interferometry station.

These values shall apply at the site of any radio astronomy station that either:

- was in operation prior to 5 July 2003 and has been notified to the Bureau before 4 January 2004; or
- was notified before the date of receipt of the complete ITU-RR 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, ITU-R 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)

- **1.552** The allocation of the spectrum for the fixed-satellite service in the bands 42.5-43.5 GHz and 47.2-50.2 GHz for Earth-to-space transmission is greater than that in the band 37.5-39.5 GHz for space-to-Earth transmission in order to accommodate feeder links to broadcasting satellites. Administrations are urged to take all practicable steps to reserve the band 47.2-49.2 GHz for feeder links for the broadcasting-satellite service operating in the band 40.5-42.5 GHz.
- **1.552A** The allocation to the fixed service in the bands 47.2-47.5 GHz and 47.9-48.2 GHz is designated for use by high altitude platform stations. The use of the bands 47.2-47.5 GHz and 47.9-48.2 GHz is subject to the provisions of ITU-R Resolution **122 (Rev.WRC-07)**. (WRC-07)
- **1.553** 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. **1.43**). (WRC-2000)
- **1.554** 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)
- **1.554A** 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)
- **1.555** *Additional allocation:* the band 48.94-49.04 GHz is also allocated to the radio astronomy service on a primary basis. (WRC-2000)
- **1.555A** (SUP WRC-03)
- **1.555B** 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)
- **1.556** 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)
- **1.556A** 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 $-147 \text{ dB}(W/(\text{m}^2 \cdot 100 \text{ MHz}))$ for all angles of arrival. (WRC-97)

- **1.556B** Additional allocation: in Japan, the band 54.25-55.78 GHz is also allocated to the mobile service on a primary basis for low-density use. (WRC-97)
- **1.557** Additional allocation: in Japan, the band 55.78-58.2 GHz is also allocated to the radiolocation service on a primary basis. (WRC-97)
- **1.557A** 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)
- **1.558** 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. **1.43**). (WRC-2000)
- **1.558A** 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 $-147 \text{ dB}(W/(\text{m}^2 \cdot 100 \text{ MHz}))$ for all angles of arrival. (WRC-97)
- **1.559** 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. **1.43**). (WRC-2000)
- **1.559A** (SUP WRC-07)
- **1.560** 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.
- **1.561** 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)
- **1.561A** The 81-81.5 GHz band is also allocated to the amateur and amateur-satellite services on a secondary basis. (WRC-2000)
- **1.561B** 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)
- **1.562** 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)
- **1.562A** In the bands 94-94.1 GHz and 130-134 GHz, transmissions from space stations of the Earth explorationsatellite 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)
- **1.562B** In the bands 105-109.5 GHz, 111.8-114.25 GHz, 155.5-158.5 GHz and 217-226 GHz, the use of this allocation is limited to space-based radio astronomy only. (WRC-2000)
- **1.562C** 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

 $-148 \text{ dB}(\text{W/(m}^2 \cdot \text{MHz}))$ for all angles of arrival. (WRC-2000)

- **1.562D** Additional allocation: In Korea (Rep. of), the bands 128-130 GHz, 171-171.6 GHz, 172.2-172.8 GHz and 173.3-174 GHz are also allocated to the radio astronomy service on a primary basis until 2015. (WRC-2000)
- **1.562E** The allocation to the Earth exploration-satellite service (active) is limited to the band 133.5-134 GHz. (WRC-2000)
- **1.562F** In the band 155.5-158.5 GHz, the allocation to the Earth exploration-satellite (passive) and space research (passive) services shall terminate on 1 January 2018. (WRC-2000)
- **1.562G** The date of entry into force of the allocation to the fixed and mobile services in the band 155.5-158.5 GHz shall be 1 January 2018. (WRC-2000)
- **1.562H** 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 $-144 \text{ dB}(W/(m^2 \cdot MHz))$ for all angles of arrival. (WRC-2000)
- 1.563 (SUP WRC-03)
- **1.563A** 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)
- **1.563B** 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)
- 1.564 (SUP WRC-2000)
- **1.565** The frequency band 275-1 000 GHz may be used by administrations for experimentation with, and development of, various active and passive services. In this band a need has been identified for the following spectral line measurements for passive services:
 - 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): 275-277 GHz, 294-306 GHz, 316-334 GHz, 342-349 GHz, 363-365 GHz, 371-389 GHz, 416-434 GHz, 442-444 GHz, 496-506 GHz, 546-568 GHz, 624-629 GHz, 634-654 GHz, 659-661 GHz, 684-692 GHz, 730-732 GHz, 851-853 GHz and 951-956 GHz.

Future research in this largely unexplored spectral region may yield additional spectral lines and continuum bands of interest to the passive services. Administrations are urged to take all practicable steps to protect these passive services from harmful interference until the date when the allocation Table is established in the above-mentioned frequency band. (WRC-2000)

1.566 to **1.600** Not used and reserved for future.

Section VI – Footnotes to the National Table of frequency allocations (fourth column)

In addition to the regional footnotes which are considerable in national frequency allocations table, some national footnotes, above the No. **1.600** and underlined, are adapted to present local concerns about the allocations made especially for Bhutan. Regional footnotes having the name of Bhutan are delineated by underline in column four of Table.

In the texts of footnotes presented here, whenever "ITU-R" or "ITU-RR" appears before a reference to a provision, it denotes to a provision in the ITU Radio Regulations. Other references refer to the provisions of this Part. For example ITU-RR No. **1.83** is the definition of "*aircraft station*" in Article **1** of Radio Regulations, while, No.**1.83** refers to provision **1.83** in section **V** above (ITU-RR No. **1.83** is also provision **1.83** of Part **II**, this Radio Rules!).

- 1.537A In <u>Bhutan</u>, Korea (Rep. of), the Russian Federation, Indonesia, Iran (Islamic Republic of), Japan, Kazakhstan, Lesotho, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 27.5-28.35 GHz may also be used by high altitude platform stations (HAPS). The use of HAPS within the band 27.5-28.35 GHz is limited, within the territory of the countries listed above, to a single 300 MHz sub-band. Such use of 300 MHz of the fixed-service allocation by HAPS in the above countries is further limited to operation in the HAPS-to-ground direction and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems or other co-primary services. Furthermore, the development of these other services shall not be constrained by HAPS. See ITU-R Resolution 145 (WRC-03). (WRC-03)
- 1.543A In Bhutan, Korea (Rep. of), the Russian Federation, Indonesia, Iran (Islamic Republic of), Japan, Kazakhstan, Lesotho, Malaysia, Maldives, Mongolia, Myanmar, Uzbekistan, Pakistan, the Philippines, Kyrgyzstan, the Dem. People's Rep. of Korea, Sri Lanka, Thailand and Viet Nam, the allocation to the fixed service in the band 31-31.3 GHz may also be used by systems using high altitude platform stations (HAPS) in the ground-to-HAPS direction. The use of the band 31-31.3 GHz by systems using HAPS is limited to the territory of the countries listed above and shall not cause harmful interference to, nor claim protection from, other types of fixed-service systems, systems in the mobile service and systems operated under No. 1.545. Furthermore, the development of these services shall not be constrained by HAPS. Systems using HAPS in the band 31-31.3 GHz shall not cause harmful interference to the radio astronomy service having a primary allocation in the band 31.3-31.8 GHz, taking into account the protection criterion as given in Recommendation ITU-R RA.769. In order to ensure the protection of satellite passive services, the level of unwanted power density into a HAPS ground station antenna in the band 31.3-31.8 GHz shall be limited to -106 dB(W/MHz) under clear-sky conditions, and may be increased up to $-100 \, \text{dB}(\text{W/MHz})$ under rainy conditions to take account of rain attenuation, provided the effective impact on the passive satellite does not exceed the impact under clear-sky conditions as given above. See ITU-R Resolution 145 (WRC-03). (WRC-03)
- **1.601** *Alternative allocation*: In Bhutan the band 2065-2107 kHz is allocated to the fixed service on a primary basis. This alternative allocation is subject to the application of the provisions of ITU-RR No. **4.4**.
- **1.602** *Alternative allocation*: In Bhutan the bands 2170-2173.5 kHz, 2190.5-2194 kHz, 18780-18900 kHz and 19680-19800 kHz are allocated to the land mobile service on a primary basis. This alternative allocation is subject to the application of the provisions of ITU-RR No. **4.4**.
- **1.603** *Alternative allocation*: In Bhutan ,according to the ITU-RR Nos. **1.128** and **1.137**, frequencies in the bands 4063-4123 kHz, 4130-4438 kHz, 6200-6213.5 kHz and 6220.5-6525 kHz may be used 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. Higher power may be permitted (with a mean power not exceeding 1 kW), on condition that harmful interference is not caused to the maritime mobile service of neighbour countries.
- **1.604** *Alternative allocation*: In Bhutan the bands 8100-8195 kHz, 12230-13200 kHz, 16360-17410 kHz, 22000-22855 kHz, 25070-25210 kHz and 26100-26175 kHz are allocated to the fixed and land mobile services on a primary basis. This alternative allocation is subject to the application of the provisions of ITU-RR No. **4.4**.
- **1.605** The frequency band 5005-5060 kHz has been utilized by sound broadcasting service for national coverage in Bhutan.
- **1.606** Alternative allocation: In Bhutan frequencies in the bands 8195-8815 kHz may be used by stations in the mobile, except aeronautical mobile service, communicating only within the boundary of the country in which they are located, with a mean power not exceeding 50 W. Higher power may be permitted (with a mean power not exceeding 1 kW), on condition that harmful interference is not caused to the maritime mobile service of neighbour countries.

- 1.607 The paired frequency bands 380 385 MHz/390 395 MHz, 385 389.9 MHz/395 399.9 MHz, 410 420 MHz/420 430 MHz and 870 876 MHz/915 921 MHz designated for implementation of radio trunk systems. Licensees may be provided by paired blocks of band, depending to the service area and technical conditions. Duplex separation between uplink and downlink links is 10 MHz which is conventional in the 400 MHz band.
- **1.608** The paired frequency bands 876 915 MHz/921 960 MHz and 1710 1785 MHz/1805 1880 MHz allocated to implement public cellular mobile system. No other applications permitted to utilize these bands.
- **1.609** The utilization of the band 3400 MHz to 3600 MHz by WiMAX point to multipoint systems has higher priority respect to the other radio applications, however such application must not cause harmful interference to the stations operating in fixed-satellite service in adjacent frequency bands.

