

RADIOCOMMUNICATIONS REGULATIONS

Chapter 1

GENERAL PROVISIONS

Section 1.0. Authority

1.1 These Regulations are promulgated under Chapter 1 of 15 PNC, subchapter 1, § 103(a) and (b) and 107, and subchapter 2 through 4.

1.2 Application

1.2.1 These Regulations shall apply to radiocommunications in all radiocommunication service, unless otherwise exempted.

1.2.2 These Regulations shall not apply to:

- .1 Palau National Communications Corporation
- .2 Employees of the National Government or any state government making radio transmissions in the HF, VHF and UHF band within the scope of their employment, and
- .3 Vessels exercising the right of innocent passage.

1.3 Definitions

As used in these Regulations, unless the context suggests otherwise,

- .1 “Alien” means any person not a citizen of the Republic of Palau.
- .2 “Assigned Frequency” (See 6.1.1).
- .3 “Authorized Bandwidth” (See 6.1.1).
- .4 “Calling” means establishing radio contact for purposes of reasonably brief communication necessary to arrange for use of an alternative channel for prolonged communication.
- .5 “Carrier Frequency” means a specific carrier frequency authorized for use by a station, from which the actual or suppressed carrier frequency is permitted to deviate, by an amount not to exceed the frequency tolerance.
- .6 “Chief” means the Chief of the Division of Transportation and

Communication.

- .7 “Characteristic frequency” (See 6.1.1)
- .8 “Coast Station” (See 6.1.1).
- .9 “Commercial” means, in respect to fees, for the purpose of providing services for monetary or other means of gain.
- .10 “Device” means a transmitter or receiver, or a combination of transmitter and receiver, including the ancillary equipment, necessary for the transmission of a radio emission.
- .11 “Fixed Station” (See 6.1.1).
- .12 “Foreign Government” means a government other than the government of the Republic of Palau.
- .13 “Frequency Tolerance” (See 6.1.1).
- .14 “Harmful Interference” (See 6.1.1).
- .15 “Interference” (See 6.1.1)
- .16 “ITU” means the International Telecommunications Union.
- .17 “Mobile Station” (See 6.1.1).
- .18 “Navigation” means, in respect of a vessel, includes the piloting of a vessel.
- .19 “Passenger vessel” means a vessel that is carrying more than 12 passengers on a voyage.
- .20 “Non-commercial” means, in respect to fees, for a purpose other than commercial.
- .21 “Radio operator” means any person who transmits over a radio station whether or not such person actually holds a radio operator license.
- .22 “Radio operator license” means a license granting a particular person authority to transmit over a radio station.
- .23 “Radio station or stations” means two or more transmitters or receivers or a combination of transmitters and receivers, including the ancillary

equipment, necessary at one location for carrying on a radio communication service, or a radio astronomy service.

- .24 “Safety Communication” means the transmission or reception of distress, alarm, urgency, or safety signals, or any communication preceded by one of these signals, or any form of radio communication which, if delayed in transmission or reception, may adversely affect the safety of life or property.
- .25 “Service” means a classification of radio communications determined by the purpose for which used.
- .26 “Ship station” means a mobile station in the maritime mobile service that is located on board a vessel not permanently moored.
- .27 “Space radiocommunications” (See 6.1.1).
- .28 “Space station” (See 6.1.1).
- .29 “Spurious Emission” (See 6.1.1).
- .30 “Superfluous Radio Communications” means any transmission that is not necessary in properly carrying on the service for which the station is licensed.
- .31 “Terrestrial radiocommunications” (See 6.1.1).
- .32 “Vessel” means every description of watercraft used, or capable of being used, in marine transportation and includes fishing vessels, hovercraft, seaplanes on the water, non-displacement vessels and mobile offshore units, but does not include vessels under construction but not yet launched.
- .33 “Watch” means listening on a designated frequency.
- .34 “Working” means radiocommunication carried on in order to pass traffic to another station by using telephony, telegraphy, facsimile or digital communications.

1.4 Administering Authority

- 1.4.1 The Chief of the Division of Transportation and Communication shall have authority and jurisdiction in all matters pertaining to the use of radio communications in the Republic of Palau including, but not limited to, assignment of radio frequencies, testing and inspection of radiocommunication devices and the establishment and enforcement of such procedures necessary to ensure proper

utilization of radio frequencies in accordance with applicable rules, regulations and laws of the Republic of Palau.

1.4.2 The Chief may delegate his authority in specific areas or cases, which, in his discretion, may be carried out by such person or persons within the scope of his competency.

1.4.3 Except as delegated by the Chief through regulation or other means, no person or persons may:

.1 authorize the use of any radio station in a manner that is contrary to the authority contained in the radio station license or rules and regulations applicable to the radio service in which the radio station is engaged; or

.2 authorize an unlicensed station to operate in any manner whatsoever.

1.5 Authorization Required

1.5.1 No person required to be licensed under these Regulations may operate a radiocommunication device or devices unless such a person is authorized by..

.1 An HF Radio Operator License;

.2 a VHF Radio Operator License;

.3 a UHF Radio Operator License ;

.4 an AM Broadcast radio station license;

.5 an FM Broadcast radio station license;

.6 a Broadcast television station license;

.7 a cellular telephone service license;

.8 a paging service license; or

.9 a Class Operator License.

1.5.2 No person may operate a radiocommunication device or devices in a manner or for a purpose other than that authorized in the license.

1.5.3 No license will be issued for the operation of any radiocommunication device or devices nor for any change in station location, frequencies or emissions unless written application has been filed with the Chief in accordance with the require-

ments set forth in these Regulations.

1.6 Prohibited Practices

The following prohibited practices shall apply to the licensee of any radio station and to any person operating a radio station regardless of the type of service being rendered.

- .1 Operation of a radio station by any person not holding a valid radio operator license prescribed for the type of operation of the station.
- .2 Operation of a radio station without identifying such station at the times and in the manner prescribed by the provisions of the chapter applicable to such station operations.
- .3 Transmission of a false call-sign or of a false distress call or message.
- .4 Operation of a radio station on a frequency not authorized for use by such station, including operation with a frequency deviation beyond frequency tolerances authorized.
- .5 Transmission of unauthorized communications on any frequency designated as a distress frequency or a calling frequency whether or not interference with any distress call or distress communication, or with communications already in progress is caused.
- .6 Operation of a radio station causing interference with any distress call or distress communication or with communications already in progress.
- .7 Use of a radio station to render a communication service not authorized for that particular station.
- .8 Operation of a radio station with a type of emission not authorized for the particular station.
- .9 Unauthorized disclosure of any information resulting from the receipt or transmission of radio communications.
- .10 Transmission of communications containing obscene, indecent or profane words, language or meaning.

1.7 Frequency Allocation Table; Spectrum and Band Plans

- 1.7.1 The Palau National Frequency Allocation Table, as amended from time to time by ITU, shall determine the type and manner of use for all frequencies assigned under these regulations.

1.7.2 Any Spectrum and Band Plans to be developed through regulations shall not conflict with the Frequency Allocation Table.

1.7.3 Where assignments are made not in accordance with the Frequency Allocation Table, such assignments shall be null and void.

1.8 Communications under Emergency Conditions

1.8.1 Emergency conditions for the purpose of this section is deemed to exist when:

- .1 normal communication facilities are disrupted as a result of typhoon, flood, earthquake or other natural disaster and, as a result, the National Emergency Management Office (NEMO) shall have declared that a state of emergency exists.
- .2 a vessel or aircraft is in distress;
- .3 the safety of life or property is in imminent danger.

1.8.2 The licensee of any radio station, during emergency conditions as defined in 1.8.1, may utilize such radio station for emergency communication service in communicating in a manner other than that authorized in the license or by these Regulation, provided that:

- .1 The procedures for operations under emergency conditions shall be carried out as outlined in appropriate regulations.
- .2 The emergency communications service may at any time be discontinued on the order of the Chief.
- .3 as soon as possible after the beginning of such emergency use, notice shall be sent to the Chief stating the nature of the emergency and the emergency use being made of the station;
- .4 such emergency use of the station shall be discontinued as soon as substantially normal communication facilities are again available; and
- .5 The Chief is notified immediately when such special use of the station is terminated.

1.9 Prior Authorizations and Licenses Issued under Emergency Regulations

1.9.1 All Frequency Authorizations issued prior to these Regulations under RPPL 5-43 and any Emergency Regulations promulgated thereunder shall be modified to meet the requirements of these Regulations.

- 1.9.2 All radio station licenses issued prior to these Regulations under RPPL 5-43 and any Emergency Regulations promulgated thereunder shall be modified to meet the requirements of these Regulations no later than the renewal date of the license.

CHAPTER 2

Telecommunication Policy

2.1 Objectives. For The Use Of The Radio Spectrum Applying To Departments And Establishments Of The National Government

The Republic of Palau is vitally dependent upon the use of the radio spectrum to extend communications and information services to the government and private sector, business communities and remote islands with the national objective of furthering economic development and the delivery of government services. Use of the spectrum is vital to enhancing health care, education and the welfare of the Republic of Palau and to the conduct of its foreign affairs. This use exerts a powerful influence upon the everyday lives of citizens and annually contributes significantly to the Republic of Palau's growth and economy. The radio spectrum is a limited natural resource that is accessible to all nations. It is imperative that this resource be developed and administered wisely so as to maintain a free democratic society and to stimulate the healthy growth of the Republic of Palau, while ensuring its availability to serve future requirements in the best interest of the Republic of Palau. Therefore, consistent with Compact of Free Association's obligations and with due regard for the rights of other nations, the national objectives for the use of the radio spectrum are to make effective, efficient, and prudent use of the spectrum in the best interest of the Republic of Palau, with care to conserve it for uses where other means of communication are not available or feasible. Specifically, in support of national policies, including ICT-2003, and the achievement of national goals, the primary objectives are:

- (a) to enhance the conduct of foreign affairs;
- (b) to safeguard life and property;
- (c) to support crime prevention and law enforcement,
- (d) to support the national and international transportation systems;
- (e) to foster conservation of natural resources;
- (f) to provide for the national dissemination of health, educational, general, and public interest information and entertainment;
- (g) to make available rapid, efficient, nationwide, and worldwide radiocommunication services,
- (h) to promote scientific research, development, and exploration;

(i) to stimulate social and economic progress; and

(j) in summary, to improve the health and well being of our citizens.

The following areas of interest are associated with the national objectives listed above:

- Agriculture and fishing
- Amateur (emergency preparedness, self-training and technical investigation)
- Commerce
- Computers and data processing
- Consumer expenditures and savings
- Education and training
- Entertainment (Broadcasting)
- Healthcare
- Infrastructure (housing, schools, hospitals, libraries, and telecommunications)
- Conduct of Foreign Affairs and information exchange
- Natural resources (including pollution abatement)
- Oceanography
- Public Safety
- Research and Development
- Social Welfare
- Transportation (roads, shipping, ports and harbors)

These areas of interest are identified to assist in the frequency management process and are not intended to be all-inclusive. Priorities among these areas of interest are normally determined on a case-by-case basis and are dependent upon many factors, including past and foreseen political and administrative decisions.

2.2 Formulation of Telecommunications Policy

The formulation and enunciation of national telecommunication policies designed to ensure achievement of the national objectives is an essential element of the role of the Republic of Palau Government. Telecommunication policies are made by the Olbiil Era Kelulau, by the Palau Supreme Court, by the Executive Branch and the Communications Information Technical Advisory Group (CITAG), and the Division of Transportation and Communication. Policy is made through treaties to which the Republic of Palau adheres with the advise and consent of the Congress, through executive mandates and by Executive Branch Ministry in the discharge of their telecommunication responsibilities.

2.3 Telecommunications Policy Applying To The Republic Of Palau

The following policies have been established regarding the use of telecommunications by the Republic of Palau.

2.3.1 General Telecommunication Development and Regulation

The Government shall encourage the development of and regulate the use of radio communications subject to its control so as to meet the needs of national security, safety of life and property, international relations, and the business, social, educational and political life of the Republic of Palau.

International Telecommunication Regulation

The Government of the Republic of Palau considers the International Telecommunication Union the principal competent and appropriate international organization for the purpose of formulating international regulations on telecommunication matters.

The Government recognizes that other international bodies, such as the International Civil Aviation Organization, Intergovernmental Maritime Consultative Organization and the World Meteorological Organization also provide appropriate international organizations for considering specialized telecommunication matters. The Republic of Palau shall be appropriately represented at international conferences dealing with telecommunications when such conferences appear to involve its national interests. The Government shall foster and encourage the participation, for the purpose of coordination and provision of advice and information, of experts from its commercial communication, scientific, and educational communities as advisers in the preparation for and participation in international telecommunication conferences, in consonance with national policy and security considerations.

Operating Capability of Industry

The Government regards the operating capability of the Palau National Communications Corporation as a vital national asset and shall encourage and promote the development of that industry in consonance with other national policy and security considerations.

2.3.2 Functions to be Achieved National Defense

The Republic of Palau in time of war or national emergency, as proclaimed by the President, shall have available to the Government the total telecommunication resources of the Republic of Palau for utilization with due regard to the extent of the war or emergency and to the continuing operation of services considered to be essential or desirable for the welfare and interest of the Republic of Palau during such a time. On a continuing and current basis, the Palau National Communications Corporation and the amateur radio operators shall be encouraged and assisted in planning and preparing for their immediate readiness to meet emergency or war conditions so that telecommunications responsiveness to emergency requirements can be instantaneous with the occurrence of such

conditions. In advance of a national emergency, all desirable and possible measures and procedures necessary for use during emergency or war conditions will be developed and made available as needed so that they can be effected concurrently with the onset or threatened onset of emergency conditions.

Safety at Sea

The Government shall aggressively foster the development, investigation, selection, and standardization of a worldwide system of radio and electronic aids for marine navigation and communication, since the national security, the Republic of Palau's sea commerce, and the assurance of adequate safety of life and property at sea for ships of all nations require such an efficient, integrated, and standardized system.

Safety in the Air

The Government shall aggressively foster the development, investigation, selection, and standardization of a worldwide system of radio and electronic aids for air navigation and communication, since the national security, the Republic of Palau's air commerce, and the assurance of adequate safety of life and property in flight require such an efficient, integrated, and standardized system.

Protection of Life, Property, and National Resources

The Government shall promote the development of and use of radio for the protection of the lives and property of its citizens and of other national resources where other means of communication are not appropriate or available.

Promotion of Efficiency and Economy of Government Operations

The Government shall promote the development of and use of radio to improve the efficiency and economy of Government operations where other means of communication are not appropriate or available.

2.3.3 Government Use of Commercial Telecommunication Service

The Government of the Republic of Palau places heavy reliance on the semi-government and private sector in providing telecommunication service for its own use. This means that all functions normally associated with providing the service shall be performed by the semi-government and private sector. These functions include design, engineering, system management and operation, maintenance, and logistical support. In order to emphasize the Government's proper role as a user, any proposal designed to provide needed telecommunication

service, which requires the Government to perform any of the “provider” functions, such as those listed above, shall be adopted only if commercial service is:

- a) not available to the user during the time needed;
- b) not adequate from either a technical or operational standpoint; or
- c) significantly more costly.

A non-commercial service approach is acceptable if such an approach will result in significant savings over an otherwise acceptable commercial service offering. To be considered significant the savings must exceed ten percent of the cost of the commercial service. If the proposed approach involves heavy investment, rapid obsolescence, or uncertain requirements, the minimum savings threshold should be increased to reflect these factors.

The Government shall establish separate communication satellite systems only when they are required to meet unique governmental needs, or are otherwise required in the national interest.

2.3.4 Role of Leadership by the Government

The Government shall exercise leadership in the application of technological advances of operational procedures that will result in more efficient and effective use of the radio spectrum. Periodically, it shall measure the status of current technical and operational capabilities to determine necessary changes in technical standards, allocations, or assignments which should be effected.

2.3.5 Radio Spectrum Administration

The Government regards the radio frequency spectrum as a world resource in the public domain; consequently it shall adopt policies and measures to insure that this resource is used in the best interest of the Republic of Palau, but with high regard to the needs and rights of other nations. The supervision and administration of the use of the radio frequency spectrum shall have the objective of assuring that such use is efficient, effective, and prudent. The Government considers the radio frequency spectrum to be a vital national resource. Any rights of users to operate on any radio frequency are rights held by the Republic of Palau as a whole. Such rights may be transferred by this Government from one user to another, as required in the overall national interest. The Government considers that the basic guide to follow in the normal assignment of radio frequencies for transmission purposes is the avoidance of harmful interference and the use of frequencies in a manner that permits and encourages the most beneficial use of the radio frequency spectrum in the national interest. Within the jurisdiction of the

Republic of Palau, use of the radio frequency spectrum for radio transmissions for telecommunications or for other purposes shall be made only as authorized by the Chief of the Division of Transportation and Communication.

In view of the limitations of the usable radio frequency spectrum, and to insure the best possible return from the use thereof, the Government in time of peace shall require all users to:

- a) justify any request, except an emergency request, for radio frequencies prior to the assignment or use of such frequencies;
- b) confirm periodically the justification of continued use;
- c) employ up-to-date spectrum conserving techniques as a matter of normal procedure; and
- d) assure the ability to discontinue the electronic functioning of any emission system including satellites when required in the interest of communication efficiency and effectiveness.

2.3.6 Spurious Emissions

In principle, spurious emissions from stations of one radio service shall not cause harmful interference to stations of the same or another radio service within the recognized service areas of the latter stations, whether operated in the same or different frequency bands. Providing appropriate spectrum standards in Chapter 5 are met, an existing station is recognized as having priority over a new or modified station. Nevertheless engineering solutions to mitigate interference may require the cooperation of all parties involved in the application of reasonable and practicable measures to avoid causing or being susceptible to harmful interference.

2.3.7 Safety Service

ITU Radio Regulation S1.59 defines a safety service as “any radiocommunication service used permanently or temporarily for the safeguarding of human life and property”. The intent of S1.59 is that the safety service connotation should be applied to individual uses (assignments) of the radio frequency spectrum, irrespective of the radio service normally applied. This is a crucial since assignments that entail the providing of a safety-of-life function require an appropriate degree of protection. This does not grant such assignments any special status which would in any way alter the normal rules applied with respect to primary, and secondary allocations, noting that priority of communications are otherwise provided in the Radio Regulations (Articles S44 and S53).

From a spectrum management point of view, the domestic and international policies regarding safety service are consistent. Accordingly, the following guidance is applicable:

(a) The protection and status afforded to the categories of Services and allocations and to stations in all services is governed, inter alia, by Art. S5, Sec. II. ITU Radio Regulations (RR).

(b) request for assistance in the case of harmful interference (RR S1.169) caused to stations of the radionavigation service in a frequency band where the service is allocated under the Table of Frequency Allocations on a secondary basis would be treated by terms of RR S5.28 through S5.31.

(c) request for assistance in the case of harmful interference (RR S1.169) caused to stations of the radionavigation service in a frequency band where the service is allocated under the Table of Frequency Allocations on a coequal primary basis would be treated in accordance with normal practices based upon which operation was first brought into use unless it can be demonstrated that a “safety-of-life function is being served.” In other words, any radiocommunication service that uses the spectrum for safety purposes may be regarded in that case as a safety service and, in this respect, the appropriate provisions of the Radio Regulations would apply.

2.3.8 Use of Spectrum-Conserving Methods for Radio Communication Systems

In the Republic of Palau, the application of advanced technology shall foster the application of spectrum-conserving methods for radiocommunication systems authorized by the Division of Transportation, and Communication. Spectrum-conserving systems are new or existing systems that make use of innovative designs or unique applications that result in efficient use of frequency, space and time. Efficient use is a mission-oriented factor that combines the requirements of the mission with available techniques to provide the most effective solution. Government departments are encouraged to use spectrum-conserving technologies and methods where they will satisfy agency operational requirements and will enhance service, economy of operation, and the more efficient and effective use of the radio spectrum. However, where spectrum is readily available due to geographic considerations or other factors, or where mission requirements mandate, security, economics, or some technical or system performance criterion may be the determining factor in system selection.

