NATIONAL RADIO REGULATIONS 1999

BHUTAN TELECOMMUNICATIONS AUTHORITY
MINISTRY OF COMMUNICATIONS
ROYAL GOVERNMENT OF BHUTAN

TABLE OF CONTENTS

PART I

PRELIMINARY

1. Preamble and Section

In exercise of the powers conferred under Section 73, Subsection (2) of the Bhutan Telecommunications Act, 1999, I, Leki Dorji, Deputy Minister, Ministry of Communications, Royal Government of Bhutan, make the following regulations for the purpose of regulating radiocommunications services in Bhutan.

2. Commencement

These Regulations may be cited as the National Radio Regulations, 1999 and shall come into force on January 01, 2000.

3. Scope of Application

These Regulations shall apply to all types of radiocommunications devices that form part of a radiocommunications service, whether such a service operates from fixed locations or in a mobile or portable capacity operating from within the territory of Bhutan or its air space, whether in the terrestrial or space radiocommunications services. These Regulations also apply to devices, other than radiocommunications devices, that produce, or have the potential to produce, radiations that cause unacceptable interference to authorised radiocommunications devices, irrespective of whether these radiations are intentional or unintentional.

PART II

TERMS AND DEFINITIONS

4. Application

Any expression used in these Regulations has the same meaning as assigned to it in the Bhutan Telecommunications Act, 1999, hereinafter referred to as "the Act", except where these Regulations state otherwise.

The following meanings apply for the purposes of these Regulations.

"Accepted Interference" means interference at a higher level than that defined as permissible interference under ruling legislation or agreements but which has been agreed upon as being acceptable between two or more affected administrations without prejudice to other administrations.

"Administration" means the Bhutan Telecommunications Authority, 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.

"Aeronautical Mobile (OR)[1] Service" means an aeronautical mobile service intended for communications, including those relating to flight co-ordination, primarily outside national or international civil air routes.

"Aeronautical Mobile (R)[2] Service" means an aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes.

"**Aeronautical Mobile-Satellite (OR) Service"** means an aeronautical mobile- satellite service intended for communications, including those relating to flight co-ordination, primarily outside national and international civil air routes.

"Aeronautical Mobile-Satellite (R) Service" means an aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes.

"Aeronautical Mobile-Satellite Service" means a mobile satellite service in which mobile Earth station are located on board aircraft; survival craft station. Emergency position-indicating radiobeacon stations may also participate in this service.

"Aeronautical Mobile Service" means a mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate. Emergency position-indicating radiobeacon station may also participate in this service on designated distress and emergency frequencies.

"Aeronautical Radionavigation Service" means a radionavigation service intended for the benefit and the safe operation, of aircraft.

"Aeronautical Radionavigation-Satellite Service" means a radionavigation-satellite service in which Earth stations are located on-board aircraft.

[1] OR: off-route
[2] R: route

"Aeronautical Station" means a land station in the aeronautical mobile service.

"Aircraft Earth Station" means a mobile Earth station in the aeronautical mobile- satellite service located on board an aircraft.

"Aircraft Station" means a mobile station in the aeronautical mobile service, other than a survival craft station, located on board a registered aircraft.

"Allocation (of a frequency band)" means 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 radiocommunications service or the radio astronomy service under specified conditions. This term shall also be applied to the frequency band concerned.

"Allotment (of a radio frequency or radio frequency channel)" means 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 radiocommunications service in one or more identified countries or geographical areas and under specified conditions.

"Amateur Service" means a radiocommunications service for the purpose of self-training, intercommunication, and technical investigations carried out by amateurs, i.e., by duly authorized persons interested in radio technique(s) solely with a personal aim and without any pecuniary interest.

"Amateur Station" means a station in the amateur service.

"Amateur Station (Restricted)" means an amateur station operated by a person to whom a certificate of proficiency has been granted in relation to Section 15.1 of these Regulations.

"Amateur Station (General)" means an amateur station operated by a person to whom a certificate of proficiency has been granted in relation to Section 15.2 of these Regulations.

"Amateur-Satellite Service" means a radiocommunications service using space stations on Earth satellites for the same purposes as those of the amateur service.

"Apparatus Licence" means a licence that authorises any person to operate a transmitter in accordance with conditions specified in APPENDIX 1of these Regulations.

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

"Assigned Frequency" means the centre of frequency band assigned to a station.

"Assignment (of a radio frequency or radio frequency channel)" means the authorisation given by an administration for a radio station to use a radio frequency or radio frequency channel under specified conditions.

"Base Earth Station" means 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.

"Base Station" means a radiocommunications station established for the purpose of communicating with land mobile stations or other base stations.

"Bhutan Radiofrequency Spectrum Plan (BRSP)" means the national radiofrequency spectrum plan that stipulates the authorised use of radiofrequency spectrum within the Kingdom of Bhutan.

"Bhutan Radiofrequency Band Plan (BRBP)" means the national radiofrequency band plan that stipulates the authorised use of radiofrequency bands within the Kingdom of Bhutan.

"Broadcasting Station" means a station in the broadcasting service.

"Broadcast Matter" means any sign or signal transmitted by a broadcasting station, whether for aural or visual reception or for both, for the information, instruction or entertainment of listeners and viewers, and includes any music, theatrical entertainment, concerts, lectures, speeches, addresses, news and information of any kind.

"Broadcasting Receiver" means a radiocommunications apparatus designed for the reception of aural and/or visual broadcast matter.

"Broadcasting Service" means a radiocommunications 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.

"Broadcasting-Satellite Service" means a radiocommunications 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.

"Broadcasting Station" means a radiocommunications transmitting station used for the purpose of providing a broadcasting service.

"Carrier Power (of a radio transmitter)" means the average power supplied to the antenna transmission line by a transmitter during one radio frequency cycle taken under the condition of no modulation.

"Characteristic Frequency" means 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.

"Citizens Band Radio Station (CBRS)" means a radiocommunications station that employs any frequency channel in the frequency bands 26.965 - 27.405 MHz and 476.425 - 477.400 MHz for personal and business operations.

"Class of Emission" means 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.

"Class Licence" means a licence that authorizes any person to operate a transmitter in accordance with the conditions specified in APPENDIX 3 of these Regulations.

"Continuous Tone Controlled Squelch System (CTCSS)" means a land mobile system incorporated in the design of a base station and mobile station equipment to detect not only the presence of radio frequency signal but also the unique tone before the squelch opens. The tone frequencies in CTCSS reference should be made to IEC Publication 487-6A.

"Convention" means the International Telecommunication Convention signed at Nairobi, 1982, under the aegis of the International Telecommunication Union (ITU), Geneva, and the Regulations annexed thereto or any other Constitution and/or Convention of the ITU, to which Bhutan may be a party and modification of Regulations made under the ITU Constitution and Convention, from time to time.

"Control Station" means a station in the fixed or land mobile service that controls the operation of a related radiocommunications network.

"Coordinated Universal Time (UTC)" means a time scale, based on the second (SI)[3], as defined in ITU-R Recommendation ITU-R TF.460-5. 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.

"Coordination Area" means the area associated with an Earth station outside of which a terrestrial station sharing the same frequency band neither causes nor is subject to interfering emissions greater than a permissible level.

"Coordination Distance" means the distance on a given azimuth from an Earth station beyond which a terrestrial station sharing the same frequency band neither causes nor is subject to interfering emissions greater than a permissible level.

"Dealer" means a person who carries on trade, business or industry in which radio transmitters, receivers, or transceivers or their component parts are assembled, manufactured, imported, bought, sold or exchanged or offered or exposed for sale and exchange.

"Distress Call Message or Signal" means a priority communication concerning safety of life at sea or in the air.

"Duplex Operation" means operating method in which transmission is possible simultaneously in both directions on a telecommunication channel.

"Earth Exploration-Satellite Service" means a radiocommunications service between Earth stations and one or more space stations, which may include links between space stations, in which:

a) 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;

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

c) such information may be distributed to Earth stations within the system concerned; and

d) platform interrogation may be included.

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

"Earth Station" means a station located either on the Earth's surface or within the major portion of the Earth's atmosphere and intended for communication:

a) with one or more space stations; or

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

"Effective Monopole Radiated Powered (e.m.r.p), in a given direction" means the product of the power supplied to the antenna and its gain, relative to a short vertical antenna, in a given direction.

[3] As defined under the International System of Units

"Effective Radiated Power (e.r.p), in a given direction" means the product of the power supplied to the antenna and its gain, relative to a half wave dipole, in a given direction.

"Electromagnetic Compatibility (EMC)" means the minimisation of electromagnetic interference between electronic products that may diminish the performance of electrical products or disrupt essential communications.

"Electromagnetic Radiation (EMR)" means the heating properties of radiofrequency energy, including its potential impact on human health.

"Emergency Position-Indicating Radio Beacon (EPIRB) Station" means a station in the mobile service the emission of which are intended to facilitate search and rescue operations.

"Emission" means 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.

"Equivalent Isotropically Radiated Power (e.i.r.p)" means 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).

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

"Exterior Paging Service" means a radiocommunications service consisting of a main transmitter for the purpose of one-way data communication to one or more paging receivers. One or more supplementary transmitters operating on the same frequency as the main transmitter may be used solely to improve the service area within an appropriate radius of the main transmitter.

"Feeder Link" means a radio link from an Earth station at a given location to a space station or vice versa conveying information for a space radiocommunications 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.

"Fixed Service" means a radiocommunications service between specified fixed points.

"Fixed Station" means a station in the fixed service.

"Fixed-Satellite Service" means a radiocommunications 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 radiocommunications services.

"Frequency Tolerance" means 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 Hertz (MHz) or in Hertz (Hz).

"Full Carrier Single-Sideband Emission" means a single-sideband emission without reduction of the carrier.

"Gain of an Antenna" means 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 polarisation. 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; and

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 a perfectly conducting plane, which contains the given direction.

"Geo-stationary Satellite" means a geosynchronous satellite whose circular and direct orbit lies in the plane of Earth's equator and which thus remains fixed relative to the Earth; by extension, a satellite which remains approximately fixed relative to the Earth.

"Geo-stationary Satellite Orbit (GSO)" means the orbit of a geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator.

"Geo-synchronous Satellite" means an Earth satellite whose period of revolution is equal to the period of rotation of the Earth about its axis.

"Harmful Interference" means interference, which endangers the functioning of a radionavigation service or of other safety service or seriously degrades, obstructs, or repeatedly interrupts a radiocommunications service operating in accordance with these Regulations or the International Radio Regulations.

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

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

b) through a distribution system covering a limited area.

"Industrial, Scientific and Medical (ISM) Applications (of radio frequency energy)" means 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.

"Input Power" means the direct current (DC) input power to the output stage of a radio frequency transmitter, immediately preceding the antenna.

"Instrument Landing System (ILS)" means 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.

"Interference" means the effect of unwanted energy due to one or a combination of emissions, radiations, or inductions upon reception in a radiocommunications system, manifested by any performance degradation, misinterpretation, or loss of information, which could be extracted in the absence of such unwanted energy.

"Interior Paging Service" means a radiocommunications service consisting of one or more transmitters and one or more paging receivers that are used for communication solely within premises or areas.

"International Radio Regulations" means Radio Regulations annexed to the Convention of the ITU, Geneva, including any modifications or amendments in force.

"Inter-Satellite Service" means a radiocommunications service providing links between artificial satellites.

"Kuensel" is the National Weekly Newspaper of Bhutan.

"Land Earth Station" means 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 that provides a feeder link for the mobile satellite service.

"Land Mobile Earth Station" means a mobile Earth station in the land mobile satellite service capable of surface movement within the geographical limits of a country or continent.

"Land Mobile-Satellite Service" means a mobile-satellite service in which mobile Earth stations are located on land.

"Land Mobile Service" means a mobile service between base stations and land mobile stations, or between land mobile stations.

"Land Mobile Station" means a mobile station in the land mobile service capable of surface movement within the geographical limits of a country or continent.

"Land Station" means a station in the mobile service not intended to be used while in motion.

"Licence" means a formal permission granted under these Regulations for the purpose of regulating the establishment, maintenance and use of a radiocommunications station or a radiocommunications apparatus.

"Licensed Radio Station" means a radiocommunications station in respect of which an apparatus licence has been issued under the provisions of these Regulations.

"Licensee" means the person or organisation, in whose name, an apparatus licence has been issued under the provisions on these regulations.

"Licensing Authority" means the person who is empowered to grant a licence under the Act and the provisions of these Regulations.

"Marker Beacon" means a transmitter in the aeronautical radionavigation service, which radiates vertically a distinctive pattern for providing position information to aircraft.

"Mean Power (of a radio transmitter)" means 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.

"Meteorological Aids Service" means a radiocommunications service used for meteorological, including hydrological, observations and explorations.

"Meteorological-Satellite Service" means an Earth exploration-satellite service for meteorological purposes. This service may also include the feeder links necessary for its operation.

"Mobile Earth Station" means an Earth station in the mobile satellite service intended to be used while motion while in motion or during halts at unspecified points.

"Mobile Service" means a radiocommunications service between mobile and land stations, or between mobile stations.

"Mobile Station" means a station in the mobile service intended to be used while in motion or during halts at unspecified points.

"Mobile-Satellite Service" means a radiocommunications service:

a) between mobile Earth stations and one or more space stations, or between space stations used by this service; or

b) between mobile Earth stations by means of one or more space station.

"Necessary Bandwidth" means 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, for a given class of emission.

"Occupied Bandwidth" means 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 %.

"Out-of-Band Emission" means emission on a frequency or frequencies immediately outside the necessary bandwidth, which results from the modulation process, but excluding spurious emissions.

"Officer" means any person in the service of or employed in connection with any official business of the Bhutan Telecommunications Authority, Ministry of Communications, Royal Government of Bhutan.

"Paging Station" means a receiving station in the land mobile service that is intended to receive selective signals from a central position.

"Peak Envelope Power (of a radio transmitter)" means 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.

"Penalty" means an offence against Subsection (6) of Section 73, Subsection (5) of Section 85, Subsections (1) & (3) of Section 86, and paragraph (b)(i) of Subsections (1) & (2) of Section 90 of the Act.

"Permissible Interference" means that 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.

"Permit Holder" means a person who has been issued a permit under the provisions of these Regulations.

"Plain Language" means words and expressions that make out an intelligible communication whereby all words and expressions have the meaning usually attached to them in the language to which they belong.

"Possession Permit" means a permit issued in accordance with Section 78 of the Act for the possession of a radiocommunications apparatus designed or adapted for emission (as opposed to reception).

"Power" means the radiofrequency power inherent in a radio emission. Whenever the power of a radio transmitter, etc. is referred to it shall be expressed in one of the following forms, accordingly to the class of emission, using the following symbols:

a) peak envelope power (PX or pX);

b) mean power (PY or pY);

c) 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 the ITU-R Recommendations, which may be used as a guide. For use in formulae, the symbols p denotes power expressed in watts and the symbol P denotes power expressed in decibels relative to a reference level.

"Protection Ratio (P.R.)" means the minimum value of the wanted to unwanted signal ratio, usually expressed in decibels, at the receiver input, determined under specified conditions such that a specified reception quality of the wanted signal is achieved at the receiver output.

"Radar" means a radiodetermination system based on the comparison of reference signals with radio signals reflected, or retransmitted, from the position to be determined.

"Radar Beacon (racon)" means a transmitter-receiver associated with a fixed navigation 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.

"Radiation" means the outward flow of energy from any source in the form of radio waves.

"Radio" means a general term applied to the use of radio waves.

"Radio Apparatus" means any radio equipment, capable of being used as a radio transmitter, receiver or transceiver, which either wholly or partly can contribute to emission or reception of radio wave.

"Radio Astronomy Service" means a service involving the use of radio astronomy.

"Radio Astronomy Station" means a station in the radio astronomy service.

"Radio Astronomy" means astronomy based on the reception of radio waves of cosmic origin.

"Radio Direction-Finding" means radiodetermination using the reception of radio waves for the purpose of determining the direction of a station or object.

"Radio Direction Finding Station" means a radiodetermination station using radio-directing finding.

"Radio Repairer" means a person holding radio repairer's certificate.

"Radio Waves or Hertzian waves" means electromagnetic waves of frequencies arbitrarily lower than 3000 GHz, propagated in space or directly through the atmosphere or some other medium without artificial guide.

"Radiobeacon Station" means 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.

"Radio Station" means an installation, containing radiocommunications apparatus capable of being used for transmission or emission or reception or for both emission as well as reception of writing, signs, signals, pictures, impulses and sounds of all description whatsoever, wholly or partly by means of radio waves.

"Radiocommunications" means telecommunication by means of radio waves.

"Radiocommunications Service" means a service that involves the transmission, emission and/or reception of radio waves for specific telecommunication purposes. In these Regulations, unless otherwise stated, any radiocommunications service relates to terrestrial radiocommunications.

"Radiodetermination" means 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.

"Radiodetermination Service" means a radiocommunications service for the purpose of radiodetermination.

"Radiodetermination Station" means a station in the radiodetermination service.

"Radiodetermination-Satellite Service" means a radiocommunications 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.

"Radiolocation" means radiodetermination used for purposes other than those of radionavigation.

"Radiolocation Service" means a radiodetermination service for the purpose of radiolocation.

"Radiolocation Land Station" means a station in the radiolocation service not intended to be used while in motion.

"Radiolocation-Satellite Service" means a radiodetermination-satellite service used for the purpose of radiolocation. This service may also include the feeder links necessary for its operation.

"Radionavigation Mobile Station" means a station in the radionavigation service not intended to be used while in motion.

"Radionavigation Service" means a radiodetermination service for the purpose of radionavigation.