Schedule 2 – Frequency Band Plans

2.1 Outline of this schedule

- (a) Relevant Sections:
 - Section 2.2 Frequency band plan for digital cellular mobile networks
 - Section 2.3 Frequency band plan for Citizen Band (CB)
 - Section 2.4 Frequency band plan for point to multi-point WiMAX
 - Section 2.5 Cordless telephones
 - Section 2.6 Radio controlled models
 - Section 2.7 Radio Frequency Identification (RFID)
 - Section 2.8 Non-specific applications
 - Section 2.9 Land mobile frequency band plan
- (b) This schedule is subject to change time to time if Authority satisfied to do so.

2.2 Frequency band plan for digital cellular mobile networks

- (a) This band plan divides the following bands into sub bands in accordance with Table 2.2(I):
 - (i) 880 MHz to 915 MHz paired with 925 MHz to 960 MHz;
 - (ii) 1710 MHz to 1785 MHz paired with 1805 MHz 1880 MHz;
 - (iii) 1920 MHz to 1980 MHz paired with 2110 MHz 2170 MHz;
 - (iv) 1885 MHz to 1920 MHz; and
 - (v) 2010 MHz to 2025 MHz
- (b) This plan does not permit a person to utilize any part of frequency bands mentioned in subsection (a) to operate digital cellular mobile networks except:
 - (i) that person authorized by an appropriate parent ICT license to provide public telecommunications service, granted by Authority; and
 - (ii) the frequency band included in that parent ICT license; and
 - (iii) the operation complies with all conditions provided in this plan.
- (c) Employing the pairing scheme provided in subsection (a) could be relaxed by prior approval of the Authority subject to complying with emission conditions in Table 2.2(II) and Table 2.2(III).
- (d) Conditions stipulated in this section assure technology neutrality of relevant public telecommunications network (PTN) license that shall be granted by the Authority for operation of licensed PTN in Bhutan.
- (e) For the protection of receivers operating in bands adjacent to the bands concerned in this plan, the power of any spurious emission should not exceed the limits specified in Table **2.2(II)**.
- (f) In accordance to the subsections **5.10**(a) and **5.11**(i) Part **III**, utilization of frequency bands given in this plan is subject to payment of yearly spectrum utilization fee, irrespective to the other fees payable under the terms of granted parent license.
- (g) The maximum radiation inside the planned sub-bands in this plan, must comply with the Safety standards for human exposure to electromagnetic radiation that Authority approves, as in force on the day of radiocommunication equipment compliance.
- (h) The radiocommunications equipment must comply with any standard applicable to it as in force on the equipment compliance day.

Frequency Band (MHz)	Item	Sub-band limits (MHz)	Sub-band limits (MHz)
880-915	1.1	880-885	925-930
925-960	1.2	885-890	930-935
	1.3	890-895	935-940
	1.4	895-900	940-945
	1.5	900-905	945-950
	1.6	905-910	950-955
	1.7	910-915	955-960
1710-1785	2.1	1 710-1 725	1 805-1 820
1805-1880	2.2	1 725-1 740	1 820-1 835
	2.3	1 740-1 755	1 835-1 850
	2.4	1 755-1 770	1 850-1 865
	2.5	1 770-1 775	1 865-1 870
	2.6	1 775-1 780	1 870-1 875
	2.7	1 780-1 785	1 875-1 880
1920-1980	3.1	1920-1935	2110-2125
2110-2170	3.2	1935-1950	2125-2140
	3.3	1950-1965	2140-2155
	3.4	1965-1970	2155-2160
	3.5	1970-1975	2160-2165
	3.6	1975-1980	2165-2170
1885-1920	4.1	1 885-1890	
	4.2	1890-1905	
	4.3	1905-1910	
	4.4	1910-1915	
	4.5	1915-1920	
2010-2025	5.1	2 010-2 015	
	5.2	2 015-2 020	
	5.3	2 020-2 025	

Table 2.2(I) – The band plan

Table 2.2(II) - Spurious emissions requirements

Frequency band	Measurement bandwidth (kHz)	Minimum requirement (dBm)
$921 \le f \le 925 \text{ MHz}$	100	-60
$925 < f \le 935 \text{ MHz}$	100	-67
$935 < f \le 960 \text{ MHz}$	100	-79
$1 805 \le f \le 1 880 \text{ MHz}$	100	-71
$1 900 \le f \le 1 920 \text{ MHz}$	100	-62
$2 \ 010 \le f \le 2 \ 025 \ \text{MHz}$	100	-62
$2 \ 110 \le f \le 2 \ 170 \text{ MHz}$	-	-71

Table 2.2(III). General receiver spurious emission requirements

Frequency band	Measurement bandwidth	Maximum level (dBm)
$30 \text{ MHz} \le f < 1 \text{ GHz}$	100 kHz	-57
$1 \text{ GHz} \le f \le 12.75 \text{ GHz}$	1 MHz	-47
$2 \ 110 \le f \le 2 \ 170 \ \text{MHz}$	-	-71

2.3 Frequency band plan for Citizen Band (CB)

- (a) Subject to conditions of this section, a person may only operate a citizen band (CB) station under class license that:
 - directly transmits speech to, or audio tones to initiate communication with, another CB station on a carrier frequency mentioned in item 1, 2, 3, 4 or 5 in Table 2.3 this section subject to a restriction mentioned in the item; or
 - (ii) through a CB repeater station, transmits speech to, or audio tones to initiate communication with, another CB station on a carrier frequency mentioned in item 5 in Table 2.3 this section subject to a restriction mentioned in the item; or
 - (iii) transmits data to communicate with another CB station on a carrier frequency mentioned in item 6 in Table 2.3 this section subject to a restriction mentioned in the item.
- Note CB repeater station means a station established at a fixed location for the reception and automatic re-transmission of radio signals from CB stations on a channel mentioned in item 5 in Table 2.3 this section; and operated under an apparatus licence.
- (b) A person must not except in an emergency operate a CB station on carrier frequencies 27.065 MHz, or 476.525 MHz, or 477.275 MHz.
- (c) A person must not:
 - (i) except to initiate contact with another CB station; or
 - (ii) if a carrier frequency mentioned in subsection (b) is not accessible

operate a CB station on carrier frequencies 27.085 MHz, or 27.155 MHz, or 476.675 MHz.

- (d) A person must not use with a transmitter device that encrypts speech transmission in transmitting:
 - (i) a radio signal on a carrier frequency that is referred to in paragraph (b) or (c); or
 - (ii) through a CB repeater station.
- (e) A person must not operate a CB station to transmit on a carrier frequency mentioned in an item in Table **2.3** if the transmission will cause harmful interference to the operation of any other CB station on that carrier frequency.
- (f) A person must not operate a CB station in a way that would be likely to cause a reasonable person, justifiably in all the circumstances, to be seriously alarmed or seriously affronted or for the purpose of harassing a person.
- (g) A person, when operating a CB station to transmit audio tones for initiating communications with another CB station, must:
 - (i) on a carrier frequency mentioned in item 1, 2 or 3 of Table 2.3, only transmit audible tones for less than 3 seconds in any period of 60 seconds; or
 - (ii) on a carrier frequency mentioned in item 4 or 5 of Table 2.3, only transmit audible tones for less than 3 seconds in any period of 60 seconds or sub-audible tones.

Note - Sub-audible tones are used in continuous tone coded squelch systems (CTCSS).

- (h) A person must not:
 - (i) except for the purpose of operating through a CB repeater station, operate a CB station on a channel mentioned in item **5** in Table **2.3** within the operational range of the CB repeater station; or
 - (ii) transmit to a CB repeater station on a channel mentioned in item 5 in Table 2.3 by a number from 1 to 8 (inclusive); or

- (iii) receive a transmission from a CB repeater station on a channel mentioned in item 5 in Table 2.3 by a number from 31 to 38 (inclusive).
- (i) A person must comply with a direction that:
 - (i) relates to the operation of a CB station by the person; and
 - (ii) is given to the person by a person from the Authority or from the Royal Bhutan Police force; and
 - (iii) the direction reasonably necessary to secure the safety of an aircraft or a vessel that is in danger, or deal with an emergency that involves a serious threat to the environment or the risk of death of or injury to a person or the risk of substantial damage to property or substantial loss of property.

Item	Channel	Carrier Frequency (megahertz)	Restriction
1	11	27.085	Operation of a CB station must only employ AM with a transmitter power not exceeding 1 watts pZ with a necessary bandwidth not exceeding 6 kHz.
2	16	27.155	Operation of a CB station must only employ SSB modulation using:
			(a) LSB; and
			(b) a transmitter power not exceeding 4 watts pX; and
			(c) a necessary bandwidth not exceeding 3 kHz.
3	1	26.965	Operation of a CB station must only employ:
	2	26.975	(a) AM with a transmitter power not exceeding 1 watts
	3	26.985	pZ with a necessary bandwidth not exceeding 6
	4	27.005	(b) SSR modulation using USR or LSR with a
	5	27.015	transmitter power not exceeding 4 watts pX and
	6	27.025	with a necessary bandwidth not exceeding 3 kHz.
	7	27.035	
	8	27.055	
	9	27.065	
	10	27.075	
	12	27.105	
	13	27.115	
	14	27.125	
	15	27.135	
	17	27.165	
	18	27.175	
	19	27.185	
	20	27.205	
	21	27.215	

Table 2.3 – HF (items 1,2 and 3) and UHF (items 4, 5 and 6) frequency channels for citizen Band (CB)

Item	Channel	Carrier Frequency (megahertz)	Restriction
3 (cont)	22	27.225	
	23	27.255	
	24	27.235	
	25	27.245	
	26	27.265	
	27	27.275	
	28	27.285	
	29	27.295	
	30	27.305	
	31	27.315	
	32	27.325	
	33	27.335	
	34	27.345	
	35	27.355	
	36	27.365	
	37	27.375	
	38	27.385	
	39	27.395	
	40	27.405	
4	9	476.625	Operation of a CB station must only employ FM or PM
	10	476.650	with a transmitter power not exceeding 5 watts pZ with a
	11	476.675	necessary bandwidth not exceeding 16 kHz.
	12	476.700	
	13	476.725	
	14	476.750	
	15	476.775	
	16	476.800	
	17	476.825	
	18	476.850	
	19	476.875	
	20	476.900	
	21	476.925	
	24	477.000	
	25	477.025	
	26	477.050	
	27	477.075	
	28	477.100	
	29	477.125	
	30	477.150	
	39	477.375	
	40	477.400	

Item	Channel	Carrier Frequency (megahertz)	Restriction
5	1	476.425	Operation of a CB station must only employ FM or PM
	2	476.450	with a transmitter power not exceeding 5 watts pZ with a
	3	476.475	necessary bandwidth not exceeding 16 kHz.
	4	476.500	
	5	476.525	
	6	476.550	
	7	476.575	
	8	476.600	
	31	477.175	
	32	477.200	
	33	477.225	
	34	477.250	
	35	477.275	
	36	477.300	
	37	477.325	
	38	477.350	
6	22	476.950	A transmitter employed in a CB station:
	23	476.975	 (a) must operate with a transmitter power not exceeding 5 watts; and
			(b) must not exceed an EIRP of 8.3 watts; and
			 (c) must operate with an occupied bandwidth not exceeding 16 kHz; and
			 (d) must not exceed a carrier frequency error of ±3 kHz; and
			 (e) must not exceed an adjacent channel power of – 22 dBm; and
			 (f) must not exceed a conducted spurious emission of -30 dBm; and
			(g) must operate on a duty cycle of not more than 3 seconds in any period of 60 minutes; and
			 (h) must be fitted with a device that shuts the transmitter down after 3 minutes of continuous operation.
			A receiver employed in a CB station must operate with a conducted spurious emission not exceeding –57 dBm.
			<i>Note</i> The use of single frequency store and forward repeaters is permitted.