2.3.9 Land Mobile Systems

Spectrum-conserving methods that should be considered for land mobile operations include trunked systems, narrowband FM (NBFM), and amplitude companded single sideband (ACSSB).

- a. Trunking is a technique that uses dynamic channel assignment to potentially obtain a higher degree of channel loading and increased spectrum utilization.
- b. NFBM is conventional FM with channel spacing of 12.5 kHz or less. It may be capable of interoperation with conventional FM equipment using 25 kHz channel spacing.
- c. ACSSB is a single-sideband modulation scheme with a necessary bandwidth of approximately 3.0 kHz, a standardized pilot carrier for synchronization, and amplitude compandoring.

CHAPTER 3

APPLICATIONS AND LICENSES GENERALLY

3.1 Applications

- 3.1.1 Applications for any license, transfer of control, or authorization, or modification thereof shall be filed with the Division and shall be accompanied by any applicable filing fee. Application forms may be obtained from the Division.
- 3.1.2 Applications shall contain the following information:
 - a. The name, post office address, telephone number, as well as any fax number and email address, of the applicant.
 - b. The name, address, telephone number, as well as any fax number and email address of the person(s) to whom inquiries or correspondence should be directed.
 - c. The type of authorization requested (e.g. radio station license, frequency authorization, transfer of control).
 - d. If the requested authorization relates to a radio station, a general description of overall system facilities, operations and services, including the types of services to be provided, the estimated demand for such services, dates by which any construction will be commenced and completed, estimated date of placement into service of the station, estimated date of commencement of station operations, identity of owner(s) of the station, proposed location of the station, the frequency

or frequencies and transmission power to be used, and the hours of operation of the station.

e. A waiver of any claim to the use of any particular frequency as against the regulatory power of the Republic of Palau because of the previous use of the frequency, whether by license or otherwise.

3.2 Additional Information

The Division may request from any party at any time additional information concerning any application of any other submission filed with the Division. Failure to promptly supply such information may result in a denial of an application.

3.3 Defective Application

An application may be unacceptable for filing and may be returned to the applicant if the application is defective with respect to completeness of answers to questions, informational showings, internal inconsistencies, execution, or if the application does not substantially comply with the law, regulations, specific requests for additional information or other requirements.

3.4 Processing of Applications

Applications received by the Division will be given a file number or other identifier for administrative convenience. Neither the assignment of a file number/identifier nor the listing of the application on public notice as received for filing indicates that the application has been found acceptable for filing or precludes the subsequent return or dismissal of the application if it is found to be defective or not in accordance with the law or regulations.

3.5. Public Notice

As soon as practicable after an application for a station license, frequency authorization, transfer of control of the owner, or significant modification thereof is received by the Division, the Division shall post a notice thereof setting forth the nature of the application, the name of the applicant, the date, time and place of the public hearing on the application, and any other information the Chief deems appropriate. The notice shall state that the application is available for inspection at the Division. A copy of the notice shall be mailed or delivered to the applicant, posted at the Division offices and the post office. If the license or authorization is to be used in connection with commercial services may require the applicant to, at its expense, publish a copy of the notice in a newspaper of general circulation in Palau at least twice before the date of the public hearing. At the discretion of the Chief, notice of involuntary transfers of control, involuntary assignments, or assignments or transfers of control that do not involve a substantial change in ownership or control may be waived.

3.6. Hearing on Applications

- 3.6.1 A hearing on an application shall commence not less than 30 days after the posting of public notice of the application, unless such time period is modified by the Chief for good cause. Applications will be granted if the Chief or his designated representative(s) finds that the applicant is legally, technically, and otherwise qualified, that any proposed facilities and operations comply with all applicable regulations, law and policies, and that the granting of the application will serve the public interest, convenience and necessity. The Chief shall make written findings on the application. If the applicant is not a citizen of Palau or a representative of a citizen, however, no license shall be issued unless the applicant has a valid foreign investment permit permitting his proposed operations.
- 3.6.2 Evidence offered in any hearing shall be admitted or rejected in accordance with the procedures set forth at 6 PNC Section 143.
- 3.6.3 Except as otherwise provided by the Administrative Procedure Act, a final decision or order shall be in writing or stated on the record. A final decision shall include findings of fact and conclusions of law, separately stated. Findings of fact, if set forth in statutory language, shall be accompanied by a concise and explicit statement of the underlying facts supporting the findings.
- 3.6.4 A party may seek review of a final decision of the Chief by filing a petition in the Trial Division of the Supreme Court within 30 days after receipt of the final decision. If mailed, a party will be deemed to have received the final decision three days after it is mailed to him at the address set forth in his application or other filing with the Division. Otherwise, the decision will be deemed received on the date it is delivered to the party.

3.7 Suspension of Radio and Television Station Licenses

- 3.7.1 An AM or FM radio station license or a television station license may be suspended for up to one year if the Chief determines that the licensee:
- a. has violated any provision of this chapter or any regulation adopted by the Division pursuant to this chapter;
 - b. has violated or failed to comply with any term or condition of its license;
 - c. has transmitted obscene words or language;
 - d. has willfully or maliciously interfered with any other radio communication or signal; or
 - e. has obtained, or attempted to obtain or has assisted another to obtain or attempt to obtain, an AM or FM radio station or television station license

by fraudulent means.

- 3.7.2 No order of suspension of any license issued under this subchapter shall take effect until 30 days after written notice of the proposed suspension, has been served on the licensee. The notice to the licensee shall not be effective until actually received. Notice of an order of suspension shall state the cause for the suspension, with reference to the appropriate provisions of the Palau National Code or Division regulations, and shall plainly set forth the procedure and time limit for requesting a hearing upon the order. A licensee having been served with proper notice of an order of suspension may at any time within 30 days after service make a written application to the Division for a hearing upon the order. An application for a hearing on an order of suspension may be submitted to the Division after the lapse of 30 days and may be granted on the basis of a satisfactory explanation of the delay. Upon receipt by the Division of an application for a hearing, the order of suspension shall be held in abeyance until the conclusion of the hearing. 3.6(b)-(d) shall be applicable to such hearing. Upon the conclusion of the hearing the Division may affirm, modify, or revoke the order of suspension.

3.8 Revocation of Radio and Television Station Licenses

- 3.8.1 The Division may revoke an AM or FM radio station or television station license on the basis of
- a. material false statements knowingly made in an application for a license;
 - b. the discovery of facts that, if known at the time the application for a license was submitted, would have justified the Division's refusal to grant the license,
 - c. a licensee's willful or repeated failure to operate substantially as set forth in the license;
 - d. a licensee's willful or repeated violation of, or willful or repeated failure to observe, any provision of this title 15 of the Palau National Code or any regulation of the Division;
 - e. a licensee's violation or failure to observe any final cease and desist order issued by the Division under 3.8; or
 - f. a licensee's failure to report to the Division all changes to information submitted as part of the license application occurring after submission of the application and before the expiration date entered on the face of the license.

- 3.8.2 Where any person holding an AM or FM radio station or television station license has failed to operate substantially as set forth in a license, (2) has violated or failed to observe any of the provisions of this chapter, or (3) has violated or failed to observe any regulation of the Division, the Division may order such person to cease and desist from such action.
- 3.8.3 Before revoking a license or issuing a cease and desist order, the Division shall serve upon the licensee an order to show cause why an order of revocation or a cease and desist order should not be issued. An order to show cause shall contain a statement of the matters with respect to which the Division is inquiring and shall call upon the licensee to appear before the Division at a time and place stated in the order, but in no event less than 30 days after the receipt of the order, and give evidence upon the matter specified therein. If, after a hearing or waiver thereof, the Division determines that an order of revocation or a cease and desist order should issue, the Division shall include in its order a statement of findings and the grounds and reasons for the order, specify the effective date of the order, and cause the order to be served on the licensee in any manner of service authorized under 14 PNC Chapter 1.3.6(b)-(d) shall apply to such hearing.

3.9 Suspension and Revocation of Other Licenses

- 3.9.1 Any license or authorization other than an AM or FM radio station or television station license may be suspended or revoked for
- a. Failure to operate in conformance with any law, regulation, license terms or conditions, or conditions imposed on any authorization.
 - b. Transmission of any signal that causes harmful interference with any other radio communications or signals.
- 3.9.2 Before suspending or revoking a license, the Division shall serve upon the licensee an order to show cause why the license should not be suspended or revoked. An order to show cause shall contain a statement of the grounds upon which the Division proposes to suspend or revoke the license and shall call upon the licensee to appear before the Division at a time and place stated in the order and show cause why the license should not be suspended or revoked, as the case may be. If, after a hearing or waiver thereof, the Division determines that the license should be suspended or revoked, Division shall include in its order a statement of findings and the grounds and reasons for the order, specify the effective date of the any suspension or revocation, the duration of any suspension, and cause the decision to be served on the licensee in any manner of service authorized under 14 PNC Chapter 1. 3.6(b)-(d) shall apply to such hearing.

3.10 Automatic Termination of Station Authorization

A radio station license shall be automatically terminated without further notice to the licensee upon:

- a. The expiration of the required date of completion of construction or other required action specified in the authorization or license, or after any additional time authorized by the Chief, if a certification of completion of the required action has not been filed with the Division unless a request for an extension of time has been filed with the Division but has not been acted upon.
- b. The expiration of the license period, unless an application for renewal of the license has been filed with the Division, provided however, that an AM or FM radio station license and a television station license shall be renewed automatically for an identical period if the licensee has not violated any term or condition of the expired license.
- c. The removal or modification of the facilities which renders the station not operational for more than 90 days unless specific authority has been granted.

3.11 Assignment and Transfer Prohibited

No station license or any other authorization, nor any rights thereunder, shall be transferred, assigned, or disposed of in any manner, voluntarily or involuntarily, directly or indirectly. Any attempted transfer shall be void. Transfer of control of any corporation or any other entity holding such license, to any person shall terminate the license unless, upon application to the Chief and upon finding by the Chief that the public interest, convenience and necessity will be served thereby, the Chief approves such transfer of control..

For purposes of 3.0, transfers of control requiring the Chief's approval shall include any transactions that:

- (1) Change the party controlling the affairs of the licensee, or
- (2) Effect any change in a controlling interest in the ownership of the licensee, including changes in legal or equitable ownership.

Transfers of control shall be completed within 60 days from the date of authorization. The Chief shall be notified in writing of the date of the consummation of the transfer.

3.12 Licensing Fees

A license fee is assessed to cover part of the costs incurred by the Division of Transportation and Communication in managing the use of the radio frequency spectrum for the benefit of all licensees. Those costs include administrative processing of radio frequency applications, technical support to applicants and ensuring that all licensed communication systems can be

operated free from harmful radio interference that might be caused by other communications facilities. The fee structure is based on the nature of the service being provided.

SCHEDULE OF RADIO FREQUENCY LICENSE FEES

Radio Service	License Fee	License Fee for Non-Palauan Citizens
Application Processing Fee	\$10	\$10
Amateur	\$5	\$10*
Amateur (w/special call sign)	\$10	\$50*
Broadcasting	\$100	\$500
Commercial (Fixed)	\$25	\$50*
Non-Commercial (Fixed)	\$5	\$15*
Common Carrier	\$500	\$5000
Commercial (mobile)	\$10	\$20*
Non-Commercial (mobile)	\$5	\$20*
Satellite		
Satellite	\$1000	\$2500
Earth station	\$750	\$3000
Other Radio Services	\$5	\$20*

* These license fees are subject to being doubled if special handling is required.

CHAPTER 4

National Table of Frequency Allocations

4.1 Frequency Allocations

4.1.1 ITU Table of Frequency Allocations

The ITU Table of Frequency Allocations is that table contained in Article S5 of the ITU Radio Regulations, 1998 Edition, and as amended by ITU.

4.1.2 National Table of Frequency Allocations

The Republic of Palau National Table indicates the normal national frequency allocation planning and the degree of conformity with the ITU Table. When required in the national interest and consistent with national rights, as well as obligations undertaken by the Republic of Palau to other countries that may be affected, additional uses of frequencies in any band may be authorized to meet service needs other than those provided for in the National Table. Under No. S4.4 of the ITU Radio Regulations, administrations may assign frequencies in derogation of the ITU Table of Frequency Allocations “on the express condition that harmful interference shall not be caused to services carried on by stations (of other countries) operating in accordance with the provisions of the Convention and of these Regulations.”

4.1.3 Republic of Palau National Table of Frequency Allocations

The rules pertaining to the relative status between radio services are as follows: Primary and permitted services have equal rights, except that, in the preparation of frequency plans, the primary service, as compared with the permitted service, shall have prior choice of frequencies.

Secondary services are on a non-interference basis to the primary service.
Stations of a secondary service:

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

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

(c) can claim protection, however, from harmful interference from stations of the same or other secondary service(s) to which frequencies may be

assigned at a later date

Additional allocation - where a band is indicated in a footnote of the Table as “also allocated” to a service in an area smaller than a Region, or in a particular country. For example, an allocation that is added in this area or in this country to the service or services which are indicated in the Table.

Alternative allocation - where a band is indicated in a footnote of the Table as “allocated” to one or more services in an area smaller than a Region, or in a particular country. For example, an allocation that replaces, in this area or in this country, the allocation indicated in the Table.

Different category of service - where the allocation category (primary or secondary) of the service in the Table is changed. For example, the Table reflects the allocation as Fixed, Mobile and RADIOLOCATION, the category of these services are changed by the footnote to FIXED, MOBILE and Radiolocation.

An allocation or a footnote to the National Table denoting relative status between radio services automatically applies to each assignment in the band to which the footnote or allocation pertains, unless at the time of a particular frequency assignment action a different provision is decided upon for the assignment concerned.

An assignment that is in conformity with the service allocation (as amplified by pertinent footnotes) for the band in which it is contained takes precedence over assignments therein that are not in conformity unless, at the time of the frequency assignment action, a different provision is decided upon.

Where in this Table a band is indicated as allocated to more than one service, such services are listed in the following order:

(a) services, the names of which are printed in all capital letters (example: FIXED); these services are called “primary” services;

(b) services, the names of which are printed in “normal characters” (example: Mobile); these are “secondary” services.

The columns to the right of the double line show the national provisions; those to the left show the provisions of the ITU Table of Frequency Allocations. Column 1 indicates the national band limits.

Where the allocated service is followed by a function in parentheses, e.g., SPACE (space-toEarth), the allocation is limited to the function shown.

Column 2 contains such remarks as serve to amplify the allocations or indicate the

existence of a National Frequency Assignment Plan for the band.

The international footnotes shown in the columns to the left of the double line are applicable only in the relationships between the Republic of Palau and other countries. An international footnote is applicable to the National Table only if the number also appears in the Table.

The texts of footnotes in this Table are listed in numerical order at the end of the Table.

4.1.4 International Frequency Allocation Regions

For the purpose of the allocation of the radio frequency spectrum, the ITU has divided the world into three regions. The Republic of Palau is in Region 3. The ITU has established Lines A, B and C to separate the three regions. These three lines are defined as follows:

Line A: Line A extends from the North Pole along Meridian 40° East of Greenwich to parallel 40° North; thence by great circle arc to the intersection of Meridian 60° East and the Tropic of Cancer; thence along the Meridian 60° East to the South Pole.

Line B: Line B extends from the North Pole along Meridian 10° West of Greenwich to its intersection with parallel 72° North; thence by great circle arc to the intersection of Meridian 50° West and parallel 40° North; thence by great circle arc to the intersection of Meridian 20° West and parallel 10° South; thence along Meridian 20° West to the South Pole.

Line C: Line C extends from the North Pole by great circle arc to the intersection of parallel 65° 30 seconds north with the international boundary in the Bering Strait; thence by great circle arc to the intersection of Meridian 165° East of Greenwich and parallel 50° North; thence by great circle arc to the intersection of Meridian 170° West and parallel 10° North; thence along parallel 10° North to its intersection with Meridian 120° West; thence along Meridian 120° West to the South Pole.

Current Republic of Palau Allocation Table is attached as Annex A of these Regulations.

CHAPTER 5

Spectrum Standards

5.1 General

5.1.1 Introduction

This chapter contains Radio Frequency Spectrum Standards applicable to radio stations and systems. A radio frequency spectrum standard is a principle, rule, or criterion that bounds the spectrum-related parameters, and characteristics, of a radio station or system for the purpose of managing the Radio Frequency Spectrum. Procurement specifications shall, as a minimum, assure compliance with the appropriate requirements of this chapter.

The standards contained herein are those associated with the potential impact of any system or station on the normal operation of other systems or stations.

If spectrum standards are not specified in this chapter, the appropriate provisions of the ITU Radio Regulations normally shall apply. If spectrum standards are not specified in this chapter or in the ITU Radio Regulations, the appropriate criteria contained in current Recommendations of the ITUR shall be used as guidelines. Compliance with standards contained in this chapter may not preclude the occurrence of interference. Therefore, compliance with the standards does not obviate the need for cooperation in resolving and implementing engineering solutions to harmful interference problems (see Section 2.3.7).

5.1.2 Compliance With U.S. FCC Requirements

All transmitting and receiving equipment imported into the Republic of Palau must comply with U.S. Federal Communications Commission (FCC) requirements. Communications equipment shall be approved under the appropriate FCC equipment authorization program set forth in FCC Regulations for the specific category of device. The FCC equipment authorization programs are type acceptance, certification, verification, notification and registration. Radio transmitting and receiving equipment in licensed and unlicensed (See Section 6.8 and Annex D) radio services is generally required to comply with type acceptance or certification. The equipment is required to comply with FCC requirements as to bearing the required label evidencing compliance with the appropriate equipment authorization program.

5.1.3 Consequences of Nonconformance with the Provisions of this Chapter

In any instance of harmful interference caused by nonconformance with the provisions of this chapter, the responsibility for eliminating the harmful

interference normally shall rest with the licensee operating in nonconformance.

5.1.4 Measurement Methods

Spectrum standards for this chapter are referenced to measurement methods in Annex F. Measurement methods referenced in the annex are provided only for clarification and uniform interpretation of the standards. In cases of harmful interference, the licensees involved are expected to utilize these or equivalent, mutually agreed upon, methods of measurement for resolution of any disagreement concerning compliance with the standards. Licensees may, at their discretion, use these measurement methods as minimum qualification test procedures, e.g., as part of factory test procedures.

5.1.5 Terminology

Definitions of Special Terms, Services, and Stations are contained in Chapter 6.

Desired Relationship of Occupied Bandwidth to Necessary Bandwidth

The emission designator(s) associated in the authorization for any particular frequency assignment specifies the value of the necessary bandwidth of emission for the particular type(s) of transmission permitted. The values of necessary bandwidth are generally idealized. All reasonable effort shall be made in equipment design and operation by licensees to maintain the occupied bandwidth of the emission of any authorized transmission as close to the necessary bandwidth as is reasonably practicable.

Authorized Bandwidth

For purposes of these Regulations, the term “authorized bandwidth” is defined as the necessary bandwidth (bandwidth required for the transmission and reception of intelligence) and does not include allowance for transmitter drift or doppler shift. See, in addition, Chapter 6 for the definitions of special terms including authorized bandwidth and mean power.

Resolution Bandwidth

Resolution bandwidth is the 3 dB bandwidth of the measurement system used, e.g., in power spectral density measurements. The appropriate resolution bandwidth of the measurement system varies depending on the modulation type and frequency band but should not be greater than the necessary bandwidth of the transmitter being measured.

Power (RR)

Power is designated as:

peak envelope power (PX or pX)

mean power (PY or pY)

carrier power (PZ or pZ)
p denotes power expressed in watts
P denotes power in dB relative to reference level

Logarithm
In this chapter, $\text{Log} = \text{Log}^{10}$

5.2 FREQUENCY TOLERANCES AND UNWANTED EMISSIONS

5.2.1 Table of Frequency Tolerances

Frequency tolerance standards applicable to stations are specified in Table 5.2.1. The table specifies standards for station types arranged within frequency bands.

Transmitter frequency tolerance is the maximum permissible departure from the assigned frequency by the center frequency of the frequency band occupied by an emission.

Receiver frequency tolerance is the maximum permissible departure of the center frequency of the IF passband from the desired center frequency of the IF passband.