"Radionavigation" means radiodetermination used for the purposes of navigation, including obstruction warning.

"Radionavigation-Satellite Service" means a radiodetermination-satellite service used for the purpose of radionavigation. This service may also include the feeder links necessary for its operations.

"Radiotelegraphy" means a form of radiocommunications set up for the transmission of written matter by the use of a signal code.

"Radiotelemetry" means telemetry by means of radio waves.

"Radiotelephone call" means 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 radiocommunications channels of the mobile service or of the mobile satellite service.

"Reduced Carrier Single-Sideband Emission" means a single-sideband emission in which the degree of carrier suppression enables the carrier to be reconstituted and to be used for demodulation.

"Reference Frequency" means 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.

"Safety Service" means any radiocommunications service used permanently or temporarily for the safeguarding of human life and property.

"Satellite Emergency Position-Indicating Radiobeacon" means an Earth station in the mobile-satellite service the emissions of which are intended to facilitate search and rescue operations.

"Satellite" means 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.

"Secondary Radar" means a radiodetermination system based on the comparison of reference signals with radio signals retransmitted from the position to be determined.

"Semi-Duplex Operation" means a method, which is simplex operation at one end of the circuit and duplex operation at the other.

"Simplex Operation" means operating method in which transmission is made possible alternately in each direction of a telecommunication channel, for example, by means of manual control.

"Single-Sideband (SSB) Emission" means an amplitude-modulated emission with one sideband only- either an upper or a lower sideband.

"Space Operation Service" means a radiocommunications 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.

"Space Radiocommunications" means any radiocommunications involving the use of, one or more space stations or the use of one or more reflecting satellites or other objects in space.

"Space Station" means 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.

"Space Telecommand" means the use of radiocommunications for the transmission of signals to a space station to initiate, modify or terminate functions of equipment on an associated space object including the space station.

"Space Tracking" means determination of the orbital 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.

"Special Service" means a radiocommunications service, not otherwise defined in this section, carried on exclusively for specific needs of general utility and not to open to public correspondence.

"Spectrum Management" means the management of radiofrequency spectrum through radiofrequency planning, frequency co-ordination, frequency allocation and interference resolution, in accordance with these Regulations.

"Spurious Emission" means 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 emission, intermodulation products and frequency conversion products but exclude out-of-band emissions.

"Standard Frequency and Time Signal Service" means a radiocommunications service for scientific, technical and other purposes, providing the transmission of specific frequencies, time signals, or both, of stated high precision, intended for general reception.

"Standard Frequency and Time Signal Station" means a station in the standard frequency and time signal service.

"Standard Frequency and Time Signal-Satellite Service" means a radiocommunications 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 the feeder links necessary for its operation.

"Station" means one or more transmitter or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunications service or the radio astronomy service. Each station shall be classified by the service in which it operates permanently or temporarily.

"Suppressed Carrier Single-Sideband Emission" means a single-sideband emission in which the carrier is virtually suppressed and not intended to be used for demodulation.

"Survival Craft Station" means 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.

"Technical Licence Specification (TLS)" means a written instrument made under *Section 85 (3)* of the Act in order to determine technical licence specifications for operation of radiocommunications apparatus or permit of specified kinds under the apparatus licences and permits.

"Telecommand" means the use of telecommunications for the transmission of signals to initiate, modify or terminate functions of equipment at a distance.

"Telecommunication" means any transmission, emission or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems.

"Terrestrial Radiocommunications" means any radiocommunications other than space radiocommunications or radio astronomy.

"Terrestrial Station" means a station effecting terrestrial radiocommunications. In these Regulations, unless otherwise stated, any station is a terrestrial station.

"The Act" means the Bhutan Telecommunications Act, 1999 (enacted by the 77th Session of the National Assembly).

"The Director" means the officer delegated by the Royal Civil Service Commission to head the Bhutan Telecommunications Authority, Ministry of Communications, Royal Government of Bhutan.

"Unwanted emission" consist of spurious emissions and out-of-band emissions.

PART III

LICENCES AND PERMITS

5. Powers of the Director, Bhutan Telecommunications Authority, Ministry of Communications, Royal Government of Bhutan.

(1) The Director, Bhutan Telecommunications Authority, Ministry of Communications, Royal Government of Bhutan, shall have the powers to:

a) issue such licences and permits, as are required under the Act, or these Regulations;

b) impose such conditions, as he deems fit with respect to any apparatus licence or permit issued by him;

c) prescribe a 'Licence Fee' for any apparatus licence or any permit issued by him;

d) grant an exemption from the licensing requirements expressed in these Regulations ;

e) delegate his authority to grant an apparatus licence or a permit or a certificate, to any officer of the Royal Government of Bhutan; and

f) prescribe any condition, which he deems fit, for which he has powers under the Act, for the purposes of implementation of these Regulations in order to ensure proper operation of radiocommunications services.

6. Licensing Authority

(1) The Director or any other officer specifically designated by him shall be the "Licensing Authority", for the purpose of these Regulations, who is empowered to grant a licence or a permit or a certificate.

7. Organisations to be licensed

(1) Under the provisions of these Regulations, an apparatus licence shall be granted to the following organisations for the establishment, maintenance and operation of a radiocommunications station or possession of radiocommunications apparatus:

a) All ministries, departments and divisions of the Royal Government of Bhutan;

b) Private individuals or organisations, institutions and bodies; and

c) Semi-governmental organisations and corporations.

8. Organisations to be issued a permit

8.1. Eligible organisations

(1) Under the provisions of these Regulations, a 'permit' shall be issued to the following organisations for the establishment, maintenance and operation of a radiocommunications station:

a) Security services of the Royal Government of Bhutan;

b) All diplomatic missions; and

c) United Nations and other international agencies having inter-governmental status.

8.2. Permit Fee

(1) The organisations stated in Subsection 8.1(1) (a), and (b), when applying for a permit, must complete an application form (FORM A) and submit it to the BTA with the appropriate permit fee. The permit fee shall comprise of the Spectrum Maintenance Component (SMC) and the Administrative Component (AC).

Note: The Spectrum Access Tax (SAT) component is waived.

8.3. Permit Conditions

(1) The operation of all radiocommunications apparatus authorised under the permit issued by the BTA is subject to:

a) conditions specified in the Act, including an obligation to comply with the Act;

b) a condition that any radiocommunications apparatus operated under the permit must comply with all the standards applicable to it;

c) conditions specified in the permit;

d) any further conditions imposed by the BTA under Section 75 (2) of the Act.

9. Transfer of Licence/Permit

(1) Licences/Permits for radiocommunications services may be transferred. Applicants wishing to transfer a licence/permit to another person should complete the transfer form (FORM T) and submit it to the BTA. Both the transferer and transferee must sign the transfer form. Applicants are required to pay a transfer charge of Nu. 500.00 to cover the BTA's administrative expenses.

(2) It is important to be aware that an apparatus authorised by the transferred licence is still required to operate under the same technical conditions (including transmission site) specified on that permit, unless a variation to the technical operating parameters is approved by the BTA.

10. Powers to refuse an apparatus licence or permit

(1) The Director shall have powers to refuse the granting of an apparatus licence or a permit for the purpose to safeguarding:

a) the Security of the country;

b) Law and Order and the public interest;

c) friendly relations with other countries;

d) obligations under the provisions of the International Telecommunications Union; and

e) obligations under any other treaties, agreements and contracts.

11. Powers to cancel an apparatus licence or a permit and impose penalties

(1) The Director shall have full powers to suspend, revoke or cancel an apparatus licence or a permit, if he deems it fit, due to violation of any conditions, thereof.

12. Requests for the granting of an apparatus licence or a permit

(1) Requests for the granting of an apparatus licence or a permit shall be made in writing on an approved application form, as prescribed by the BTA or in another format prescribed as acceptable by the BTA. The applicant is to truthfully disclose all information required by the BTA for the purpose of granting an apparatus licence or a permit.

13. Possession Permit

(1) Pursuant to Subsection (1) of Section 78 of the Act, a possession permit shall be issued for the physical possession of radiocommunications equipment (other than sound and television broadcast receiver), which is not covered under any other category of licence or permit.

13.1. General Conditions applied to Possession Permit

(1) For the purpose of Section 78 of the Act, a possession permit is subject to the following terms and conditions:

a) that the possession permit holder must not connect the apparatus concerned to any main or external power supply or cause the apparatus to transmit via an antenna or a dummy load;

b) that the possession permit holder should allow any authorised officer of the BTA to inspect the apparatus concerned at any time;

c) a sticker or label signifying approval by the BTA should be prominently affixed to the apparatus;

d) that the possession permit holder should, at all time have full knowledge of the whereabouts and control of the apparatus concerned; and

e) in the case of change of ownership or disposal of equipment authorised by a possession permit, the permit holder is to formally advise the BTA in writing of the equipment disposition.

13.2. Unlawful Possession of Radio Apparatus

(1) In accordance with Subsection (4) of Section 78 of the Act, where any radio apparatus is found in the possession of any person that contravenes Subsection 13.1 of these Regulations, the Director may:

a) seal or alter the contravening apparatus or any part thereof in order to prevent its use for the purpose of transmission or reception; or

b) issue to such person a permit for a limited or indefinite period authorising the possession of that apparatus on condition that the apparatus is used for the stated purpose; or

c) seize such apparatus for disposal.

13.3. Period of Retention of Seized Radio Apparatus

(1) The seized radio apparatus shall be retained by the Director until:

a) the owner of the seized radio apparatus obtains an apparatus licence issued under Section 75 of the Act; or

b) a possession permit is issued to the owner of the seized radio apparatus for a limited or indefinite period stated in Section 13.2(b) of these Regulations; or

c) it is dealt with, by the court in terms of Section 93 of the Act.

13.4. Exemption from the requirement to hold a Possession Permit

(1) The following organisations/bodies are not required to hold a radiocommunications possession permit for unlicensed radiocommunications apparatus in their possession or under their control:

a) Ministries, Departments and Divisions under the Royal Government of Bhutan; and

b) United Nations organisations or any other international agencies having inter-governmental status.

14. Categories of Radiocommunications Stations

(1) Pursuant to Section 75 Subsection (1) of the Act, the Director shall issue radiocommunications apparatus licences or permits for the establishment, maintenance and operation of radiocommunications apparatus for the following categories of station:

a) Aeronautical;

b) Aircraft;

c) Amateur;

d) Broadcasting;

e) Citizens Band;

f) Earth (Receive);

g) Fixed;

h) Land Mobile; and

i) Radiodetermination.

14.1. Aeronautical Stations

14.1.1. Application of licence

(1) An Aeronautical Licence is issued to an aeronautical station that is not fixed to an aircraft and is operating in the aeronautical mobile (R) bands for purposes relating to the operation of aircraft or airports or aerodrome operations. This includes:

a) all mobile stations operating on the ground in support of aircraft operations and employing aeronautical frequencies in accordance with local air traffic control authority procedures; or

b) mobile stations operating in the air communicating with other mobile stations in the air or mobile stations on the ground and non-mobile stations such as airport control towers.

14.1.2. Type of Service

(1) The aeronautical licence type authorises the operation of one type of service called the aeronautical (mobile) service.

14.1.3. Channel utilisation

(1) Any frequency assigned to aeronautical (Mobile) services must be in accordance with the allotment plan prescribed in *APS27* of the ITU Radio Regulations. Aeronautical stations intending to operate on other than aeronautical, aeronautical-mobile satellite or radiodetermination frequencies must first apply for a separate licence from BTA.

14.1.4. Provision for use of Aeronautical Stations

(1) For the purpose of Section 73, Subsection 3 (b) of the Act, an aeronautical station is subject to the provisions of Annex 10 to the Convention on International Civil Aviation. The use and assignment of frequencies for non-directional beacons (NDBs) in the aeronautical radionavigation service, in the bands, 190 to 405 kHz, 415 to 495 kHz and 1606.5 to 1800 kHz, shall be carried out considering Annex 10 to the Convention on International Civil Aviation and the Standards and the Recommended Practices of the International Civil Aviation Organization (ICAO).

14.2. Aircraft Stations

14.2.1. Application of licence

(1) An aircraft licence authorises a person to establish, maintain and operate a radiocommunications apparatus on board a registered aircraft. The types of radiocommunications apparatus authorised under this category are:

a) aircraft radiocommunications transmitters and receivers; and

b) aircraft radionavigation apparatus including, but are not limited to, automatic direction finders, marker beacon receivers, instrument landing systems (ILS), VOR receivers, DME interrogators, ATC transponders and weather radars.

(2) Aircraft radio (mobile) stations may use other than aeronautical, aeronautical-mobile satellite or radiodetermination frequencies. In such cases, a separate licence is required for each such operation.

14.3. Fixed Stations

14.3.1. Application of licence

(1) A fixed station licence shall be issued for one or more stations that are operated principally for communications with stations located at one or more other fixed points specified in the apparatus licence.

14.3.2. Types of Service

(1) The fixed station licence permits the operation of five types of service:

a) Point-to-point;

b) Point-to-multipoint;

c) Experimental/Scientific/Research;

d) Outside Broadcasting (TV); and

e) Outside Broadcasting (Sound).

14.3.3. General Conditions Applicable to Fixed Services

(1) For the purposes of Subsection (3)(b) of Section 73 of the Act, a fixed station apparatus licence authorises the licensee to establish, maintain, and operate a transmitter in a fixed service subject to the following conditions:

a) the use of double-sideband radiotelephone (Class A3E) transmissions shall be discontinued;

b) Class F3E or G3E emissions are prohibited in the bands below 30 MHz;

c) border coordination must be effected before approval is granted for an apparatus licence or a permit;

d) the radiocommunications apparatus must comply with technical specifications specified in Section 18 of these Regulations including those concerning with EMC and EMR; and

e) the frequency or frequencies used must be in accordance with the Bhutan Radiofrequency Band Plans and Bhutan Radiofrequency Spectrum Plan.

14.3.4. Availability of Suitable Frequencies

(1) The issue of apparatus licences to operate in the MF and HF bands depends on the availability of suitable frequencies. Co-ordinated frequency band plans are to be developed as necessary, for Bhutan-wide use, to assist in the frequency assignment process. Consideration is to be given to the HF Broadcasting extension bands (WARC-92) and to border co-ordination with other countries bordering Bhutan including India, China, Nepal and Bangladesh.

14.3.5. Procedure for Co-ordinating MF, HF and VHF/UHF Proposed Frequencies with Bordering Countries

(1) Procedures for effecting successful frequency coordination apply to fixed and land mobile services operating in the MF, HF and VHF/UHF bands. ITU RRS9 Section II and Sub-Section IIA describe the procedures for co-ordination applicable to satellite networks including Earth stations.

(2) Before the BTA makes a frequency notification to the Radiocommunications Bureau (BR) of the ITU or brings into use a frequency assignment, it shall affect co-ordination with bordering countries. The requisite steps in the co-ordination process are:

a) Submission of a request for co-ordination using the "Border Co-ordination Form" (FORM B) applicable to the administration concerned. The form encompasses all technical details necessary for the neighbouring administration to assess and evaluate the potential of interference to its existing services. Only the assignments appearing in the International Frequency List (IFL) need to be protected. The minimum technical details that are to be submitted to the neighbouring administration are:

i. Assigned frequency;

ii. Emission and bandwidth;

iii. Class of station and nature of service;

iv. Power output of transmitter;

v. Geographical location of station in Longitude and Latitude;

vi. Antenna gain, azimuth and height above sea level (ASL); and

vii. Hours of operation (HJ or HN or HT or H24).

Note: It is also highly desirable to attach to the 'Co-ordination Form', a print out of Best Usable Frequency, predicted field strength and signal to noise calculations.

b) If no acknowledgement of receipt is received within thirty (30) days, a facsimile message shall be sent to the neighbouring administration requesting an acknowledgement.

c) If there is no acknowledgement of receipt within fifteen (15) days of the second notification, then the assistance of the Radiocommunications Bureau shall be sought.

d) The completed 'Form of Notice-Form AP1/A1' shall be submitted to the Radiocommunications Bureau with a copy of the 'Border Co-ordination Form' and a copy of any technical calculations previously sent to the administration concerned.

e) If, after examining the technical details with a view to determining the level of interference that may be expected to be caused by the proposed frequency assignment, the neighbouring administration determines that the interference level will not affect the quality of its existing services, then, full details of the agreement of the neighbouring administration to the use of the proposed frequency or frequencies should be entered in Item 11 of the AP1/A1 form (this form has been changed to T II Form, as from October 1999). A copy of this agreement shall be attached to the completed AP1/A1 Form to be submitted to the Radiocommunications Bureau.

f) If the neighbouring administration disagrees with the proposed assignment, then other suitable frequency or frequencies shall be sought.

14.3.6. Passive Repeater Stations

(1) Passive repeaters consist of two interconnected antennas, or a reflector intended to purposely change the direction of a coordinated path. All interconnected stations in a fixed link system, including passive repeaters, need to be recorded for compatibility assessment. This assessment considers each station's location and orientation as well as each frequency employed.

14.4. Citizens Band Radio Stations (CBRS)

14.4.1. Types of Service

(1) Under the Citizens Band Radio station category, there are two types of service, viz.:

a) Citizens Band Radio-HF; and

b) Citizens Band Radio-UHF.