2.4 Frequency band plan for point to multi-point WiMAX

- (a) This band plan divides the following bands into sub bands in accordance with Table 2.4(I):
 - (i) 3400 MHz to 3500 MHz paired with 3500 MHz to 3600 MHz;
- (b) This plan does not permit a person to utilize any part of frequency bands mentioned in subsection (a) to operate a point to multipoint fixed network except:
 - (i) that person authorized by an appropriate parent ICT license to provide public telecommunications service, granted by Authority subject to market demand; and
 - (ii) the frequency band included in that parent ICT license; and
 - (iii) the operation complies with all conditions provided in this plan.
- (c) Employing the duplexing scheme provided in subsection (**a**) could be relaxed subject to complying with in-band, out-of-band and spurious emission conditions in ETSI EN 302 326-2.
- (d) Conditions stipulated in this section assure technology neutrality of relevant public telecommunications network (PTN) license that shall be granted by the Authority for operation of licensed PTN in Bhutan.
- (e) In accordance to the subsections **5.10(a)** and **5.11(i)** Part **III**, utilization of frequency bands given in this plan is subject to payment of yearly spectrum utilization fee, irrespective to the other fees payable under the terms of granted parent license.
- (f) The maximum radiation inside the planned sub-bands in this plan, must comply with the Safety standards for human exposure to electromagnetic radiation that Authority approves, as in force on the day of radiocommunication equipment compliance.
- (g) The radiocommunications equipment must comply with any standard applicable to it as in force on the equipment compliance day.
- (h) The spectrum utilization in the band planned in this section must not cause any harmful interference to the earth stations operating in adjacent frequency band.

Frequency Band (MHz)	Item	Sub-band limits (MHz)	Sub-band limits (MHz)
3400-3500	1.1	3400-3425	3500-3525
3500-3600	1.2	3425-3450	3525-3550
	1.3	3450-3475	3550-3575
	1.4	3475-3500	3575-3600

Table 2.4 – The band plan

2.5 Cordless telephones

- (a) As a class licence, this section authorises any person to operate a cordless telephone that uses a frequency:
 - (i) greater than 1880 MHz and not greater than to 1900 MHz;
 - (ii) greater than 2400 MHz and not greater than to 2483.5 MHz;
 - (iii) greater than 5725 MHz and not greater than to 5825 MHz;
- (b) A handset as well as base unit of a cordless telephone system covered by this section:
 - (i) must be used for private purposes; and
 - (ii) must not be used for the provision of commercial cordless telecommunications services to the public; and
 - (iii) must not be used for the provision of a connection under a wireless local loop arrangement.
- (c) Frequency use by a cordless telephone under this section is on a non-interference and no-protection basis. Should interference occur, therefore, cordless telephone must change frequency or cease operation immediately, manually or cognitively.
- (d) A handset or land station that operates at a frequency mentioned in subsection (a) must comply with the requirement of Tables 2.5(I), 2.5(II) and 2.5(III)
- (e) A cordless telephone system authorized in this section:
 - (i) shall be capable to select an interference free channel among available channels automatically; and
 - (ii) shall be capable to restrict and designate handset(s) exclusively to the corresponding base station, without need to prior and manual coordination.
- (f) A person must not alter a cordless telephone in a way:
 - (i) to boost transmitter output power; or
 - (ii) to employ outdoor or directional antenna

for the purpose of extension of radiocommunications range.

(g) The specification of base unit of a cordless telephone covered by this section must be consistent with the approved standards for the terminals for connecting to the public switching telephone network of Bhutan.

Table $2.5(I) - $	Technical information	of Digital Enhance	d Cordless Telecon	mmunications c	cordless

Channel arrangement (MHz)	Designation of emission	EIRP of base unit, average per occupied time slot	EIRP of base unit, peak	Attenuation (dB) below the power supplied to the antenna transmission line	Spurious emission
$f_n = 1897.344 - 1.728n$ n = 0, 1, 2,, 9	F1W, F7W	22 dBm	36 dBm	40 dB	EN 300 175-2

Table 2.5(II) – Technical information of 2.4 GHz cordless telephone system (FCC part 15.247)

Spreading method	Designation of emission	Minimum processing gain	Maximum transmitter power (dBm)	Number of hopping channels	20 dB hopping bandwidth	Dwell Time (Second /Channel in 30 sec)	Maximum spectral density (dBm in 3 kHz)
FHSS	83M5F7WCT	-	20 dBm	15	25 kHz to 1 MHz	0.4	-
DSSS	83M5F7WCT	10	20 dBm	-		-	8
DSSS/FHSS	83M5F7WCT	17	20 dBm	15	25 kHz to 1 MHz	0.4	8

Spreading method	Designation of emission	Minimum processing gain	Maximum transmitter power (dBm)	Number of hopping channel	20 dB hopping bandwidth	Dwell Time (Second /Channel in 30 sec)	Maximum spectral density (dBm in 3 kHz)
FHSS	100MF7WCT	-	20 dBm	75	25 kHz to 1 MHz	0.4	-
DSSS	100MF7WCT	10	20 dBm	-		-	8
DSSS/FHSS	100MF7WCT	17	20 dBm	75	25 kHz to 1 MHz	0.4	8

Table 2.5(III) – Technical information of 5.8 GHz cordless telephone system (FCC part 15.245)

2.6 Radio controlled models

- (a) Subject to the conditions of this section, this section authorises any person, as a class license, to operate a radiocommunications device to control model aircraft, model landcraft or model watercraft.
- (b) Frequency use by a radio device to control a model under this section is on a non-interference and noprotection basis.
- (c) Installation and using of any radiocommunication apparatus on a model other than for remote control is not permitted unless:
 - (i) that additional device covered by another class license; or
 - (ii) the Authority issues an apparatus license for such installation
- (d) Installation and operation of a fixed station for the control of models is not authorized except after obtaining an apparatus license.
- (e) The regulation of heavy remotely controlled flying aircrafts lies with the aviation responsible organization.
- (f) A person must not operate:
 - (i) a remotely controlled model to the beyond of national border; and
 - (ii) a flying model controlled by remote control in a distance less than five kilometers to an airport runaway; and
 - (iii) a remote control to control another transceiver installed on model; and
 - (iv) a remote control to control another remote control installed on model, and
 - (v) a remote control device to transmit sound, voice, telegraph, video or any other signal for non-control purpose.
- (g) A device used for controlling of a model remotely must be a transmitter and the device installed on model must be receiver only. The two-way utilization of radio frequencies for operation of a remote control covered by this section is not allowed.
- (h) Continuous transmission of un-modulated radio frequency carrier by the remote control of non-flying models is not permitted and in case of flying model, it is permitted if only used for the purpose safe operation of model.
- (i) The frequency channels and emission characteristics for use by remote control of flying models is given in Table **2.6(I)**.
- (j) The frequency channels and emission characteristics for use by remote control of non-flying models is given in Table **2.6(II)**.
- (k) The frequency channels and emission characteristics for use by remote control of all models is given in Table **2.6**(**III**).
- (l) For the protection of citizen band (CB) transceivers from the harmful interference of model remote controls, the utilization of center frequency 27.255 MHz by remote controls is not permitted.
- (m) Other specification of remote control of models covered by this section shall comply with the technical conditions given in ETSI EN 300 220-1 standard.

Centre frequencies of RF channels	$f_n = 35 + 0.01n$, MHz $0 \le n \le 22$		
Channel spacing	10 kHz		
Average radiated power	100 mW e.r.p.		
Duty cycle	No limit		
Transmitter spurious emission	Less than 16.4 μ W in any 100 kHz		
Receiver spurious emission	Less than 2 nW		
Ratio of in-band average power to the average power of spurious emissions	Better than 40 dBc		
Adjacent channel selectivity	Better than 60 dB		

Table 2.6(I) – Frequency channels for use by remote control of flying models (exclusive use)

Table 2.6(II) – Frequency channels for use by remote control of non-flying models (exclusive use)

Centre frequencies of RF channels	$f_n = 40.665 + 0.01n$, MHz $0 \le n \le 32$
Channel spacing	10 kHz
Average radiated power	100 mW e.r.p.
Duty cycle	No limit
Transmitter spurious emission	Less than 16.4 μ W in any 100 kHz
Receiver spurious emission	Less than 2 nW
Ratio of in-band average power to the average power of spurious emissions	Better than 40 dBc
Adjacent channel selectivity	Better than 60 dB

Table 2.6(III) – Frequency channels for use by remote control of all models

Centre frequencies of RF channels (MHz)	26.995, 27.045, 27.095, 27.145, 27.195
Channel spacing	10 kHz
Average radiated power	100 mW e.r.p.
Duty cycle	No limit
Transmitter spurious emission	Less than 16.4 μ W in any 100 kHz
Receiver spurious emission	Less than 2 nW
Ratio of in-band average power to the average power of spurious emissions	Better than 40 dBc
Adjacent channel selectivity	Better than 60 dB

2.7 Radio Frequency Identification (RFID)

- (a) Frequency use by a radio device to control a model under this section is on a non-interference and noprotection basis.
- (b) Installation and usage of RFID readers and associated tags with the given specification in Table 2.7(I) is under the class license.
- (c) Installation and usage of RFID readers and associated tags with the given specification in Table 2.7(II) requires obtaining an apparatus license.
- (d) Continuous transmission of radio waves by RFID readers and tags is not permitted.
- (e) The spurious emission of RFID readers and tags shall comply with Table 2.7(III).

Frequency range	865 MHz to 868 MHz	Above 1000 MHz
Reader on operation	25 nW e.r.p.	1 μW e.i.r.p.
Reader on standby	2 nW e.r.p.	20 nW e.i.r.p.
Receiver	2 nW e.r.p.	20 nW e.i.r.p.