In Table 5.2.1 the units for frequency tolerance are expressed in (\pm) parts per million (ppm) unless otherwise stated. For the purpose of this Manual, the “ \pm ” symbol will always be implied. For example, ± 10 ppm will appear as 10 ppm. The power shown for the various categories of stations is the peak envelope power for singlesideband transmitters and the mean power for all other transmitters, unless otherwise indicated. (RR)

Table 5.2.1 Table of Frequency Tolerances

Frequency Band 9 kHz to 535 kHz	Frequency Tolerance
I. Fixed Stations	
A. 9 - 50 kHz	100
B. 50 - 535 kHz	50
II. Mobile Stations	
A. Aeronautical Stations	
1. Aeronautical	50
2. Aircraft	50
3. Survival Craft	500
B. Land Mobile Stations	
1. Base (TIS) (530 kHz)	100 Hz
2. Land Mobile	20
3. Direct Printing Telegraph and Data	10 Hz
C. Maritime Mobile Stations	
1. Coast	100
2. Ship	
a. Direct Printing Telegraph and data.	10 Hz
3. Ship Emergency Transmitters	500 (a)
4. Survival Craft	500
III. Radiodetermination Stations	100

Frequency Band 535 kHz to 1605 kHz	Frequency Tolerance
I. Broadcasting Stations	10 Hz

Frequency Band 1605 kHz to 4000 kHz	Frequency Tolerance
I. Fixed Stations	
A. All, except SSB	10
B. SSB radiotelephone	20 Hz
II. Mobile (Aeronautical, Land, Maritime) Stations	
A. Aeronautical Mobile Stations	
1. Aeronautical a. $pY \leq 200W$ b. $pY > 200W$ c. SSB radiotelephone	20 10 20 Hz (b)
2. Aircraft a. All except SSB b. SSB radiotelephone	20 20 Hz (c)
B. Land Mobile Stations	
1. Base a. $pY \leq 200W$, except SSB b. $pY > 200W$ c. SSB radiotelephone	20 (e) 10 20 Hz
2. Land Mobile a. All except SSB b. SSB radiotelephone	50 20 Hz
C. Maritime Mobile Stations	
1. Coast a. $pY \leq 200W$, except c and d below b. $pY > 200W$, except c and d below c. SSB radiotelephone d. Direct printing telegraph and data	100 50 20 Hz 10 Hz
2. Ship a. All except below b. SSB radiotelephone c. Direct printing telephony and data	40 (d) 40 Hz 40 Hz
3. Survival Craft a. EPIRB	
D. Radiodetermination Stations	
1. Radionavigation a. $pY \leq 200W$ b. $pY > 200W$	20 10
2. Radiolocation	10
E. Broadcasting Stations	10 Hz

Frequency Band 4 to 29.7 MHz	Frequency Tolerance
I. Fixed Stations	
A. $pY \leq 500W$, except C and D below	20
B. $pY > 500W$, except C and D below	10
C. SSB/ISB Radiotelephone	20 Hz
D. Class F1B emissions	10 Hz
II. Mobile (Aeronautical, Land Maritime) Stations	
A. Aeronautical mobile stations	
1. Aeronautical	
a. $pY \leq 500W$, except SSB	30
b. $pY > 500W$, except SSB	10
c. SSB Radiotelephone	10Hz (c)
2. Aircraft	
a. All except SSB	30
b. SSB Radiotelephone	20 Hz
B. Land mobile stations	
1. Base	
a. $pY \leq 500W$, except SSB	20
b. $pY > 500W$, except SSB	10
c. SSB Radiotelephone	20 Hz
2. Land Mobile	
a. All except SSB	30
b. SSB Radiotelephone	20 Hz
C. Maritime mobile stations	
1. Coast	
a. SSB radiotelegraph	20 Hz
b. Direct printing telegraph and data	10 Hz
c. Other than above	20 Hz (e)
2. Ship	
a. Class A1A emission	10
b. Other than A1A emissions	
(1) SSB radiotelephone	50 Hz
(2) Direct printing, telegraphy and data	10 Hz
(3) Other than above	50 Hz (f)
3. Survival Craft	50
III. Broadcasting stations	2
IV. Space and earth stations	20

Frequency Band 29.7 to 108 MHz	Frequency Tolerance
I. Fixed stations	
A. 29.7-50 MHz, single-channel analog/digital FM/PM	5 (g)
B. Other than above	
1. $pY \leq 10$ W	20
2. $pY > 10$ W	5
II. Mobile (Aeronautical, Land, Maritime) Stations	
A. 29.7-50 MHz, analog and digital FM/PM	
1. Land and mobile	5 (g)
2. Portables	20 (g)
B. Other than above	
1. $pY \leq 10$ W	20 (h)
2. $pY > 10$ W	5
III. Aeronautical Radionavigation stations (Marker beacons on 75 MHz)	50
IV. Broadcasting stations	
A. TV sound and vision	500 Hz (i)(j)
B. Other than TV	
1. $pY \leq 10$ W	3000 Hz
2. $pY > 10$ W	2000 Hz
V. Space and earth stations	20

Frequency Band 108 to 470 MHz	Frequency Tolerance
I. Fixed stations	
A. 108 - 406.1 MHz, all except below	5
B. 138 - 150.8 and 162 - 174 MHz narrowband analog/digital FM/PM except C below	1.5
C. 162 - 174 MHz, low power and splinter channels 1. pY ≤ 10 W 2. pY > 10 W	5 2
D. 406 - 470 MHz 1. 406.1 - 420 MHz a. Multi-Channel b. Analog/Digital FM/PM (1) Wideband (2) Narrowband	2.5 (k)(l) 2.5 (g) 1.0 (g)
2. Other than above a. pY ≤ 10 W b. pY > 10 W	5 2.5
II. Mobile (Aeronautical, Land, Maritime) Stations	
A. Aeronautical mobile stations	
1. Aeronautical a. Analog/digital FM/PM (1) 162 - 174 MHz (a) Wideband (b) Narrowband (2) 406.1 - 420 MHz (a) Wideband (b) Narrowband b. Other than above	5 (g) 1.5 (m) 2.5 (g) 1.0 (k) 20
2. Aircraft	
a. 156 - 174 MHz (1) 162 - 174 MHz analog/digital FM/PM (a) Wideband (b) Narrowband (2) 406.1 - 420 MHz analog/digital FM/PM (a) Wideband (b) Narrowband	5 5 (g) 2.5 (m) 5 (g) 2.5 (m)
b. Other than above	20

Frequency Band 108 to 470 MHz (cont.)	Frequency Tolerance
B. Land mobile stations	
1. Base	
a. 108 - 406.1 MHz, all except below b. 138 - 150.8 and 162 - 174 MHz analog/digital FM/PM (1) Wideband (2) Narrowband c. 162 - 174 splinter channel (1) $pY \leq 10$ W (2) $pY > 10$ W d. 220 - 222 MHz, single channel, narrowband e. 406.1 - 470 MHz (1) 406.1 - 420 MHz analog/digital FM/PM (a) Wideband (b) Narrowband (2) Other than above (a) $pY \leq 10$ W (b) $pY > 10$ W	5 5 (g) 2.5 (m) 5 2 0.1 2.5 (g) 1.0 (m) 5 2.5
2. Land Mobile	
a. 138 - 150.8 and 162 - 174 MHz, all except below b. 138 - 150.8 and 162 - 174 MHz, analog/digital FM/PM (1) Wideband (2) Narrowband c. 162 - 174 MHz (splinter channels) (1) $pY \leq 10$ W (2) $pY > 10$ W d. 220 - 222 MHz (single channel, narrowband) e. 406.1 - 420 MHz (1) Analog/digital FM/PM (2) Other than above f. Other than above	5 (h) 5 (g) 2.5 (m) 5 2 1.5 (n) 5 (g) 5 15

Frequency Band 108 to 470 MHz (cont.)	Frequency Tolerance
C. Maritime mobile stations	
1. Coast	
a. 150.8 - 162.0125 MHz (1) FM (a) $pY < 3\text{ W}$ (b) $3\text{ W} \leq pY \leq 50\text{ W}$ (2) Other than above (a) $pY < 3\text{ W}$ (b) $3\text{ W} \leq pY \leq 100\text{ W}$ (c) $pY \geq 100\text{ W}$ b. Outside of 150.8 - 162.0125 MHz (1) 162 - 174 MHz, analog/digital FM/PM (a) Wideband (b) Narrowband (2) 406.1 - 420 MHz, analog/digital FM/PM (a) Wideband (b) Narrowband (2) [sic] Other than above	 100 (o) 50 (o) 10 5 2.5 5 (g) 1.5 (m) 2.5 (g) 1.0 (m) 10
2. Ship	
a. 150.8 - 162.0125 MHz (FM, $pY < 25\text{ W}$) b. 156 - 162 MHz c. 162 - 174 MHz, analog/digital FM/PM (1) Wideband (2) Narrowband d. 406.1 - 420 MHz analog/digital FM/PM (1) Wideband (2) Narrowband (3) Other than above e. 450 - 470 MHz f. Outside above bands	100 (o)(p) 10 5 (g) 2.5 (m) 5 (g) 2 (m) 5 5 20 (p)
3. Survival craft	
a. 156 - 174 MHz b. Other than above	10 (p) 20 (q)
III. Radiodetermination Stations	
A. Radionavigation Stations	
1. Radar	50
2. Other than radar	20
B. Radiolocation stations	
1. Radar	50 (r)
2. Other than radar	50

Frequency Band 108 to 470 MHz (cont.)	Frequency Tolerance
IV. Broadcasting Stations	
A. TV sound and vision	500 Hz (i)(m)
B. Other than TV	2000 Hz
V. Space and Earth Stations	20

Frequency Band 470 to 960 MHz	Frequency Tolerance
I. Fixed Stations	
A. Point-to-Multipoint (932 - 932.5, 941 - 941.5 MHz)	1.5 (l)
B. Point-to-Point (932.5 - 935, 941.5 - 944 MHz)	2.5 (l)
C. Other than above	5
II. Mobile (Aeronautical, Land, Maritime) Stations	
A. Land (Aeronautical, Base, Coast)	5
B. Mobile (Aircraft, Land Mobile, Ship)	
(a) $pY \leq 3$ W	20
(b) $pY > 3$ W	5
III. Radiolocation Stations	400
IV. Broadcasting Stations	
A. TV Broadcasting	500 Hz (i)(g)
B. TV Broadcasting Translators	200
V. Space and Earth Stations	20

Frequency Band 960 to 1215 MHz	Frequency Tolerance
I. Aeronautical Radionavigation Stations	
A. Aeronautical and Ship Stations	10
B. Aircraft	50
II. IFF/ATCRBS of similar type station	
A. Interrogators 1030 MHz	200 kHz
B. Transponders 1090 MHz	3 MHz

Frequency Band 1215 to 10500 MHz	Frequency Tolerance
I. Fixed Stations	
A. $pY \leq 100$ W	
1. 1215 to 4000 MHz	30 (l)
2. 4 to 10500 MHz	50 (l)
B. $pY > 100$ W	10 (l)
II. Mobile (Aeronautical, Land, Maritime) Stations	
A. 1215 to 2450 MHz	20
B. 2450 to 4000 MHz	30
C. 4000 to 10500 MHz	50
III. Radiodeterminations Stations	
A. 1215 to 2450 MHz	500
B. 2450 to 4000 MHz	800
C. 4000 to 10500 MHz	1250
IV. Space and Earth Stations	20

Frequency Band 10.5 to 30 GHz	Frequency Tolerance
I. Fixed Stations	
A. 21.2 - 23.6 GHz	300
B. 21.8 Ghz - 22 Ghz and 23 - 23.2 GHz	500 (s)
C. Other than above	50 (l)
II. Mobile (Aeronautical, Land, Maritime) Stations	100
III. Radiodetermination Stations	2500
IV. Space and Earth Stations	50

Frequency Band Greater than 30 GHz	Frequency Tolerance
I. Fixed Stations	75
II. Mobile (Aeronautical, Land, Maritime) Stations	150
III. Radiodetermination Stations	5000
IV. Space and Earth Stations	75

Notes For Frequency Tolerances

- (a) If the emergency transmitter is used as the reserve transmitter for the main transmitter, the tolerance for ship station transmitters applies.
- (b) 20 Hz is applicable to other than Aeronautical Mobile (R) frequencies.
- (c) The tolerance for aeronautical stations in the Aeronautical Mobile (R) service is 10 Hz.
- (d) For A1A emissions the tolerance is 50 ppm.
- (e) For A1A emissions the tolerance is 10 ppm.
- (f) For ship station transmitters in the band 26.175-27.5 MHz, on board small craft, with a carrier power not exceeding 5 W operating in or near coastal waters and utilizing A3E or F3E and G3E emissions, the frequency tolerance is 40 ppm.
- (g) This tolerance is based on emissions with an analog input and a necessary bandwidth of 16 kHz. Stations with digital inputs may require a different necessary bandwidth, but still must meet all other standards. It does not apply to FM wireless microphone systems whose $pY < 0.1$ watts, and fixed stations with multichannel emissions. The measurement method for the receiver frequency tolerance is contained in paragraph 2.1.2.E.1 of Annex F.
- (h) 50 ppm applies to wildlife telemetry with mean power output less than 0.5 W.
- (i) In the case of television stations of:
 - (1) 50 W (vision peak envelope power) or less in the band 29.7 - 100 MHz;
 - (2) 100 W (vision peak envelope power) or less in the band 100 - 965 MHz and which receive their input from other television stations or which serve small isolated communities. It may not, for operational reasons, be possible to maintain this tolerance. For such stations, this tolerance is 1000 Hz.
- (j) For transmitters for system M(NTSC) the tolerance is 1000 Hz. However, for low power transmitters using this system note (m) applies.
- (k) The receiver frequency tolerance shall be maintained within 10 ppm.
- (l) See Annex F, paragraph 2.1.2.C.1.(a), for the measurement method of
 - (1) multichannel equipments in the 406.1 - 420 MHz band,
 - (2) (2) [sic] point-to-point and point-to-multipoint equipments in the bands 932-935/941 - 944 MHz, or (3) point-to-point and transportable type equipments operating between

1710 MHz and 15.35 GHz (except for systems designed to use scatter techniques).

(m) This tolerance is for stations with emissions having a necessary bandwidth of 11 kHz or less. It does not apply to FM wireless microphone systems whose mean output power does not exceed 0.1 watt.

(n) This standard is for narrowband operations with a necessary bandwidth of 4 kHz or less

(o) The frequency tolerance standard is for maritime mobile stations using FM emissions in the band 150.8 - 162.0125 MHz with a necessary bandwidth of less than or equal to 16 kHz. See Annex F, paragraph 2.1.2.B, for the measurement method.

(p) Outside band 156 - 174 MHz, for transmitters used by on-board communications stations, a tolerance of 5 ppm shall apply.

(q) For transmitters used by on-board communications stations, a tolerance of 5 ppm applies.

(r) A frequency tolerance of 10 ppm applies to wind profiler radars operating on the frequency 449 MHz.

(s) Applies to frequency pairs 21.825 GHz, 23.025 GHz; 21.875, 23.075 GHz; 21.925, 23.125GHz; and, 21.975 GHz, 23.175 GHz only.

5.2.2 Location of Standards for Levels of Unwanted Emissions

5.2.2.1 Location of Specific Standards

The location of levels of unwanted emission standards are provided in Table 5.2.2.1 below. The table specifies the section number for each standard by station type.

Table 5.2.2.1

Station Type: FIXED STATIONS	Location of Standards
Single Sideband and Independent Sideband Equipment (2 - 29.7 MHz)	§ 5.3.1
Multichannel (406.1 - 420 MHz)	§ 5.3.3
Point-to-point and point-to-multipoint (932 - 935/941 - 944 MHz)	§ 5.3.3
Point-to-point and transportable, except for systems using scatter techniques (1.71 - 15.35 GHz)	§ 5.3.3
Analog or Digital FM/PM Wideband Operations (30 - 50, 162 - 174, and 406.1 - 420 MHz)	§ 5.3.5.1
Analog or Digital FM/PM Narrowband Operations (138 - 150.8, 162 - 174, and 406.1 - 420 MHz)	§ 5.3.5.2
Low Power Channels and Splinter Channels (162 - 174 MHz and 406.1 - 0 420 MHz)	§ 5.3.7
Telemetry, Terrestrial (1435 - 1535, 2200 0 2290 and 2310 - 2390 MHz)	§ 5.3.8
Analog Transmissions and Low Power Transmit (21.2 - 23.6 GHz)	§ 5.3.9
Other than above	§ 5.2.2.2

Station Type: LAND and MOBILE STATIONS	Location of Standards
Single Sideband and Independent Sideband Equipment (2 - 29.7 MHz)	§ 5.3.1
Maritime Mobile Stations using FM (150.8 - 162.-125 MHz)	§ 5.3.2
Land Mobile, Single Channel Narrowband Operations (220 - 222 MHz)	§ 5.3.4
Analog or Digital FM/PM Wideband Operations (29.7 - 50, 162 - 174, and 406.1 - 420 MHz)	§ 5.3.5.1
Analog or Digital FM/PM Narrowband Operations (162 -174 MHz)	§ 5.3.5.2
Low Power Channels and Splinter Channels (162 - 174 MHz and 406.1 - 0 420 MHz)	§ 5.3.6
Telemetry, Terrestrial (1435 - 1535, 2200 0 2290 and 2310 - 2390 MHz)	§ 5.3.7
Other than above	§ 5.2.2.2

Station Type: RADIODETERMINATION STATIONS	Location of Standards
Primary radars including space-based radars on a case-by-case basis (100 MHz to 40 Ghz)	Part 5.5
Other than above	§ 5.2.2.2

Station Type: BROADCASTING STATIONS	Location of Standards
All bands	§ 5.2.2.2

Station Type: EARTH and SPACE STATIONS (excluding space-based radars)	Location of Standards
Below 470 MHz § 5.2.2.2 [sic] 470 MHz and above	Part 5.6 [sic]

5.2.2.2 General Standards

Below 29.7 MHz, the following standard applies when no other standard applies:

The mean power of any unwanted emissions supplied to the antenna transmission line, as compared with the mean power of the fundamental, shall be in accordance with the following:

1. On any frequency removed from the assigned frequency by more than 100 percent, up to and including 150 percent of the authorized bandwidth, at least 25 decibels attenuation;
2. On any frequency removed from the assigned frequency by more than 150 percent, up to and including 300 percent of the authorized bandwidth, at least 35 decibels attenuation; and
3. On any frequency removed from the assigned frequency by more than 300 percent of the authorized bandwidth, for transmitters with mean power of 5 kilowatts or greater, at least 80 decibels attenuation; and for transmitters with mean power less than 5 kilowatts, at least $43 + 10 \log(pY)$ decibels attenuation (i.e., 50 microwatts absolute level), except that
 - a. For transmitters of mean power of 50 kilowatts or greater and which operate over a frequency range approaching an octave or more, a minimum attenuation of 60 decibels shall be provided and every effort should be made to attain at least 80 decibels attenuation.
 - b. For hand-portable equipment of mean power less than 5 watts, the attenuation shall be at least 30 decibels, but every effort should be made to attain $43 + 10 \log(pY)$ decibels attenuation (i.e., 50 microwatts absolute level).
 - c. For mobile transmitters, any unwanted emissions shall be at least 40 decibels below the fundamental without exceeding the value of 200 milliwatts, but every effort should be made to attain $43 + 10 \log(pY)$ decibels attenuation (i.e., 50 microwatts

absolute level),

d. When AI A, FIB, or similar types of narrowband emissions are generated in an SSB transmitter, the suppressed carrier may fall more than 300 percent of the authorized bandwidth from the assigned frequency. Under these conditions, the suppressed carrier shall be reduced as much as practicable and shall be at least 50 decibels below the power of the fundamental emission.