14.4.2. General Conditions Applicable to CBRS (HF) and CBRS (UHF)

(1) A Citizens Band Radio licence shall be issued for the establishment, maintenance and operation of a land mobile service using low cost radiocommunications apparatus for private and business purposes. An apparatus licence for a transmitter that forms part of a Citizens Band Radio station is subject to the following conditions:

a) the licensee must operate in the frequency range from 26.965 to 27.405 MHz inclusively or from 476.425 to 477.400 MHz inclusively;

b) that the transmitter must at all times be under the control of the licensee;

c) the emission and power of the transmitter must not exceed that stated on the licence;

d) the licensee must employ in the transmitter circuits, devices or methods designed to protect other radiocommunications services from interference due to transmissions that vary from the transmitters nominal frequency of operation or any other non essential emissions that may arise;

e) the licensee must announce his or her call sign at the beginning and end of each distinct sequence of transmissions when communicating with other stations and use proper procedure when exchanging communication with other stations. These procedures should be in accordance with those specified in the ITU Radio Regulations;

f) the equipment used must comply with the standards set by BTA;

g) the licensee must not directly or indirectly interconnect a citizens band radio station with any element of a public telecommunications network;

h) the use of abusive language is forbidden; and

i) CTCSS is permitted in the CBRS (UHF) band.

14.5. Broadcasting Stations

14.5.1. Licence Coverage

(1) By virtue of Section 75 of the Act, a broadcasting station licence authorises the establishment, maintenance and operation of one or more specified transmitters used for the purpose of transmitting a commercial radio and/or television broadcasting service. In accordance with Section 85 of the Act, the radiocommunications station licence is also subject to a condition that the licensee, and any person so authorised, must not operate, or permit operation of a transmitter otherwise than in accordance with relevant technical specifications determined by the Director.

14.5.2. Technical Specifications

(1) The Director may, from time to time, determine technical specifications relating to Sound and Television broadcasting stations.

(2) In accordance with Section 17 of these Regulations, compliance with any such specifications is a mandatory condition of the licence.

14.5.3. Types of Service

(1) Three types of service are allowed under the broadcasting station licence category, viz.:

a) Broadcasting (Sound);

b) Broadcasting (TV); and

c) Broadcasting (Satellite).

13.5.3.1. Broadcasting (Satellite) Service

(1) Broadcasting satellite services are intended to support the direct reception of television and sound broadcasts originating from broadcasting satellites, by the general public including individual and community reception. The ITU has allocated to individual countries certain bands for broadcasting-satellite services that are specified in terms of the operating frequencies and orbital characteristics of the providing satellite(s). A detailed plan is listed in Appendix 30 of the ITU Radio Regulations.

(2) The satellite service frequencies available for use in Region 3 are listed in the table below:

Satellite Service	Band (GHz)	Uplink Frequency	Downlink Frequency
FIXED	2.5/2.6	2655-2690 MHz	2500-2535 MHz
	4/6	5850-7075 MHz	3400-4200 MHz
			4500-4800 MHz
	7/8	7900-8400 MHz	7270-7750 MHz
	10/14	12.75-13.25 GHz	10.7-11.7 GHz
		13.75-14.80 GHz	12.2-12.7 GHz
	20/30	27.0-31.0 GHz	18.4-21.2 GHz
BROADCASTING	1.4	UPLINK IN FIXED-SATELLITE BANDS	1452-1492 MHz
	2.5 - 2.7		2520-2670 MHz
	11 - 12		11.7-12.2 GHz
			12.5-12.75 GHz
	21 - 22		21.4-22.0 GHz
	40 - 43		40.5-42.5 GHz
	84 - 86		84.0-86.0 GHz

14.6. Amateur Stations

14.6.1. Conditions on Amateur Station Licence

(1) For the purposes of Section 77 of the Act, a radiocommunications amateur licence is subject to the condition that the licensee may only communicate with another licensed amateur station or stations of the same country or another country or countries provided that administrations concerned have no objection to such radiocommunications. This condition does not apply in case of distress or emergency situations or when directed by BTA to communicate with another station in relation to the investigation of interference.

14.6.2. Third Party Communications

(1) For the purposes of Section 77 of the Act, the licensee of an Amateur station must not, on behalf of a third party, transmit messages that directly or indirectly enable any person to obtain a financial gain or other reward or contribute to the commercial or financial benefit of any person, organisation, company or business.

14.6.3. Technical and Procedural Conditions

(1) For the purposes of Section 77 of the Act, the operation of amateur stations is subject to the following conditions:

a) that the licensee must only transmit within the designated frequency bands for Amateur and Amateur-satellite services specified in the Bhutan Radiofrequency Spectrum Plan and the ITU Table of Frequency Allocations;

b) that the licensee must not exceed the power limits or use other emission type other than those specified on the licence;

c) that the licensee must use the call sign allocated to the station when making a call or a reply to a call. The call sign must be announced at the beginning and at the end of each transmission and at least every 10 minutes during transmissions of longer than 10 minutes; and

d) that the licensee must not carry out unnecessary transmissions, or the transmissions of superfluous signals, or the transmission of false or misleading signals.

14.6.4. Procedure for Calling and Replying to Calls - Radiotelephony (J3E)

The call for radiotelephony consists of:
- call sign of the station called spoken not more than three times;
- the words THIS IS; and
- call sign of the calling station spoken not more than three times.

The call may be made more effective in difficult circumstances by the use of the phonetic alphabet.

Example of a call:

A5TMU A5TMU A5TMU THIS IS A5CKZ A5CKZ A5CKZ OVER

The reply to a call for radiotelephony consists of:
- call sign of the calling station spoken not more than three times;
- the words THIS IS; and
- call sign of the station called spoken not more than three times.

Example of a reply to a call:

A5CKZ A5CKZ A5CKZ THIS IS A5TMU A5TMU A5TMU RECEIVED GO AHEAD

14.6.5. Procedure for Calling and Replying to Calls – Radiotelegraphy (A1A/A2B)

The call for radiotelegraphy consists of:
- call sign of the station called sent no more than three times;
- the words DE; and
- call sign of the calling station sent no more than three times.

Example of a call:

CT A5TMU A5TMU A5TMU DE A5CKZ A5CKZ A5CKZ AR K

Example of a reply to a call:

CT A5CKZ A5CKZ A5CKZ DE A5TMU A5TMU A5TMU R QRK? QSA? AR K

14.7. Earth (Receive) Stations

14.7.1. Licence Coverage

(1) For the purposes of Subsection (b) of Section 73 of the Act, an Earth (Receive) apparatus licence authorises the licensee to receive TV signals from satellites by employing a parabolic (or other) antenna and associated radiocommunications equipment, having ‘receive only’ capability.

14.7.2. General conditions applicable to Earth (Receive) Stations

(1) For the purposes of Subsection (b) of Section 73 of the Act, an Earth (Receive) station shall be subject to the following conditions:

a) that the licensee must not use his or her equipment to transmit any kind of picture and sound information;

b) that the equipment operated under the licence must comply with all the standards applicable to it;

c) that the equipment used must not radiate any spurious emissions that will interfere with other radiocommunications or telecommunication systems;

d) that the licensee must not use the station for financial gain unless authorised by the BTA; and

e) that the distribution of signals received from satellites must be confined to the precincts of the building or site specified on the licence.

14.7.3. International Recognition

(1) The licensee of an Earth Station (receive only) may request national and international recognition so that the existence of the Earth station will be taken into account in frequency coordination for other radiocommunications stations. For example, where a major Earth station (receive only) requires special protection from terrestrial stations, satellite systems or Earth stations of another countries.

14.8. Land Mobile Stations

14.8.1. Licence Coverage

(1) A land mobile station licence authorises the use of radiocommunications apparatus to communicate between a land station and a mobile, and between mobile stations. There are four types of service under this licence category:

a) Land mobile system;

b) Paging system (interior);

c) Paging system (exterior); and

d) Experimental/Scientific/Research.

14.8.2. Conditions to be observed by Land Mobile Licensees

(1) For the purpose of Subsection 3(b), Section 73 of the Act, land mobile services that are authorised by a land mobile apparatus licence are subject to the following conditions:

a) class F3E or G3E emissions are prohibited in the bands below 30 MHz;

b) border coordination must be effected before approval is granted for an apparatus licence or a permit;

c) compliance with the licence terms and conditions so as to avoid interference to and from bordering countries. This specification prescribes technical limitations on the use of antennae effective radiated power and antenna heights, when operating land mobile transmitters and receivers near the border areas of Bhutan. The transmitters and receivers must also conform to technical specifications detailed in *Part VI* of these Regulations.

d) harmful interference shall not be caused to services which operate in adjacent bands using receivers in conformity with *S3.3, S3.11, S3.12, S3.13* and relevant ITU-R Recommendations; and

e) only upper side-band, amplitude modulated, radiotelephony mode of emission are allowed in the bands below 30 MHz.

14.8.3. Compliance with Radiofrequency Band Plans

(1) Land mobile services may be licensed to operate in the MF, HF, VHF and microwave bands. Bands must be in accordance with the Table of Frequency Allocations contained in Article S5 of the ITU Radio Regulations as well as and the Bhutan Frequency Band Plans including footnotes applicable to Bhutan and also footnotes relevant to Region 3.

14.8.4. Frequency Co-ordination

(1) The issue of apparatus licences to operate in the MF and HF bands shall depend on the availability of suitable frequencies. Before a frequency is assigned to an applicant, coordination shall be carried out with neighbouring countries including India, China, Nepal and Bangladesh. Depending on the outcome of the co-ordination process with these countries, the result of any necessary radiofrequency monitoring by BTA's Monitoring Station, and a favourable response from the Radiocommunication Bureau (if necessary), the requested frequency shall be assigned.

14.8.5. Effective Radiated Power

(1) The geographical position of Bhutan makes it necessary to limit the effective radiated power of transmitters operating in the MF, HF, VHF and microwave bands. The effective radiated power of transmitters operating in the MF and HF bands must not exceed 100 W and that in the VHF and UHF 50 W.

Note: Irrespective of the maximum power normally permitted for a service, the BTA may further restrict the maximum e.r.p and specify it in the apparatus licence in order to prevent unacceptable interference to other services.

14.8.6. Sharing Common Frequency

(1) For reasons of spectrum efficiency and due to spectrum congestion, it is a common practice in other countries to share HF frequencies by users having common interest. However, Bhutan currently has adequate spectrum in the HF frequency bands for fixed and mobile services and sharing of frequencies is not necessary in most cases. In practice, the BTA will avoid allocating frequencies to more than one user if this is practicable.

14.8.7. Border Co-ordination Procedure

(1) Procedures for co-ordinating frequencies with border countries are specified in Section 15.3.5 of these Regulations.

PART IV

RADIO AMATEUR OPERATORS

15. Amateur Station Radio Operator's Certificate

(1) For the purpose of Section 77 of the Act, the Director may issue the following types of certificate:

a) Amateur Station (Restricted) Operator's Certificate;

b) Amateur Station (General) Operator's Certificate; and

c) Amateur Station (Novice) Operator's Certificate.

15.1. Amateur Station (Restricted) Operator's Certificate

(1) A person holding a valid Amateur Station (Restricted) operator's certificate is eligible for consideration of an Amateur Station (Restricted) licence.

(2) An Amateur Station (Restricted) licence shall be issued to candidates who have given proof of the knowledge and qualifications specified below:

a) a knowledge of the principles of electricity and of radiocommunications; and

b) a knowledge of the regulations applying to the operation of amateur stations and specifically of that part of those regulations relating to the safety of life.

15.2. Amateur Station (General) Operator's Certificate

(1) A person holding a valid Amateur Station (General) operator's certificate is eligible for consideration of an Amateur Station (General) licence.

(2) An Amateur station (General) licence shall be issued to candidates who have given proof of the knowledge and qualifications specified below:

a) a knowledge of the principles of electricity and of radiocommunications;

b) a knowledge of the regulations applying to the operation of an amateur station and specifically of that part of those regulations relating to the safety of life; and

c) an ability to send correctly, and to receive correctly by ear, in Morse code, a message in mixed plain language and figures at a speed of 10 words per minute.

15.3. Amateur Station (Novice) Operator’s Certificate

(1) A person holding a valid Amateur Station (Novice) operator’s certificate is eligible for consideration of an Amateur Station (Novice) licence.

(2) An Amateur Station (Novice) licence shall be issued to candidates who have given proof of the knowledge and qualifications specified below:

a) an elementary knowledge of the principles of electricity and radiocommunications;

b) a knowledge of the regulations applying to the operation of a Novice Amateur Station and specifically of that part of those regulations relating to the safety of life; and

c) an ability to send correctly, and to receive correctly by ear, in Morse Code, a message in mixed plain language and figures at a speed of 5 words per minute.

15.4. Application to sit for an Amateur Station Examination

(1) A candidate who wishes to sit for the Amateur Station Examination must complete an application form and submit it with the appropriate fee (refer to paragraph 15.7(1)) to the Bhutan Telecommunications Authority, P.O. Box 278, Ministry of Communications, Thimphu, Bhutan.

15.5. Age Limit

(1) An Amateur Station licence shall not be issued to a person below 18 years of age.

15.6. Examination Date, Time and Place

(1) The BTA shall advertise in Kuensel the date, time and place of the examination not less than 14 days before the date of the relevant examination.

15.7. Examination Fees

(1) The following examination fee shall be charged to sit for the Amateur Station Operator's Certificate of Proficiency:

Certificate of Proficiency	Examination Fee (Nu.)	Remarks
Amateur Station (Restricted)	250	Examination syllabi shall be provided when a candidate applies to sit for an examination
Amateur Station(General)	300	-do-
Amateur Station (Novice)	150	-do-

15.8. Refund of Examination Fees

(1) An applicant who has paid the examination fee and does not undertake the examination is not entitled to a refund of the money.

15.9. Examination Result and Reassessment

(1) The BTA shall give notice of examination results, in writing, to the applicant as soon as practicable after the examination is conducted.

(2) A candidate of an Amateur Station Examination can apply in writing to the BTA within 28 days after the day on which the notice is given, for a reassessment of the result of the examination. A fee of 50% of the initial examination fee shall be charged to the candidate.

15.10. Duration of Amateur Station Examination

(1) The Amateur Station (Restricted) Examination shall consist of two parts. Part I is the Radiocommunications Theory Paper of 90 minutes duration comprised of 50 multiple-choice questions and Part II is the Radio Regulations Paper of 30 minutes duration comprised of 25 multiple-choice questions.

(2) The Amateur Station (General) Examination shall consist of three parts. Part I is a Radiocommunications Theory Paper of 90 minutes duration comprised of 50 multiple-choice questions. Part II is the Radio Regulations Paper of 30 minutes duration, with 25 multiple-choice questions and Part III is the Morse Telegraphy Receiving and Sending Tests. The receiving test lasts for 10 minutes and the sending test lasts for 5 minutes. Both receiving and sending tests shall be in mixed plain language and figures.

15.11. Pass conditions for Radio Theory and Regulations Subjects

(1) To secure a pass in either the radio theory or regulations subjects, a candidate must obtain at least 40 percent of the total marks allocated for a particular subject. Tests include:

a) Morse Telegraphy – Receiving Test

i) To secure a pass in the Morse Telegraphy Receiving Test for an Amateur Station (General) Examination, a candidate must not make more than 7 errors out of 50 words of mixed plain language and figures received for 5 minutes.

ii) To secure a pass in the Morse Telegraphy Receiving Test for an Amateur Station (Novice) Examination, a candidate must not make more than 10 errors out of 25 words of mixed plain language and figures received for 2 minutes and 30 seconds.

b) Morse Telegraphy – Sending Test

i) To secure a pass in the Morse Telegraphy Sending Test for an Amateur Station (General) Examination, a candidate must not make more than 4 uncorrected or improperly corrected errors, or failure to complete the test in 2 ½ minutes shall be considered unsuccessful.

ii) To secure a pass in the Morse Telegraphy Sending Test for an Amateur Station (Novice) Examination, a candidate must not make more than 4 uncorrected or improperly corrected errors, or failure to complete the test in 2 ½ minutes shall be considered unsuccessful.

iii) To indicate a transmission error, the "erase"(eight dots or more or the repeat signal (IMI)) symbol shall be transmitted. Transmission shall be resumed, commencing with the last word correctly sent. The candidate is also required to utilise the correct "commencing" (CT) and "end of message"(AR) signals.

15.12. Visitor's Permits

(1) A licensed radio amateur from a foreign country who wishes to operate his or her station in Bhutan shall be granted a visitor's permit on application in writing to the BTA at least three (3) months before the arrival date.

(2) The category of licence issued shall be based on the class of operator's certificate or licence held by the applicant and no greater privilege as far as frequency bands, power levels, emissions etc, than applies in his or her own country shall be granted.

(3) The radio amateur visitor shall enter Bhutan on 'Tourist Visa' and must comply strictly with all the terms and conditions laid down by the Department of Tourism, Royal Government of Bhutan.

(4) The visitor shall strictly comply with other condition(s) governing Radio Amateur Station licensees in Bhutan and any other relevant National Laws.

(5) All equipment imported by the visitor shall be cleared, by an authorised Tour Operator or Agency, from the Department of Revenue and Customs, counter-checked by a designated official of the BTA, on the condition that they are re-exported on departure from Bhutan.

15.13. Reciprocal Licensing Agreement

(1) Reciprocal Licensing Agreements shall be enforced as and when Bhutan enters into such with other countries.

15.14. Third Party Authorisation

(1) The licensee of an Amateur Station may authorise, by written instrument, other persons to operate his or her radio amateur station under the licence. However, the third party users are subject to all of the conditions of the licence to which the authorisation relates.

15.15. Issue of Duplicate Licences, Certificate and Permits

(1) If a licence, certificate or permit issued to a person under the Bhutan Telecommunications Act has been lost or destroyed, the holder of the original licence, certificate or permit may apply to the BTA for a duplicate. A fee of 50% of the actual licence fee shall be charged.