Table 2.7(III) - Spurious emission of RFID readers and tags

Frequency range (MHz)	Radiated power/Field	Channel spacing	Spectrum access method	Location limitation	Standard	Comment
0.125 to 0.135	72 dBµA/m at 10m	No limitation	No limitation	-	ISO/IEC 18000-2 Part 2 EN 300 330	-
13.553 to 13.567	60 dBμA/m at 10m	No limitation	No limitation	-	EN 300 330 ISO/IEC 18000-3	-
433.05 to 434.79	10 mW e.r.p.	No limitation	Duty cycle < 10%	-	EN 300 330 ISO/IEC 18000-7	The band 433.5 MHz to 434.5 MHz considered for active RFID in future exclusively
2446 to 2454	500 mW e.i.r.p.	No limitation	No limitation	No limitation	EN 300 440 ISO/IEC 18000-4	Subject to use of FHSS or un-modulated carrier (CW) with directional antenna with 45 degrees horizontal beamwidth
2446 to 2454	500 mW e.i.r.p. to 4 W e.i.r.p.	No limitation	Duty cycle < 15% in any 200 ms	Fixed or portable indoor. Having mechanism to reduce power to below 500 mW e.i.r.p. in case of crossing to the outdoor from indoor	EN 300 440 ISO/IEC 18000-4	The power control scheme explained in Appendices C and D of standard. The directional antenna with 45 degrees horizontal beamwidth. In radiation powers higher than 500 mW e.i.r.p., the FHSS spreading method shall be used for interference management
865 to 865.6	100 mW e.r.p.	200 kHz	No limitation	No limitation	EN 302 208	FHSS or other method of spectrum spreading is not permitted. The continuous transmission in the band 865 MHz to 868 MHz shall be less than 4 sec
867.6 to 868	500 mW e.r.p.	200 kHz	No limitation	No limitation	EN 300 220	FHSS or other method of spectrum spreading is not permitted.

Table 2.7(I) - RFID readers and associated tags under the *class license*

Table 2.7(II) - RFID readers and associated tags subject to obtain of an apparatus license

Frequency range (MHz)	Maximum Radiated power	Channel spacing	Spectrum access method	Standard	Comment
865.6 to 867.6 (centre frequencies: 865.7, 866.3, 866.9)	2 W e.r.p.	200 kHz	No limitation	EN 302 208	The continuous transmission in the band 865 MHz to 868 MHz shall be less than 4 sec. The frequency agility is preferred and LBT (listen before talk) capability is optional and

2.8 Non-specific applications

- (a) This class licence authorises a person to operate a transmitter included in a class of transmitters mentioned in an item in Table **2.8**, subject to the conditions stipulated in subsections (**b**) and (**c**).
- (b) Following conditions must be met by transmitters under this class license:
 - (i) the transmitter must be operated on a frequency, or within a range of frequencies, mentioned in the item at a radiated power that does not exceed the maximum EIRP/ERP mentioned in the item; and within the limitations (if any) mentioned in the item. Normally the values below 1 GHz is in e.r.p.;
 - (ii) the transmitter's operation must not cause interference to the operation of radiocommunications services.
- (c) A device under this class license will not be afforded protection from interference caused by other radiocommunications devices. If necessary, effective interference mitigation techniques shall be employed in a device operated under this class licence. Such a device shall not cause and shall not be suffered from the interference caused by other radiocommunications devices sharing same frequency band.

Item	Permitted operating frequency band (MHz)	Maximum EIRP/ERP	Limitations
1	0.000-0.014	200 µW	The transmitter mentioned in the items 1 to 10 (inclusive) must meet the
2	0.014-0.01995	50 µW	requirements of ETSI EN 300 330 standard as existing from time to time.
3	0.02005-0.07	7.5 μW	
4	0.07–0.16	3 μW	
5	 0.16-0.285 0.325-0.415 	500 nW	
6	3.025-3.155	7.5 nW	
7	3.5–3.7	30 pW	
8	1. 3.7–3.95 2. 4.438–4.65	7.5 nW	
9	13.553-13.567	100 mW	
10	24–24.89	10 mW	
11	26.957–27.283	10 mW e.r.p.	 Separation of the operating frequency from the centre frequency of any adjacent citizen band (CB) radio channel must be at least 5 kHz. The emission handwidth must not exceed 10 kHz.
			 The emission bandwidth must not exceed to kHz. The transmitter must meet the requirements of FTSI Standard FN
			300 220 as existing from time to time, except EIRP.
			4. See also ERC/DEC/(01)02
			5. ETSI EN 300 220 standard
12	40.660-40.700	10 mW e.r.p.	1. ERC/DEC/(01)03
			2. ETSI EN 300 220 standard
13	433.05-434.79	10 mW	 Audio and video applications are allowed provided that a digital modulation method is used with a max. bandwidth of 300 kHz.
			2. Analogue and digital voice applications are allowed with a max. bandwidth \leq 25 kHz.
			3. See also ECC/DEC/(04)02
			4. ETSI EN 300 220 standard

Table 2.8 – Non-specific transmitters under the class license

Item	Permitted operating frequency band (MHz)	Maximum EIRP/ERP	Limitations
14	433.05-434.79	1 mW e.r.p.	 Power density limited to -13 dBm/10 kHz for wideband modulation with a bandwidth greater than 250 kHz
			2. Audio and video applications are excluded. Analogue or digital vo applications are allowed with a max. bandwidth ≤ 25 kHz and with spectrum access technique such as LBT or equivalent. The transmitter shall include a power output sensor controlling the transmitter to a maximum transmit period of 1 minute for each transmission
			3. ETSI EN 300 220 standard
15	434.040-434.790	10 mW e.r.p.	1. Audio and video applications are excluded. Analogue or digital vo applications are allowed with a max. bandwidth ≤ 25 kHz and with spectrum access technique such as LBT or equivalent. The transmitter shall include a power output sensor controlling the transmitter to a maximum transmit period of 1 minute for each transmission
			2. Channel spacing less than 25 kHz
			3. See also ECC/DEC/(04)02
			4. ETSI EN 300 220 standard
16	863-870	25 mW e.r.p.	 For FHSS modulation the channel spacing less than 100 kHz for 4 or more channels
			 When either a duty cycle, Listen Before Talk (LBT) or equivalent technique applies then it shall not be user dependent/adjustable an shall be guaranteed by appropriate technical means.
			3. For LBT devices without Adaptive Frequency Agility (AFA), or equivalent techniques, the duty cycle limit applies.
			4. For any type of frequency agile device the duty cycle limit applies the total transmission unless LBT or equivalent technique is used.
			5. Duty cycle may be increased to 1% if the band is limited to 865-86 MHz.
			6. Only in case of DSSS or other non-FHSS wideband modulation, was a bandwidth of 200 kHz to 3 MHz, duty cycle can be increased to if the band is limited to 865-868 MHz and power to ≤10 mW e.r.p
			7. Audio and video applications are allowed provided that a digital modulation method is used with a max. bandwidth of 300 kHz.
			8. Analogue and digital voice applications are allowed with a max. bandwidth \leq 25 kHz.
			9. In sub-band 863-865 MHz voice and audio conditions of Annexes and 13 of ERC/REC 70 – 03 apply respectively.
			10. For other wide-band modulation than FHSS and DSSS with a bandwidth of 200 kHz to 3 MHz, duty cycle can be increased to 1 if the band is limited to 865-868 MHz and power to ≤10 mW e.r.p
			11. ETSI EN 300 220 standard

Item	Permitted operating frequency band (MHz)	Maximum EIRP/ERP	Limitations
17	868.000-868.600	25 mW e.r.p.	 Narrow / wide-band modulation No channel spacing, however the whole stated frequency band may be used
			2. When either a duty cycle, Listen Before Talk (LBT) or equivalent technique applies then it shall not be user dependent/adjustable and shall be guaranteed by appropriate technical means.
			3. For LBT devices without Adaptive Frequency Agility (AFA), or equivalent techniques, the duty cycle limit applies.
			4. For any type of frequency agile device the duty cycle limit applies to the total transmission unless LBT or equivalent technique is used.
			5. See also ERC/DEC/(01)04
			Audio and video applications are allowed provided that a digital modulation method is used with a max. bandwidth of 300 kHz.
			 Analogue and digital voice applications are allowed with a max. bandwidth ≤ 25 kHz.
			 In sub-band 863-865 MHz voice and audio conditions of Annexes 10 and 13 of ERC/REC 70 – 03 apply respectively.
			9. ETSI EN 300 220 standard
18	868.700-869.200	25 mW e.r.p.	 Similar to the conditions in the item 17 (the band 868.000-868.600), except duty cycle which is limited to 0.1% or combination of Listen Before Talk (LBT) and Adaptive Frequency Agility (AFA) should be used
			2. ETSI EN 300 220 standard
19	869.400-869.650	500 mW e.r.p.	 Channel spacing 25 kHz and duty cycle less than 10% or combination of Listen Before Talk (LBT) and Adaptive Frequency Agility (AFA) should be used
			2. When either a duty cycle, Listen Before Talk (LBT) or equivalent technique applies then it shall not be user dependent/adjustable and shall be guaranteed by appropriate technical means.
			3. For LBT devices without Adaptive Frequency Agility (AFA), or equivalent techniques, the duty cycle limit applies.
			4. For any type of frequency agile device the duty cycle limit applies to the total transmission unless LBT or equivalent technique is used.
			5. ETSI EN 300 220 standard
20	869.700-870.000	A. 5 mW e.r.p. B. 25 mW	 In case of power less than 5 mW e.r.p. there is no duty cycle requirement but for 25 mW e.r.p. the duty cycle should be below 1% or combination of Listen Before Talk (LBT) and Adaptive Frequency Agility (AFA) should be used
		e.r.p.	2. Audio and video applications are allowed provided that a digital modulation method is used with a max. bandwidth of 300 kHz.
			3. Analogue and digital voice applications are allowed with a max. bandwidth ≤ 25 kHz.
			 In sub-band 863-865 MHz voice and audio conditions of Annexes 10 and 13 of ERC/REC 70 – 03 apply respectively.
			5. ETSI EN 300 220 standard
21	2400 0-2483 5	10 mW	1. ISM band
<u>~1</u>		e.i.r.p.	2. EN 300 440
22	5725-5875	25 mW	1. ISM band
		e.i.r.p.	2. EN 300 440

2.9 Land mobile frequency band plan

- (a) The assignable frequencies to the transmitters of base stations and mobile stations in the land mobile service in the band 26.175 MHz to 960 MHz shall be consistent with the plan given in Fig. **2.9**.
- (b) The preferred channel spacing in the all sub-bands in Fig.2.9, shall be integer multiple of 12.5 kHz, as far as practical and efficient.
- (c) Utilization of any channel in the plan by the radiocommunications stations is not allowed unless having a valid apparatus license or a valid spectrum license issued by the Authority.