29.7 MHz and above, the following standard applies when no other standard applies:

The mean power of any emission supplied to the antenna transmission line, as compared with the mean power of the fundamental, shall be in accordance with the following (above 40 GHz these are design objectives pending further experience at these orders of frequency:

1. On any frequency removed from the assigned frequency by more than 75 percent, up to and including 150 percent, of the authorized bandwidth, at least 25 decibels attenuation;

2. On any frequency removed from the assigned frequency by more than 150 percent, up to and including 300 percent, of the authorized bandwidth, at least 35 decibels attenuation; and

3. On any frequency removed from the assigned frequency by more than 300 percent of the authorized bandwidth:

- a. For transmitters with mean power of 5 kilowatts or greater, attenuation shall be at least 80 decibels.

- b. For transmitters with mean power less than 5 kilowatts, spurious output shall not exceed 50 microwatts (i.e., $43 + 10 \log(pY)$) decibels attenuation except for frequency modulated maritime mobile radiotelephone equipment above 30 MHz as follows:

- (1) The mean power of modulation products falling in any other international maritime

mobile channel shall not exceed 10 microwatts for mean transmitter power 20 watts or less.

(2) The mean power of any other unwanted emission on any discrete frequency within the international maritime mobile band shall not exceed 2.5 microwatts for transmitters with mean power of 20 watts or less.

(3) For maritime mobile transmitters of mean power above 20 watts, these 2.5 and 10 microwatt limits may be increased in proportion to the increase of the mean power of the transmitters above this 20 watts.

5.3 FIXED AND MOBILE STATIONS

5.3.1 HF Single Sideband and Independent Sideband Equipments (2-29.7 MHz)

This standard specifies that spectrum standards for single sideband equipment for single channel voice, direct printing telegraphy and data, in the Fixed and Mobile services between 2 and 29.7 MHz (Except in the bands allocated exclusively to the Aeronautical Mobile (R) service).

A. Transmitter Standards

1. For unwanted emissions for fixed and mobile services (except the land mobile service), the peak power of any emission on any frequency removed from the center of the authorized bandwidth¹ (BW) by a displacement frequency (f_d in kHz) shall be attenuated below the peak envelope power (pX) of the transmitter in accordance with the following schedule:

f_d in kHz	Attenuation in dB
$50\% BW < f_d \leq 150\% BW$	26
$150\% BW < f_d \leq 250\% BW$	35
$f_d > 250\% BW$	$40 + 10 \log(pX)$ or 80 whichever is the lesser attenuation.

Figure 5.3.1 below provides an example of HF SSB emission plotted using the measurement method described in Annex F. The figure also shows the standard superimposed on the plot to show conformance.

For the land mobile service, the peak power of any emission on any frequency removed from the center of the authorized bandwidthⁱ (BW) by a displacement frequency (f_d in kHz) shall be attenuated below the peak envelope power (pX) of the transmitter in accordance with the following schedule:

f_d in kHz	Attenuation in dB
$1.75 \text{ kHz} \leq f_d < 5.25 \text{ kHz}$	28
$5.25 \text{ kHz} \leq f_d < 8.75 \text{ kHz}$	38
$f_d > 8.75 \text{ kHz}$	$43+10 \log (pX)$

2. Where suppressed carrier operation is employed, transmitters shall be capable of operation with the emitted carrier power attenuated at least 40 dB below peak envelope power.

3. Where interoperability with conventional double sideband AM receivers is required, single sideband transmitters shall have the capability to transmit the carrier at a level within 6 dB of the peak envelope power.

4. The upper sideband mode shall be employed where there is need for working among international services.

B. Receiver Standards

1. Selectivity. The passbandⁱⁱ shall be no greater than the authorized bandwidth of emission and the slope of the selectivity characteristic outside the passband shall be 100 dB/kHz.

2. Tunability. The equipment shall be capable of operation on any frequency within its tuning range. However, where a synthesizer is employed as the frequency controlling element, the receiver shall be capable of operation on any frequency which is an integral multiple of 0.1 kHz.

C. Antenna Standardsⁱⁱⁱ

Fixed Station

1. Directive antennas are not required below 4 MHz. Directive antennas shall be employed above 4 MHz unless in specific cases they are shown to be impracticable.

2. Minimum forward power gain over an isotropic radiator located at the same height over the same earth as directive antenna shall be 10 dB in the

range 4 to 10 MHz and 15 dB in the range 10 to 30 MHz^{iv}. The gain of any reference antenna used in an actual measurement must be specified relative to an isotropic antenna.

3. The antenna gain in the desired direction over that of a lobe in any other direction shall be greater than 6 dB.

Mobile Station

To the extent practicable, land stations shall use antennas designed so as to reduce their radiation and/or their susceptibility to interference in those directions where service is not required.

[frequency graph example (Figure 5.3.1) from page 35 not included]

RSL (dBm) vs. Frequency (MHz)
Figure 5.3.1

Example of measured Emission for HT SSB Transmitter Fundamental with Standard in Section 5.3.1.

Modulation Tones = 400 Hz and 1800 Hz, Resolution. BW = 100 Hz, Span = 21.1 kHz.

5.3.2 Maritime Mobile Stations using FM (150.8-162.0125 MHz)

This standard is for maritime mobile stations using FM emissions in the band 150.8 - 162.0125 MHz with a necessary bandwidth of less than or equal to 16 kHz. Ship station transmitters, except portable ship station transmitter, must be capable of automatically reducing power to 1 watt or less when tuned to the frequency 156.375 MHz or 156.650 MHz. A manual override will permit full carrier power operation on these channels.

5.3.3 Fixed Services (406.1-420 MHz Band, the 932-935/941-944 MHz Bands, and the 1710 MHz-15.35 GHz Frequency Range)

The following standard is for Fixed Services employing: (a) multichannel equipments in the 406.1 - 420 MHz band, (b) point-to-point and point-to-multipoint equipments in the bands 932 - 935/941 - 944 MHz, (c) point-to-point and transportable type equipments operating between 1710 MHz and 15.35 GHz (except for systems designed to use scatter techniques). Standards for receivers operating in the bands 932 - 935/941 - 944 MHz, are not mandatory and are presented herein to provide guidelines to promote efficient and effective use of these shared frequencies.

A. Transmitter Standards

1. Unwanted Emissions. The mean power of any emission on any frequency removed from the center of the authorized bandwidth (BW) by a displacement frequency (f_d in kHz) shall be attenuated below the mean output power (pY) of the transmitter in accordance with the following schedule:

(a) For transmission other than those employing digital modulation techniques:

f_d in kHz	Attenuation in dB
$50\% \text{ BW} < f_d \leq 100\% \text{ BW}$	25
$100\% \text{ BW} < f_d \leq 250\% \text{ BW}$	35
$f_d > 250\% \text{ BW}$	$43 + 10\log(pY)$ or 80 whichever is the lesser attenuation

(b) For transmissions employing digital - modulation techniques: ^v
In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 50 percent, up to and including 250 percent, of the authorized bandwidth as specified by the following equation but at least 50 decibels:

$$A = 35 + 0.8(\% - 50) + 10 \log(BW)$$

where:

A = attenuation (in decibels) below the mean output power level,
% = percent of the authorized bandwidth removed from the assigned frequency.

and:

BW = authorized bandwidth in MHz.

Attenuation greater than 80 decibels is not required.

In any 4 kHz band, the center frequency of which is removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log(pY)$ decibels, or 80 decibels, whichever is the lesser attenuation. The Measurement Method is in paragraph 2.1.1.C.1.(b) of Annex F.

(c) In the bands 932 - 935 and 941 - 944 MHz, fixed stations using

transmissions employing digital modulation techniques with a bandwidth of 12.5 kHz or less, the power of any emission shall be attenuated below the unmodulated carrier power (mean power can be used) of the transmitter (pY) in accordance with the following schedule:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 2.5 kHz up to and including 6.25 kHz: At least $53 \log(f_d/2.5)$ decibels;

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 6.25 kHz up to and including 9.5 kHz: At least $103 \log(f_d/3.9)$ decibels;

(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 9.5 kHz up to and including 15 kHz: At least $157 \log(f_d/5.3)$ decibels;

(4) On any frequency removed from the center of the authorized bandwidth by a displacement frequency greater than 15 kHz: At least $50 + 10 \log(pY)$ or 70 decibels, whichever is the lesser attenuation.

(d) In the bands 932 - 935 and 941 - 944 MHz, fixed stations using transmissions employing digital modulation techniques with a bandwidth greater than 12.5 kHz, the power of any emission shall be attenuated below the unmodulated carrier power (mean power can be used) (pY) of the transmitter in accordance with the following schedule:

(1) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5 kHz up to and including 10 kHz: At least $83 \log(f_d/5)$ decibels;

(2) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 10 kHz up to and including 250 percent of the authorized bandwidth: At least $116 \log(f_d/6.1)$ or $50+10 \log(pY)$ or 70 decibels, whichever is the lesser attenuation;

(3) On any frequency removed from the center of the authorized bandwidth by more than 250 percent of the authorized bandwidth: At least $43+10 \log (pY)$ decibels or 80 decibels, whichever is the lesser attenuation.

2. The maximum equivalent isotropic radiated power (EIRP) shall not exceed the values specified below. However, the additional constraints of Section 8.2.34 of these Regulations apply.

Frequency Band (MHz)	Maximum Allowable EIRP (dBm)
406.1 - 420	80
932 - 932.5	47
932.5 - 935	70
941 - 941.5	60
941.5 - 944	70
1710 - 4990	80
7125 - 15350	85

B. Receiver Standards

1. The receiver unwanted signals shall be attenuated at least 60 dB relative to the receiver sensitivity at the center of the passband. The Measurement Method is in paragraph 2.1.1.C.2.(b) of Annex F.

2. Selectivity. Receiver selectivity is the degree to which a receiver is able to discriminate against the effects of undesired signals primarily outside the authorized emission bandwidth that arrive at its RF input terminals.

The -3 dB receiver bandwidth should be commensurate with the authorized emission bandwidth plus twice the frequency tolerance of the transmitter specified in Section 5.2.1. The - 0 dB receiver bandwidth shall not exceed five times the - 3 dB receiver bandwidth.

3. Conducted Undesired Emissions are those undesired signals generated in the receiver and leaving the receiver by way of the receiving transmission line.

Conducted emissions from the receiver on any frequency, as measured at the radio frequency interface point to the antenna system, shall not exceed -85 dBW. For the bands 406.1 - 1420 MHz and 932 - 935/941 - 944 MHz, conducted emissions shall not exceed -57 dB.

4. Noise Figure. The noise figure of a receiver is the ratio expressed in dB of (1) the output noise power to (2) the portion of noise power attributable

to thermal noise in the input termination at 290 kelvins.

The receiver noise figure including pre-amplifier should be 9 dB or less for frequencies below 4400 MHz, 12 dB or less for frequencies between 4400 MHz, and 10 GHz, and 14 dB or less for higher frequencies (up to 15.35 GHz).

C. Antenna Standards

The following limitations do not apply to transportable antenna systems when used in tactical and training operations. Additionally, the following limitations do not apply to multipoint distribution systems (point-to-multipoint) operating in the bands 406.1 - 420, 932 - 932.5 and 941 - 941.5 MHz.

1. Each station shall employ directional antennas with the major lobe of radiation directed toward the receiving station with which it communicates, or toward any passive repeater that may be used.

2. Antenna Radiation Pattern. The antenna radiation pattern is the relative power gain as a function of direction for the specified polarization. Directional antennas shall meet the performance standards indicated in Table 5.3.3. For assignments in bands shared with satellite-space services, determination on additional beamwidth limitations shall be made on a case-by-case basis if mutual interference problems are likely to be involved.

TABLE 5.3.3

Frequency Band	Maximum Beamwidth (3 dB point)	Minimum suppression at angle in degrees from center line of main beam (dB)						
		5 - 10°	10 - 15°	15 - 20°	20 - 30°	30 - 100°	100 - 140°	140 - 180°
406.1 - 420 MHz ¹	80°	-	-	-	-	10	10	10
a) 932.5 - 935 MHz/941.5 - 944 MHz ²	14°	-	6	11	14	17	20	24
b) 932.5 - 935 MHz/941.5 - 944 MHz ²	20°	-	-	6	10	13	15	20
1710 - 1850 MHz ³	10°	-	14	16	18	23	24	30
1710 - 1850 MHz ⁴	8°	5	18	20	20	25	28	36
2200 - 2400 MHz	8.5°	4	12	16	16	24	25	30
4.4 - 4.99 GHz	4°	13	20	23	24	29	31	31
7.125 - 8.5 GHz	2.5°	19	23	28	30	34	35	43
14.4 - 15.35 Ghz	1.5°	21	26	31	35	37	41	48

Notes for Table 5.3.3

1. Any secondary lobe.
2. The use of a high performance antenna may be required where interference problems can be resolved by the use of such antennas.
3. These suppression levels could be met, e.g., by a 1.2 meter (4 foot) diameter parabolic antenna.
4. These suppression levels could be met, e.g., by a 1.83 meter (6 foot) diameter parabolic antenna.

5.3.4 Land Mobile, Single Channel Narrowband Operations (220-222 MHz Band)

The operations are limited to single channel, narrowband equipment. The 2 MHz available in this band are allocated in 400 channels each 5 kHz wide and paired to create 200 narrowband channel pairs. See Section 4.3.15 for the channeling plan.

A. Transmitter Standards

1. Bandwidth Limitations: The maximum authorized bandwidth shall be 4 kHz.

2. Unwanted Emissions: On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz), the power of any emission shall be attenuated below the peak envelope power (pX) watts in accordance with the following schedule:

f_d in kHz		Attenuation in dB
		$30 + 20(f_d - 2)$ or
$2 < f_d \leq 3.75$	the lesser of	$55 + 10 \log(pX)$ or 65
$3.75 < f_d$	at least	$55 + 10 \log(pX)$

The Measurement Method is in paragraph 2.1.1 .D of Annex F.

B. Geographic Separation of Sub-Band A Base Station Receivers and Sub-Band B Base Station Transmitters

Base station receivers utilizing channels assigned for sub-band A as designated in Chapter 8 will be geographically separated from those base station transmitters utilizing channels removed 200 kHz or less and assigned from sub-band B as follows:

Separation Distances (kilometers)	Effective Radiated Power (Watts)*
0.0 - 0.3	**
0.3 - 0.5	5
0.5 - 0.6	10
0.6 - 0.8	20
0.8 - 2.0	25
2.0 - 4.0	50
4.0 - 5.0	100
5.0 - 6.0	200
over 6.0	500

* Transmitter peak envelope power shall be used to determine effective radiated power.

** Stations separated by 0.3 km or less shall not be authorized. This table does not apply to the low-power mobile data channels 196-200. (See Section C.)

Except for nationwide assignments, the separation of co-channel base stations shall be 120 kilometers. Shorter separations will be considered on a case-by-case basis upon submission of a technical analysis indicating that at least a 10 dB protection will be provided to an existing station's 39 dBp signal level contour.

C. Limitations on Power and Antenna Height:

1. The permissible effective radiated power (ERP) with respect to antenna heights shall be determined from the following table. These are maximum values and applications are required to justify power levels requested.

ERP vs Antenna Height Table

Antenna Height above Average Terrain (HAAT) Meters	Effective Radiated Power (ERP) Watts*
Up to 150	500
150 to 225	250
225 to 300	125
300 to 450	60
450 to 600	30
600 to 750	20

750 to 900	15
900 to 1050	10
Above 1050	5

* Transmitter PEP shall be used to determine ERP.

2. The maximum permissible ERP for mobile units is 50 watts. Portable units are considered as mobile units.

3. Channels 196-200 are limited to 2 watts ERP and a maximum antenna height of 6.1 meters (20 feet) above ground.

5.3.5 Standards for Fixed and Mobile Analog or Digital FM/PM Operations (29.7 - 50, 138 - 150.8, 162 - 174, and 406.1 - 420 MHz Bands)

5.3.5.1 Standard for Fixed and Mobile Analog or Digital FM/PM Wideband Operations (29.7-50, 162-174, and 406.1-420 MHz Bands)

These standards do not apply to:

- o FM wireless microphone systems whose mean output power does not exceed 0.1 watt.
- o (Equipment operating on splinter channels. (See Section 5.3.6).
- o Fixed stations equipment with multichannel emissions (see Section 5.3.3).

The following is for fixed and mobile/land mobile service employing fixed, land, mobile and portable stations using analog or digital FM or PM emissions in the bands 29.7 - 50, 162 - 174, and 406.1 - 420 MHz. These standards are based upon emissions with analog input and a necessary bandwidth of 16 kHz.^{vi}

Stations with digital input may require a different necessary bandwidth but still must meet all other standards.

A. Transmitter

1. Unwanted Emissions: The power of any unwanted emission on any frequency removed from the center of the authorized bandwidth (BW) by a displacement frequency (f_d in kHz) shall be attenuated below the unmodulated carrier power (pZ) in accordance with the following and Figure 5.3.5.1.

f_d in kHz	Attenuation in dB
$5\text{kHz} < f_d \leq 10\text{ kHz}$	All bands: $83 \log (f_d/5)$
$10\text{ kHz} < f_d \leq 250\% \text{ BW}$	29.7 - 50 MHz & 162 - 174 MHz: $291 \log (f_d^2/11)$ or 50 whichever is the lesser attenuation. 406.1 - 420 MHz: $1161 \log (f_d/6.1)$ or $50 + 10 \log (\text{pZ})$ or 70 whichever is the lesser attenuation.
$f_d > 250\% \text{ BW}$	All bands: $50 + 10 \log (\text{pZ})$ (i.e. 10 microwatts absolute) Portable $43 + 10 \log (\text{pZ})$ (i.e. 50 microwatts absolute)

Figure 5.3.5.1 shows the mask for a fixed or mobile station operating in the bands 29.7-50, 162-174 and 406.1- 420 MHz with an authorized bandwidth of 25 kHz and a mean power of 100 watts.

Figure 5.3.5.1 Levels of Unwanted Emissions[sic]

2. Frequency Deviation for all station classes and frequency bands shall not exceed ± 5 kHz. The Measurement Method is in paragraph 2.1.1.E.1 of Annex F.

B. Receiver

1. Spurious Response Attenuation:

Station Class	Band (MHz)		
	29.7 - 50	162 - 174	406.1 - 420
Land, Fixed Mobile	85 dB	85 dB	85 dB
Portable	60 dB	60 dB	50 dB

2. Adjacent Channel Selectivity:

ANALOG			
Station Class	Band (MHz)		
	29.7 - 50	162 - 174	406.1 - 420
Land, Fixed, Mobile	80 dB	80 dB	80 dB
Portable	50 dB	70 dB	60 dB

DIGITAL			
Station Class	Band (MHz)		
	29.7 - 50	162 - 174	406.1 - 420
Land, Fixed, Mobile	50 dB	55 dB	55 dB
Portable	50 dB	50 dB	50 dB

3. Intermodulation Attenuation:

DIGITAL			
Station Class	Band (MHz)		
	29.7 - 50	162 - 174	406.1 - 420
Land, Fixed, Mobile	60 dB	70 dB	70 dB
Portable	50 dB	50 dB	50 dB

4. Conducted Spurious Emissions: All station classes and all bands 57 Db.

5. The Measurement Method is in paragraph 2.1. I.E. 1 of Annex F.

5.3.5.2 Standards for Fixed and Mobile Analog or Digital FM/PM Narrowband Operations (138 - 150.8, 162 - 174 and 406.1 - 420 MHz Bands)

The standards outlined in this section apply to narrowband systems designed to operate in accordance with the timetable below and apply to all stations in the 138 - 150.8, 162 - 174 and 406.1 - 420 MHz bands. Reference is also made to changes made to the channeling plans and rules of use identified in Sections 4.3.7a and 4.3.9a. These standards do not apply to FM wireless microphone systems whose mean output power does not exceed 0.1 watt.

Standard

The following is for fixed and mobile/land mobile service employing fixed, land, mobile, and portable stations using DE, FID or FIE emissions in the bands 138-150.8, 162-174 and 406. 1420 MHz with a necessary bandwidth of 11 kHz or less. The standard applies to analog and digital transmitters and receivers.

A. Transmitter

1. Unwanted Emissions: The power of any unwanted emission on any frequency removed from the center of the authorized bandwidth (BW) by a displacement frequency (f_d) shall be attenuated below the unmodulated carrier power (pZ) in accordance with the following and the emission mask in Figure 5.3.5.2.