(2) The applicant is also required to furnish with his application a statutory declaration summarising the circumstances under which the licence was lost or destroyed, and if lost, an undertaking to return either the original or duplicate certificate, if the original is located at any time.

(3) In addition, the applicant shall submit the following details to BTA:

a) the applicant's personal particulars relating to :

- height;
- colour of eyes;
- colour of hair;
- complexion; and
- any special peculiarities to assist identification.

b) a recent head-and-shoulders photograph (taken "full face" without head covering against a plain background) about 6.5 cm x 5.5 cm, endorsed on the front.

15.16. Technical Requirements

15.16.1. Frequencies and Emissions

(1) An Amateur Station (Restricted) licensee shall operate his or her station in accordance with the ITU Table of Frequency Allocations and the Bhutan Radiofrequency Spectrum Plans. The Amateur Station (Restricted) is permitted to operate in the frequency bands above 50 MHz.

(2) An Amateur Station (General) licensee shall operate his or her station in accordance with the ITU's Table of Frequency Allocations and the Bhutan Radiofrequency Spectrum Plans. Authorised frequency bands shall also be specified on the licence.

(3) The frequency band 146 - 148 MHz (inclusive) is not permitted for Amateur service or Amateur-Satellite service in Bhutan.

(4) Amateur Station (Restricted) and Amateur Station (General) licensees are not permitted to use emissions other than those specified on the licence.

15.16.2. Power

(1) The mean transmitter power output of an Amateur Station (Restricted) and Amateur Station (General) shall not exceed that specified on the licence.

15.16.3. Control of Stations

(1) The licensee shall take measures that are reasonably practicable to erect, fix, place and use the transmitter in such a manner as to avoid interference to the efficient and convenient working of other stations.

15.16.4. Interference

(1) The BTA encourages operators of amateur equipment and persons suffering interference to their television and radio services, to resolve the problem by mutual agreement and assistance. The BTA may assist in resolving the problem.

Note 1: Interference from amateur transmitters generally occur from faults in a transmitter or because the radio and television receiving equipment is unable to reject unwanted amateur transmissions, even though those transmissions are on different frequency bands from those used by radio and television stations.

Note 2: Equipment standards and licensing conditions ensure that amateur transmitters meet stringent quality requirements; however, radio and television receivers vary in quality and many do not have a high level of immunity from interference.

15.17. Radiocommunications in the Event of Natural Disasters

(1) In accordance with RR S5.120 of the ITU Radio Regulations, certain frequency bands allocated to Amateur service may be used by Administrations to meet the needs of international disaster communications. However, the involvement is limited to the duration of the emergency and also to the geographical area of the emergency.

(2) Any communication shall be carried out only with the consent of the Director. In the event of disaster, the designated frequencies are: 3.5 MHz, 7.0 MHz, 10.1 MHz, 14.0 MHz, 18.068 MHz, 21.0 MHz, 24.89 MHz and 144 MHz.

14.17.1. Safety Precautions

(1) Licensees shall take all necessary measures to ensure absolute safety during operations and otherwise.

PART V

RADIOFREQUENCY BAND PLANS

16. National and International Band Plans

16.1. Making of Frequency Band Plans

(1) The Director shall, by instrument in writing, prepare for each frequency band, a plan consistent with the Bhutan Radiofrequency Spectrum Plan.

(2) A Frequency Band Plan shall make provisions for and specify the purpose or purposes for which the band may be used. This includes, but does not limit, any provisions that specify the purpose or purposes for which any specific parts of the subject band, including any particular frequency or frequency channel, may be used. Any provisions applying to a specific part of a band shall be consistent with the overall purposes for which the band may be used.

(3) A frequency band plan may be made either generally or as otherwise provided for in the plan, may apply:

a) with respect to a specified area(s);

b) with respect to a specified period.

(4) For the purpose of Section 74 of the Act, the allocation of frequency bands to radiocommunications services must conform to the following national and international band plans:

a) ITU's Table of Frequency Allocations contained in the Radio Regulations, Article S5;

b) Bhutan Radiofrequency Spectrum Plan; and

c) Bhutan Radiofrequency Band Plans.

16.2. Review of Frequency Band Plans

(1) For the purpose of Subsection (8) of Section 74 of the Act, the Director shall review and make changes to the approved frequency band plan.

16.3. ITU's Table of Frequency Allocations and the Bhutan Radiofrequency Spectrum Plan

(1) The ITU Radio Regulations are annexed to the Convention and are revised by the ITU World Radiocommunications Conferences, normally held every two to three years. The basis for the structure of the Bhutan Radiofrequency Spectrum Plan is the ITU's Table of Frequency Allocations produced in accordance with Article S5 of the Radio Regulations. The Table of Frequency Allocations lists the frequency bands allocated to each type of radiocommunications services in each of the three geographical regions, defined as Regions 1, 2 and 3. Bhutan is located in Region 3. All radiocommunications services operating in Bhutan must be assigned in accordance with the Bhutan Radiofrequency Spectrum Plan, maintained in alignment with the ITU's Table of Frequency Allocations with reference to the footnotes for Bhutan and the footnotes relevant to Region 3.

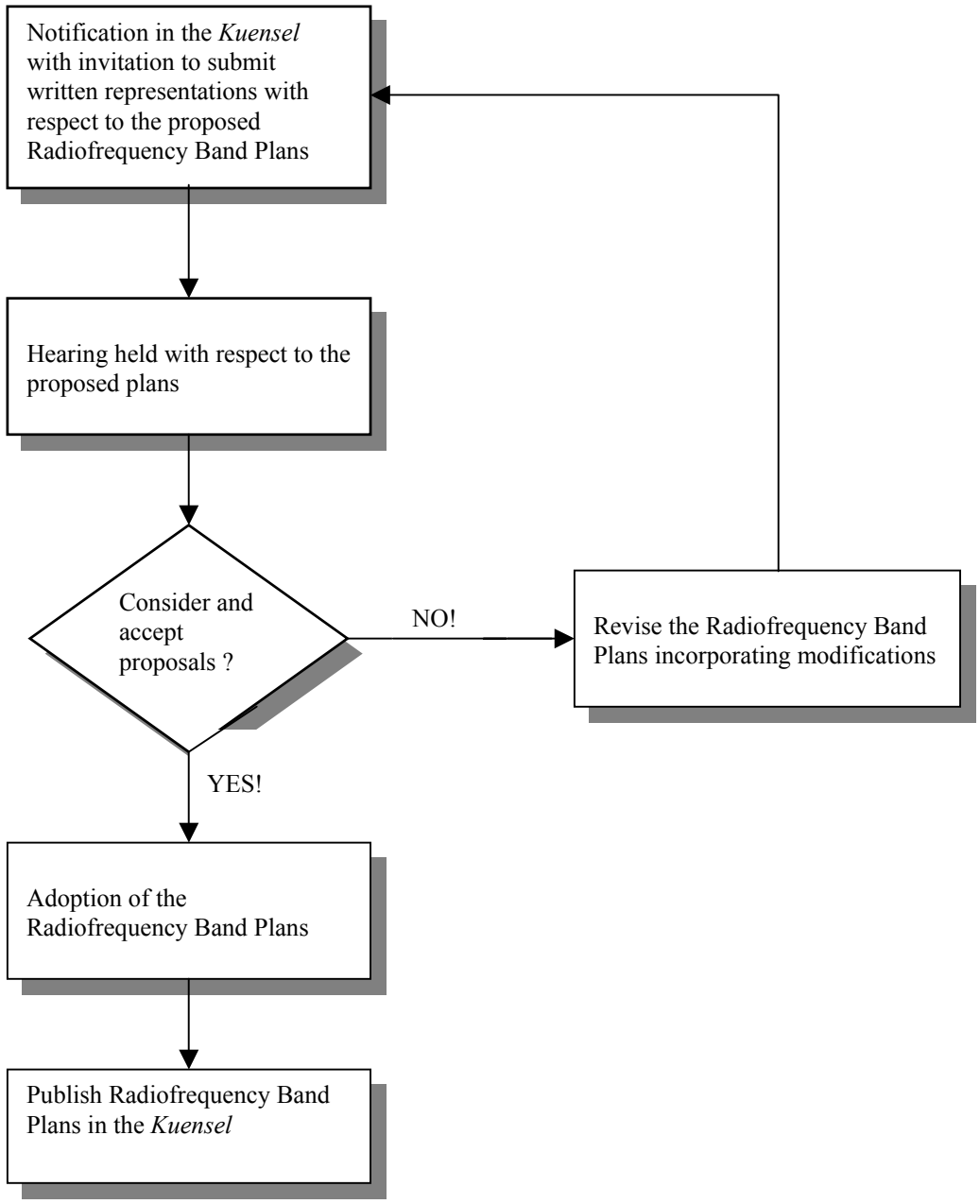
16.4. Bhutan Radiofrequency Spectrum Plan

(1) The Bhutan Radiofrequency Spectrum Plan specifies the purposes for which each radiofrequency band shall be used, and provides for the reservation of parts of the spectrum for public or community services. Radiocommunications services shall only be authorised to operate in accordance with the

Spectrum Plan or the applicable Band Plan and must conform to the technical requirements, and terms and conditions applying to each radiocommunications licence.

16.5. Invitation to Comment on a Proposed Band Plan

(1) For the purpose of Subsections (4), (5), (6), (7) & (8) of Section 74 of the Act, prior to the Director's approval of the Radiofrequency Band Plans, the following procedures shall be adopted:



PART VI

TECHNICAL REQUIREMENTS

17. Prescription of Technical Requirements

(1) Pursuant to Subsections (2), (3) & (4) of Section 85 of the Act, the Director shall use provisions within these Regulations to prescribe technical requirements for radiocommunications apparatus and accessories of radiocommunications apparatus. The Director may prescribe such technical requirements for the purpose of minimising the risk of interference, to and from the lawful use of any other licensed apparatus. For the purpose of Subsection (4) of Section 85 of the Act, the technical requirements prescribed in ITU Report 319 - 6 and subsequent insertions in ITU Recommendation 478 may be specified as mandatory technical requirements applying to radiocommunications apparatus. The technical requirements prescribed in ITU Report 319-6 and subsequent insertions in ITU Recommendation 478 are applicable to radiocommunications equipment operating in the frequency bands allocated to land mobile services between 25 MHz and 1000 MHz. Technical requirements for transmitters and receivers are specified below.

17.1. Transmitter Characteristics

17.1.1. Transmitter response for modulating frequencies above 3 kHz

(1) Between 3 kHz and 6 kHz, the frequency deviation should not exceed that at 3 kHz. At 6 kHz, it should not be more than half the deviation at 1 kHz. For frequencies above 6 kHz and up to the channel spacing, the deviation should decrease with an increase of the modulating frequency and, in addition, the ratio of the initial and final deviations for a doubling of frequency should have a value of 5.

17.1.2. Attenuation of the intermodulation of base station transmitters

(1) The attenuation of intermodulation, due generally to the non-linearities of the output stage of the transmitter, should be at least 20 dB. Higher values of attenuation may be necessary and can be obtained by means of appropriate devices.

17.1.3. Modulator characteristics

17.1.3.1. Limitation

(1) For a signal at a frequency of 1 kHz, with a level 20 dB greater than that which produces 20% of the maximum permissible deviation, the frequency deviation should be between 70% and 100% of the maximum.

17.1.3.2. Sensitivity

(1) For a sound level at the microphone diaphragm of 93 dB relative to 2×10^{-5} Pascal, the deviation should be between 60% and 90% of the maximum permissible deviation.

17.1.3.3. Audio-Frequency response of the transmitter

(1) For a constant level of the modulating signal, the modulation index (phase modulation) or frequency deviation (frequency modulation) should remain constant, within limits of +1 to -3 dB, when the modulating frequency varies between 300 Hz and 3000 Hz.

17.1.3.4. Residual modulation

(1) The residual modulation, in the absence of a modulating signal, should be lower at the output of a linear demodulator by 40 dB relative to the signal corresponding to a deviation of 60% of the maximum permissible deviation.

17.1.3.5. Harmonic distortion

(1) The level of harmonic distortion should in no case exceed 10%.

17.2. Receiver Characteristics

17.2.1. Operation of the limiter

(1) When the radiofrequency varies between 6 dB(μV) and 100 dB(μV), the audio-frequency output signal should not vary by more than 3 dB.

17.2.2. Co-channel rejection

(1) When a wanted signal is applied in the presence of an interfering signal on the same frequency, a reduction in the signal-to-noise at the output from 20 dB to 14 dB should occur when the ratio of interference to signal is not less than -8 dB for 25 kHz channel spacing and not less than -12 dB for 12.5 kHz spacing.

17.2.3. Duplex working

(1) Desensitization of the receiver with simultaneous transmission and reception should not exceed 3 dB.

17.2.4. Output power at audio frequencies

(1) The output power at audio frequencies should not be less than 200 mW in the loudspeaker and 1 mW in the handset earphone.

17.2.5. Audio frequency response

(1) For a radio signal with a constant modulation index (phase modulation) or with a constant deviation (frequency modulation), the audio-frequency signal at the output should remain constant to within +1 dB to - 3dB when the modulating frequency varies between 300 Hz and 3000 Hz.

17.2.6. Harmonic distortion

(1) The level of harmonic distortion should in no case exceed 10%.

17.2.7. Noise and hum

(1) Noise and hum should not exceed - 40dB with respect to the output level produced by a strong radio signal modulated of 1 kHz to a deviation equal to 60% of the maximum permissible deviation.

PART VII

GENERAL PROVISIONS APPLICABLE FOR ALL CATEGORIES OF RADIO STATIONS

18. Introduction

(1) For the purposes of Part IX of the Act, a radiocommunications apparatus licence or a permit holder shall operate his or her radiocommunications station in strict adherence to the provisions that follow.

18.1. Location

(2) A radiocommunications station shall be established, maintained and operated at location(s) or in area(s) as specified in the apparatus licence or permit. Any change in location or area of operation shall only be made with the prior permission or approval of the BTA. The BTA shall charge the licensee a fee based on the time taken to carry out an electromagnetic compatibility check on the new site. An apparatus licence shall be issued only if no interference is caused to existing service(s).

18.2. Change of Address

(1) An apparatus licensee or a permit holder shall notify the BTA of any change in his/her/its postal address, telephone number, fax number, and/or e-mail address previously furnished to the BTA for contact purposes, within 2 weeks of such a change.

18.3. Use of Apparatus Licence or Permit

(1) A radiocommunications station, whether authorised either by licence or permit, shall be used only for the purpose and the type of radiocommunications service specified in the apparatus licence or a permit.

18.4. Fee and Charges

(1) An apparatus licence fee shall be charged for the granting of a radiocommunications apparatus licence or a permit. The fee shall be the sum of the Spectrum Access Tax (SAT), the Spectrum Maintenance Component (SMC), and the issue charge. On renewal of the licence after the expiry date, a renewal fee shall apply. The fees for all types of apparatus licence are prescribed in **APPENDIX 2 - LICENCE FEE SCHEDULE.**

18.5. Validity of a Licence or Permit

(1) The validity of an apparatus licence or a permit shall be indicated on the licence or permit. An apparatus licence may be issued for more than one year.

18.6. Identification and Call sign

(1) The licensee of a radiocommunications station shall use his or her call sign as specified in the apparatus licence or permit and shall follow identification procedures consistent with ITU Radio Regulations. The Bhutan allocated call sign is generated using the International Telecommunication Union series A5A - A5Z. For example, a particular amateur and a particular fixed station operating in Bhutan could be allocated the call signs A51MOC and A5B23 respectively. A list of allocated call signs to fixed, land mobile, amateur, aircraft, broadcast and citizens band radio stations is given at **ANNEX C – CALL SIGN ALLOCATION IN BHUTAN**.

18.7. Hours of operation

(1) A radiocommunications station shall be operated only during the hours of service as prescribed on the apparatus licence.

18.8. Use of encryption methods

(1) Unless, otherwise, specifically authorised by the BTA, a radiocommunications station shall transmit messages only in plain language and shall not use coding or encryption methods. This provision shall not be applicable, however, to radiocommunications stations belonging to the Royal Body Guards (RBG), Royal Bhutan Army (RBA), and Royal Bhutan Police (RBP), or any other organisation designated by the Director.

18.9. Secrecy of Correspondence

(1) Any individual having access to a radio communication not intended for his/her receipt, shall hold strictly confidential the full contents of such radio communication. This restriction applies to all radio communications that may pass through his or her hands or come to his or her knowledge. He or she shall not directly or indirectly disclose the contents thereof except to a person entitled to become acquainted with the same or to the BTA or to a competent court and shall not make other use of any such message(s). This restriction does not apply to public broadcasts intended for general information.

18.10. Obligation to Accept Distress Message

(1) A distress message shall have absolute priority over all other radio transmissions. Any station receiving a distress message, clearly originating in the neighbouring vicinity, must immediately acknowledge receipt and must render all possible assistance with the least possible delay. This requirement exists whether or not the distress message originates within Bhutan. Operators hearing a distress message should, however, conduct in a way that does not interfere with the operations of other stations, which are better placed to assist the party in distress.

(2) The details of the distress situation must be conveyed to the appropriate national agency for Disaster & Emergency Services, or the Royal Bhutan Police, or an officer of the BTA if the above proves difficult. However, in areas where reliable communications with nearer stations are practicable, acknowledgement of receipt of this message should be deferred for a short interval so that these stations may acknowledge receipt.

18.11. Right to use frequencies

(1) An individual shall not have an exclusive right to the frequency or frequencies assigned to him/her by the BTA, nor claim as his or her exclusive right to interference-free reception on frequencies assigned for reception.