Figure 2.9 – Frequency band plan in VHF and UHF primary-based bands that allocated to the land mobile service

Schedule 3 – Different types of transmitter licenses and receiver licenses

3.1 Outline of this schedule

(a) Relevant Sections:

Section 3.2 Different types of apparatus licenses

3.2 Different types of apparatus licenses

- (a) For the purpose of subsection **2.13(e)** of the Part **III** of Radio Rules, the Authority may issue an apparatus license from nine kinds 27 categories specified in Table **3.2** in this schedule.
- (b) Any application for an apparatus license shall be in accordance with the Chapter 2 of Part III of Radio Rules.

1	2	3
Item	Type of apparatus license	Category
1	Aeronautical	Ground station in exclusive bands
		Ground station in non-exclusive bands
2	Aircraft	Aircraft in exclusive bands
3	Amateur	General amateur
		Novice amateur
		Restricted amateur
4	Broadcasting	Short wave sound broadcasting
		VHF FM broadcasting
		VHF/UHF TV broadcasting
5	Earth	Fixed earth station in any space service
		Mobile earth station in any space service
6	Fixed	Long range point to point (below 30 MHz)
		Point-to-point
		Point-to-multipoint
		Wireless local loop
		Outside Broadcasting (TV)
		Outside Broadcasting (Sound).
7	Land mobile	Long range land mobile (below 30 MHz)
		Land mobile (above 30 MHz)
		Public land mobile
		Paging
8	Radiodetermination	Radar
		VOR
		ILS
9	Research	Experimental
		Educational
		Scientific

Table 3.2 – Apparatus license kinds

Schedule 4 – Applicable fees under National Radio Rules

4.1 Outline of this schedule

- (a) Relevant Sections:
 - Section 4.2 Table of application fee, all license types and permit types
 - Section 4.3 Table of area and ICT multiplicands of districts
 - Section 4.4 Spectrum utilization fee schedule
 - Section 4.5 Frequencies exempted under paragraph **5.9(a)(iii)**

Section 4.6 Table of permitting fee

(b) This schedule is subject to change time to time if Authority satisfied to do so.

4.2 Table of application fee, all license types and permit types

- (a) The application fee under the subsection **5.5**(d) Part **III**, in price unit, for utilization of each transmitting or receiving radio channel in each radio station shall be calculated in accordance with Table **4.2**(**I**) below.
- (b) The application fee for obtaining a permit under subsection **5.5**(e), in price unit, shall be calculated in accordance with Table **4.2**(**II**) below.

Stati	Application fee per each frequency in each station, in price unit	
Terrestrial sound or TV broadcasting sta land mobile service below 28 MHz, on-	ation, Base station and repeater station in board cell phone base station	Fifty
Ground station in aeronautical mobile se metrological aids station, fixed station is point to multipoint system, base station standard frequency and time signal, base system, base station and repeater station service above 29.7 MHz, base station ar amateur station	Ten	
Space research station, space operation broadcasting satellite station, VSAT hu	Hundred	
fixed and mobile stations in all space se	Twenty Five	
	One to thirty handsets	Zero
Handsets in a network having one base station (in land mobile service)	Thirty one to seventy handsets	Ten
at least	More than seventy handsets	Ten plus ten for each fifty handsets more than seventy
	One to thirty handsets	Ten
Handsets in a network having no base	Thirty one to seventy handsets	Twenty
station (in land mobile service)	More than seventy handsets	Twenty plus ten for each fifty handsets more than seventy
Other station	Thirty	

Table 4.2(I) – Table of application fee

Permit Type	Reference in Part III	Application fee, in price unit
Supplying of radiocommunications apparatus	paragraph 3.2(a)(i)	Twelve Hundred
Exporting or re-exporting radiocommunications apparatus	paragraph 3.2 (a)(ii)	Twenty Four hundred
Possession and installation of an amateur station	paragraph 3.2(a)(iii)	Two hundred forty
Manufacturing radiocommunications apparatus	paragraph 3.2 (a)(iv)	Three hundred
Testing of radiocommunications apparatuss	paragraph 3.2 (a)(v)	Six hundred
Conducting experiments for research and education	paragraph 3.2 (a)(vi)	Sixty
Demonstration of radiocommunications apparatus	paragraph 3.2 (a)(vii)	Hundred fifty
Possession of a non-standard radiocommunications apparatus	subsection 3.7 (e)	Six hundred
Testing of radiocommunications apparatus	subsection 3.7 (h)	Twelve Hundred

Table **4.2(II)** – Table of application fee for obtaining a permit (Note – *table of permit fee is given in section 4.6 of this schedule*)

4.3 Table of area and ICT multiplicands of districts

(a) For the purpose of calculation of spectrum utilization fee, the area multiplicand and the ICT multiplicand for each district shall be in accordance with Table **4.3** below:

1	2	3	4
No.	District	Area Multiplicand, M _{ARA}	ICT Multiplicand, M _{ICT}
1	Bumthang	25	0.53
2	Chukha	25	0.75
3	Dagana	18	0.75
4	Gasa	35	0.71
5	Наа	18	0.74
6	Lhuntse	35	0.97
7	Mongar	25	0.89
8	Paro	25	0.42
9	Pemagatshel	18	0.84
10	Punakha	18	0.44

1	2	3	4
No.	District	Area Multiplicand, M _{ARA}	ICT Multiplicand, M _{ICT}
11	Samdrup Jongkhar	25	0.84
12	Samtse	25	0.67
13	Sarpang	25	0.71
14	Thimphu	25	0.59
15	Trashigang	25	0.38
16	Trashiyangste	25	0.61
17	Trongsa	25	0.38
18	Tsirang	18	1.00
19	Wangdue Phodrang	35	0.95
20	Zhemgang	25	0.63

4.4 Spectrum utilization fee schedule

- (a) Except for the cases covered by subsection (b) (c) and (d), the yearly spectrum utilization fee, in price unit, for any type of radio applications mentioned in the leftmost column of Table 4.4(I) is equal to the multiplication of all multiplicands marked in the column of "*contributed multiplicands*" (Column 5) of the Table 4.4(I).
- (b) The annual spectrum utilization fee for all onboard non-ICAO transceivers of an aircraft, other than for onboard cell-phones, is equal to **74.8** price units.
- (c) The annual spectrum utilization fee payable by a national amateur licensee of:
 - (i) amateur satellite earth station or terrestrial amateur stations utilizing radio frequency channel within any of the frequency ranges 9-27500 kHz, 30-3000 MHz and 3-275 GHz is equal to 10 and 20 price units for individual and group license respectively; If the licensee holds a General amateur license and would like to operate with more than 400 watts additional fee equal to 5 price units will be charged.
- (d) The spectrum utilization fee payable by foreign national amateur licensee of:
 - (i) terrestrial amateur stations utilizing radio frequency channel within any one of the frequency ranges 9-27500 kHz, 30-3000 MHz and 3-275 GHz is equal to 100 and 300 price units for individual and group license respectively; If the licensee holds a General amateur license and would like to operate with more than 400 watts additional fee equal to 50 price units will be charged.
 - (ii) amateur satellite earth station, utilizing radio frequency channel within any frequency ranges is equal to 200 and 400 price units for individual and group license respectively; If the licensee holds a General amateur license and would like to operate with more than 400 watts additional fee equal to 50 price units will be charged.

Note – Price unit defined in subsection **5.2(f)**, Part **III** of Radio Rules

(d) Explanation of the Table columns:

- (ii) *Column 2*: Frequency range in MHz
- (iii) Column 3: (minimum) channel spacing X_f in kHz and to be used for calculation of M_f as explained in subsection 5.10(d), Part III
- (iv) Column 4: A multiplicand derived in accordance with nature and significance of of application. Under this column, there are three sub-multiplicands: per station (M_S) , per district (M_D) and nationwide (M_N) which denotes to station-wised, distric-wised and national usage of assigned radio frequency channel, respectively. Only one on of above multiplicands would be given in each row.
- (v) *Column 5*: Multiplication of 'Y'-marked multiplicands would result yearly spectrum utilization fee for utilization each radio channel that explained in column **1** and column **6**
- (vi) *Column 6*: Usage and conditions

Column 1	Column 2	Col. 3		Column	4			Colu	mn 5			Column 6
	_	Channel	Applic	ation Mul	tiplicand		Contri	buted	Multin	licand	c	
Radio Application	Frequency	spacing.	Dor	Dor	Nation	Multi	olv mi	iltiplic:	ands m	narked	, bv 'Y'	
or	range	(kHz)	station	district	wide			1	1	1		Usage and conditions
Radio service	(MHZ)	X _f	M _s	M _D	M _N	$\mathbf{M}_{\mathbf{ARA}}$	M_{ICT}	M_{S}	$M_{\rm D}$	$M_{\rm N}$	M_{f}	
Analog sound broadcasting	0.3-30	10	-	-	475.3	Ν	Ν	Ν	Ν	Y	Y	Each channel, nationwide
			-	3.42	-	Y	Y	N	Y	N	Y	Each channel per a given district
	30-610	200	-	8.70	-	Y	Y	Ν	Y	N	Y	Each channel per a given district
Digital sound broadcasting	0.3-30	10	-	-	244.8			Ν		Y	Y	Each channel, nationwide
			-	1.76	-	Y	Y	N	Y	N	Y	Each channel per a given district
	30-610	1750	-	6.24	-	Y	Y	N	Y	N	Y	Each channel per a given district
	1452-1492	2320	-	36.85	-		Y	Ν	Y	Ν	Y	A T-DAB channel per a given district
Analog TV broadcasting	47-68	8000	-	25.87	-	Y	Y	N	Y	N	Y	Each TV channel per a given district
	174-230	8000	-	25.87	-	Y	Y	Ν	Y	N	Y	
	470-610	8000	-	25.70	-	Y	Y	N	Y	N	Y	
Digital TV broadcasting	174-230	8000	-	19.40	-	Y	Y	N	Y	N	Y	Each digital TV channel per a given district
	470-610	8000	-	19.28	-	Y	Y	Ν	Y	N	Y	
Standard frequency & time signal	0.009-30	30	-	-	48.10	Ν	Ν	Ν	Ν	Y	Y	Each channel, nationwide
Broadcasting satellite, TV	All bands	1800	-	-	796.01	Ν	Ν	Ν	Ν	Y	Y	Each DVB-S channel, nationwide
Broadcasting satellite, sound	All bands	1536	-	-	486.66	Ν	Ν	Ν	Ν	Y	Y	Each S-DAB channel, nationwide
Long range point to point fixed	0.09-0.19	1	-	-	22.81	Ν	Ν	Ν	Ν	Y	Y	Each TX channel, nationwide
service	1.607-2.65	5	-	-	92.39	Ν	Ν	Ν	Ν	Y	Y	
	3.155-28	5	-	-	144.35	Ν	Ν	Ν	Ν	Y	Y	
Point to point fixed service	29.7-960	25	86.98	-	-	N	Y	Y	N	Ν	Y	Each TX channel per station in a given district
	1215-2690	500	150.75	-	-	Ν	Y	Y	Ν	Ν	Y	
	3300-5000	5000	149.93	-	-	Ν	Y	Y	N	Ν	Y	
	5250-8750	14000	128.10	-	-	Ν	Y	Y	N	Ν	Y	
	9800-15400	14000	116.64	-	-	Ν	Y	Y	Ν	Ν	Y	
	15700-31300	28000	75.31	-	-	N	Y	Y	N	N	Y	
	31500-557800	28000	37.68	-	-	N	Y	Y	N	N	Y	
	557800-275000	50000	31.15	-	-	N	Y	Y	N	N	Y	
Long range point to multipoint	0.09-0.19	1	22.81	-	-	Ν	Ν	Ν	Ν	Y	Y	Each TX channel, nationwide
central station in fixed service	1.607-2.65	5	71.52	-	-	Ν	Ν	Ν	Ν	Y	Y	
	3.155-28	5	63.51	-	-	Ν	Ν	Ν	Ν	Y	Y	