Displacement Freq (f_d)	Attenuation (dB)
$0 < f_d \leq 2.5$ kHz	0
2.5 kHz $< f_d \leq 12.5$ kHz	$7(f_d - 2.5)$
12.5 kHz $< f_d$	$50 + 10 \log(pZ)$ or 70 whichever is smaller

2. Frequency Deviation for all FM or PM station classes shall not exceed ± 2.5 kHz for F3E emission, and ± 3.11 kHz for FID or FIE emission using C4FM modulation with a digital transmission rate of 4800 symbols per second.

3. The Measurement Method is in paragraph 2.1.1.E.2 of Annex F.

B. Receiver

1. Spurious Response Attenuation:

Station Class	138-150.8 MHz 162 - 174 MHz	406.1 - 420 MHz
Land, Fixed	70 dB	70 dB
Mobile	70 dB	70 dB
Portable	60 dB	60 dB

2. Adjacent Channel Selectivity:

Station Class	138-150.8 MHz 162 - 174 MHz F3E/F1D/F1E	406.1 - 420 MHz F3E/F1D/F1E
Land, Fixed	70/60/60 dB	70/60/60 dB
Mobile	70/60/60 dB	70/60/60 dB
Portable	60/50/50 dB	60/50/50 dB

3. Intermodulation Rejection:

Station Class	138-150.8 MHz 162 - 174 MHz	406.1 - 420 MHz
Land, Fixed	70 dB	70 dB
Mobile	70 dB	70 dB
Portable	50 dB	50 dB

4. Conducted Spurious Emissions: All station classes and all bands -57 dBm.

5 The Measurement Method is in paragraph 2.1.1.E.2 of Annex F.

5.3.6 Low Power Channels and Splinter Channels (162 - 174 MHz Band)

1. The following transmitter standards are for the use of fixed and mobile low power channels identified in Section 4.3.8 and splinter channels identified in Section 4.3.10.

2. Emission -- For FM or PM emission the maximum frequency deviation plus the highest audio tone shall not exceed 0.5 times the authorized bandwidth (authorized bandwidth is equal to $2D + 2M$)

3. Unwanted emission levels at the equipment antenna terminals on any frequency removed from the center of the authorized bandwidth (BW) by a displacement frequency (f_d in kHz) shall be attenuated below the mean power (pY) of the unmodulated carrier output as specified by the following:

fd in kHz	Attenuation in dB
50% BW < $f_d \leq$ 100% BW	25
100% BW < $f_d \leq$ 250% BW	35
$f_d >$ 250%	43 dB + 10 log (pY)

4. Power output -- The maximum mean power of the unmodulated carrier output for operations on splinter channels in the 406-420 MHz band shall be limited to 30 watts.

5.3.7 Telemetry, Terrestrial (1435-1535, 2200-2290 and 2310-2390 MHz Bands)

1. This transmitter standard is applicable to terrestrial teletennng stations, authorized for operation in the bands 1435-1535, 2200-2290 and 2310-2390 MHz.

2. Unwanted Emissions.

a. For Authorized Bandwidth equal to or less than 1 MHz, the emissions must be attenuated below the mean power of the transmitter (pY) as follows:

(1) On any frequency removed from the assigned frequency by more than 100 percent of the authorized bandwidth up to and including 100 percent plus 0.5 MHz, the attenuation must be at least 60 dB, when measured in a 3.0 kHz bandwidth. This signal need not be attenuated more than 25 dB below 1 milliwatt.

(2) On any frequency removed from the assigned frequency by more than 100 percent of the authorized bandwidth plus 0.5 MHz, the attenuation must be at least 55 + 10 log (pY) dB, when measured in a 3.0 kHz bandwidth.

b. For Authorized Bandwidth greater than 1 MHz, the emissions must be attenuated below the mean power of the power of the transmitter (pY) as follows:

(1) On any frequency removed from the assigned frequency by more than 50 percent of the authorized bandwidth plus 0.5 MHz up to and including 50 percent of the authorized bandwidth plus 1.0 MHz, the attenuation must be 60 dB, when measured in a 3.0 kHz bandwidth. The signal need not be attenuated more than 25 dB below 1 milliwatt.

(2) On any frequency removed from the assigned frequency by

more than 50 percent of the authorized bandwidth plus 1.0 MHz, the attenuation must be at least $55 + 10 \log(pY)$ dB, when measured in a 3.0 kHz bandwidth.

5.3.8 Low Power Transmit (21.8-22.0 and 23.0-23.2 GHz Band Segments) ^{vii}

These standards apply to the following four frequency pairs within the above two band segments:

21.825 GHz	23.025 GHz
21.875 GHz	23.075 GHz
21.925 GHz	23.125 GHz
21.975 GHz	23.175 GHz

1. Unwanted Emissions.

When using transmissions other than those employing digital modulation techniques: the mean power of any emission supplied to the antenna transmission line, as compared with the mean power of the fundamental, shall be in accordance with the following (above 40 GHz these are design objectives pending further experience at these orders of frequency):

- a. On any frequency removed from the assigned frequency by more than 50 percent, up to and including 100 percent of the authorized bandwidth, at least 25 decibels attenuation,
- b. On any frequency removed from the assigned frequency by more than 100 percent, up to and including 250 percent of the authorized bandwidth, at least 35 decibels attenuation; and
- c. On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth, at least $43 + 10 \log(pY)$ decibels or 80 decibels, whichever is the lesser attenuation.

2. Maximum effective radiated power (ERP) shall be 55 dBm.

3. The rated transmitter output power shall not exceed 0.100 watts.

4. Upon showing need, a maximum bandwidth of 50 MHz may be authorized per frequency assigned.

5. These radio systems shall have no more than five hops in tandem, except upon showing of need, but in any event the maximum tandem length shall not exceed 40 km (25 miles).

6. Interfering signals at the antenna terminals of stations authorized shall not exceed -90 dBm and -70 dBm, respectively, for co-channel and adjacent channel interfering signals.

7. Antennas employing circular polarization may be used with these systems.

8. Maximum beamwidth shall not exceed 4 degrees with a minimum front-to-back ratio of 38 dB.

5.4 DISTRESS AND SAFETY COMMUNICATIONS

1. Global Maritime Distress and Safety System (GMDSS):
2. Stations in the Maritime and other radio services employing frequencies and techniques used in the GMDSS shall comply with the relevant ITU-R recommendations with respect to the technical characteristics of
 - a. Digital selective calling (DSC) distress call formats (RR S32.9.3 and S34.2);
 - b. DSC on VHF channel 70 (156.525 MHz):
 - (1) Capability of sensing the presence of a signal on channel 70, and
 - (2) Automatic prevention of transmitting a DSC call on channel 70, except for a Distress and Safety call by DSC, when the channel is occupied by calls (Volume 4, Rec. ITU-R M.4892);
 - c. Other aspects of DSC equipment (RR S54.2);
 - d. Narrowband direct printing (NBDP) message formats (Volume 4, Rec. ITU-R M.492-6) and error correction for distress, urgency, and safety messages (RR S32.43, S33.17, and S33.37, respectively);
 - e. Transmissions from satellite emergency position-indicating radio beacons (EPIRBs) operating in the bands 406-406.1 MHz and 1645.5-1646.5 MHz (RR Appendix S13 Part A5, Section I(c) and RR S34.1);
 - f. Transmissions from search and rescue radar transponders operating in the band 9200-9500 MHz (RR S5.474); and
 - g. Broadcasts on 518 (NAVTEX) and other broadcasts of maritime safety information using NBDP in the bands 4-27.5 MHz (RR S33.41).

Additionally, such stations when using DSC shall conform to the calling, acknowledgment, and operating procedures for DSC contained in the Radio

Regulations (Article S32) and the relevant ITU-R recommendation(s).

2.121.5/243 MHz EPIRBs:

EPIRBs operating at 121.5 MHz and/or 243 MHz shall conform to the requirements of Volume 4, Rec. ITU-R M.690.1 and Annex 10 to the Convention on International Civil Aviation, to the extent that each provision is applicable.

5.5 RADAR SPECTRUM ENGINEERING CRITERIA (RSEC)

5.5.1 General including RSEC-A

The wide application of radar for various functions makes large demands on the electromagnetic spectrum, and requires the application of effective frequency management measures for the equipment and systems involved. Criteria for certain equipment characteristics are specified herein to ensure an acceptable degree of electromagnetic compatibility among radar systems, and between such systems and those of other radio services sharing the frequency spectrum. These Criteria are concerned with promoting efficient use of the spectrum, and in specifying them there is no intent to require particular numerical values from the standpoint of the radar's mission. For example, characteristics such as power, sensitivity, pulse repetition rate, pulse duration, pulse rise and fall times, and the range of radio frequency emission are closely related to operational requirements. Accordingly, where limits for some of these characteristics are specified herein, the Criteria have been chosen to avoid undue degradation of operational effectiveness. Moreover, the specification of these Criteria is compatible with the policy of encouraging a free and unrestricted approach in further research looking toward more effective radars. Nevertheless, any proposals for new approaches and new System concepts involving radar must be reviewed from a frequency management viewpoint prior to development of new equipment.

Useful receiver techniques are available for reduction of the susceptibility of radars to low-duty-cycle pulse interference. The applicability of such devices as video integrators, correlators, PRF and pulse width discriminators varies with factors such as cost, availability, and their adaptability to specific equipments and environmental situations. While the mandatory incorporation of such devices is not specified herein, their application is recommended for low duty-cycle radars.

All primary radars ^{viii} shall be classified in one of five groups as shown in the following table and shall come under the Criteria indicated for that group.

Applicability of RSEC ^{ix x}

Radar description	Applicable Criteria
<p>Group A Non-pulsed radars of 40 watts or less rated average power; or Pulsed radars of 1 kW or less rated peak power; or Radars with an operating frequency above 40 GHz; or Man-portable ⁶ radars; or Man-transportable ⁷ radars; or Radionavigation radars in the band 9300 - 9500 MHz, as described above; or Expendable, non-recoverable radars on missiles</p>	<p>Criteria A Presently exempt from any RSEC</p>
<p>Group B Radars having a rated peak power of more than 1 kW but not more than 100 kW and operating between 2900 MHz and 40 Ghz</p>	<p>Criteria B See 5.5.2</p>
<p>Group C All radars not included in Group A, B, D or E</p>	<p>Criteria C See 5.5.3</p>
<p>Group D All fixed radars in the 2700 - 2900 MHz band</p>	<p>Criteria D See 5.5.4</p>
<p>Group E Wind Profiler Radar (WPR) operating on 449 MHz</p>	<p>Criteria E See 5.5.5</p>

For radars employing more than a single emitter, including phased array radars, variable PRY radars, radars whose modulation changes from pulse to pulse, and other special types of radars for which any of the following Criteria cannot be directly applied, special methods may be required in establishing appropriate Criteria. Pending adoption of technical Criteria for such radars, values submitted for these parameters shall be accompanied by an explanation of their derivation.

The provisions of Section 5.5.2, Criteria B, are applicable to Class 1 space-based radar systems ^{xi} on a case-by-case basis. The provisions of Section 5.5.2 or Section 5.5.3 (i.e. Criteria B or C as appropriate) are applicable to Class 2 space-based radar systems ^{xii} and active space-borne sensors ^{xiii} on a case-by-case basis.

Waivers

Waiver of the requirements herein may be requested when supported by reasonable justification. When technical and engineering data are supplied in support of a request for waiver or in evaluating the performance of equipment, an explanation of the non-conforming parameters and measurement methods employed shall be furnished.

Manufacturer's data may be used where deemed appropriate and adequate.

Symbols Used

B = emission bandwidth, in MHz.

B_c = bandwidth of the frequency deviation. (The total frequency shift during the pulse duration) in MHz.

B_d = bandwidth of the frequency deviation (peak difference between instantaneous frequency of the modulated wave and the carrier frequency) -- (FM/CW radar systems).

B_s = maximum range in MHz over which the carrier frequency will be shifted for a frequency hopping radar.

d = pulse compression ratio = emitted pulse duration/compressed pulsed duration (at 50% amplitude points).

F_o = operating frequency in MHz. For non-FM pulse radars the peak of the power spectrum; for FM pulse radars the average of the lowest and highest carrier frequencies during the pulse.

N = total number of chips (subpulses) contained in the pulse. ($N = 1$ for non-FM and FM pulse radars.)

PG = processing gain (dB).

P_p = peak power (dBm).

PRR = pulse repetition rate in pulses per second.

P_t = maximum spectral power density dBm/kHz.

t = emitted pulse duration in μ sec. at 50% amplitude (voltage) points. For coded pulses the pulse duration is the interval between 50% amplitude points of one chip (sub-pulse). The 100% amplitude is the nominal flat top level of the pulse (see Fig. 1).

t_r = emitted pulse rise time in μ sec. from the 10% to the 90% amplitude points on the leading edge. See Fig. 1. For coded pulses it is the rise time of a sub-pulse; if the sub-pulse rise time is not discernible, assume that it is 40% of the time to switch from one phase or sub-pulse to the next.

t_f = emitted pulse fall time in μ sec from the 90% to the 10% amplitude points on trailing edge. See Fig. 1 and endnote 15.

5.5.2 Criteria B

1. Applicability

These Criteria are applicable to radars of Group B, “Radars having a rated peak power of more than 1 kW but not more than 100 kW and operating between 2900 MHz and 40 GHz.”

2. Radar Emission Bandwidth

The emission bandwidth for radars at the antenna input shall not exceed the following limits:

2.1 For Non-FM pulse radars (including spread spectrum or coded pulse radars):^{xiv} whichever is less

$$B(-40\text{dB}) = \frac{7.6}{\sqrt{t_r}} + \frac{64}{\sqrt{t}}$$

whichever is lesser

2.2 For FM-pulse radars (intentional FM)^{xiv}

$$B(-40\text{dB}) = \frac{7.6}{\sqrt{t_r}} + 2\left(\frac{64}{\sqrt{t}}\right)$$

For FM-pulse radars with pulse rise time, t_r , of less than 0.1 microsecond, an operational justification for the short rise time shall be provided.

2.3 For FM pulse radars (intentional FM) with frequency hopping:^{xiv xv}

$$B(-40\text{dB}) = \frac{7.6}{\sqrt{t_r}} + 2\left(\frac{0.065}{\sqrt{t}}\right) + B_s$$

For FM pulse radars (intentional FM) with frequency hopping, but with pulse rise time, t_r , of less than 0.1 microsecond an operational justification for the short rise time shall be provided.

2.4 For frequency hopping radars using non-FM pulses (including spread spectrum or coded pulses):^{xiv xv}

$$B(-40\text{dB}) = \frac{7.6}{\sqrt{t_r}} + B_s$$

For this category of radars, an operational justification shall be provided if the pulse rise time, t_r , is less than 0.01 microsecond.

2.5 For CW radars:

$$B(-40\text{dB}) \sim \sim 0.0003 F_o$$

2.6 For FM/CW radars:

$$B(-40\text{dB}) \sim \sim 0.0003 F_o + 2 B_d$$

3. Emission Levels ^{xvi}

3.1 With the exception of CW and FM/CW radars, the radar emission levels at the antenna input shall be no greater than the values obtainable from the curve in Figure 2. At the frequency $\pm B(40\text{ dB})/2$ displaced from F_o , the level shall be at least 40 dB below the maximum value. Between the -40 dB and the -X dB frequencies the level shall be below the 20 dB per decade (S=20) roll-off lines in Figure 2. At and beyond the frequencies $\pm B(-X\text{ dB})/2$ from F_o , the level shall be at least the dB value below the maximum spectral power density given by:

$$X(\text{dB}) = 60\text{ dB}, \text{ or } X(\text{dB}) = P_t + 30$$

whichever is the larger value

NOTE: P_t may be measured or may for the purpose of these Criteria be calculated from the following:

$$P_t = P_p + 20 \log(Nt) + 10 \log(\text{PRR}) - \text{PG} - 90$$

Where PG = 0, for non-FM, non-encoded pulse radars
10log(d), for FM pulse radars
10 log(N), for coded pulse radars

3.2 For CW and FM/CW radars, the levels of all emissions at the antenna input shall be no greater than the values obtainable from the curve in Figure 2. At the frequencies $\pm B(-40\text{dB})/2$ displaced from F_o , the level shall be at least 40 dB below the maximum value. Between the -40 dB and -X dB frequencies, the level shall be below the 20 dB per decade (S=20) rolloff lines in Figure 2. At and beyond the frequencies $\pm B(X\text{ dB})/2$ from F_o , the level shall be at least 60 dB below the maximum level of the signal contained within B(-40 dB). All levels are specified for a 1.0 kHz measurement bandwidth.

4. Antenna Pattern

No requirement is specified at present.

5. Radar Tunability

Each radar shall be tunable in an essentially continuous manner either over the allocated bands for which it is designed to operate, or over a band which is 10% of the midband frequency. Crystal controlled radars conform to this requirement if operation at essentially any frequency across the band can be achieved with a

crystal change.

6. Radar Receivers

The overall receiver selectivity characteristics shall be commensurate with or narrower than the transmitter bandwidth, as portrayed in Figure 2. Rejection of spurious responses, other than image responses, shall be 50 dB or better except where broadband front ends are required operationally. Receivers shall not exhibit any local oscillator radiation greater than - 40 dBm at the receiver input terminals. Frequency stability of receivers shall be commensurate with, or better than, that of the associated transmitter.

7. Measurement Capability

See paragraph 2.1.2.B of Annex F.

5.5.3 Criteria C

1. Applicability

These Criteria are applicable to radars of Group C, “all radars below 40 GHz not included in Group A, B or D”.

2. Radar Emission Bandwidth

The emission bandwidth for radars at the antenna input shall not exceed the following limits:

2.1 For non-FM pulse radars (including spread spectrum or coded pulse radars):¹⁴

$$B(-40\text{dB}) = \frac{6.2}{\sqrt{t_r t}} \text{ or } \frac{64}{\sqrt{t}}$$

2.2. For FM-pulse radars (intentional FM):¹⁴

$$B(-40\text{dB}) = \frac{6.2}{\sqrt{t_r t}} + 2(B_c + \frac{0.0105}{\sqrt{t}})$$

For FM pulse radars with pulse rise time, t_r , or fall time, t_f , of less than 0.1 microsecond, an operational justification for the short rise time shall be provided.

2.3 For FM pulse radars (intentional FM) with frequency hopping:^{14 15}

$$B(-40\text{dB}) = \frac{6.2}{\sqrt{t_r t}} + 2(B_c + \frac{0.0105}{\sqrt{t}}) + B_s$$

For FM pulse radars (intentional FM) with frequency hopping, but with pulse rise time, t_r , of less than 0.1 microsecond, an operational justification for the short rise time shall be provided.

2.4 For frequency hopping radars using non-FM pulses (including spread spectrum or coded pulses):

$$B(-40\text{dB}) = \frac{6.2}{\sqrt{t_r t}} + B_s$$

For this category of radars, an operational justification shall be provided if the pulse rise time, t_r , is less than 0.01 microsecond.

2.5 For CW radars:

$$B(-40\text{dB}) = 0.0003F_o$$

2.6 For FM/CW radars:

$$B(-40\text{dB}) = 0.0003F_o + 2 B_d$$

3. Emission Levels ^{xvi}

3.1 With the exception of CW and FM/CW radars, the radar emission levels at the antenna input shall be no greater than the values obtainable from the curve in Figure 2. At the frequency $\pm B(-40\text{dB})/2$ displaced from F_o , the level shall be at least 40 dB below the maximum value. Between the -40 dB and -X dB frequencies the level shall be below the 20 dB per decade (S=20) roll-off lines in Figure 2. At and beyond the frequencies $\pm B(-X\text{dB})/2$ from F_o , the level shall be at least the dB value below the maximum spectral power density given by:

$$X(\text{dB}) = 60 \text{ dB, or } X(\text{dB}) = P_t + 30$$

whichever is the larger value

NOTE: P_t may be measured or may for the purpose of these Criteria be calculated from the following:

$$P_t + P_p + 20 \log(Nt) + 10 \log(\text{PRR}) - \text{PG} - 90$$

where PG = 0, for non-FM, non-encoded pulse radars
 10 log(d), for FM pulse radars
 10 log(N), for coded pulse radars

3.2 For CW and FM/CW radars, the levels of all emissions at the antenna

input shall be no greater than the values obtainable from the curve in Figure 2. At the frequencies $\pm B(-40 \text{ dB})/2$ displaced from F_o , the level shall be at least 40dB below the maximum value. All levels are specified for a 1.0 kHz measurement bandwidth. Between the -40 dB and -X dB frequencies, the level shall be below the 20 dB per decade (S=20) rolloff lines in Figure 2. At and beyond the frequencies $\pm B(X \text{ dB})/2$ from F_o , the level shall be at least 60 dB below the maximum level of the signal contained within B(-40 dB).