18.12. Station particulars

(1) A radiocommunications station and associated installation and apparatus shall not be modified, varied or otherwise changed from its licensed characteristics without the prior written approval of the BTA.

18.13. Site approval

(1) The BTA shall have full authority to approve or reject the location or site of a fixed radiocommunications station, including the location and the height of the antenna and its supporting towers or masts, for engineering or safety reasons including the safety of movement of aircraft. The BTA shall have full authority to approve or reject the location or site in order to protect the licensed operations of other radiocommunications stations. The BTA may finalise and issue guidelines in this regard in consultation with the Civil Aviation Department and other concerned authorities and agencies of the Royal Government of Bhutan.

18.14. Guarding of antenna structures

(1) An antenna system, which protrudes, crosses-over or could fall on to or to be blown on to any overhead power wire or electricity transmission line or electrical power reticulation equipment, shall be guarded to the reasonable satisfaction of the owner or service provider associated with the overhead wire or electrical apparatus concerned. All antenna systems shall conform to the by-laws laid down by the municipal or other relevant local governing bodies. Adequate fencing and protection shall be provided in case of a transmitting antenna, so as to ensure safety of life.

18.15. Community Sites

(1) A community site is defined as a site at which there are located three or more services within a radius of 200 metres operating on frequencies within 10 MHz of each other.

(2) The following general rules shall be observed when selecting a community site for VHF/UHF land mobile services. It is essential that the site:

a) has good access to power and has adequate unimpeded access for station operators;

b) supports the effective power requirements of any base transmitter;

c) meets antenna height requirements, with antenna heights not more than necessary;

d) is properly established to provide the required range and communication quality;

e) provides an adequate line of sight over the required communication path or area;

f) be notified to the Civil Aviation Department in order to determine whether a permit is required for the erection of the antenna; and

g) be placed so as to avoid overhead high voltage power lines (66 kV or above).

18.16. Power to appoint Inspectors

(1) The BTA may appoint inspecting officers for the purpose of inspecting and examining radiocommunications station installations and radio apparatus as well as station's log book and related records.

18.17. Right of interception and monitoring

(1) The BTA may verify adherence to the licensed or authorised technical parameters of any radiocommunications apparatus by means of physical inspection and testing or 'off-the-air' radio monitoring techniques. Any violations or infringements, thus detected, shall be communicated to the licensee for corrective action.

18.18. Adherence to ITU Conventions

(1) The Royal Government of Bhutan may apply any provisions of the ITU's Conventions that may be deemed appropriate by the BTA, to all or any radiocommunications stations licensed or permitted under these Regulations and to any radio communication undertaken by any such authorised station.

18.19. Control of broadcast matter

(1) Except in the case of an approved broadcasting station, a radiocommunications station shall not be employed for transmission of news, advertisements or messages meant for general reception by public, unless otherwise previously authorised in writing by the BTA.

18.20. Log books

(1) A record of use of a radiocommunications station shall be maintained as required by the BTA, in writing, in a log book indicating:

a) date and hours of operation carried out;

b) frequencies/channels used;

c) name of operator;

d) stations contacted and messages exchanged, where required by the BTA; and

e) details of any repairs carried out.

18.21. Display of Apparatus Licences

(1) Authorisation to operate radiocommunications equipment should be prominently displayed, either in the form of the original licence document or an original permit issued by the BTA, or a duly certified copy thereof. In case of portable, mobile or hand-held transmitters or transceivers operated as part of a network or system, relevant documents shall be maintained and kept at the control of an operator at the base stations.

18.22. Suspension of authorisation due to a declared national emergency

(1) In the interest of public safety or in the case of a declared national emergency, the Royal Government of Bhutan or the BTA shall have the authority to order the suspension of an apparatus licence or a permit as well ordering the suspension of operations by a radiocommunications station. Following any such suspension, the BTA may take possession of or seal radio apparatus which is part of a radiocommunications station or make use of the radiocommunications station for the transmission or reception of messages or stop or delay any such transmission or reception.

18.23. Sealing of Radio Apparatus

(1) The BTA may seal any radio apparatus in respect of which an apparatus licence or a permit has been issued under Section 75 of the Act or any radio apparatus possessed by any person, whose licence in respect of such apparatus, has been suspended. Such radio apparatus may be sealed to indicate that the use of such apparatus for the purpose of radio transmission or reception is prohibited.

18.24. Tampering with seals

(1) Any person who tampers with or breaks an official BTA seal affixed to any radio apparatus, where such a seal is affixed in accordance with these Regulations, is guilty of an offence and may be liable to pay a fine of up to Nu. 1,000.00 (Ngultrums OneThousand) only or to face imprisonment for a term of six (6) months or both.

18.25. Powers to grant exemption

(1) For the purpose of Subsection (1) of Section 75 of the Act, the Director shall have full powers to grant an exemption to an individual or group from the provisions of the Regulations. Such exemption may be granted in exceptional cases such as, in the interest of national security, in reaction to a natural disaster, in support of the Institute for the Disabled, in support of emergency medical practitioners, to assist distance education and in support of approved volunteer organisations.

19. Classified Register

(1) A classified register shall be maintained by the BTA for the purpose of recording details of classified radiocommunications services. Details of radiocommunications services may be regarded as classified by the BTA if the public exposure of such details has the potential to prejudice Bhutan's national security, defence, international relations and/or other national interests. Access to any such classified register shall be limited to persons approved by the BTA or the Royal Government of Bhutan. Any such classified register shall be secured properly under the care and control of BTA, when it is not in the direct care of an approved officer of BTA or the Royal Government of Bhutan.

19.1. Methods for Passing/Mailing Classified Material

(1) Classified files being transferred between officers within the same office, or office complex, shall be passed 'by hand'. The originating officer shall attach a BTA Classified Material receipt to the file for the receiving officer to sign. Materials or files above 'RESTRICTED' classification must be placed in a sealed, opaque envelope or folder when being transferred or carried.

Classified materials being mailed or sent to the BTA Monitoring Station or other Government Departments or Organisations must be double-enveloped by the originating officer prior to the materials' dispatch to the receiving office.

PART VIII

MISCELLANEOUS PROVISIONS

20. Interference suppression and control of man-made noise

(1) The BTA shall have full powers to direct an individual to take any action necessary to limit the level of man-made radio noise or electromagnetic radiation from any apparatus where such apparatus is under the control of that individual. Such apparatus may include radiocommunications equipment, electrical installations, appliances, power lines and wiring, as well as, machinery plants and lighting system. An officer of the BTA may give such a direction when, in the assessment of the BTA, the subject apparatus is causing harmful interference to the effective operation of a radiocommunications system or systems.

20.1. Level of Interference Impact

(1) In accordance with Subsections (1)(a), (2)(a), (b) & (3) of Section 82 of the Act, the Director may prescribe mandatory technical requirements relating to the maximum intensity of electromagnetic energy that may be radiated in any direction from any apparatus while in use. Such technical requirements are to be composed with the objective of preventing undue interference to radiocommunications, telecommunications and electrical power reticulation systems. To effectively regulate the use and performance of radiocommunications apparatus in Bhutan, the BTA has categorised machinery and apparatus based on the following levels of interference potential:

a) low interference potential;

b) moderate-to-high potential; and

c) life threatening potential.

(2) The low interference potential radiocommunications apparatus or products that are authorised for use under class licences have been categorised as having a low potential to interfere with radiocommunications apparatus and power lines. In order for a piece of radiocommunications equipment to be authorised for use under a class licence, manufacturers, assemblers and importers must conform to specific technical requirements set by the BTA. Such requirements may be varied from time to time by the BTA at the Director's discretion.

(3) All radiocommunications apparatus or products that have a moderate-to-high interference potential must conform to specific technical requirements set by the BTA. Such technical requirements may be varied from time to time by the BTA at the Director's discretion.

(4) Radiocommunications apparatus or products, whose non-compliant performance may result in life threatening consequences, must conform to specific technical requirements set by the BTA. Most of such products or apparatus involve safety equipment such as Emergency Position Indicating Radio Beacons (EPIRBs).

Note: The non-compliant performance of such apparatus or products for example, a land mobile two-way radio equipment, can be expected to cause moderate-to-high levels of interference to other apparatus using the radiofrequency spectrum. The BTA enforces mandatory technical requirements in order to avoid or alleviate any such interference.

20.2. Compliance Requirements

(1) For the purpose of Subsections 2(a), (b) & 3 of Section 82 of the Act, a manufacturer, assembler or importer of radiocommunications apparatus or products shall:

a) when requested by an authorised BTA officer, produce evidence of compliance with relevant mandatory standards applicable to each model, type or version of an apparatus;

b) safely maintain a description of the apparatus or product including photographs, pictures, circuit diagrams or sufficient information to determine the product or apparatus in the same manner as that of (a); and

c) hold a test report from any international recognised type approval testing laboratory for any apparatus likely to have a moderate-to-high or life threatening interference impact or potential.

PART IX

ENFORCEMENT OF NATIONAL RADIO REGULATIONS

21. Non-Conformity to the Act or Radio Regulations

(1) For the purpose of Section 83 of the Act, any person who uses an apparatus, or causes or permits to be used any radiocommunications apparatus, that does not comply with the requirements applicable to it under these Regulations and in so doing is likely to cause or has caused or is causing harmful interference to services relating to safety of life, safety of a person or vessel, aircraft or vehicle, shall be guilty of an offence specified in the relevant sections of the Act.

(2) For the purpose of Section 84 of the Act, any person who in the course of business, manufactures, assembles or imports an apparatus, other than for export, and offers for the purpose of sale, advertises for sale, hires or lets on hire, any such apparatus that does not comply with the technical requirements applicable to it under these Regulations, shall be guilty of an offence specified in the relevant sections of the Act.

APPENDIX 1 – LICENSING FEE FRAMEWORK

1. Apparatus Licence Categories

(1) Apparatus licence categories should meet the following criteria:

a) workable number of categories;

b) clear, simple and mutually exclusive;

c) accommodate new uses of existing technology and new technologies;

d) consistent with BTA's management functions, particularly planning, applying licence conditions and setting fees; and

e) easy to automate (administrative efficiency).

(2) These licensing criteria would contribute to:

a) improving efficiency and effectiveness of the system from the point of view of both the BTA and its clients;

b) providing economic benefits, arising from the use of radiofrequency spectrum; and

c) encouraging competition in the provision of telecommunications services.

2. International Based Categories of Spectrum Use

(1) International planning of the radiofrequency spectrum is co-ordinated by the International Telecommunication Union (ITU). Through the ITU, countries make agreements on allocations of frequency bands for different uses. These are then, used by individual countries as a basis for domestic planning. The ITU's proposed sets of categories are adopted for Bhutan.

3. Categories of Radiocommunications Licence

(1) There are nine categories of radiocommunications licence that are used as a mechanism to impose licence conditions and fee structures to twenty (20) different types of service and to two (2) types of Certificates of Proficiency. Details of categories and types of service are shown in Table 1 below.

Table 1

Categories of Licence	Types of Service	Radiocommunications Licence/Permit/Certificate
1. Aeronautical	Aeronautical (Mobile)	Licence
2. Aircraft	Aircraft radio (Mobile)	Licence
3. Amateur	Amateur Radio Station (Restricted)	Certificate of Proficiency
	Amateur Radio Station (General)	Certificate of Proficiency
	Amateur Radio Station (Novice)	Certificate of Proficiency
4. Land Mobile	Land Mobile System	Licence/Permit
	Paging System (interior)	-do-
	Paging System (exterior)	-do-
	Experimental/Scientific/Research	-do-
5. Broadcasting	Broadcasting (Sound)	Licence
	Broadcasting (TV)	-do-
	Broadcasting (Satellite)	-do-
6. Citizens Band	CBRS HF	-do-
	CBRS UHF	-do-
7. Fixed	Point-to-point	-do-
	Point-to-multipoint	-do-
	Outside Broadcasting (TV)	-do-
	Outside Broadcasting (Sound)	-do-
8. Earth (Receive)	Earth (Receive)	Licence/Permit
	Earth Station (Tx/Rx) Fixed	-do-
	Number of Earth Stations (Tx/Rx) Fixed	-do-
	Transportable Earth Station (Tx/Rx) at any location in Bhutan	-do-
9. Radiodetermination	Radiodetermination	-do-

4. The Radiocommunications Licence

(1) Under Section 75 of the Act, the Director is empowered to issue radiocommunications licences for establishment, maintenance and operation of radiocommunications stations under two categories. These licence categories are:

a) Apparatus licences; and

b) Class licences.

5. Apparatus Licence

(1) Apparatus licence fees are charged to recover the BTA's costs in managing the spectrum, a public resource, and also to derive economic returns to the Nation to compensate for the use of spectrum. The licensing fee schedule is based on three components:

a) a spectrum access tax;

b) a spectrum maintenance component; and

c) an administrative component.

5.1 Spectrum Access Tax (SAT)

(1) This tax is charged to all licensed users of the spectrum* and is levied to derive a return to the Government from the use of this national resource. Spectrum Access Tax is calculated from a formula that takes four factors into account:

a) spectrum location including spectrum density, (S,D);

b) bandwidth, B;

c) effective radiated power in watts, P; and

d) a constant, K.

* **Note**: This does not include permit holders or those awarded full exemption from SAT by the Director.

5.1.1. Spectrum Location related to Spectrum Density, (S,D)

(1) The spectrum location has been divided into six frequency bands:

a) band I : 0 - 30 MHz;

b) band II : >30- 300 MHz;

c) band III : >300 - 500 MHz;

d) band IV : >500 - 3000 MHz;

e) band V : >3 - 9 GHz; and

f) band VI : >9 - 30 GHz.

(2) Weighting is given to each band depending on the density of spectrum access for a particular service. Each band is given a proportional weighting with a value of up to ten (10) depending upon the density of spectrum access for that particular spectrum.

(3) Spectrum density is the ratio of the amount of spectrum allocated for the particular service to the amount of spectrum in use in the particular frequency band up to proportional weighting of 10. For example, there are 12,731.5 kHz of spectrum allocated to mobile services in the frequency band 0 - 30 MHz and there are 150 x (3 kHz channels) in use which equates to 450 kHz actually in use. Therefore, (S,D) value is 0.35 (i.e., 10 x 450/12731.50). As spectrum demand increases, the level of tax levied increases, which accordingly provides greater economic returns to the Government of Bhutan. This approach is in accordance with the policy principle outlined in Subsection (2)(c) (ii), Section 80 of the Act.

5.1.2. Bandwidth, B

(1) The bandwidth is taken as the midpoint value of the following channel bandwidth groupings as in Table 2 below:

Table 2

Sl. No.	Bandwidth Grouping	Sl. No.	Bandwidth Grouping
1	0 to 9 kHz	6	> 2 to 7 MHz
2	> 9 to 36 kHz	7	> 7 to 14 MHz
3	> 36 to 100 kHz	8	> 14 to 30 MHz
4	> 100 to 500 kHz	9	> 30 to 50 MHz
5	> 500 to 2000 kHz	10	> 50 to 200 MHz

5.1.3. Power, P

(1) 'P' is the effective radiated power of a given system bandwidth that is appropriate to its channel bandwidth grouping. For example, for the spectrum location 0 - 30 MHz, P is taken as 100 W, and for the spectrum location >30 - 300 MHz, 50 W.

5.1.4. Constant, K

(1) The constant 'K' is the same for all licences. It allows the BTA to meet a revenue target set by the Government. This figure is initially set at 5* but may be revised every financial year.

(2) From these principles, the Spectrum Access Tax that may be levied on a service can be calculated from the following relationship:

Spectrum Access Tax (SAT) = K x (S,D) x B x P

(3) For example, using the calculations in paragraph 3.1 (3*)* above*,* the applicable SAT for land mobile services in the spectrum location 0-30 MHz is:

5 x 0.35 x 5 x 100 = Nu. 885.00

(4) Similarly, the applicable SAT for land mobile services in the spectrum location >30-300 MHz can be calculated as follows:

5 x 0.30 x 16 x 50 = Nu 1,195.00

***** A different value of K applies in case of CBRS and Amateur services. Separate licence fee schedules are provided for these services; refer to Tables 4, 5 and 6 in APPENDIX 2.

5.2 Spectrum Maintenance Component (SMC)

(1) The spectrum maintenance component is designed to recover the costs of the BTA activities including:

a) ITU/APT membership fee;

b) International co-ordination;

c) Domestic frequency planning;

d) Interference investigation; and

e) Policy development.

(2) The cost recovery of the BTA activities is also in accordance with 'matters to be taken into account when setting up charges and radiocommunications licence fees' specified in Subsection (1), Section 80 of the Act.

(3) The spectrum maintenance component is a fixed percentage of the spectrum access tax at 10%, i.e.,

Spectrum Maintenance Component (SMC) = 10% of SAT = 0.01 x SAT

This component will depend on consumer price index and will be adjusted accordingly on an yearly basis. In the examples above, the spectrum access tax is Nu. 885.00 and therefore SMC is Nu. 88.50 (10% of SAT). Thus, SAT + SMC = 885 + 88.50 = Nu. 973.50 for land mobile services in the 0-30 MHz band. In the band >30 - 300 MHz, the SAT + SMC = 1,195 + 119.50 = Nu. 1,314.50.

5.3 Administrative Component (AC)

(1) The administrative component covers the work done by BTA in relation to:

a) frequency assignment (cost per hour);

b) issuing of the licence; or

c) renewing of the licence.

(2) The cost of the initial licence is comprised of an administrative component of frequency assignment plus an issue charge. After the first year, if the licensee renews his or her licence, the administrative component shall consist of only the renewal charge. For the time being for instance, the administrative component has been worked out to Nu. 500.00, based on an average monthly salary of Nu. 8,000.00 (of a full-time working staff) plus resources needed for carrying out frequency assignment activities and processing the issue of licence document.