Table 4.4(I) – Table of multiplicands contributed in spectrum utilization fee formula and relevant formula

Column 1	Column 2	Col. 3		Colum	n 4			Colu	mn 5			Column 6
		Channel	App	lication M	ultiplicand		Contra	:1	M. 1	1.		
Radio Application or	Frequency range	spacing,	Per	Per		Mult	tiply m	ultiplica	ands ma	arked b	y 'Y'	Usage and conditions
Radio service	(11112)	X _f	station M _S	district M _D	Nationwide M _N	M _{ARA}	M _{ICT}	Ms	M _D	M _N	M _f	
Point to multipoint central station	29.7-960	25	107.18	-	-	N	Y	Y	N	N	Y	Each TX or RX channel per central station in a given
in fixed service	1215-2690	500	99.62	-	-	N	Y	Y	N	N	Y	district
	3300-5000	5000	104.20	-	-	N	Y	Y	N	N	Y	
	5250-8750	14000	95.78	-	-	N	Y	Y	N	N	Y	
	9800-15400	14000	67.41	-	-	Ν	Y	Y	Ν	Ν	Y	
	15700-31300	28000	36.98	-	-	Ν	Y	Y	Ν	N	Y	
	31500-557800	28000	30.73	-	-	Ν	Y	Y	Ν	Ν	Y	
	557800-275000	50000	31.76	-	-	Ν	Y	Y	Ν	Ν	Y	
CDMA wireless local loop	800 MHz band	1250	70.05	-	-	Ν	Y	Y	Ν	Ν	Y	Each TX or RX channel per central station in a given
DECT wireless local loop	1870-1920	1250	62.33	-	-	Ν	Y	Y	Ν	Ν	Y	district
Long range land mobile	0.505-0.527	1	-	-	20.92	Ν	Ν	Ν	Ν	Y	Y	Each TX or RX channel, nationwide
base/vehicular station (non-	1.607-2.850	3	-	-	23.55	Ν	Ν	Ν	Ν	Y	Y	(for the handset stations in land mobile service see
cellular)	3.155-28	3	-	-	22.76	Ν	Ν	Ν	Ν	Y	Y	<i>Table</i> 4.4 (II))
Land mobile base/vehicular	29.7-100	12.5	82.07	-		Ν	Ν	Y	Ν	Ν	Y	Each TX or RX channel per central station in a given
station (non-cellular)	137-880	12.5	83.32	-		Ν	Ν	Y	Ν	Ν	Y	district
	915-925	25	74.74	-		Ν	Y	Y	Ν	Ν	Y	(for the handset stations in land mobile service see
	1215-1710	50	52.01	-		Ν	Y	Y	Ν	Ν	Y	<i>Table</i> 4.4 (II))
	1785-1805	50	50.98	-		Ν	Y	Y	Ν	N	Y	
	1880-1920	50	73.50	-		Ν	Y	Y	Ν	N	Y	
	1980-2010	50	47.54	-		Ν	Y	Y	Ν	Ν	Y	
	2025-2110	50	73.44	-		N	Y	Y	Ν	N	Y	
	2170-2700	500	59.47	-		Ν	Y	Y	Ν	Ν	Y	
	3300-8750	5000	45.69	-		N	Y	Y	Ν	N	Y	
	10000-15400	5000	37.18	-		N	Y	Y	Ν	N	Y	
	15700-275000	20000	24.24	-		N	Y	Y	Ν	N	Y	
	29.7-100	12.5	-	6.84	-	Ν	N	Ν	Y	N	Y	
	137-880	12.5	-	6.94	-	N	N	Ν	Y	Ν	Y	
GSM, E-GSM, GPRS and	880-960, 1710-1880	200	-	17.38	-	Y	Y	N	Y	Ν	Y	Each TX or RX channel for a given district
DCS1800 cellular network			-	-	2413.4	N	N	Ν	Ν	Y	Y	Each TX or RX channel, nationwide
Third generation and beyond	880-960, 1710-	1250	-	18.35	-	Y	Y	N	Y	Ν	Y	Each TX or RX channel for a given district
cellular mobile network	2200,		-	-	2548.6	N	Ν	Ν	Ν	Y	Y	Each TX or RX channel, nationwide
On board aircraft cell phone	All bands	Any	-	-	10	Ν	Ν	Ν	Ν	Y	Y	Each TX or RX channel, onboard aircraft

Table 4.4(1) – Table of multiplicand contributed in spectrum utilization fee formula and relevant formula (4

	Column 1	Column 2	Col. 3	(Column	4			Colu	mn 5			Column 6
			Channel	Applica	ation Mult	tiplicand		Contra	1	M. 1	1.		
	Radio Application or Radio service	Frequency range (MHz)	spacing, (kHz) X _f	Per station Ms	Per district Mp	Nation- wide M _N	Mult M _{ARA}	tiply m	ultiplic M _S	ands ma	arked b	y 'Y' M _f	Usage and conditions
Private ra	adio trunk base station	87.5-328.6	12.5	51.28	-		N	Y	Y	N	N	Y	Each TX or RX channel per base station in a given
		328.6-2690	200	49.89	-	-	N	Y	Y	N	Ν	Y	district
Public ra	dio trunk base station	87.5-328.6	12.5	-	4.93	-	Y	Y	N	Y	N	Y	Each TX or RX channel per base station in a given
		328.6-2690	200	-	4.80	-	Y	Y	N	Y	N	Y	district
Paging b	ase station	87.5-328.6	12.5	-	75.52	-	N	Y	N	Y	N	Y	Each paging channel per base station in a given district
		328.6-2690	200	-	42.54	-	Ν	Y	N	Y	N	Y	
Aeronau	ical radionavigation	0.009-3	12.5	-	-	80.26	Ν	Ν	N	Ν	Y	Y	Each TX or RX channel per ground station, nationwide
service		30-300	25	-	-	190.47	Ν	Ν	Ν	Ν	Y	Y	
		300-3100	1000	-	-	97.55	Ν	Ν	Ν	Ν	Y	Y	
		4200-265000	5000	-	-	73.83	Ν	Ν	N	Ν	Y	Y	
_ p	Exclusive bands	0.009-30	3	-	-	47.06	Ν	Ν	Ν	Ν	Y	Y	Each channel for ground station
ica]	Non-exclusive bands	0.009-30	3	-	-	66.60	Ν	Ν	Ν	Ν	Y	Y	
grc	Allowed bands	30-100	25	-	-	79.34	Ν	Ν	Ν	Ν	Y	Y	
on: ile stat	Radio telephone	117.975-137	25	-	-	92.68	Ν	Ν	Ν	Ν	Y	Y	
Aer	Allowed bands	138-8400	100	-	-	44.60	Ν	Ν	Ν	Ν	Y	Y	
, n	Allowed bands	10000-76000	1000	-	-	10.71	Ν	Ν	Ν	Ν	Y	Y	
Radioloc	ation stations (Radars)	0.3-3	5	-	-	68.14	Ν	Ν	Ν	Ν	Y	Y	Each channel, nationwide
		30-300	25	75.97	-	-	Ν	Ν	Y	N	Ν	Y	Each channel per station
		420-450	25	74.65	-	-	Ν	Ν	Y	N	Ν	Y	
		1215-1400	1000	61.31	-	-	Ν	Ν	Y	N	Ν	Y	L band radars
		2300-3700	1000	94.23	-	-	Ν	Ν	Y	N	Ν	Y	S band radars, including metorological radars
		5250-17700	5000	88.38	-	-	Ν	Ν	Y	N	Ν	Y	Including metorological radars
		24050-275000	20000	24.95	-	-	Ν	Ν	Y	N	Ν	Y	Short range radars
Meteorol	ogical aids base station	27-30	20	-	-	138.38	Ν	Ν	Ν	Ν	Y	Y	Each radiosonde channel per base station
		400.15-406	100	66.98	-	-	Ν	Ν	Y	N	Ν	Y	
		1668.4-1700	1000	81.6	-	-	Ν	Ν	Y	N	Ν	Y	
		35200-36000	10000	26.06	-	-	Ν	Ν	Y	N	Ν	Y	Each channel per base station
Very/Ult	ra small aperture terminals	3100-8500	2000	95.60	-	-	Ν	Y	Y	N	Ν	Y	Each uplink or downlink channel for a VSAT/USAT in
		10450-18100	1000	28.91	-	-	N	Y	Y	N	Ν	Y	a given district
		18100-50200	2000	34.42	-	-	Ν	Y	Y	N	N	Y	
		5200-275000	4000	25.64	-	-	Ν	Y	Y	N	Ν	Y	

Table $4.4(1)$ – Table of multiplicand contributed in spectrum utilization fee formula and relevant formula