4. Antenna Pattern

Since electromagnetic compatibility considerations involved phenomena which may occur at any angle, the allowable antenna patterns for many radars may be usefully described by “median gain” relative to an isotropic antenna.^{xvii} Antennas operated by their rotation through 360 of the horizontal plane shall have a “median gain” of -10 dB or less, as measured on an antenna test range, in the principal horizontal plane. For other antennas, suppression of lobes other than the main antenna beam shall be provided to the following levels, referred to the main beam:

first three sidelobes: 17 dB;
all other lobes: 26 dB.

5. Radar Tunability

Each radar shall be tunable in an essentially continuous manner either over the allocated bands for which it is designed to operate, or over a band which is 10% of the midband frequency. Crystal controlled radars conform to this requirement if operation at essentially any frequency across the band can be achieved with a crystal change.

6. Radar Receivers

The overall receiver selectivity characteristics shall be commensurate with the transmitter bandwidth, as portrayed in Figure 2. Receivers shall be capable of switching bandwidth limits to appropriate values whenever the transmitter bandwidth is switched (pulse shape changed). Receiver image rejection shall be at least 50 dB; rejection of other spurious responses shall be at least 60 dB. Radar receivers shall not exhibit any local oscillator radiation greater than -40 dBm at the receiver input terminals. Frequency stability of receivers shall be commensurate with, or better than, that of the associated transmitters.

7. Measurement Capability

See paragraph 2.1.2.C of Annex F.

5.5.4 Criteria D

1. Applicability

These Criteria are applicable to fixed radars in the 2700-2900 MHz band. All radars subject to these Criteria shall be designed and constructed to meet the basic minimum electromagnetic compatibility (EMC) requirements stated herein. In addition to the basic minimum EMC requirements, radar systems in the 2700-2900 MHz band which are intended to operate in close proximity to other equipment in the band shall be designed and constructed to permit, without modification to the basic equipment, field incorporation of EMC enhancement provisions. These additional provisions will improve the electromagnetic compatibility of the radar thus improving the accommodation of the radar System in the band. These provisions are stated in Section 5.5.4, paragraph 7.

2. Radar Emission Bandwidth

The emission bandwidth for radars at the antenna input shall not exceed the following limits:

2.1 For non-FM pulse radars (including spread spectrum or coded pulse radars): ^{xiv}

$$B(-40\text{dB}) = \frac{6.2}{\sqrt{t_r} t}$$

For non-FM pulse radars, a pulse rise time, t_r , or fall time, t_f , of less than $0.1t$ shall be justified: [sic]

2.2 For FM-pulse radars (intentional FM): ^{xiv}

$$B(-40\text{dB}) = \frac{6.2}{\sqrt{t_r} t} + 2(B_c + \frac{0.105}{\sqrt{t}})$$

For FM pulse radars with pulse rise time, t , of less than 0.1 microsecond, a justification for the short rise time shall be provided.

2.3 For FM Pulse radars (intentional FM) with frequency hopping: ^{xiv xv}

$$B(-40\text{dB}) = \frac{6.2}{\sqrt{t_r} t} + 2(B_c + \frac{0.105}{\sqrt{t}}) + B_s$$

For FM pulse radars (intentional FM) with frequency hopping, but with pulse rise time, t_r , of less than 0.1 microsecond, an operational justification for the short rise time shall be provided.

2.4 For frequency hopping radars using non-FM pulses (including spread spectrum coded pulses): ^{xiv xv}

$$B(-40\text{dB}) = \frac{6.2}{\sqrt{t_r}} + B_s$$

For this category of radars, an operational justification shall be provided if the pulse rise time, t_r , is less than 0.01 microsecond.

2.5 For CW radars:

$$B(-40\text{dB}) = 0.0003 F_o$$

2.6 For FM/CW radars:

$$B(-40\text{dB}) = 0.0003 F_o + 2 B_d$$

3. Emission Levels ^{xvi}

3.1 With the exception of CW and FM/CW radars, the radar emission levels at the antenna input shall be no greater than the values obtainable from the curve in Figure 2. At the frequencies $\pm B(-40\text{ dB})/2$ displaced from F_o the level shall be at least 40 dB below the maximum value. Beyond the frequencies $\pm B(-40\text{ dB})/2$ from F_o , the emission level(s), with the exception of harmonic frequencies, shall be below the 40 dB per decade (S=40) roll-off lines of Figure 2 down to a -X dB level that is 80 dB below the maximum spectral power density. All harmonic frequencies shall be at a level that is at least 60 dB below the maximum spectral power density.

3.2 For CW and FM/CW radars, the levels of all emissions at the antenna input shall be no greater than the values obtainable from the curve in Figure 2. At the frequencies $\pm B(-40\text{ dB})/2$ displaced from F_o , the level shall be at least 40 dB below the maximum value. Between the -40 dB and -X dB frequencies, the level shall be below the 40 dB per decade (S=40) rolloff lines in Figure 2. At and beyond the frequencies $B(-X\text{ dB})/2$ from F_o , the level shall be at least 80 dB below the maximum level of the signal contained with $B(-40\text{ dB})$. All levels are specified for a 1.0 kHz measurement bandwidth.

4. Antenna Pattern

Since electromagnetic compatibility considerations involved phenomena which may occur at any angle, the allowable antenna patterns for many radars may be usefully described by “median gain” relative to an isotropic antenna. ^{xvii} Antennas operated by their rotation through 360 degrees of the horizontal plane shall have a “median gain” of -10 dB or less, as measured on an antenna test range, in the principal horizontal plane. For other antennas, suppression of lobes other than the main antenna beam shall be provided to the following levels, referred to the main

beam:

first three sidelobes: 17 dB;
all other lobes: 26 dB.

5. Radar Tunability

Radar systems shall be tunable over the entire 2700-2900 MHz band.

6. Radar Receiver

The overall receiver selectivity characteristics shall be commensurate with the transmitter bandwidth, as portrayed in Figure 2. Receivers shall be capable of switching bandwidth limits to appropriate values whenever the transmitter bandwidth is switched (pulse shape changed). Receiver image rejection shall be at least 50 dB; rejection of other spurious responses shall be at least 60 dB. Radar receivers shall not exhibit any local oscillator radiation greater than -40 dBm at the antenna input terminals. Frequency stability of receivers shall be commensurate with, or better than, that of the associated transmitters.

7. Additional EMC Provisions

To improve the accommodation of radar systems in the 2700-2900 MHz band which operate in close proximity to other equipment in the band, the radar shall be designed and constructed to permit, without modification to the basic equipment, field incorporation of System EMC provisions. These provisions include the requirement to meet specifications in accordance with paragraphs a. and b. below and the recommendation to meet guidelines in accordance with paragraph c. below.

a. Emission Levels

The radar emission levels at the antenna input shall be no greater than the values obtainable from the curves in Figure 2. At the frequency $\pm B(-40 \text{ dB})/2$ displaced from F_0 , the level shall be at least 40 dB below the maximum value. Beyond the frequencies $\pm B(-40 \text{ dB})/2$ from F_0 , the equipment shall have the Capability to achieve up to 80 dB per decade ($S=80$) rolloff lines of Figure 2. The emission levels, with the exception of harmonic frequencies, shall be below the appropriate dB per decade rolloff lines of Figure 2 down to a -X dB level that is 80 dB below the maximum spectral power density. All harmonic frequencies shall be at a level that is at least 60 dB below the maximum spectral power density.

b. Radar System PRF

The radar System shall be designed to operate with an adjustable pulse repetition frequency (s), PRF (s), with a nominal difference of $\pm 1\%$ (minimum). This will permit the selection of PRF's to allow certain types of receiver interference suppression circuitry to be effective.

c. Receiver Interference Suppression Circuitry

Radar systems in this band should have provisions incorporated into the System to suppress pulsed interference. The following information is intended for use as an aid in the design and development of receiver signal processing circuitry or software to suppress asynchronous pulsed interference. A description of the parametric range of the expected environmental signal characteristics at the receiver IF output is:

Peak Interference-to-Noise Ratio: ≤ 50 dB

Pulse width: 0.5 to 4.0 μ sec

PRF: 100 to 2000 pps

8. Measurement Capability

See paragraph 2.1.2.C of Annex F.

5.5.5 Criteria E

1. Applicability

These Criteria are applicable to wind profiler radars (WPR's) operating on 449 MHz.

2. Emission Bandwidth

The emission bandwidth for WPR's at the antenna input shall not exceed the following limits:

2.1 For non-FM pulse radars (including coded pulse radars): ^{xiv}

$$B(-40\text{dB}) = \frac{6.2}{\sqrt{t_r t}} \text{ or } \frac{64}{t}$$

whichever is less.

2.2 For FM--pulse radars ((intentional FM)): ^{xiv}

$$B(-40\text{dB}) = \frac{6.2}{\sqrt{t_r t}} + 2\left(\frac{B_c + 0.105}{t}\right)$$

2.3 For wind profiler radars, an operational justification shall be provided if the pulse rise time, t_r , is less than 0.01 microsecond.

2.4 For CW radars

$$B(-40\text{dB}) = 0.00003F_0$$

2.5 For FM/CW radars

$$B(-40\text{dB}) = 0.00003F_o + 2 B_d$$

3. Emission Levels ^{xvi}

WPR emission levels at the antenna input shall be no greater than the values obtainable from the curve in Figure 3. At the Frequencies $\pm B(-40\text{ dB})/2$ displaced from F_o , the level shall be at least 40 dB below the maximum value. Between the -40 dB and -X dB frequencies, the level shall be below the 40 dB per decade (S=40) rolloff lines in Figure 3. At and beyond the frequencies $\pm B(-X\text{ dB})/2$ from F_o , the level shall be at least the dB value below the maximum spectral power density given by:

$$X(\text{dB}) = 60\text{ dB}, \text{ or } X(\text{dB}) = P_t + 30$$

whichever is the greater attenuation

All harmonic frequencies shall be at a level that is at least 60 dB below the maximum spectral power density.

NOTE: P_t may be measured or may for the purpose of these Criteria be calculated from the following:

$$P_t = P_p + 20 \log(Nt) + 10 \log(\text{PRR}) - \text{PG} - 90$$

4. EIRP

The EIRP ¹ of any WPR operating at 449 MHz shall not exceed the following values:

	Median	Maximum
for	elevation angle > 70 deg ²	110 dBm
for	60 < elevation angle ≤ 70 deg	83 dBm
for	45 < elevation angle ≤ 60 deg	78 dBm
for	5 < elevation angle ≤ 45 deg	73 dBm
for	elevation angle ≤ 5 deg	58 dBm

1. EIRP is the sum of two quantities: peak transmitter power in dBm and antenna gain in dBi. The column labeled Median is based on median antenna gain and the column labeled Maximum is based on maximum antenna gain.

2. The center of the antenna main beam generated at any time shall be limited to elevation angles greater than 70 degrees.

5. WPR Receiver

The -3 dB receiver bandwidth should be commensurate with the authorized emission bandwidth plus twice the transmitter frequency tolerance of 10 ppm (as specified in Section 5.2.1). The -60 dB receiver bandwidth shall be

commensurate with the - 60 dB emission bandwidth. Receivers shall be capable of switching bandwidth limits to appropriate values whenever the transmitter bandwidth is switched (pulse shape changed). Receiver IF image frequency rejection shall be at least 50 dB. Rejection of other spurious responses shall be at least 60 dB. WPR receivers shall not exhibit any local oscillator radiation greater than - 40 dBm at the antenna input terminals.

6. EMC Provision

WPR's shall have the capacity to tolerate incoherent pulsed interference of duty cycles less than 1.5 percent such that peak interfering signal levels 30 dB greater than WPR receiver noise level at the IF output will not degrade WPR performance.

7. Measurement Capability

See paragraph 2.1.2.1) of Annex F.

Endnotes for Chapter 5

ⁱ In other than exceptional cases the practice is to authorize 3 kHz as the necessary bandwidth for normal voice intelligibility. This is specified by the emission designator. In the practical case, to meet the minimum performance requirements of this paragraph the roll-off of the emission curve will begin at a value somewhat less than 1.5 kHz from the assigned frequency.

ⁱⁱ Passband -- The passband is the band of frequencies limited by the two frequencies for which the voltage is attenuated to one-half of the voltage of the most favored frequency.

ⁱⁱⁱ Applies to both transmitting and receiving antennas, ut to the latter only when protection from harmful interference is required.

^{iv} These gain figures would be approximately 6 dB greater if the gain were to be expressed relative to an isotropic antenna in free space, in order to account for ground reflection.

^v It is recognized that relatively narrowband digital radio systems may be unduly restricted by this standard. Work is in progress to define appropriate limitations for such narrowband systems. This standard will be modified in accordance with the findings and experience with such narrowband systems.

^{vi} The spacing of channels (adjacent channel spacing) is 20 kHz in the 30 - 50 MHz band and 25 kHz in the 162 - 174 and 406.1 - 420 MHz bands.

^{vii} Power constraints placed on the frequency pairs facilitate coordination due to the decreased interference potential.

^{viii} Primary Radar: A radiodetermination system based on the comparison of reference signals with radio signals reflected from the position to be determined. (No. S1.101 of the ITU Radio Regulations, 1998 Edition.)

^{ix} Man-portable: Items which are designed to be carried as a component part of individual, crew-served or team equipment in conjunction with assigned duties. These items are nominally less than 15 kilograms (32 pounds).

^x Man-transportable: items which are usually transported on wheeled, tracked or air vehicles but have integral provisions to allow periodic handling by one or more individuals for limited distances (i.e., 100-500 meters). These items are nominally less than 30 kilograms (65 pounds)

^{xi} Spacebased Radiolocation System--Class 1: a radiolocation system in space the primary function of which is the detection and location of objects on or near the surface of the Earth.

^{xii} Spacebased Radiolocation System--Class 2: a radiolocation system installed aboard a spacecraft for the purpose of determining the relative positions or velocities of one or more extravehicular objects.

^{xiii} Active Spaceborne Sensor--a measuring instrument in the earth exploration-satellite service, or in the space research service, by means of which physical measurements of various phenomena are obtained through transmission and reception of radio waves.

^{xiv} If t_f is less than t_r , as defined in Part 5.5, t_f is to be used in place of t_r , when performing the emission bandwidth calculations.

^{xv} These formulas yield the total composite B(-40 dB) bandwidth of a frequency hopping radar as if all channels included within B_s were operating simultaneously. Individual channels have a B(-40 dB) radar emission bandwidth given by the equations in paragraph 3.1 or 3.2 of Sections 5.5.2, 5.5.3, and 5.5.4.

^{xvi} For frequency hopping radars, the radar spectrum shall not intrude into adjacent spectrum regions on the high or low side of the allocation band, defined by B_s , more than would occur if the radar were fixed tuned at carrier frequencies equivalent to the end values of B_s and was complying with the constraints given by paragraphs 4.1 and 4.2 of Sections 5.5.2, 5.5.3, and 5.5.4.

^{xvii} Median gain is defined as that level over an angular region at which the probability is 50% that the observed or measured gain at any position of the antenna will be less than or equal to that level.

CHAPTER 6 Particulars of Assignments

6.1 DEFINITIONS

The terms and definitions in this chapter apply to the application of these Radiocommunication Regulations, including the Table of Frequency Allocations and to the International Telecommunication Union international Radio Regulations.

6.1.1 Special Terms (General):

Where a definition is followed by the parenthetical expression “(RR)”, it is an indication the definition is in the ITU Radio Regulations.

Accepted Interference: Interference at a higher level than that defined as permissible interference and which has been agreed upon between two or more administrations without prejudice to other administrations. (RR)

Active Satellite: A satellite carrying a station intended to transmit or retransmit radiocommunication signals. (RR)

Active Sensor: A measuring instrument in the Earth exploration-satellite service or in the space research service by means of which information is obtained by transmission and reception of radio waves. (RR)

Adaptive System: A radio-communication system which varies its radio characteristics according to channel quality. (RR)

Administration: Any governmental department or service responsible for discharging the obligations undertaken in the Constitution of the International Telecommunication Union, in the Convention of the International Telecommunication Union and in the Administrative Regulations. (RR)

Aeronautical Broadcast Station: An aeronautical station which makes scheduled broadcasts of meteorological information and notices to airmen. (In certain instances, an aeronautical broadcast station may be placed on board a ship.)

Aeronautical Earth Station: An Earth Station in the fixed-satellite service, or, in some cases, in the aeronautical mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the aeronautical mobile satellite service. (RR)

Aeronautical Fixed Service: A radiocommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air transport. (RR)

Aeronautical Fixed Station: A station in the aeronautical fixed service. (RR)

Aeronautical Marker Beacon Station: A radio-navigation land station in the aeronautical radionavigation service which employs a marker beacon. 2 [sic]

Aeronautical Mobile Service: A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radiobeacon stations may also participate in this service on designated distress and emergency frequencies. (RR)

Aeronautical Mobile OR (OFFROUTE) Service: An aero-nautical mobile service intended for communications, including those relating to flight coordination, primarily outside national or international civil air routes. (RR)

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

Aeronautical Mobile-Satellite Service: A mobile- satellite service in which mobile earth stations are located on board aircraft; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. (RR)

Aeronautical Mobile-Satellite OR (OFF-ROUTE) Service: An aeronautical mobile-satellite service intended for communications, including those relating to flight coordination, primarily outside national and international civil air routes. (RR)

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

Aeronautical Mobile Satellite Space Station: A space station in the aeronautical mobilesatellite service.

Aeronautical Radiobeacon Station: A radio-beacon station in the aeronautical radionavigation service intended for the benefit of aircraft.

Aeronautical Radionavigation-Satellite Earth Station: A fixed earth station in the aeronautical radionavigation-satellite service.

Aeronautical Radionavigation-Satellite Mobile Earth Station: A mobile earth station in the aeronautical radionavigation-satellite service.

Aeronautical Radionavigation-Satellite Service: A radionavigation satellite

service in which earth stations are located on board aircraft. (RR)

Aeronautical Radionavigation Service: A radionavigation service intended for the benefit and for the safe operation of aircraft. (RR)

Aeronautical Radionavigation-Satellite Space Station: A space station in the aeronautical radionavigation satellite service.

Aeronautical Station: A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea. (RR)

Aeronautical Telemetry Land Station: A telemetry land station used in the flight testing of manned or unmanned aircraft, missiles, or major components thereof.

Aeronautical Telemetry Mobile Station: A telemetry mobile station used for transmitting data directly related to the airborne testing of the vehicle (or major components), on which the station is installed.

Aeronautical Utility Land Station: A land station located at airdrome control towers and used for control of ground vehicles and aircraft on the ground at airdromes.

Aeronautical Utility Mobile Station: A mobile station used for communication at airdromes with the aeronautical utility land station, the airdrome control station, the flight service station, ground vehicles, and aircraft on the ground. (All transmissions shall be subject to the control of the airdrome control station and shall be discontinued immediately when so requested by the airdrome control operators.)

Aircraft Earth Station: A mobile earth station in the aeronautical mobile-satellite service located on board an aircraft. (RR)

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

Airdrome Control Station: An aeronautical station providing communication between an airdrome control tower and aircraft.

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

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

Altimeter Station: A radionavigation mobile station in the aeronautical radionavigation service which employs a radio altimeter.