6. Bidding for Radiocommunications Licences

(1) For the purposes of Subsections (2)(c), (i) of Section 80, Subsections (1), (5) & (6) of Section 81 of the Act, an applicant may bid for a particular segment of the spectrum in the view of obtaining a radiocommunications licence for the establishment, maintenance and operation of particular radiocommunications equipment for a particular frequency, geographical location and use.

(2) Users will be able to buy radiocommunications licence in a particular segment of the spectrum from the BTA through a competitive tender or auction process or over-the-counter.

(3) Auctions will be held where demand is high and if demand is low or auctions are impractical, radiocommunications licences will be available over-the-counter on a ‘first come, first served’ basis.

(4) The reserved price of a spectrum segment will be based on the Apparatus Licence Fee Framework, that is comprised of a Spectrum Access Tax (SAT), a Spectrum Maintenance Component (SMC), an Administrative Component (AC) plus a Spectrum Reservation Component (SRC).

APPENDIX 2 – LICENCE FEE SHEDULE

1. Fee Schedule applying to the Land Mobile Licence Type

1.1. Apparatus licence fees for the following types of land mobile services are calculated and shown in Table 1 below:

(1) Land Mobile System;

(2) Experimental/Scientific/Research; and

(3) Paging System.

Table 1

Frequency Range (MHz)	Bandwidth (kHz)	SAT + SMC (Nu.)	AC (Nu.)	Annual Licence Fee (SAT+SMC+AC) (Nu.)	Additional Information
0 - 30	0 - 9 (5 kHz)	973.50	500	1,473.50 ≅ 1,475	K=5, S,D=0.35, B= 5, P=100
	> 9 - 36 (16 kHz)				No services using this bandwidth
>30 - 300	0 - 9 (5 kHz)				No services using this bandwidth
	> 9 - 36 (16 kHz)	1,314.50	500	1,814.50 ≅ 1,820	K=5, S,D=0.30, B=16, P=50

2. Fee Schedule applying to the Fixed Licence Type

2.1. Apparatus licence fees for Point-to-point and Point-to-multipoint fixed services operating in the frequency range specified are calculated and represented in Table 2 below.

2.1.1. Point-to-multipoint (e.g., Digital Radio Multiple Access Subscriber System (DRMASS): 2.3 GHz - 2.5 GHz)

Table 2

Frequency Range (MHz)	Bandwidth	SAT +SMC (Nu.)	AC (Nu.)	Annual Licence Fee (SAT+SMC+AC) (Nu.)	Additional Information
2001- 3000	>2 – 7 MHz (4M0)	4,000+ 600 = 4,600	500	5,100	K=1, S,D=2.0, B=4000, P=0.5

Note that K = 1, assuming that the RGOB subsidises Bhutan Telecom.

2.1.2. Point-to-point (Digital Microwave Radio Relay Links: 7725 - 8275 MHz (34 Mbits/s – Main route), 8275 - 8500 MHz (8 Mbits/s – Spur route))

Table 3

Spectrum Range (MHz)	Bandwidth	SAT+SMC (Nu.)	AC (Nu.)	Annual Licence Fee (SAT+SMC+AC) (Nu.)	Additional Information
5001 - 8500	> 2 - 7 (4M0)	5,800+ 870 = 6,670	500	7,170	K=1, S,D=2.9, B=4000, P=0.5

Note that K = 1, assuming that the RGOB subsidises Bhutan Telecom.

3. Fee Schedule Applying to the Amateur Licence Type

3.1. Amateur Radio Station (Restricted) Licence

Table 4

Amateur Frequency Ranges	SAT+SMC (Nu.)	AC (Nu.)	Annual Licence Fee (Nu.)	Additional Information
>50 MHz	2,500	500	3,000	K=1, S,D=10

3.2. Amateur Radio Station (General) Licence

Table 5

Amateur Frequency Ranges	SAT+SMC (Nu.)	AC (Nu.)	Annual Licence Fee (Nu.)	Additional Information
> 1.8 MHz	2,500	500	3,000	K=1, S,D=10

3.3. Fee Schedule Applying to the Amateur Visitor's Permit (For foreign nationals)

Table 4/5

Visitor's Permit	Bandwidth	Annual Licence Fee (SAT + SMC + AC) (Nu.)	Additional Information
> 1.8 MHz	>0-9 (5 kHz) >0-36 (16 kHz)	US $ 300 (Individual) US $ 500 (Group)	K=1, S,D=10 B=10.5, P=50

4. Fee Schedule Applying to the Citizens Band Licence Type

Table 6

CBRS Frequency Bands (MHz)	SAT+SMC (Nu.)	AC (Nu.)	Annual Licence Fee (SAT+SMC+AC) (Nu.)	Additional Information
26.965-27.405	100 + 10 = 110	500	610	K=1, S,D=10,
476.425-477.40	100 + 10 = 110	500	610	K=1, S,D=10

The value of K may be changed for business purposes.

5. Fee Schedule Applying to the Earth (Station) Licence Type

(1) A Radiocommunications licence is required for Earth station (transmit) and Earth station (receive only). Under the Earth Station Licence category, there are 4 types of service. It includes:

a) Earth station (transmit/receive) at fixed locations;

b) a number of Earth stations (transmit/receive) at fixed locations;

c) transportable Earth stations (transmit/receive) operating at any location in Bhutan; and

d) Earth station (receive only).

(2) The Earth station licence fee for each individual type of service is set out below.

5.1. Fee schedule Applying to the Earth Station (transmit/receive) Licence Type

Table 7

Frequency Range (GHz)	Bandwidth Range (kHz)	SAT + SMC (Nu.)	AC (Nu.)	Annual Licence Fee (SAT+SMC+AC) (Nu.)	Additional Information
>8.5 - 31.3	>14 - 30 MHz (22M)	115,995+11,599.5 =	500	128,094.50 ≅ 128,100	K=5, S,D=2.109, B=22000, P= 0.5

The typical Earth station operating frequencies are taken from an ITU's Weekly Circular.

5.2. Earth (receive) Licence Fee

Table 8

Frequency Range (GHz)	Bandwidth Range	SAT+SMC (Nu.)	AC (Nu.)	Annual Licence Fee (SAT+SMC+AC) (Nu.)	Additional Information
>8.5 - 31.3	>14 - 30 MHz (22M)	2,376 + 237.60 = 2,613.60	500	3,113.60 ≅ 3,115	K=5, S,D=2.16 B=22000, P=0.01

The typical Earth station operating frequencies are taken from an ITU's Weekly Circular.

6. Fee Schedule Applying to the Broadcasting (Sound) Licence Type

Table 9

Frequency Range (MHz)	Bandwidth Range	SAT+SMC (Nu.)	AC (Nu.)	Annual Licence Fee (SAT+SMC+AC) (Nu.)	Additional Information
>30-300	>36-200 kHz (118 kHz)	8,428+126 = 8,554	500	9,054.00 ≅ 9,055	K=1, S,D=0.2857 B=118, P=250

APPENDIX 3 – CLASS LICENCE

1. Class Licence

1.1. A class licence is issued to radiocommunications users of low interference potential apparatus. Such apparatus will not be afforded protection from interference caused by other radiocommunications services and also that caused by Industrial, Scientific and Medical (ISM) applications in the ISM bands specified in the ITU's Table of Frequency Allocations. Some of the equipment that comes under a class licence category is:

(1) Radio controlled models;

(2) Wireless microphones;

(3) Garage door openers and remote switching devices;

(4) Auditory assistance devices;

(5) Cordless loudspeakers and headphones;

(6) Animal tracking system;

(7) Biomedical telemetry;

(8) Radiofrequency identification transmitters; and

(9) Personal safety transmitters.

1.2. These apparatus must operate on a specific frequency or within a range of frequencies with specific power limitation as detailed in Table 1 below.

Table 1

Item	Class of transmitter	Permitted operating frequency/frequency range (MHz)	Max e.i.r.p.
1.	Wireless audio transmitters and auditory assistance transmitters	88 - 108; emission FM, B/W =180 kHz	10 µW
2.	Wireless audio transmitters	174 - 204; or 208 - 222; or 520 - 820; Emission FM, B/W = 330 If transmission is in a TV channel, it must not originate in the licence area of a TV broadcast station	3 mW
3.	Biomedical telemetry transmitters	174 - 204; transmission in a TV channel must not originate in the licence area of a TV broadcast station	10 µW
4.	Telecommand or telemetry transmitters	472.0125 - 472.1125	100 mW
5.	Telecommand or telemetry transmitters	2,400 - 2,450; or 5,725 - 5,795; or 5,815 - 5,875	1 W
6.	Telecommand or telemetry	5,795 - 5,815	2 W
7.	Auditory assistance transmitters	3.155 - 3.4; 3.225; 3.275; or 3.325	60 µW
8.	Auditory assistance transmitters	41 - 42 with a carrier frequency of: 41.55, 41.65, 41.75, 41.85; 41.95.	1.3 mW
		43 - 44 with a carrier frequency of: 43.05; 43.15; 43.25; 43.45	1.3 mW
9.	Radiofrequency identification transmitters	1.77 - 2.17; 2.93 - 3.58; 7.2 - 10.01	100 pW
10.	Radiofrequency identification transmitters	13.553 - 13.567; 918-926; 2,400-2,450; 5,725-5,795; 5,815 - 5,875; 24,000-24,250	1 W
11.	Radiofrequency identification transmitters	5,795 - 5,815	2 W
12.	Alarm transmitters(security & personal safety transmitters	303.60 - 404.05	100 µW
13.	Radiodetermination transmitters	24,000 - 24,250	1 W
14.	All transmitters	0 - 0.014	200 µW
		0.014 - 0.01995	50 µW
		0.02005 - 0.07	7.5 µW
		0.07 - 0.16	3 µW
		3.025 - 3.155	7.5 nW
		3.5 - 3.7	30 pW
		3.7 - 3.95; 4.438 - 4.65	7.5 nW

ANNEX A

BHUTAN RADIOFREQUENCY SPECTRUM PLAN 1999

(TABLE OF FREQUENCY ALLOCATIONS)

This table indicates significant, but not necessarily exclusive, use of ranges of frequencies (i.e. bands) by particular radio services within Bhutan. It is based on the broad Region III allocations from the International Telecommunication Union (ITU) Radio Regulations where international co-ordination of spectrum use is particularly important such as in the aeronautical, maritime, satellite navigation, space research, astronomy, and amateur services.

The radiofrequency spectrum presently exploited for use in Bhutan covers only the frequency range from 190 kHz to 8.5 GHz.

The contents of this document are subject to change at any time.

FREQUENCY BAND	**RADIO SERVICES:** **PRIMARY** **Secondary**	**Additional Information**
Below 9 kHz	(Not allocated) S5.53 S5.54	
9-190 **kHz**	Allocations as per the ITU Radio Regulations (Edition of 1998)	
190-405	AERONAUTICAL RADIONAVIGATION S5.73	
405-415	RADIONAVIGATION S5.76 Aeronautical mobile	
415-495	MARITIME MOBILE S5.79 S5.79A Aeronautical radionavigation S5.80 S5.77 S5.78 S5.81 S5.82	
495-505	MOBILE (distress and calling) S5.83	The frequency 500 kHz is an international distress and calling frequency for radiotelegraphy.
505-526.5	MARITIME MOBILE S5.79 S5.79A S5.84 AERONAUTICAL RADIONAVIGATION Aeronautical mobile And mobile S5.81	
526.5-535	BROADCASTING Mobile S5.88	
535-1606.5	BROADCASTING	

1606.5-1800 **kHz**	FIXED MOBILE RADIOLOCATION RADIONAVIGATION S5.91	
1800-2000	AMATEUR FIXED MOBILE except aeronautical mobile RADIONAVIGATION Radiolocation S5.97	
2000-2065	FIXED MOBILE	
2065-2107	MARITIME MOBILE S5.105 S5.106	
2107-2170	FIXED MOBILE	
2170-2173.5	MARITIME MOBILE	
2173.5-2190.5	MOBILE (distress and calling) S5.108 S5.109 S5.110 S5.111	The carrier frequency 2182 kHz is an international distress and calling frequency for radiotelephony.
2190.5-2194	MARITIME MOBILE	
2194-2300	FIXED MOBILE S5.112	
2300-2495	FIXED MOBILE BROADCASTING S5.113	
2495-2501	STANDARD FREQUENCY AND TIME SIGNAL (2500 kHz)	
2501-2502	STANDARD FREQUENCY AND TIME SIGNAL Space Research	
2502-2505	STANDARD FREQUENCY AND TIME SIGNAL	
2505-2850	FIXED MOBILE	
2850-3025	AERONAUTICAL MOBILE (R) S5.111 S5.115	
3025-3155	AERONAUTICAL MOBILE (OR)	
3155-3200	FIXED MOBILE except aeronautical mobile (R) S5.116 S5.117	

3200-3230 **kHz**	FIXED MOBILE except aeronautical mobile (R) BROADCASTING S5.113 S5.116	
3230-3400	FIXED MOBILE except aeronautical mobile BROADCASTING S5.113 S5.116 S5.118	
3400-3500	AERONAUTICAL MOBILE (R)	
3500-3900	AMATEUR S5.120 FIXED MOBILE	
3900-3950	AERONAUTICAL MOBILE BROADCASTING	
3950-4000	FIXED BROADCASTING S5.126	
4000-4063	FIXED MARITIME MOBILE S5.127 S5.126	
4063-4438	MARITIME MOBILE S5.79A S5.109 S5.110 S5.130 S5.131 S5.132 S5.128 S5.129	Exceptional use by fixed service station, with a mean power not exceeding 50W, communicating only within the country.
4438-4650	FIXED MOBILE except aeronautical mobile	
4650-4700	AERONAUTICAL MOBILE (R)	
4700-4750	AERONAUTICAL MOBILE (OR)	
4750-4850	FIXED BROADCASTING S5.113 Land mobile	
4850-4995	FIXED LAND MOBILE BROADCASTING S5.113	
4995-5003	STANDARD FREQUENCY AND TIME SIGNAL (5000 kHz)	
5003-5005	STANDARD FREQUENCY AND TIME SIGNAL Space Research	
5005-5060	FIXED BROADCASTING S5.113	
5060-5250	FIXED Mobile except aeronautical mobile S5.133	
5250-5450	FIXED MOBILE except aeronautical mobile	
5450-5480	FIXED AERONAUTICAL MOBILE (OR) LAND MOBILE	

5480-5680 **kHz**	AREONAUTICAL MOBILE (R) S5. 111 S5.115	
5680-5730	AERONAUTICAL MOBILE (OR) S5.111 S5.115	
5730-5900	FIXED Mobile except aeronautical mobile (R)	
5900-5950	BROADCASTING S5.134 S5.136	
5950-6200	BROADCASTING	
6200-6525	MARITIME MOBILE S5.109 S5.110 S5.130 S5.132 S5.137	
6525-6685	AERONAUTICAL MOBILE (R)	
6685-6765	AERONAUTICAL MOBILE (OR)	
6765-7000	FIXED Land mobile S5.139 S5.138	
7000-7100	AMATEUR S5.120 AMATEUR-SATELLITE S5.140 S5.141	
7100-7300	BROADCASTING	
7300-7350	BROADCASTING S5.134 S5.143	
7350-8100	FIXED Land mobile S5.144	
8100-8195	FIXED MARITIME MOBILE	
8195-8815	MARITIME MOBILE S5.109 S5.110 S5.132 S5.145 S5. 111	
8815-8965	AERONAUTICAL MOBILE (R)	
8965-9040	AERONAUTICAL MOBILE (OR)	
9040-9400	FIXED	
9400-9500	BROADCASTING S5.134 S5.146	
9500-9900	BROADCASTING S5.147	
9900-9995	FIXED	

9995-10003 **kHz**	STANDRAD FREQUENCY AND TIME SIGNAL (10 000 kHz) S5.111	
10003-10005	STANDARD REQUENCY AND TIME SIGNAL Space research S5.111	
10005-10100	AERONAUTICAL MOBILE (R) S5.111	
10100-10150	FIXED Amateur S5.120	
10150-11175	FIXED Mobile except aeronautical mobile (R)	
11175-11275	AERONAUTICAL MOBILE (OR)	
11275-11400	AERONAUTICAL MOBILE (R)	
11400-11600	FIXED	
11600-11650	BROADCASTING S5.134 S5.146	
11650-12050	BROADCASTING S5.146	
12050-12100	BROADCASTING S5.134 S5.146	
12100-12230	FIXED	
12230-13200	MARITIME MOBILE S5.109 S5.110 S5.132 S5. 145	
13200-13260	AREONAUTICAL MOBILE (OR)	
13260-13360	AREONAUTICAL MOBILE (R)	
13360-13410	FIXED RADIO ASTRONOMY S5. 149	
13410-13570	FIXED Mobile except aeronautical mobile (R) S5.150	
13570-13600	BROADCASTING S5.134 S5.151	
13600-13800	BROADCASTING	
13800-13870	BROADCASTING S5.134 S5.151	