Column 1	Column 2	Col. 3	C	Column 4	ļ.			Colu	mn 5			Column 6
		Channel	Applicati	ion Multi	iplicand		Contrib	nuted I	Multin	licand	2	
Radio Application or	Frequency range (MHz)	spacing,	D	Per	Nation-	Multij	ply mu	ltiplica	ands m	narked	, by 'Y'	Usage and conditions
Radio service	(11112)	X _f	Per station M _S	district M _D	wide M _N	M _{ARA}	M _{ICT}	M_{S}	M _D	$M_{\rm N}$	M_{f}	
Very/Ultra small aperture	3100-8500	2000	125.69	-	-	Ν	Y	Y	Ν	Ν	Y	Each uplink or downlink channel for a VSAT
terminals for HUB	10450-18100	1000	168.50	-	-	Ν	Y	Y	Ν	Ν	Y	HUB in a given district
	18100-50200	2000	60.34	-	-	Ν	Y	Y	Ν	Ν	Y	
	5200-275000	4000	52.84	-	-	Ν	Y	Y	Ν	Ν	Y	
Fixed earth station under any	30-1400	30	59.51	-	-	Ν	Y	Y	Ν	Ν	Y	Each uplink or downlink channel in a given
radiocommunications service,	1400-2700	30	89.87	-	-	Ν	Y	Y	Ν	Ν	Y	district
	3100-8500	2000	331.98	-	-	Ν	Y	Y	Ν	Ν	Y	
(except VSATs/USATs and	10450-18100	1000	178.82	-	-	Ν	Y	Y	Ν	Ν	Y	
VSAT HUBs-covered in other	18100-50200	2000	180.79	-	-	Ν	Y	Y	Ν	Ν	Y	
rows of this Table)	5200-275000	4000	53.77	-	-	Ν	Y	Y	Ν	Ν	Y	
Portable earth station	30-1400	30	43.10	-	-	Ν	Ν	Y	Ν	Ν	Y	Each portable earth station
	1400-2700	30	42.11	-	-	Ν	Ν	Y	Ν	Ν	Y	
	3100-8500	2000	98.24	-	-	Ν	Ν	Y	Ν	Ν	Y	
	10450-18100	1000	65.35	-	-	Ν	Ν	Y	Ν	Ν	Y	
	18100-50200	2000	32.43	-	-	Ν	Ν	Y	Ν	Ν	Y	
	5200-275000	4000	32.20	-	-	Ν	Ν	Y	Ν	Ν	Y	
Mobile earth stations	30-1400	30	61.44	-	-	Ν	Ν	Y	Ν	Ν	Y	Each mobile earth station
	1400-2700	30	60.04	-	-	Ν	Ν	Y	Ν	Ν	Y	
	3100-8500	2000	140.06	-	-	Ν	Ν	Y	Ν	Ν	Y	
	10450-18100	1000	93.17	-	-	Ν	Ν	Y	Ν	Ν	Y	
	18100-50200	2000	46.23	-	-	Ν	Ν	Y	Ν	Ν	Y	
	5200-275000	4000	45.91	-	-	Ν	Ν	Y	Ν	Ν	Y	
Stations in radio astronomy	All bands	500	26.36	-	-							A transmitting (uplink) or a receiving (downlink)
service, space operation						Ν	Ν	Y	Ν	Ν	Y	radio channel
service, space research service												
Space station	All bands	500	-	-	230.98					Y	Y	Each licensed uplink or downlink channel used in space by satellite

Table 4.4(I) – Table of multiplicand contributed in spectrum utilization fee formula and relevant formula (*cont*.)

TX: Transmitter, RX: Receiver, DVB-S: Digital video broadcasting – satellite, T-DAB: Terrestrial digital audio broadcasting $^{(1)}$: In case of a land mobile network without having base or vehicular station, the equivalent number of base stations must be evaluated from Table **4.4**(**II**) of this Part. Then, the spectrum utilization fee by handsets would be equal to the spectrum utilization fee calculated for equivalent base stations.

Table 4.4(II) – Equivalent number of base stations for given number of handsets in land mobile service (for calculation of spectrum utilization fee of handsets. See the explanation below Table 4.4(I))

Number of handsets	Equivalent base station if network has at least one base/vehicular station	Equivalent base station if network has not any base/vehicular station				
One to thirty	Zero base station	One base station				
Thirty one to seventy	One base station	Two base stations				
More than seventy	One base station plus one base station for each fifty mobile sets	Two base stations plus one base station for each fifty mobile sets				

4.5 Frequencies exempted from spectrum utilization fee under paragraph 5.9(a)(iii)

(a) All frequencies given in column 1 of Table **4.5** exempted from spectrum utilization fee.

Frequency or frequency range, kHz	Usage
2183.4	Worldwide distress and calling frequency for radiotelephony. This frequency can also be used for vital navigational warnings, international frequency for search and rescue operations concerning manned space vehicles, GMDSS frequency for distress and safety traffic by radiotelephony.
2187.5	Worldwide frequency for distress and safety calling using DSC techniques.
3 024.4 (Carrier frequency: 3 023)	Worldwide frequency for use by stations of the aeronautical mobile (R) and (OR) services as laid down in Part II of Appendix 27 to the ITU-RR and by stations of the maritime mobile service engaged in coordinated search and rescue operations, international frequency for search and rescue operations concerning manned space vehicles.
5 681.4 (Carrier frequency: 5 680)	Worldwide frequency for use by stations of the aeronautical mobile (R) and (OR) services as laid down in Part II of Appendix 27 to the ITU-RR and by stations of the maritime mobile service engaged in coordinated search and rescue operations, international frequency for search and rescue operations concerning manned space vehicles.
10003	International frequency for search and rescue operations concerning manned space vehicles. The emissions must be limited to a band of ± 3 kHz about the frequency.
14 993	International frequency for search and rescue operations concerning manned space vehicles. The emissions must be limited to a band of ± 3 kHz about the frequency.
19993	International frequency for search and rescue operations concerning manned space vehicles. The emissions must be limited to a band of ± 3 kHz about the frequency.
121500	Aeronautical emergency frequency. Used for distress and urgency purposes for radiotelephony by stations of the aeronautical mobile service using the band between 117.975 and 136 MHz. May also be used for these purposes in survival craft stations and emergency position-indicating radiobeacons and by mobile stations of the maritime mobile service (class A3E emissions) for the exclusive purposes of distress and urgency with stations of the aeronautical mobile service. International frequency for search and rescue operations concerning manned space vehicles.
123100	Aeronautical frequency auxiliary to the aeronautical emergency frequency 121.5 MHz. May also be used by mobile stations of the maritime mobile service (class A3E emissions) and by other mobile and land stations for coordinated search and rescue operations with stations of the aeronautical mobile service.

Table 4.5 – Frequencies exempted under paragraph 5.9(a)(iii)

Frequency or frequency range, kHz	Usage
156300 (if used by	Worldwide frequency to be used for communication between ship stations and aircraft stations, using class G3E emission, engaged in coordinated search and rescue operations.
aircrafts)	May also be used by aircraft stations to communicate with ship stations for other safety purposes.
243000	Worldwide frequency for use by survival craft stations and equipment used for survival purposes. International frequency for search and rescue operations concerning manned space vehicles.
1 544000 – 1545000	Worldwide frequency in the mobile-satellite service (space-to-Earth) for distress and safety communications.
1645500 – 1646500	Worldwide frequency in the mobile-satellite service (Earth-to-space) and for inter-satellite links for distress and safety communications.

Table 4.5 – Frequencies exempted under paragraph 5.9(a)(iii)

4.6 Table of permitting fee

(a) Under the subsection **5.6(b)**, Part **III**, permit fees for each month of permit duration shall be in accordance with the Table **4.6** below.

Purpose of permit	Reference in Part III	Permit fee (in price unit)
Supplying of radiocommunications apparatus	paragraph 3.2 (a)(i)	1200
Exporting or re-exporting radiocommunications apparatus	paragraph 3.2 (a)(ii)	2400
Possession and installation of an amateur station	paragraph 3.2(a)(iii)	240
Manufacturing radiocommunications apparatus	paragraph 3.2 (a)(iv)	350
Testing of radiocommunications apparatuss	paragraph 3.2 (a)(v)	600
Conducting experiments for research and education	paragraph 3.2(a)(vi)	60
Demonstration of radiocommunications apparatus	paragraph 3.2 (a)(vii)	150
Possession of a non-standard radiocommunications apparatus	subsection 3.7 (e)	600
Testing of radiocommunications apparatus	subsection 3.7 (h)	1200

Table **4.6** – permitting fees

Schedule 5 – Permitted Technical Specifications for Amateur Stations

5.1 Outline of this schedule

- (a) Relevant Sections:
 - Section 5.2 Emission modes
 - Section 5.3 Permitted frequency bands and emission modes of General amateur stations
 - Section 5.4 Permitted frequency bands and emission modes of Novice amateur stations
 - Section 5.5 Permitted frequency bands and emission modes of Restricted amateur stations
- (b) This schedule is subject to change time to time if Authority satisfied to do so.

5.2 Emission modes

- (a) For this schedule, the emission mode of a transmission of an amateur station is set out in a series of numbers and letters representing (in order) the following components:
 - (i) the *necessary* bandwidth of the transmission;
 - (ii) the modulation of the main carrier of the transmission;
 - (iii) the nature of the signal or signals modulating the main carrier of the transmission;
 - (iv) the kind of information to be transmitted using the station.
- (b) The symbols used to describe each component of the emission mode are:

Component	Description	
Necessary bandwidth	Necessary bandwidth is a value between 0.001 Hz and 999.999 Hz (inclusive)	
	Necessary bandwidth is a value between 1.000 kHz and 999.999 kHz (inclusive)	K
	Necessary bandwidth is a value between 1.000 MHz and 999.999 MHz (inclusive)	М
	<i>Note</i> 200 Hz would be represented as 200H and 4 kHz would be represented as 4K00.	
Modulation of the main carrier	Main carrier: (a) is amplitude modulated; and (b) uses double-sideband	А
	Main carrier:(a) is amplitude modulated; and(b) uses single-sideband, full carrier	Н
	 Main carrier: (a) is amplitude modulated; and (b) uses a single-sideband, reduced or variable-level carrier 	R
	Main carrier:(a) is amplitude modulated; and(b) uses a single-sideband, suppressed carrier	J

Table 5.2 - The symbols used to describe each component of the emission mode

Component	Description	Symbol
	Main carrier: (a) is amplitude modulated; and (b) uses independent sideband	В
	Main carrier: (a) is amplitude modulated; and (b) uses vestigial sideband	C
	Main carrier: (a) is angle modulated; and (b) uses frequency modulation	F
Modulation of the main carrier (continued)	Main carrier:(a) is angle modulated; and(b) uses phase modulation	G
Signal or signals modulating the main carrier	Signal modulating the main carrier is a single channel containing quantized or digital information without the use of a modulating subcarrier	
	Signal modulating the main carrier is a single channel containing quantized or digital information with the use of a modulating subcarrier	2
	Signal modulating the main carrier is a single channel containing analog information	3
	Signal modulating the main carrier is 2 or more channels containing analog information	8
Kind of information	Telegraphy for aural reception	А
to be transmitted	Telegraphy for automatic reception	В
	Facsimile transmission	С
	Data transmission, telemetry or telecommand	D
	Telephony	Е
	Television (video)	F
	A combination of any of the kinds of information described in the previous items	W

5.3 Permitted frequency bands and emission modes of General amateur stations

- (a) The licensee must operate a General amateur station only on a frequency that is in a frequency band mentioned in an item in Table **5.3**, Schedule **5** of this part and subject to:
 - (i) using an emission mode mentioned in the item; and
 - (ii) the transmission remains entirely within a frequency band mentioned in the item.
- (b) The licensee must not operate a General amateur station, using a transmitter output power of more than **400** watts pX, if the emission mode of the station includes:
 - (i) C3F; or
 - (ii) J3E; or
 - (iii) R3E.
- (c) The licensee must not operate a general amateur station, with an emission mode not mentioned in subsection (b), using a transmitter output power of more than 120 watts pY.