Altitude of the Apogee or of the Perigee: The altitude of the apogee or perigee above a specified reference surface serving to represent the surface of the Earth. (RR)

Amateur-Satellite Earth Station: An earth station in the amateur-satellite service.

Amateur-Satellite Service: A radiocommunication service using space stations on earth satellites for the same purposes as those of the amateur service. (RR)

Amateur-Satellite Space Station: A space station in the amateur-satellite service.

Amateur Service: A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorized persons interested in radio technique solely with a personal aim and without pecuniary interest. (RR)

Amateur Station: A station in the amateur service. (RR)

ASDE: A radiolocation device employed for airport surface surveillance.

Assigned Frequency: The center of the Frequency Band assigned to a station. (RR)

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

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

Authorized Bandwidth: Authorized bandwidth is, for purposes of these

Regulations, the necessary bandwidth (bandwidth required for transmission and reception of intelligence) and does not include allowance for transmitter drift or Doppler shift.

Aviation Instructional Station: A land or mobile station in the aeronautical mobile service used for radiocommunications pertaining to instructions to students or pilots while actually operating aircraft or engaged in soaring activities.

Base Earth Station: An earth station in the fixed-satellite service or, in some cases, in the land mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the land mobile-satellite service.(RR)

Base Station: A land station in the land mobile service. (RR)

Bridge-to-Bridge Station: A ship station operating in the port operations service in which messages are restricted to navigational communications and which is capable of operation from the ship's navigational bridge or, in the case of a dredge, from its main control station, operating on a frequency or frequencies in the 156-162 MHz band.

Broadcasting-Satellite Service: A radiocommunication service in which signals transmitted or retransmitted by space stations are intended for direct reception by the general public. In the broadcasting-satellite service, the term “direct reception” shall encompass both individual reception and community reception. (RR)

Broadcasting-Satellite Space Station: A space station in the broadcasting satellite service (television).

Broadcasting Service: A radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmissions. (RR)

Broadcasting Station: A station in the broadcasting service. (RR)

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

Characteristic Frequency: A frequency which can be easily identified and measured in a given emission. A carrier frequency may, for example, be designated as the characteristic frequency. (RR) (See also Reference Frequency.)

Chip-Rate: The rate of encoding.

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

Coast Earth Station: An earth station in the fixed-satellite service or, in some cases, in the maritime mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the maritime mobile-satellite service. (RR)

Coast Station: A land station in the maritime mobile service. (RR)

Coded Squelch: A system wherein radio receivers are equipped with devices which allow audio signals to appear at the receiver output only when a carrier modulated with a specific signal is received.

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

- by a group of the general public at one location, or
- through a distribution system covering a limited area. (RR)

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

Coordination Contour: The line enclosing the coordination area. (RR)

Coordination Distance: When determining the need for coordination, the distance on a given azimuth from an earth station sharing the same frequency band with terrestrial stations, or from a transmitting earth station sharing the same bidirectionally allocated frequency band with receiving earth stations, beyond which the level of permissible interference will not be exceeded and coordination is therefore not required. (RR)

Coordinated Universal Time (UTC): Time scale, based on the second (SI), as defined in ITUR 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. (RR)

Deep Space: Space at distances from the Earth equal to or greater than 2×10^6 kilometers. (RR)

Direct Sequence Spread Spectrum: A signal structuring technique utilizing a digital code sequence having a chip rate much higher than the information signal bit rate. Each information bit of a digital signal is transmitted as a pseudo-random sequence of chips.

Distance Measuring Equipment (DME): Equipment that ascertains the distance of an interrogator from a transponder by measuring the time of transmission to and from the transponder.

Duplex Operation: Operating method in which transmission is possible simultaneously in both directions of a telecommunication channel² (RR)

Earth Exploration-Satellite Earth Station: An earth station in the Earth exploration-satellite service.

Earth Exploration-Satellite Service: A radiocommunication service between earth stations and one or more space stations, which may include links between space stations, in which:

- information relating to the characteristics of the Earth and its natural phenomena including data relating to the state of the environment is obtained from active sensors or passive sensors on earth satellites;
- similar information is collected from airborne or earth-based platforms;
- such information may be distributed to earth stations within the system concerned;
- platform interrogation may be included.

This service may also include feeder links necessary for its operation. (RR)

Earth Exploration-Satellite Space Station: A space station in the Earth exploration-satellite service.

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

- with one or more space stations, or
- with one or more stations of the same kind by means of one or more reflecting satellites or other objects in space. (RR)

Effective Antenna Gain Contour (of a steerable satellite beam): An envelope of antenna gain contours resulting from moving the boresight of a steerable satellite beam along the limits of the effective boresight area. (RR)

Effective Boresight Area (of a steerable satellite beam): An area on the surface of the Earth within which the boresight of a steerable satellite beam is intended to

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

Effective Monopole Radiated Power (e.m.r.p.) (in a given direction): The product of the power supplied to the antenna and its gain relative to a short vertical antenna in a given direction Effective Radiated Power (e.r.p.) (in a given direction): The product of the power supplied to the antenna and its gain relative to a halfwave dipole in a given direction. (RR)

Electromagnetic Compatibility (EMC): Electro-magnetic compatibility is the condition which prevails when telecommunications equipment is performing its individually designed function in a common electromagnetic environment without causing or suffering unacceptable degradation due to unintentional electromagnetic interference to or from other equipment in the same environment.

Emergency locator transmitter (ELT): A transmitter of an aircraft or survival craft actuated manually or automatically that is used as an alerting and locating aid for survival purposes.

Emergency Position-Indicating Radiobeacon Station: A station in the mobile service the emissions of which are intended to facilitate search and rescue operations. (RR)

Emission: Radiation produced, or the production of radiation, by a radio transmitting station. For example, the energy radiated by the local oscillator of a radio receiver would not be an emission but a radiation. (RR)

Environmental Communications: Communications in the maritime mobile service for the broadcast of information pertaining to the environmental conditions in which vessels operate, i e., weather, sea conditions, time signals of a grade adequate for practical navigation, notices to mariners and hazards to navigation.

Equivalent Isotropically Radiated Power (e.i.r.p.): The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain). (RR)

Equivalent Satellite Link Noise Temperature: The noise temperature referred to the output of the receiving antenna of the earth station corresponding to the radio frequency noise power which produces the total observed noise at the output of the satellite link excluding noise due to interference coming from satellite links using other satellites and from terrestrial systems. (RR)

Expendable Launch Vehicle (ELV): A booster rocket that can be used only once to launch a payload, such as a missile or space vehicle.

Experimental Developmental Station: An experimental station used for evaluation or testing of electronics equipment or systems in a design or development stage.

Experimental Research Station: An experimental station used in basic studies concerning scientific investigations looking toward the improvement of the art of radiocommunications.

Experimental Station: A station utilizing radio waves in experiments with a view to the development of science or technique. This definition does not include amateur stations. (RR)

Experimental Testing Station: An experimental station used for the evaluation or testing of electronics equipment or systems, including site selection and transmission path surveys, which have been developed for operational use.

Facsimile: A form of telegraphy for the transmission of fixed images, with or without half-tones, with a view to their reproduction in a permanent form. (RR)

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

Field-Disturbance Sensor: A restricted radiation device which establishes a radio frequency field in its vicinity and detects changes in that field resulting from the movement of persons or objects within the radio frequency field. Examples: microwave intrusion sensors, devices that use RF energy for production line counting and sensing.

Fixed Earth Station: An earth station intended to be used at a specified fixed point.

Fixed-Satellite Earth Station: An earth station in the fixed-satellite service.

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

Fixed-Satellite Space Station: A space station in the fixed-satellite service.

Fixed Service: A radiocommunication service between specified fixed points.

(RR)

Fixed Station: A station in the fixed service. (RR)

Foreign Communication or Foreign Transmission: A radio communication or transmission of energy by radio from or to any place in the Republic of Palau to or from a foreign country, or between a station in the Republic of Palau and a mobile station located outside the Republic of Palau.

Frequency-Hopping Spread Spectrum: A signal structuring technique employing automatic switching of the transmitted frequency. Selection of the frequency to be transmitted is typically made in a pseudo-random manner from a set of frequencies covering a band wider than the information band-width. The intended receiver would frequency-hop in synchronization with the code of the transmitter in order to retrieve the desired information.

Frequency Sharing: The common use of the same portion of the radio frequency spectrum by two or more users where a probability of interference exists.

Frequency-Shift Telegraphy: Telegraphy by frequency modulation in which the telegraph signal shifts the frequency of the carrier between predetermined values. (RR)

Frequency Tolerance: The maximum permissible departure by the center frequency of the frequency band occupied by an emission from the assigned frequency or, by the characteristic frequency of an emission from the reference frequency. The frequency tolerance is expressed in parts in 10⁶ or in Hertz. (RR)

Full Carrier Single-Sideband Emission: A single-sideband emission without reduction of the carrier. (RR)

Gain of an Antenna: The ratio, usually expressed in decibels, of the power required at the input of a loss free reference antenna to the power supplied to the input of the given antenna to produce, in a given direction, the same field strength or the same power flux density at the same distance. When not specified otherwise, the gain refers to the direction of maximum radiation. The gain may be considered for a specified polarization. Depending on the choice of the reference antenna a distinction is made between:

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

normal to the surface of a perfectly conducting plane which contains the given direction. (RR)

Geostationary Satellite: A geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator and which thus remains fixed relative to the Earth; by extension, a satellite which remains approximately fixed relative to the Earth. (RR)

Geostationary Satellite Orbit: The orbit of a geosynchronous satellite whose circular and direct orbit lies in the plane of the Earth's equator. (RR)

Geosynchronous Satellite: An earth satellite whose period of revolution is equal to the period of rotation of the Earth about its axis. (RR)

Glide Path (Slope) Station: A radionavigation land station which provides vertical guidance to aircraft during approach to landing.

Harmful Interference: Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with these Regulations. (RR)

Hertz: A unit of frequency which is equivalent to one cycle per second.

High Altitude Platform Station: A station located on an object at an altitude of 20 to 50 km and at a specified, nominal, fixed point relative to the earth. (RR)

Hydrologic and Meteorological Fixed Station: A fixed station the emissions of which are used for the automatic transmission of either hydrologic or meteorological data, or both.

Hydrologic and Meteorological Land Station: A land station the emissions of which are used for the automatic transmission of either hydrologic or meteorological data, or both.

Hydrologic and Meteorological Mobile Station: A mobile station the emissions of which are used for the automatic transmission of either hydrologic or meteorological data, or both.

Incidental Radiation Device: A device that radiates radio frequency energy during the course of its operation although the device is not intentionally designed to generate radio frequency energy.

Inclination of an Orbit (of an earth satellite): The angle determined by the plane containing the orbit and the plane of the Earth's equator measured in

degrees between 0-180 and in counterclockwise direction from the Earth's equatorial plane at the ascending node of the orbit. (RR)

Individual Reception (in the broadcasting-satellite service): The reception of emissions from a space station in the broadcasting-satellite service by simple domestic installations and in particular those possessing small antennae. (RR)

Industrial Heating Equipment: Any apparatus which utilizes a radio frequency oscillator or any other type of radio frequency generator and transmits radio frequency energy used for or in connection with industrial heating operations utilized in a manufacturing or production process.

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

Instrument Landing System (ILS): A radio-navigation 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. (RR)

Instrument Landing System Glide Path: A system of vertical guidance embodied in the instrument landing system which indicates the vertical deviation of the aircraft from its optimum path of descent. (RR)

Instrument Landing System Localizer: A system of horizontal guidance embodied in the instrument landing system which indicates the horizontal deviation of the aircraft from its optimum path of descent along the axis of the runway. (RR)

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

International Broadcasting Station: A broadcasting station, employing frequencies allocated to the broadcasting service between 5950 kHz and 26100 kHz, whose transmissions are intended to be received directly by the general public in foreign countries.

Inter-Satellite Service: A radiocommunication service providing links between artificial earth satellites. (RR)

Interstate Communication or Interstate Transmission: A radio communication or transmission of energy by radio from any place in one State in the Federated States of Micronesia to another State in the Republic of Palau.

Ionosphere Sounder: A device that transmits signals for the purpose of determining ionospheric conditions.

Ionospheric Scatter: The propagation of radio waves by scattering as a result of irregularities or discontinuities in the ionization of the ionosphere. (RR)

Land Earth Station: An earth station in the fixed-satellite service or, in some cases, in the mobile-satellite service, located at a specified fixed point or within a specified area on land to provide a feeder link for the mobile-satellite service. (RR)

Land Mobile Earth Station: A mobile earth station in the land mobile-satellite service capable of surface movement within the geographical limits of a country or continent (RR)

Land Mobile-Satellite Service: A mobile-satellite service in which mobile earth stations are located on land. (RR)

Land Mobile-Satellite Space Station: A space station in the land mobile-satellite service.

Land Mobile Service: A mobile service between base stations and land mobile stations, or between land mobile stations. (RR)

Land Mobile Station: A mobile station in the land mobile service capable of surface movement within the geographical limits of a country or continent. (RR)

Land Station: A station in the mobile service not intended to be used while in motion. (RR)

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

Licensee: The holder of a radio station license granted or continued in force by the Government of the Republic of Palau.

Localizer Station: A radionavigation land station in the aeronautical radionavigation service which employs an Instrument Landing System Localizer.

Loran Station: A long distance radionavigation land station transmitting

synchronized pulses. Hyperbolic lines of position are determined by the measurement of the difference in the time of arrival of these pulses.

Low-Power Communication Device: A restricted radiation device, exclusive of those employing conducted or guided radio frequency techniques, used for the transmission of signs, signals (including control signals), writing, images and sounds or intelligence of any nature by radiation of electromagnetic energy. Examples: Wireless microphone, phonograph oscillator, radio-controlled garage door opener, and radio-controlled models.

Marine Broadcast Station: A coast station which makes scheduled broadcasts of time, meteorological, and hydrographic information.

Marine Radiobeacon Station: A radiobeacon station in the maritime radionavigation service intended for the benefit of ships.

Maritime Mobile-Satellite Earth Station: An earth station in the maritime mobile-satellite service at a specified fixed points.

Maritime Mobile-Satellite Service: A mobile-satellite service in which mobile earth stations are located on board ships; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. (RR)

Maritime Mobile-Satellite Space Station: A space station in the maritime mobile-satellite service.

Maritime Mobile Service: A mobile service between coast stations and ship stations, or between ship stations, or between associated on-board communication stations; survival craft stations and emergency position-indicating radiobeacon stations may also participate in this service. (RR)

Maritime Radionavigation-Satellite Earth Station: An fixed earth station in the maritime radionavigation- satellite service.

Maritime Radionavigation-Satellite Mobile Earth Station: A mobile earth station in the maritime radionavigation satellite service.

Maritime Radionavigation-Satellite Service: A radionavigation-satellite service in which earth stations are located on board ships. (RR)

Maritime Radionavigation-Satellite Space Station: A space station in the maritime radionavigation-satellite service.

Maritime Radionavigation Service: A radio-navigation service intended for the benefit and for the safe operation of ships. (RR)

Marker Beacon: A transmitter in the aeronautical radionavigation service which radiates vertically a distinctive pattern for providing position information to aircraft. (RR)

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

Medical Diathermy Equipment: Any apparatus (other than surgical diathermy apparatus designed for intermittent operation with low power), which utilizes a radio frequency oscillator or any other type of radio frequency generator and transmits radio frequency energy used for therapeutic purposes.

Meteor Burst Communications: Communications by the propagation of radio signals reflected by ionized meteor trails.

Meteorological Aids Service: A radiocommunication service used for meteorological, including hydrological, observations and exploration. (RR)

Meteorological Radar Station: A station in the meteorological aids service employing radar. **Meteorological-Satellite Earth Station:** An earth station in the meteorological-satellite service. **Meteorological-Satellite Service:** An Earth exploration-satellite service for meteorological purposes. (RR)

Meteorological-Satellite Space Station: A space station in the meteorological-satellite service.

Miscellaneous ISM Equipment: Any apparatus other than that defined as medical diathermy equipment or industrial heating equipment, or otherwise excepted by those definitions, in which radio frequency energy is applied to materials to produce physical, biological, or chemical effects such as heating, ionization of gases, mechanical vibrations, hair removal, and acceleration of charged particles, which do not involve communications or the use of radio receiving equipment.

Mobile Earth Station: An earth station in the mobile-satellite service intended to be used while in motion or during halts at unspecified points. (RR)

Mobile-Satellite Service: A radiocommunication service:

- between mobile earth stations and one or more space stations, or between space stations used by this service; or
- between mobile earth stations by means of one or more space stations.

This service may also include feeder links necessary for its operation. (RR)

Mobile-Satellite Space Station: A space station in the mobile-satellite service.

Mobile Service: A radiocommunication service between mobile and land stations, or between mobile stations. (RR)

Mobile Station: A station in the mobile service intended to be used while in motion or during halts at unspecified points. (RR)

Multi-Function System: A system that provides for more than one type of telecommunication with the same equipment. This system can have one or more principal functions and may have one or more secondary functions contained within the signal format or structure. The signal structure technique can be either of a conventional or spread spectrum type.

Multi-Satellite Link: A radio link between a transmitting earth station and a receiving earth station through two or more satellites, without any intermediate earth station. A multi-satellite link comprises one up-link, one or more satellite-to-satellite links and one downlink. (RR)

Necessary Bandwidth: For a given class of emission, the width of the frequency band which is just sufficient to ensure the transmission of information at the rate and with the quality required under specified conditions. (RR)

Occupied Bandwidth: The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage $B/2$ of the total mean power of a given emission. Unless otherwise specified by the ITU-R for the appropriate class of emission, the value of $B/2$ should be taken as 0.5%. (RR)

Oceanographic Data Interrogating Station: A station in the maritime mobile service the emissions of which are used to initiate, modify or terminate functions of equipment directly associated with an oceanographic data station, including the station itself.

Oceanographic Data Station: A station in the maritime mobile service located on a ship, buoy, or other sensor platform the emissions of which are used for transmission of oceanographic data.

Omnidirectional Range Station: A radionavigation land station in the aeronautical radionavigation service providing direct indication of the bearing (omnibearing) of that station from an aircraft.

On-Board Communication Station: A low-powered mobile station in the maritime mobile service intended for use for internal communications on board a ship, or between a ship and its lifeboats and life rafts during lifeboat drills or

operations, or for communication within a group of vessels being towed or pushed, as well as for line handling and mooring instructions. (RR)

Orbit: The path, relative to a specified frame of reference, described by the center of mass of a satellite or other object in space subjected primarily to natural forces, mainly the force of gravity. (RR)

Out-of-band Emission: Emission on a frequency or frequencies immediately outside the necessary bandwidth which results from the modulation process, but excluding spurious emission. (RR)

Passive Sensor: A measuring instrument in the Earth exploration satellite service or in the space research service by means of which information is obtained by reception of radio waves of natural origin. (RR)

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

Perimeter Protection System: A field disturbance sensor which uses buried leaky cables installed around a facility to detect any unauthorized entry or exit.

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

Permissible Interference: ⁱ 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. (RR)

Port Operations Service: A maritime mobile service in or near a port, between coast stations and ship stations, or between ship stations, in which messages are restricted to those relating to the operational handling, the movement and the safety of ships and, in emergency, to the safety of persons. Messages which are of a public correspondence nature shall be excluded from this service. (RR)

Port Station: A coast station in the port operations service. (RR)

Portable Land Mobile Station: A portable station operating in the land mobile service.

Portable Mobile Station: A portable station operating in the mobile service.

Portable Station: A station designed to be carried by a person and capable of

transmitting and/or receiving while in motion or during brief halts at unspecified locations.

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

- peak envelope power (PX or pX);
- mean power (PY or pY);
- carrier power (PZ or pZ).

For different classes of emission, the relationships between peak envelope power, mean power and carrier power, under the conditions of normal operation and of no modulation, are contained in ITU-R Recommendations which may be used as a guide. For use in formulae, the symbol p denotes power expressed in watts and the symbol P denotes power expressed in decibels relative to a reference level. (RR) (See also Carrier Power of a Radio Transmitter, Effective Radiated Power, Mean Power of a Radio Transmitter, and Peak Envelope Power of a Radio Transmitter.)