13870-14000 **kHz**	FIXED Mobile except aeronautical (R)	
14000-14250	AMATEUR S5.120 AMATEUR-SATELLITE	
14250-14350	AMATEUR S5. 120 S5.152	
14350-14990	FIXED Mobile except aeronautical mobile (R)	
14990-15005	STANDARD FREQUENCY & TIME SIGNAL (15000 kHz) S5.111	
15005-15010	STANDARD FREQUENCY AND TIME SIGNAL Space research	
15010-15100	AREONAUTICAL MOBILE (OR)	
15100-15600	BROADCASTING	
15600-15800	BROADCASTING S5.134 S5.146	
15800-16360	FIXED S5.153	
16360-17410	MARITIME MOBILE S5.109 S5.110 S5.132 S5.145	
17410-17480	FIXED	
17480-17550	BROADCASTING S5.134 S5.146	
17550-17900	BROADCASTING	
17900-17970	AERONAUTICAL MOBILE (R)	
17970-18030	AERONAUTICAL MOBILE (OR)	
18030-18052	FIXED	
18052-18068	FIXED Space research	
18068-18168	AMATEUR S5.120 AMATEUR-SATELLITE S5.154	
18168-18780	FIXED Mobile except aeronautical mobile	
18780-18900	MARITIME MOBILE	
18900-19020	BROADCASTING S5.134 S5.146	
19020-19680	FIXED	

19680-19800 **kHz**	MARITIME MOBILE S5. 132	
19800-19990	FIXED	
19990-19995	STANDARD FREQUENCY AND TIME SIGNAL Space research S5.111	
19995-20010	STANDARD AND FREQUENCY AND TIME SIGNAL (20 000 kHz) S5.111	
20010-21000	FIXED Mobile	
21000-21450	AMATEUR S5.120 AMATEUR-SATELLITE	
21450-21850	BROADCASTING	
21850-21870	FIXED S5.155A S5.155	
21870-21924	FIXED S5.155B	
21924-22000	AERONAUTICAL MOBILE (R)	
22000-22855	MARITIME MOBILE S5.132 S5.156	
22855-23000	FIXED S5.156	
23000-23200	FIXED Mobile except aeronautical mobile (R) S5.156	
23200-23350	FIXED S5.156A AERONAUTICAL MOBILE (OR)	
23350-24000	FIXED MOBILE except aeronautical mobile S5.157	
24000-24890	FIXED LAND MOBILE	
24890-24990	AMATEUR S5.120 AMATEUR-SATELLITE	
24990-25005	STANDARD FREQUENCY AND TIME SIGNAL (25 000 kHz)	
25005-25010	STANDARD FREQUENCY AND TIME SIGNAL Space research	
25010-25070	FIXED MOBILE except aeronautical mobile	
25070-25210	MARITIME MOBILE	
25210-25550	FIXED MOBILE except aeronautical mobile	

25.55-25.67 **MHz**	RADIO ASTRONOMY S5. 149	
25.67-26.1	BROADCASTING	
26.1-26.175	MARITIME MOBILE S5.132	
26.175-27.5	FIXED MOBILE except aeronautical mobile S5. 150	The frequency band 26965-27405 kHz has been allocated to CBRS in Bhutan, with a maximum power of 5 W
27.5-28	METEOROLOGICAL AIDS FIXED MOBILE	
28-29.7	AMATEUR AMATEUR-SATELLITE	
29.7-30.005	FIXED MOBILE	
30.005-30.010	SPACE OPERATION (satellite identification) FIXED MOBILE SPACE RESEARCH	
30.010-37.500	FIXED MOBILE	
37.500-38.250	FIXED MOBILE Radio astronomy S5.149	
38.250-39.986	FIXED MOBILE	
39.986-40.020	FIXED MOBILE Space research	
40.020-40.980	FIXED MOBILE S5.150	
40.980-41.015	FIXED MOBILE Space research S5.160 S5.161	
41.015-44	FIXED MOBILE S5.160 S5.161	
44-47	FIXED MOBILE S5.162 S5.162A	46-72 MHz : SN-738S band
47-50	FIXED MOBILE BROADCASTING	

50-54 **MHz**	AMATEUR S5.166 S5.167 S5.168 S5.170	
54-68	FIXED MOBILE BROADCASTING	
68-74.8	FIXED MOBILE S5.149 S5.176 S5.179	72-136 MHz: SN-889 band
74.8-75.2	AERONAUTICAL RADIONAVIGATION S5.180 S5.181	75-116 MHz: SN-768 band
75.2.75.4	FIXED MOBILE S5.179	
75.4-87	FIXED MOBILE S5.149 S5.182 S5.183 S5.188	
87-100	FIXED MOBILE BROADCASTING	
100-108	BROADCASTING S5.192 S5.194	
108-117.975	AERONAUTICAL RADIONAVIGATION S5.197	
117.975-137	AERONAUTICAL MOBILE (R) S5.111 S5.198 S5. 199 S5.200 S5.201 S5.202 S5.203 S5.203A S5.203B	Frequency assignments to comply with the stipulations of ANNEX 10 of ICAO Convention
137-137.025	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.208A S5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) S5.204 S5.205 S5.206 S5.207 S5.208	
137.025-137.175	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile-satellite (space-to-Earth) S5.208A S5.209 Mobile except aeronautical mobile (R) S5.204 S5.205 S5.206 S5.207 S5.208	
137.175-137.825	SPACE OPERATION (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.208A S5.209 SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) S5.204 S5.205 S5.206 S5.207 S5.208	

137.825-138 **MHz**	SPACE OPERATION (space-to-Earth) METEROLOGICAL-SATELLITE (space-to-Earth) SPACE RESEARCH (space-to-Earth) Fixed Mobile except aeronautical mobile (R) S5.204 S5.206 S5. 207. S5. 208	
138-143.6	FIXED MOBILE Space research (space-to-Earth) S5.207 S5. 213	
143.6-143.65	FIXED MOBILE SPACE RESEARCH (space-to-Earth) S5.207 S5. 213	
143.65-144	FIXED MOBILE Space research (space-to-Earth) S5.207 S5.213	
144-146	AMATEUR S5.120 AMATEUR-SATELLITE S5.216	
146-148	FIXED MOBILE S5. 217	Amateur station operation prohibited in Bhutan
148-149.9	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) S5.209 S5.218 S5.219 S5.221	
149.9-150.05	MOBILE-SATELLITE (Earth-to-space) S5.209 S5.224A RADIONAVIGATION-SATELLITE S5. 224B S5.220 S5.222 S5.223	
150.05-153	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY S5.149	
150.05-156.7625	FIXED MOBIL S5.225 S5.226 S5.227	
156.7625-156.8375	MARITIME MOBILE (distress and calling) S5. 111 S5.226	The frequency 156.8 MHz is the international distress, safety and calling frequency for the maritime mobile VHF radiotelephone service.
156.8375-174	FIXED MOBILE S5.226 S5.230 S5.231 S5.232	
174-223	FIXED MOBILE BROADCASTING S5.233 S5.238 S5.245	
223-230	FIXED MOBILE BROADCASTING AERONAUTICAL RADIONAVIGATION Radiolocation S5.250	

230-235 **MHz**	FIXED MOBILE AERONAUTICAL RADIONAVIGATION S5.250	
235-267	FIXED MOBILE S5.111 S5.199 S5.252 S5.254 S5.256	254-380 MHz: SN-868 258-384 MHz: SENAO STAR 2000
267-272	FIXED MOBILE Space operation (space-to-Earth) S5.254 S5.257	
272-273	SPACE OPERATION (space-to-Earth) FIXED MOBILE S5.254	
273-312	FIXED MOBILE S5.254	The band 277-284 MHz is proposed for use by one-way paging and two-way paging (outbound channel) in Bhutan
312-315	FIXED MOBILE Mobile-satellite (Earth-to-space) S5.254 S5.255	
315-322	FIXED MOBILE S5.254	
322-328.6	FIXED MOBILE RADIO ASTRONOMY S5.149	
328.6-335.4	AERONAUTICAL RADIONAVIGATION S5.258 S5.259	
335.4-387	FIXED MOBILE S5.254	Proposed for use by Terrestrial Trunked Radio (TETRA) (emergency): 380-385 MHz & 390-395 MHz.
387-390	FIXED MOBILE Mobile-satellite (space-to-Earth) S5.208A S5.254 S5.255	
390-399.9	FIXED MOBILE S5.254	
399.9-400.05	MOBILE-SATELLITE (Earth-to-space) S5.209 S5.224A RADIONAVIGATION-SATELLITE S5.222 S5.224B S5.260 S5.220	
400.05-400.15	STANDARD FREQUENCY AND TIME SIGNAL SATELLITE (400.1 MHz) S5.261 S5.262	
400.15-401	METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.208A S5.209 SPACE RESEARCH (space-to-Earth) S5.263 Space operation (space-to-Earth) S5.262 S5.264	

401-402 **MHz**	METEOROLOGICAL AIDS SPACE OPERATION (space-to-Earth) 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 Mobile except aeronautical mobile	
403-406	METRORLOGICAL AIDS Fixed Mobile except aeronautical mobile	
406-406.1	MOBILE-SATELLITE (Earth-to-space) S5.266 S5.267	
406.1-410	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY S5.149	
410-420	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-space) S5.268	Proposed for use by TETRA (commercial): 410-430 MHz.
420-430	FIXED MOBILE except aeronautical mobile Radiolocation S5.269 S5.270 S5.271	
430-440	RADIOLOCATION Amateur S5.271 S5.276 S5.277 S5.278 S5.279 S5.281 S5.282	
440-450	FIXED MOBILE except aeronautical mobile Radiolocation S5.269 S5.270 S5.271 S5.284 S5.285 S5.286	
450-455	FIXED MOBILE S5.209 S5.271 S5.286 S5.286A S5.286B S5.286C S5.286D S5.268E	
455-456	FIXED MOBILE S5.209 S5.271 S5.286A S5.286B S5.286C S5.286E	
456-459	FIXED MOBILE S5.271 S5.287 S5.288	
459-460	FIXED MOBILE S5.209 S5.271 S5.286A S5.286B S5.286C S5.286E	
460-470	FIXED MOBILE Meteorological-Satellite (space-to-Earth) S5.287 S5.288 S5.289 S5.290	

470-585 **MHz**	FIXED MOBILE BROADCASTING S5.291 S5.298	
585-610	FIXED MOBILE BROADCASTING RADIONAVIGATION S5.149 S5.305 S5.306 S5.307	
610-890	FIXED MOBILE BROADCASTING S5.149 S5.305 S5.306 S5.307 S5.311 S5.320	
890-942	FIXED MOBILE BROADCASTING Radiolocation S5.327	The band 915-928 MHz is proposed for use by two-way paging (inbound channel).
942-960	FIXED MOBILE BROADCASTING S5.320	
960-1215	AERONAUTICAL RADIONAVIGATION S5.328	
1215-1240	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) S5.329 SPACE RESEARCH (active) S5.330 S5.331 S5.332	
1240-1260	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION RADIONAVIGATION-SATELLITE (space-to-Earth) S5.329 SPACE RESEARCH (active) Amateur S5.330 S5.331 S5.332 S5.334 S5.335	
1260-1300	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) Amateur S5.282 S5.330 S5.331 S5. 332 S5.334 S5.335	
1300-1350	AERONAUTICAL RADIONAVIGATION S5.337 Radiolocation S5.149	
1350-1400	RADIOLOCATION S5.149 S5.334 S5.339	
1400-1427	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340 S5.341	
1427-1429	SPACE OPERATION (Earth-to-space) FIXED MOBILE except aeronautical mobile S5.341	

1429-1452 **MHz**	FIXED MOBILE S5.343 S5.341	
1452-1492	FIXED MOBILE S5.343 BRIADCASTING S5.345 S5.347 BROADCASTING-SATELLITE S5.345 S5.347 S5.341 S5.344	
1492-1525	FIXED MOBILE S5.341 S5.348A	
1525-1530	SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite Mobile S5.349 S5.341 S5.351 S5.352A S5.354	
1530-1535	SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.353A Earth exploration-satellite Fixed Mobile S5.343 S5.341 S5.351 S5.354	
1535-1559	MOBILE-SATELLITE (space-to-Earth) S5.341 S5.351 S5.353A S5.354 S5.355 S5.356 S5.357 S5.357A S5.359 S5.362A	
1599-1610	AERONAUTICAL RADIONAVIGATION RADIONAVIGATION-SATELLITE (space-to-Earth) S5.341 S5.355 S5.359 S5.363	
1610-1610.6	MOBILE-SATELLITE (Earth-to-space) AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) S5.341 S5.355 S5.359 S5.364 S5.366 S5.367 S6.368 S5.369 S5.372	
1610.6-1613.8	MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY AERONAUTICAL RADIONAVIGATION Radiodetermination-satellite (Earth-to-space) S5.149 S5.341 S5.355 S5.359 S5.364 S5.366 S5.367 S5.368 S5.369 S5.372	
1613.8-1626.5	MOBILE-SATELLITE (Earth-to-space) AERONAUTICAL RADIONAVIGATION Mobile-satellite (space-to-Earth) Radiodetermination-satellite (Earth-to-space) S5.341 S5.355 S5.359 S5.364 S5.365 S5. 366 S5.367 S5.368 S5.369 S5.372	
1626.5-1660	MOBILE-SATELLITE (Earth-to-space) S5.341 S5.351 S5.353A S5.354 S5.355 S5.357A S5.359 S5.362A S5.374 S5. 375 S5. 376	
1660-1660.5	MOBILE-SATELLITE (Earth-to-space) RADIO ASTRONOMY S5.149 S5.341 S5. 351 S5.354 S5. 362A S5.376A	

1660-1668.4 **MHz**	RADIO ASTRONOMY SPACE RESEARCH (passive) Fixed Mobile except aeronautical mobile S5.149 S5.341 S5.379 S5.379A	
1668.4-1670	METEOROLOGICAL AIDS FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY S5.149 S5.341	
1670-1675	METEOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE S5. 380 S5.341	
1675-1690	METOROLOGICAL AIDS FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile S5.341	
1690-1700	METEOROLOGICAL AIDS METEOROLOGICAL-SATELLITE (space-to-Earth) S5.289 S5.341 S5.381	
1700-1710	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile S5.289 S5.341 S5.384	
1710-1930	FIXED MOBILE S5.380 S5.149 S5.341 S5.385 S5.387 S5.388	Proposed for use by IMT-2000: 1885-2025 MHz & 2110-2200 MHz
1930-1970	FIXED MOBILE S5.388	
1970-1980	FIXED MOBILE S5.388	
1980-2010	FIXED MOBILE MOBILE-SATELLITE (Earth-to-space) S5.388 S5.389A S5.389B S5.389F	
2010-2025	FIXED MOBILE S5.388	
2025-2110	SPACE OPERATION (Earth-to-space) (space-to-space) EARTH EXPLORATION-SATELLITE (Earth-to-space) (space-to-space) FIXED MOBILE S5.391 SPACE RESEARCH (Earth-to-space) (space-to-.space) S5.392	
2110-2120	FIXED MOBILE SPACE RESEARCH (deep space) (Earth-to-space) S5.388	

2120-2160 **MHz**	FIXED MOBILE S5.388	
2160-2170	FIXED MOBILE S5.388	
2170-2200	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) S5.388 S5.389A S5.389F S5.392A	
2200-2290	SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE S5.391 SPACE RESEARTH (space-to-Earth) (space-to-space) S5.392	
2290-2300	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (deep space) (space-to-Earth)	
2300-2450	FIXED MOBILE RADIOLOCATION Amateur S5.150 S5.282 S5.393 S5.394 S5.396	
2450-2483.5	FIXED MOBILE RADIOLOCATION S5.150 S5.394	
2483.5-2500	FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) RADIOLOCATION Radiodertermination-satellite (space-to-Earth) S5.398 S5.150 S5.400 S5.402	
2500-2520	FIXED S5.409 S5.411 FIXED-SATELLITE (space-to-Earth) S5.415 MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) S5.403 S5.404 S5.407 S5.414 S5.415A	
2520-2535	FIXED S5.409 S5.411 FIXED-SATELLITE (space-to-Earth) S5.415 MOBILE except aeronautical mobile BROADCASTING-SATELLITE S5.413 S5.416 S5.403 S5.415A	
2535-2655	FIXED S5.409 S5.411 MOBILE except aeronautical mobile BROADCASTING-SATELLITE S5.413 S5.416 S5.339 S5.418	

2655-2670 **MHz**	FIXED S5.409 S5.411 FIXED-SATELLITE (Earth-to-space) S5.415 MOBILE except aeronautical mobile BROADCASTING-SATELLITE S5.413 S5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive) S5.149 S5.420	
2670-2690	FIXED S5.409 S5.411 FIXED-SATELLITE (Earth-to-space) S5.415 MOBILE except aeronautical mobile MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite (passive) Radio astronomy Space research (passive) S5.149 S5.419 S5.420 S5.420A	
2690-2700	EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340 S5.421 S5.422	
2700-2900	AERONAUTICAL RADIONAVIGATION S5.337 Radiolocation S5.423 S5.424	
2900-3100	RADIONAVIGATION S5.426 Radiolocation S5.425 S5.427	
3100-3300	RADIOLOCATION Earth exploration-satellite (active) Space research (active) S5.149 S5.428	
3300-3400	RADIOLOCATION Amateur Fixed Mobile S5.149 S5.430	
3300-3400	RADIOLOCATION Amateur S5.149 S5.429	
3400-3500	FIXED FIXED-SATELLITE (space-to-Earth) Amateur Mobile Radiolocation S5.433 S5.282 S5.432	
3500-3700	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile Radiolocation S5.433 S5.435	
3700-4200	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	