Item	Frequency band	Permitted emission modes
1	1.800 MHz-1.825 MHz	Any emission mode with a necessary
	3.500 MHz-3.900 MHz	bandwidth not exceeding 8 kHz
	7.000 MHz-7.200 MHz	
	10.100 MHz-10.150 MHz	
	14.000 MHz-14.350 MHz	
	18.068 MHz-18.168 MHz	
	21.000 MHz-21.450 MHz	
	24.890 MHz-24.990 MHz	
2	28.000 MHz–29.700 MHz	Any emission mode with a necessary bandwidth not exceeding 16 kHz
3	50.000 MHz-54.000 MHz	Any emission mode with a necessary
	144.000 MHz-146.000 MHz	bandwidth not exceeding 100 kHz
4	430.000 MHz-440.000 MHz	Any emission mode
	1 240.000 MHz-1 300.000 MHz	
	2 300.000 MHz–2 450.000 MHz	
	3.300 GHz-3.400 GHz	
	5.650 GHz–5.850 GHz	
	10.000 GHz-10.500 GHz	
	24.000 GHz-24.250 GHz	
	47.000 GHz-47.200 GHz	
	76.000 GHz-81.000 GHz	
	122.250 GHz-123.000 GHz	
	134.000 GHz-141.000 GHz	
	241.000 GHz-250.000 GHz	

Table 5.3 – Permitted frequency bands and emission modes under the certificate of proficiency of 'General'

5.4 Permitted frequency bands and emission modes of Novice amateur stations

- (a) The licensee must operate a Novice amateur station to transmit only on a frequency in a frequency band mentioned in an item in Table **5.4**, Schedule **5** of this part and subject to:
 - (i) it is operated using an emission mode mentioned in the item; and
 - (ii) the transmission remains entirely within a frequency band mentioned in the item.
- (b) The licensee must not operate a Novice amateur station, using a transmitter output power of more than **100** watts pX, if the emission mode of the station includes:
 - (i) J3E; or
 - (ii) R3E.
- (c) The licensee must not operate a Novice amateur station, with an emission mode not mentioned in subsection (b), using a transmitter output power of more than **30** watts pY.

Item	Frequency band	Permitted emission modes
1	3.500 MHz-3.700 MHz	Any emission mode with a necessary
	7.000 MHz-7.200 MHz	bandwidth not exceeding 8 kHz
	14.000 MHz-14.350 MHz	
	21.000 MHz-21.450 MHz	
2	28.000 MHz-29.700 MHz	Any emission mode with a necessary
	52.000 MHz-54.000 MHz	bandwidth not exceeding 16 kHz
	144.000 MHz-146.000 MHz	
	430.000 MHz-440.000 MHz	
	1 240.000 MHz-1 300.000 MHz	
	2 400.000 MHz–2 450.000 MHz	
	5.650 GHz–5.850 GHz	

Table 5.4 – Permitted frequency bands and emission modes under the certificate of proficiency of 'Novice'

5.5 Permitted frequency bands and emission modes of Restricted amateur stations

- The licensee of a restricted amateur license must not operate an amateur station using automatic mode or (a) computer controlled mode.
- (b) Inline with the paragraph 2.35(h) of Part III, the licensee of a restricted amateur license must not operate an amateur station that is directly connected to a public telecommunications network.

Note A restricted amateur station may be indirectly connected to a public telecommunications network through a gateway operated by another licensee.

- The licensee must not operate a restricted amateur station in a frequency band mentioned in an item (c) mentioned in an item in Table 5.5, Schedule 5 of this part and subject to:
 - (i) using an emission mode mentioned in the item; and

- (ii) if the emission mode is 200HA1A, the information to be transmitted is sent by the use of a manually operated Morse key; and
- (iii) the transmission remains entirely within a frequency band mentioned in the item.
- (d) The licensee must not operate a restricted amateur station using a transmitter output power of more than 10 watts pX.

Table 5.5 – Permitted frequency bands and emission modes under the certificate of proficiency of 'Restricted'

ltem	Frequency band	Permitted emission modes
1	3.500 MHz-3.700 MHz	200HA1A
	7.000 MHz-7.200 MHz	8K00A3E
	21.000 MHz-21.450 MHz	4K00J3E
2	28.000 MHz-29.700 MHz	200HA1A
	144.000 MHz-146.000 MHz	8K00A3E
	430.000 MHz-440.000 MHz	4K00J3E
		16K0F3E
		16K0G3E

Schedule 6 – Table of Call Signs

6.1 Outline of this schedule

- (a) Relevant Sections:
 - Section 6.2 General
 - Section 6.3 Call sign of mobile station in land mobile service
 - Section 6.4 Call sign of land station or fixed station
 - Section 6.5 Call sign of aeronautical station
 - Section 6.6 Call sign of Aircraft survival craft stations
 - Section 6.7 Call sign of broadcasting stations
 - Section 6.8 Call sign of amateur stations
- (b) This schedule is subject to change time to time if Authority satisfied to do so.

6.2 General

- (a) Under the subsection **2.19(g)** of Part **III**, a call sign to a transmitting station shall be assigned at the time of issuing an apparatus license;
- (b) A call sign assigned to a transmitter under the subsection **6.2(b)** is not subject to change unless:
 - (i) A characteristic of corresponding valid license changed that requires call sign modification; or
 - (ii) The license cancelled.
- (c) In case of more than one transmitting frequency assignment to a single station, the Authority must assign a call sign to each group of frequencies that is going to be utilized in same radiocommunications service.
- (d) The method of call sing assignment established by this section in case of station belongs to the defense sector, is valid only in peace. In the event of national conflict or war, the assigned call signs may be changed by defense sector itself. If happened, the Authority shall be provided by enough information for prevention of call sign conflicts.
- (e) For construction of call sings:
 - (i) The three character identifier of districts, wherein the transmitting station is operated, shall be in accordance with Table **6.2(I)** below.
 - (ii) The one letter of identifier of dedicated spectrum users shall be in accordance with the Table 6.2(II) below.
 - (iii) The three character identifier of group of districts, wherein the transmitting station is operated, shall be in accordance with Table **6.2(III)** below.

No.	District	Identifier	No.	District	Identifier
1	Bumthang	A5B	11	Samdrup Jongkhar	A5J
2	Chukha	A5C	12	Samtse	A5S
3	Dagana	A5D	13	Sarpang	A5V
4	Gasa	A5G	14	Thimphu	A5T
5	Наа	A5H	15	Trashigang	A5I
6	Lhuntse	A5L	16	Trashiyangste	A5Y
7	Mongar	A5M	17	Trongsa	A5R
8	Paro	A5P	18	Tsirang	A50

Table 6.2(I) – The three-character identifier of districts
9	Pemagatshel	A5E	19	Wangdue Phodrang	A5W
10	Punakha	A5U	20	Zhemgang	A5Z

No.	Entity	Identifier
1	Road Safety & Transport Authority of Bhutan	А
2	Ministry of Health	В
3	Ministry of Home & Cultural Affairs	С
4	Ministry of Labour & Human Resources	D
5	Ministry of Works & Human Settlements	Е
6	Ministry of Education	F
7	Ministry of Agriculture	G
8	Ministry of Economic Affairs	Н
9	Ministry of Finance	Ι
10	Royal Bhutan Army	J
11	Royal Bhutan Police	К
12	Royal Bhutan Guard	L
13	Bhutan Broadcasting Service	М
14	Bhutan Post	Ν
15	Thimphu City Corporation	0
16	Druk Air	Р
17	Royal	Q
18	Others (Reserved by the Authority)	R to Z

Table 6.2(II) – The character identifier of major spectrum users

Table 6.2(III) – The three-character identifier of districts

No.	Districts	
1	Bumthang, Sarpang, Trongsa, Zhemgang	A5K
2	Chukha, Haa, Paro, Samtse, Thimphu	A5A
3	Dagana, Gasa, Punakha, Tsirang, Wangdue Phodrang	A5Q
4	Lhuntse, Mongar, Pemagatshel, Samdrup Jongkhar, Trashigang, Trashiyangste	A5F
5	Nationwide	A5N
7	Other combination of districts	A5X

6.3 Call sign of mobile station in land mobile service

- (a) The call sign of a mobile station in land mobile service is the combination of three character of Table **6.2(I)** followed by a letter of Table **6.2(II)** followed by a four digit from '**2000**' to '**9999**'.
- (b) If a mobile station is in use in more than one district, the Authority assigns the combination of three characters of Table **6.2(III)** followed by a letter of Table **6.2(II)** followed by a four digit from '2000' to '9999'.

6.4 Call sign of land station or fixed station

(a) The call sign of a land station is the combination of three character of Table **6.2(I)** followed by a three digit from '**250**' to '**999**'.

(b) If the location of a land station is unknown to the Authority, the Authority assigns the 'A5X' followed by a three digit from '250' to '999'.

6.5 Call sign of aeronautical station

The Authority assigns a call sign to an aeronautical station from the range A5AAB to A5AZZ.

6.6 Call sign of Aircraft survival craft stations

The Authority assigns a call sign to an aircraft survival craft station as the complete call sign of the parent aircraft, followed by a single digit other than 0 or 1.

6.7 Call sign of broadcasting stations

- (a) The call sign of a broadcasting station is the combination of three character of Table **6.2(I)** followed by a three digit from:
 - (i) '200' to '205' in case of short-wave sound broadcasting;
 - (ii) '206' to '225' in case of FM sound broadcasting
 - (iii) '226' to '249' in case of TV broadcasting

6.8 Call sign of amateur stations

- (a) The call sign of an amateur station is the combination of:
 - (i) **'A5**' followed by;
 - (ii) digit '0' or '1' or '2' for 'Clubs', 'Bhutanese' and 'Foreign National' certificate types, respectively, followed by;
 - (iii) "AA" to "ZZ"
- (b) The Authority may provide special call sign for special events using digit '4' or '8' in position of subsection **6.8(a)(ii)**. Such identification needs to be published by the Authority in advance if made.