4200-4400 **MHz**	AERONAUTICAL RADIONAVIGATION S5.438 S5.437 S5.439 S5.440	
4400-4500	FIXED MOBILE	
4500-4800	FIXED FIXED-SATELLITE (space-to-Earth) S5.4411 MOBILE	
4800-4990	FIXED MOBILE S5.442 Radio astronomy S5.149 S5.339 S5.443	
4990-5000	FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY Space research (passive) S5.149	
5000-5150	AERONAUTICAL RADIONAVIGATION S5.367 S5.444 S5.444A	
5150-5250	AERONAUTICAL RADIONAVIGATION FIXED-SATELLITE SERVICE (Earth-to-space) S5.447A S5.446 S5.447 S5.447B S5.447C	
5250-5255	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH S5.447D S5.448 S5.448A	
5255-5350	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) S5.448 S5.448A	
5350-5460	EARTH EXPLORATION-SATELLITE (active) S5.448B AERONAUTICAL RADIONAVIGATION S5.449 Radiolocation	
5460-5470	RADIONAVIGATION S5.449 Radiolocation	
5470-5650	MARITIME RADIONAVIGATION Radiolocation S5.450 S5.451 S5.452	
5650-5725	RADIOLOCATION Amateur Space research (deep space) S5.282 S5.451 S5.453 S5.454 S5.455	
5725-5830	RADIOLOCATION Amateur S5.150 S5.453 S5.455	
5830-5850	FIXED-SATELLITE (Earth-to-space) RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) S5.150 S5.451 S5.453 S5.455 S5.456	

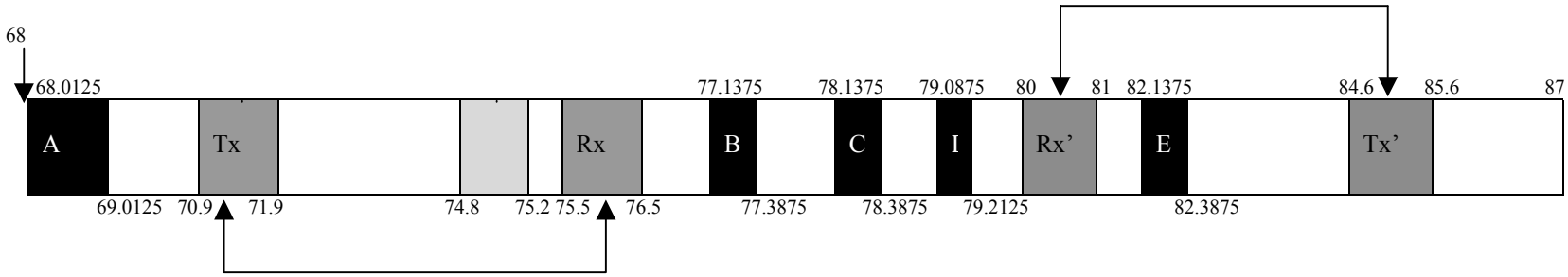
5830-5850 **MHz**	RADIOLOCATION Amateur Amateur-satellite (space-to-Earth) S5.150 S5.453 S5.455	
5850-5925	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE Radiolocation S5.150	
5925-6700	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE S5.149 S5.440 S5.458	
6700-7075	FIXED FIXED-SATELLITE (Earth-to-space) S5.441 MOBILE S5.458 S5.458A S5.458B S5.458C	
7075-7250	FIXED MOBILE S5.458 S5.459 S5.460	
7250-7300	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE S5.461	
7300-7450	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile S5.461	
7450-7550	FIXED FIXED-SATELLITE (space-to-Earth) METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile S5.461A	
7550-7750	FIXED FIXED-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	
7750-7850	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) S5.461B MOBILE except aeronautical mobile	
7850-7900	FIXED MOBILE except aeronautical mobile	
7900-8025	FIXED FIXED-SATELLITE (Earth-to-space) MOBILE S5.461	
8025-8175	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE S5.463 S5.462A	

8175-8215 **MHz**	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) METEOROLOGICAL-SATELLITE (Earth-to-space) MOBILE S5.463 S5.462A	
8215-8400	EARTH EXPLORATION-SATELLITE (space-to-Earth) FIXED FIXED-SATELLITE (Earth-to-space) MOBILE S5.463 S5.462A	
8400-8500	FIXED MOBILE except aeronautical mobile SPACE RESEARCH (space-to-Earth) S5.465 S5.466 S5.467	No assignment above 8.5 GHz in Bhutan.
8500-8550	RADIOLOCATION S5.468 S5.469	
8550-8650	EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) S5.468 S5.469 S5.469A	
8650-8750	RADIOLOCATION S5.468 S5.469	
8750-400000	Allocation as per ITU Radio Regulations (Edition of 1998)	

ANNEX B

BHUTAN RADIOFREQUENCY BAND PLANS 1999.

A. VHF LOW BAND PLAN (68-87 MHz)



Index:

- Simplex (existing): 25 kHz Channeling
- Duplex (future): 12.5 kHz Channeling/4.6 MHz Tx-Rx bandsplit frequency
- Aeronautical Radionavigation (Primary)
- Fixed services (future): 12.5 kHz Channeling

Channeling Plans:

1. Land mobile (simplex) – 25 kHz channeling

i. 68.0125-69.0125 MHz (A)

Channel 1	-	68.0250 (68.0125 +0.0125)	Channel 27	-	68.6750
Channel 2	-	68.0500	Channel 28	-	68.7000
Channel 3	-	68.0750	Channel 29	-	68.7250
Channel 4	-	68.1000	Channel 30	-	68.7500 (used)
Channel 5	-	68.1250	Channel 31	-	68.8750
Channel 6	-	68.1500	Channel 32	-	68.8000
Channel 7	-	68.1750	Channel 33	-	68.8250
Channel 8	-	68.2000	Channel 34	-	68.8500
Channel 9	-	68.2250	Channel 35	-	68.9750
Channel 10	-	68.2500	Channel 36	-	68.9000
Channel 11	-	68.2750	Channel 37	-	68.9250
Channel 12	-	68.3000	Channel 38	-	68.9500
Channel 13	-	68.3250	Channel 39	-	68.9750
Channel 14	-	68.3500	Channel 40	-	69.0000
Channel 15	-	68.3750			
Channel 16	-	68.4000			
Channel 17	-	68.4250			
Channel 18	-	68.4500			
Channel 19	-	68.4750			
Channel 20	-	68.5000 (used)			
Channel 21	-	68.5250			
Channel 22	-	68.5500			
Channel 23	-	68.5750			
Channel 24	-	68.6000			
Channel 25	-	68.6250			
Channel 26	-	68.6500			

Note: Channel 2-40 frequencies can be calculated based on the channel 1 frequency as shown below:

68.0250 + (n x (0.0250)), where n = Channel 2-40.

Similarly, this formula can be used for other bands.

ii. 77.1375-77.3875 MHz (B)

Channel 1	-	77.1500 (used)
Channel 2	-	77.1750
Channel 3	-	77.2000
Channel 4	-	77.2250
Channel 5	-	77.2500
Channel 6	-	77.2750
Channel 7	-	77.3000
Channel 8	-	77.3250
Channel 9	-	77.3500
Channel 10	-	77.3750

iii. 78.1375-78.3875 MHz (C)

Channel 1	-	78.1500 (used)
Channel 2	-	78.1750
Channel 3	-	78.2000
Channel 4	-	78.2250
Channel 5	-	78.2500
Channel 6	-	78.2750
Channel 7	-	78.3000
Channel 8	-	78.3250
Channel 9	-	78.3500
Channel 10	-	78.3750

iv. 79.0875-79.2125 MHz (D)

Channel 1	-	79.1000 (used)
Channel 2	-	79.1250
Channel 3	-	79.1500 (used)
Channel 4	-	79.1750
Channel 5	-	79.2000

v. 82.1375-82.3875 MHz (E)

Channel 1	-	82.1500 (used)
Channel 2	-	82.1750
Channel 3	-	82.2000
Channel 4	-	82.2250
Channel 5	-	82.2500
Channel 6	-	82.2750
Channel 7	-	82.3000
Channel 8	-	82.3250
Channel 9	-	82.3500
Channel 10	-	82.3750

2. Land mobile (Duplex) – 12.5 kHz channeling

i. Tx: 70.9-71.9 MHz; Rx: 75.5-76.5 MHz.

Ch 1 - 70.90625 Ch 1' - 75.50625

For n = 2, we have 70.90625 + (2 x .0125) = 70.93125
∴ Ch 2 - 70.93125 Ch 2' - 75.53125
.
.
.
and, for n = 79, Ch 79 - 70.90625 + (79 x .0125) = 71.89375 Ch 79' - 76.49375

ii. Tx': 80-81 MHz; Rx': 84.6-85.6 MHz.

Channel 1 - 80.00625 Channel 1' - 84.6.625
.
.
.
Channel 79 - 80.00625 + (79 x .0125) = 80.99375 Ch 79' - 85.59375

3. Fixed services – 12.5 kHz channeling

i. **69.0125-70.9 MHz** (Channel 1 = 69.01875 … Channel 150 = 69.01875 + (150 x .0125) = 70.89375, putting n = 150)

ii. **71.9-74.8 MHz** (Channel 1 = 71.90625 … Channel 231 = 71.90625 + (231 x .0125) = 74.79375, putting n = 131)

iii. **75.2-76 MHz** (Channel 1 = 75.20625 … Channel 63 = 75.20625 + (63 x .0125) = 75.99375 putting n = 63)

iv. **77-77.1375 MHz** (Channel 1 = 77.00625 … Channel 10 = 77.00625 + (10 x .0125) = 77.13125 putting n = 10)

v. **77.3875-79.0875 MHz** (Channel 1 = 77.39375 … Channel 35 = 77.38375 + (135 x .0125) = 79.07125, putting n= 135)

vi. **79.2125-80 MHz** (Channel 1 = 79.21875 … Channel 62 = 79.21875 + (62 x .0125) = 79.99375, putting n = 62)

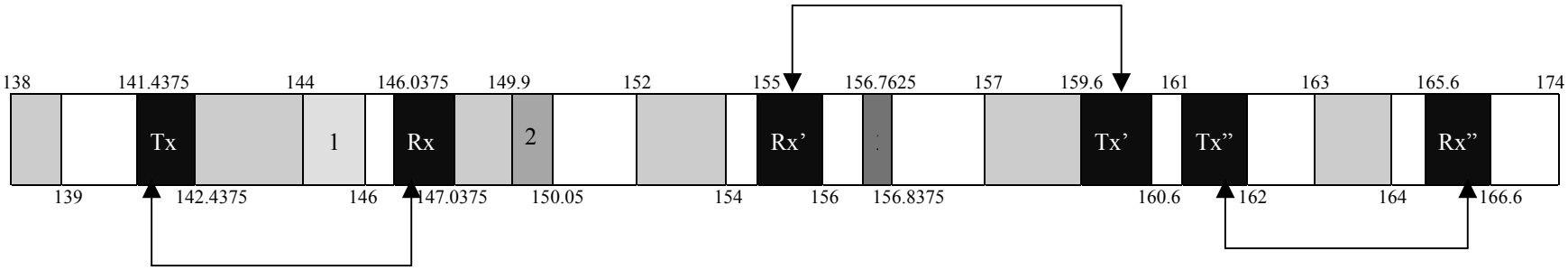
vii. **81-82.1375 MHz** (Channel 1 = 81.00625 … Channel 90 = 81.00625 + (90 x .0125) = 82.13125, putting n = 90)

viii. **82.3875-84.6 MHz** (Channel 1 82.39375 … Channel 176 = 82.39375 + (176 x .0125) = 84.59375, putting n = 176)

ix. **85.6-87 MHz** (Channel 1 = 85.60625 … Channel 111 = 85.60625 + (111 x .0125) = 86.99375, putting n = 111).

No. of channels for assignment = 928.

B. VHF HIGH BAND PLAN (138-174MHz)



Index:

1 — Amateur/Amateur-satellite (Primary)

2 — Mobile-satellite (Earth-to-space)/Radionavigation-satellite (Primary)

3 — Maritime mobile (distress and calling)

— Duplex (existing/future): 12.5 kHz channeling

— Fixed services: 12.5 kHz channeling

— Simplex (existing/future): 25 kHz channeling

Channeling Plans:

1. **Land mobile (simplex) – 25 kHz channeling:**

   i. **138-139 MHz** (Channel 1 = 138.0125 MHz … Channel 39 = 138.9875 MHz)
   ii. **142.4375-144 MHz** (Channel 1 = 142.4500 MHz … Channel 61 = 143.975 MHz)
   iii. **147.0375-149.9 MHz** (Channel 1 = 147.0500 MHz … Channel 113 = 149.875 MHz)
   iv. **152-154 MHz** (Channel 1 = 152.0125 MHz … Channel 79 = 153.9875 MHz)
   v. **157-159.6 MHz** (Channel 1 = 157.0125 MHz … Channel 103 = 159.5875 MHz)
   vi. **163-164 MHz** (Channel 1 = 163.0125 … Channel 39 = 163.9875 MHz).

2. **Land mobile (duplex) – 12.5 kHz channeling/4.6 MHz Tx-Rx bandsplit**

   i. **Tx: 141.4375-142.4375 MHz** **Rx: 146.0375-147.0375 MHz**
   ii. **Tx': 155-156 MHz** **Rx': 159.6-160.6 MHz**
   iii. **Tx": 161-162 MHz** **Rx": 165.6-166.6 MHz**

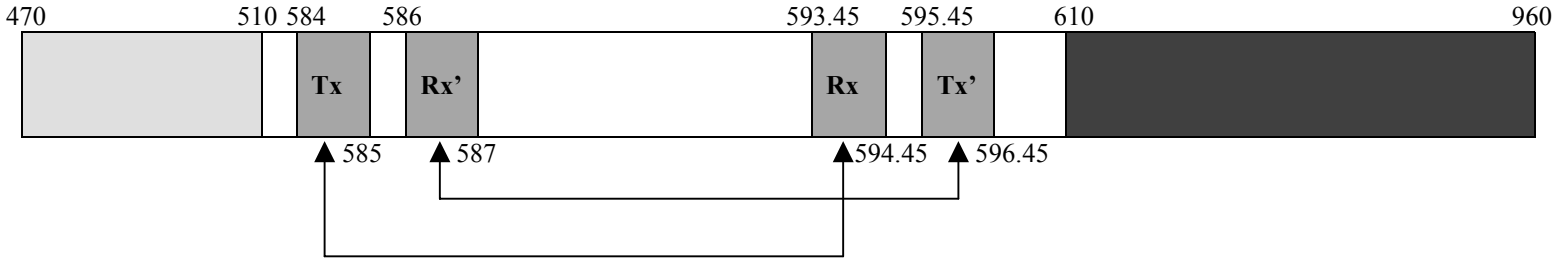
3. **Fixed services – 12.5 kHz channeling**

   i. **139-141.4375 MHz** ii. **146-146.0375** iii. **150.05-152**
   iv. **154-155** v. **156-156.7625** vi. **156.8375-157**
   vii. **160.6-161** viii. **162-163** ix. **164-165.6**
   x. **166.6-174 MHz.**

The frequency corresponding to an assigned channel is calculated based on the following formula:

Channel n = f_1 + {n x (channeling)},
where, f_1 = channel 1 frequency
n = channel number
channeling = 25 kHz for land mobile (simplex),
= 12.5 kHz for land mobile (duplex) and fixed service.

C. UHF BAND PLAN (470-960 MHz)



Index:

- Land mobile (Duplex) – 12.5 kHz channeling/9.45-9.5 MHz Tx-Rx bandsplit
- BBS TV (470-477 MHz & 486-494 MHz)
- GSM/STL/OB /TWO-WAY PAGING (inbound channel)
- Fixed services

Channeling Plan Formula: Channel n = f_1 + {n x (0.0125)},
where, f_1 = channel 1 frequency in MHz.

ANNEX C – CALL SIGN ALLOCATION IN BHUTAN

1. FIXED AND LAND MOBILE STATIONS (FX/FB):

A5T20 - A5T99	:	THIMPHU
A5T21 - A5T30	:	TRONGSA
A5T31 - A5T40	:	TSIRANG
A5T41 - A5T50	:	TASHI YANGTSE
A5T51 - A5T60	:	TRASHIGANG
A5B20 - A5B30	:	BUMTHANG
A5C31 - A5C70	:	CHHUKHA
A5D71 - A5D80	:	DAGANA
A5G81 - A5G90	:	GASA
A5H91 - A5H99	:	HAA
A5L21 - A5L30	:	LHUNTSE
A5M31 - A5M40	:	MONGGAR
A5P41 - A5P50	:	PEMA GATSHEL
A5P51 - A5P60	:	PUNAKHA
A5P61 - A5P90	:	PARO
A5S21 - A5S30	:	SAMTSE
A5S31 - A5S40	:	SARPANG
A5S41 - A5S99	:	SAMDRUP JONGKHAR
A5W21 - A5W40	:	WANGDUE PHODRANG
A5Z41 - A5Z50	:	ZHEMGANG

e.g., Wireless Unit: A5T200 - A5T299
Animal Husbandry: A5T300

2. AMATEUR STATION:

a) For Bhutanese Amateurs:

A52MOC	:	Official call sign for Thimphu
A52GEN	:	General call sign for Thimphu
A53GEN	:	,, Bumthang, etc.

b) For Visitor (General):

A52VA	:	Operates in Thimphu.
A53VA	:	Operates in Bumthang etc.

c) For Visitor (Restricted):

A52RVA	:	Operates in Thimphu
A53RVA	:	Operates in Bumthang etc.

3. AIRCRAFT STATION:

A5PDK	:	Paro Airport only.

4. BROADCASTING STATION:

A5BC	:	Sound short-wave broadcasting
A5FBC	:	Sound FM broadcasting
A5TV	:	TV broadcasting

5. CITIZENS BAND:

Identity of the vehicle or any other appropriate indications.