Primary Radar: A radiodetermination system based on the comparison of reference signals with radio signals reflected from the position to be determined. (RR)

Priority: Priority, unless specifically qualified, is the right to occupy a specific frequency for authorized uses, free of harmful interference from stations of other stations.

Processing Gain: The ratio of the post processing signal-to-noise ratio to the received signal-to-noise ratio, usually expressed in dB.

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

Public Correspondence: Any telecommunication which the offices and stations must, by reason of their being at the disposal of the public, accept for transmission. (RR)

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

Radar Beacon (racon): A transmitterreceiver associated with a fixed navigational mark which, when triggered by a radar, automatically returns a distinctive signal which can appear on the display of the triggering radar,

providing range, bearing and identification information. (RR)

Radar Beacon (racon) Station: A station which employs a radar beacon (racon).

Radar Transponder: A receiver-transmitter facility the function of which is to transmit signals automatically when proper interrogation is received.

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

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

Radio Altimeter: Radionavigation equipment, on board an aircraft or spacecraft, used to determine the height of the aircraft or the spacecraft above the Earth's surface or another surface.

Radio Astronomy: Astronomy based on the reception of radio waves of cosmic origin. (RR)

Radio Astronomy Service: A service involving the use of radio astronomy. (RR)

Radio Astronomy Station: A station in the radio astronomy service. (RR) (This is always a receiving station.)

Radio Beacon Mobile Station: A mobile station the emissions of which are used to determine its location.

Radiobeacon Station: A station in the radio-navigation service the emissions of which are intended to enable a mobile station to determine its bearing or direction in relation to the radiobeacon station. (RR)

Radio Communication or Communication by Radio: The transmission by radio of writing, signs, signals, pictures, and sounds of all kinds, including all instrumentalities, facilities, apparatus, and services (among other things, the receipt, forwarding and delivery of communications) incidental to such transmissions.

Radiocommunication Service: A service as defined in this Section involving the transmission, emission and/or reception of radio waves for specific telecommunication purposes. In these regulations, unless otherwise stated, any radiocommunication service relates to terrestrial radiocommunication. (RR)

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

Radiodetermination-Satellite Earth Station: A fixed earth station in the radiodeterminationsatellite service.

Radiodetermination-Satellite Mobile Earth Station: A mobile earth station in the radiodetermination-satellite service.

Radiodetermination-Satellite Service: A radiocommunication service for the purpose of radiodetermination involving the use of one or more space stations. This service may also include feeder links necessary for its own operation. (RR)

Radiodetermination Service: A radiocommunication service for the purpose of radiodetermination. (RR)

Radiodetermination Station: A station in the radiodetermination service. (RR)

Radio Direction-Finding: Radiodetermination using the reception of radio waves for the purpose of determining the direction of a station or object. (RR)

Radio Direction-Finding Station: A radiodetermination station using radio direction-finding (RR)

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

Radiolocation Land Station: A station in the radiolocation service not intended to be used while in motion. (RR)

Radiolocation Mobile Station: A station in the radiolocation service intended to be used while in motion or during halts at unspecified points. (RR)

Radiolocation-Satellite Service: A radiodetermination-satellite service used for the purpose of radiolocation. This service may also include the feeder links necessary for its operation. (RR)

Radiolocation Service: A radiodetermination service for the purpose of radiolocation. (RR)

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

Radionavigation Land Station: A station in the radionavigation service not intended to be used while in motion. (RR)

Radionavigation Land Test Station (Maintenance Test Facility): A radionavigation land station in the aeronautical radionavigation service which is

used as a radionavigation calibration station for the transmission of essential information in connection with the testing and calibration of aircraft navigational aids, receiving equipment and interrogators at predetermined surface locations. The primary purpose of this facility is to permit maintenance testing by aircraft radio service personnel.

Radionavigation Land Test Station (Operational Test Facility): A radionavigation land station in the aeronautical radionavigation service which is used as a radionavigation calibration station for the transmission of essential information in connection with the testing and calibration of aircraft navigational aids, receiving equipment and interrogators at predetermined surface locations. The primary purpose of this facility is to permit the pilot to check a radionavigation system aboard the aircraft prior to takeoff.

Radionavigation Mobile Station: A station in the radionavigation service intended to be used while in motion or during halts at unspecified points. (RR)

Radionavigation-Satellite Earth Station: An earth station in the radionavigation-satellite service.

Radionavigation-Satellite Mobile Earth Station: A mobile earth station in the radionavigation-satellite service.

Radionavigation-Satellite Service: A radiodetermination-satellite service used for the purpose of radionavigation. This service may also include feeder links necessary for its operation. (RR)

Radionavigation-Satellite Space Station: A space station in the radionavigation-satellite service.

Radionavigation Service: A radiodetermination service for the purpose of radionavigation. (RR)

Radiosonde: An automatic radio transmitter in the meteorological aids service usually carried on an aircraft, free balloon, kite, or parachute, and which transmits meteorological data. (RR)

Radiosonde Ground Station: A station in the meteorological aids service employing a ground station associated with a radiosonde.

Radiosonde Station: A station in the meteorological aids service employing a radiosonde.

Radiotelegram: A telegram, originating in or intended for a mobile station or a mobile earth station transmitted on all or part of its route over the

radiocommunication channels of the mobile service or of the mobile-satellite service. (RR)

Radiotelemetry: Telemetry by means of radio waves. (RR)

Radiotelephone Call: A telephone call, originating in or intended for a mobile station or a mobile earth station, transmitted on all or part of its route over the radiocommunication channels of the mobile service or of the mobile-satellite service. (RR)

Radiotelex Call: A telex call, originating in or intended for a mobile station or a mobile earth station, transmitted on all or part of its route over the radiocommunication channels of the mobile service or the mobile-satellite service. (RR)

Radio Waves or Hertzian Waves: Electromagnetic waves of frequencies arbitrarily lower than 3000 GHz, propagated in space without artificial guide. (RR)

Reduced Carrier Single-Sideband Emission: A single-sideband emission in which the degree of carrier suppression enables the carrier to be reconstituted and to be used for demodulation. (RR)

Reference Frequency: A frequency having a fixed and specific 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 center of the frequency band occupied by the emission. (RR) (See also Characteristic Frequency.)

Reflecting Satellite: A satellite intended to reflect radiocommunication signals. (RR)

Restricted Radiation Device: A device in which the generation of radio frequency energy is intentionally incorporated into the design, and in which the radio frequency energy is conducted along wires or is radiated, exclusive of transmitters and exclusive of Industrial, Scientific, and Medical (ISM) equipment.

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

RF Stabilized Arc Welder: Any welding equipment that utilizes radio frequency energy to initiate and stabilize the arc. An RF stabilized arc welder includes the

source of the RF and welding currents, the welding torch, and all interconnecting cables.

Safety Service: Any radiocommunication service used permanently or temporarily for the safeguarding of human life and property. (RR)

Satellite: A body which revolves around another body of preponderant mass and which has a motion primarily and permanently determined by the force of attraction of that other body. (RR)

Satellite Emergency Position-Indicating Radio-beacon: An earth station in the mobile-satellite service the emissions of which are intended to facilitate search and rescue operations. (RR)

Satellite Link: A radio link between a transmitting earth station and a receiving earth station through one satellite. A satellite link comprises one uplink and one downlink. (RR)

Satellite Network: A satellite system or a part of a satellite system, consisting of only one satellite and the cooperating earth stations. (RR)

Satellite System: A space system using one or more artificial earth satellites. (RR)

Secondary Radar: A radiodetermination system based on the comparison of reference signals with radio signals retransmitted from the position to be determined. (RR)

Semi-Duplex Operation: A method which is simplex operation at one end of the circuit and duplex operation at the other. ⁱⁱ (RR)

Ship Earth Station: A mobile earth station in the maritime mobile-satellite service located on board ship. (RR)

Ship's Emergency Transmitter: A ship's transmitter to be used exclusively on a distress frequency for distress, urgency or safety purposes. (RR)

Ship Movement Service: A safety service in the maritime mobile service other than a port operations service, between coast stations and ship stations, or between ship stations, in which messages are restricted to those relating to the movement of ships. Messages which are of a public correspondence nature shall be excluded from this service. (RR)

Ship Station: A mobile station in the maritime mobile service located on board a vessel which is not permanently moored, other than a survival craft station. (RR)

Simplex Operation: Operating method in which transmission is made possible alternately in each direction of a telecommunication channel, for example, by means of manual control. ⁱⁱ (RR)

Single-Sideband Emission: An amplitude modulated emission with one sideband only. (RR)

Sounder Network Station: A station equipped with an ionosphere sounder used for the realtime selection of frequencies for operational communication circuits.

Sounder Prediction Station: A station equipped with an ionosphere sounder for realtime monitoring of upper atmosphere phenomena or to obtain data for the prediction of propagation conditions.

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

Space Operation Earth Station: An earth station in the space operation service.

Space Operation Service: A radiocommunication service concerned exclusively with the operation of spacecraft, in particular space tracking, space telemetry and space telecommand. These functions will normally be provided within the service in which the space station is operating. (RR)

Space Operation Space Station: A space station in the space operation service.

Space Radiocommunication: Any radiocommunication involving the use of one or more space stations or the use of one or more reflecting satellites or other objects in space. (RR)

Space Research Earth Station: An earth station in the space research service.

Space Research Service: A radiocommunication service in which spacecraft or other objects in space are used for scientific or technological research purposes. (RR)

Space Research Space Station: A space station in the space research service.

Space Station: A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere. (RR)

Space System: Any group of cooperating earth stations and/or space stations employing space radiocommunication for specific purposes. (RR)

Space Telecommand: The use of radiocommunication for the transmission of

signals to a space station to initiate, modify or terminate functions of equipment on an associated space object. including the space station. (RR)

Space Telecommand Earth Station: An earth station the emissions of which are used for space telecommand.

Space Telecommand Space Station: A space station which receives emissions used for space telecommand.

Space Telemetry Earth Station: An earth station which receives emissions used for space telemetry.

Space Telemetry Space Station: A space station the emissions of which are used for space telemetry.

Space Telemetry: The use of telemetry for the transmission from a space station of results of measurements made in a spacecraft, including those relating to the functioning of the spacecraft (RR)

Space Tracking: Determination of the orbit, velocity or instantaneous position of an object in space by means of radiodetermination, excluding primary radar, for the purpose of following the movement of the object. (RR)

Space Tracking Earth Station: An earth station which transmits or receives emissions used for space tracking.

Space Tracking Space Station: A space station which transmits or receives and retransmits emissions used for space tracking.

Space Transponder: A receivertransmitter combination on board a satellite or space craft which receives a signal and transmits it at a different carrier frequency.

Special Service: A radiocommunication service, not otherwise defined in this Section, carried on exclusively for specific needs of general utility, and not open to public correspondence. (RR)

Spread Spectrum: A signal structuring technique that employs direct sequence, frequency hopping or a hybrid of these, which can be used for multiple access and/or multiple functions. This technique decreases the potential interference to other receivers while achieving privacy and increasing the immunity of spread spectrum receivers to noise and interference. Spread spectrum generally makes use of a sequential noise-like signal structure to spread the normally narrowband information signal over a relatively wide band of frequencies. The receiver correlates the signals to retrieve the original information signal.

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

Squelch: A circuit function that acts to suppress the audio output of a receiver.

Standard Frequency and Time Signal Station: A station in the standard frequency and time signal service. (RR)

Standard Frequency and Time Signal-Satellite Service: A radiocommunication service using space stations on earth satellites for the same purpose as those of the standard frequency and time signal service. This service may also include feeder links necessary for its operation. (RR)

Standard Frequency and Time Signal-Satellite Space Station: A space station in the standard frequency and time signal-satellite service.

Standard Frequency and Time Signal Service: A radiocommunication service for scientific, technical and other purposes, providing the transmission of specified frequencies, time signals, or both, of stated high precision, intended for general reception. (RR)

Station: One or more transmitters or receivers or a combination of transmitters and receivers, including the accessory equipment, necessary at one location for carrying on a radiocommunication service, or the radio astronomy service. Each station shall be classified by the service in which it operates permanently or temporarily. (RR)

Steerable Satellite Beam: A satellite antenna beam that can be re-pointed. (RR)

Suppressed Carrier Single-Sideband Emission: A single-sideband emission in which the carrier is virtually suppressed and not intended to be used for demodulation. (RR)

Surface Telemetry Land Station: A telemetry land station the emission of which are intended to be received on the surface of the Earth.

Surface Telemetry Mobile Station: A telemetry mobile station located on the surface of the Earth and the emissions of which are intended to be received on the surface of the Earth.

Surveillance Radar Station: A radionavigation land station in the aeronautical radionavigation service employing radar to display the presence of aircraft within

its range. (In certain instances, a surveillance radar station may be placed on board a ship.)

Survival Craft Station: A mobile station in the maritime mobile service or the aeronautical mobile service intended solely for survival purposes and located on any lifeboat, life-raft or other survival equipment. (RR)

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

Telecommand Base Station: A land station in the land mobile service the emissions of which are used for terrestrial telecommand.

Telecommand Fixed Station: A fixed station in the fixed service the emissions of which are used for terrestrial telecommand.

Telecommand Land Station: A land station in the mobile service the emissions of which are used for terrestrial telecommand.

Telecommand Land Mobile Station: A mobile station in the land mobile service the emissions of which are used for terrestrial telecommand.

Telecommand Mobile Station: A mobile station in the mobile service the emissions of which are used for terrestrial telecommand.

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

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

Telegraphy: A form of telecommunication in which the transmitted information is intended to be recorded on arrival as a graphic document, the transmitted information may sometimes be presented in an alternative form or may be stored for subsequent use. (RR)

Telemetry Fixed Station: A fixed station the emissions of which are used for telemetry.

Telemetry Land Station: A land station the emissions of which are used for telemetry.

Telemetry Mobile Station: A mobile station the emissions of which are used

for telemetering.

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

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

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

Terrestrial Radiocommunication: Any radiocommunication other than space radiocommunication or radio astronomy. (RR)

Terrestrial Station: A station effecting terrestrial radiocommunication. In these Regulations, unless otherwise stated, any station is a terrestrial station. (RR)

Time-Gated Direct Sequence Spread Spectrum: Direct-Sequence Spread Spectrum where the transmitter is on only for a short fraction of a time interval. The on-time can be periodic or random within a time interval.

Transportable Station: A station which is transferred to various fixed locations but is not intended to be used while in motion.

Travelers Information Station: A base station in the Land Mobile Service used to transmit non-commercial voice information pertaining to traffic and road conditions, traffic hazard and travelers advisories, directions, availability of lodging, rest stops and service stations, and descriptions of local points of interest.

Tropospheric Scatter: The propagation of radio waves by scattering as a result of irregularities or discontinuities in the physical properties of the troposphere. (RR)

Ultrasonic Equipment: Any apparatus which generates radio frequency energy and utilizes that energy to excite or drive an electro-mechanical transducer for the production of sonic or ultrasonic mechanical energy for industrial, scientific, medical, or other noncommunication purposes.

Ultra-Wideband Radar: A radar having an instantaneous bandwidth greater than 25 percent of its center frequency.

Unwanted Emissions: Consist of spurious emissions and out-of-band emissions. (RR)

Wired Radio Frequency Systems: Systems employing restricted radiation devices in which the radio frequency energy is conducted or guided along wires or

in cables, including electric power and telephone lines.

TABLE A
Services, Station Classes, and Stations

Service	Station Class	Station
1. Amateur	none	Amateur
2. Broadcasting	BC BT	Broadcasting (sound) Broadcasting (television)
3. Broadcasting-Satellite	EB EV	Space (sound) Space (television)
4. Earth Exploration-Satellite	EW TW	Space Earth
<i>Meteorological-Satellite</i>	EM TM	Space Earth
5. Fixed	FX FXD FXE FXH	Fixed Telecommand Fixed Telemetry Fixed Hydrologic and Meteorological Fixed
<i>Aeronautical Fixed</i>	AX	Aeronautical Fixed
6. Fixed-Satellite	EC TC VA TB TI TY	Space Earth Land Earth Earth Coast Earth Base Earth
7. Inter-Satellite	ES	Space
8. Meteorological Aids	SA SAR SM SMB SMD SMRG	Meteorological Aids Mobile Station Radiosonde Meteorological Aids Base Station Radar Beacon Precipitation Gage Meteorological Rada Radiosonde Ground

9. Mobile	FL FLD FLE FLEA FLEB FLEC FLH FLU MO MOB MOD MOE MOEA MOEB MOEC MOH MOP MOU	Land Telecommand Land Telemetry Land Aeronautical Telemetry Land Flight Telemetry Land Surface Telemetry Land Hydrologic and Meteorological Land Aeronautical Utility Land Mobile Radio Beacon Mobile Telecommand Mobile Telemetry Aeronautical Telemetry Mobile Flight Telemetry Mobile Surface Telemetry Mobile Hydrologic and Meteorological Mobile Portable Mobile Aeronautical Utility Mobile
<i>Aeronautical Mobile</i>	FA FAB FAC FAD FAT MA MAD MAP	Aeronautical Aeronautical Broadcast Airdrome Control telecommand Aeronautical Flight Test Aircraft Telecommand Aircraft Portable Aircraft
<i>Aeronautical Mobile (OR)</i>	FG	Aeronautical
<i>Aeronautical Mobile (R)</i>	FD	Aeronautical
<i>Land Mobile</i>	FD FBD ML MLD MLP	Base Telecommand Base Land Mobile Telecommand Land Mobile Portable Land Mobile
<i>Maritime Mobile</i>	FC FCB FCD MS MSD MSP OD OE	Coast Marine Broadcast Telecommand Coast Ship Telecommand Ship Portable Ship Oceanographic Data Oceanographic Data Interrogating

10. Mobile-Satellite	UA TE EI VA	Mobile Earth Satellite EPIRB Space Land Earth
<i>Aeronautical Mobile-Satellite</i>	EJ TB TJ	Space Land Mobile Earth Base Earth
<i>Land Mobile-Satellite</i>	EU TU TY	Space Land Mobile Earth Base Earth
<i>Maritime Mobile-Satellite</i>	EG TG TI	Space Ship Earth Coast Earth
11. Radio Astronomy	RA	Radio Astronomy
12. Radiodetermination	None RG	Radiodetermination Radio Direction-Finding
<i>Radiolocation</i>	LR MR MRP	Land Mobile Portable
<i>Radionavigation</i>	NR RNL RN	Mobile LORAN Land
Aeronautical Radionavigation	AL ALA ALB ALC ALG ALL ALO ALR ALS ALTM ALTO AM AMA	Land Marker Beacon Radio Beacon Radar Beacon (Racon) Glide Path (Slope) Localizer Omnidirectional Range Radio Range Surveillance Rada Land Test (Maintenance) Land Test (Operational) Mobile Altimeter
Maritime Radionavigation	NL NLC NLM	Land Radar Beacon (Racon) Marine Radio Beacon

13. Radiodetermination-Satellite	EF TF TL	Space Earth Mobile Earth
<i>Radionavigation-Satellite</i>	EN TN UM	Space Fixed Earth Mobile Earth
Aeronautical Radionavigation-Satellite	EO TO TZ	Space Mobile Earth Earth
Maritime Radionavigation - Satellite	EQ TQ TX	Space Mobile Earth Earth
14. Space Operation	ET TT	Space Earth
15. Space Research	EH TH	Space Earth
16. Standard Frequency and Time Signal	SS	Standard Frequency and Time Signal
17. Standard Frequency and Time Signal-Satellite	EE	Space
18. No Specific Service	DGP ED EK ER SN SP TD TK TR XC XD XE XM XR XT	Differential-Global-Positioning-System Space Telecommand Space Space Tracking Space Space Telemetry Space Sounder Network Sounder Prediction Space Telecommand Earth Space Tracking Earth Space Telemetry Earth Experimental Contract Developmental Experimental Developmental Experimental Export Experimental Composite Experimental Research Experimental Testing

6.1.2 Table of Services, Station Classes, and Stations

Table A is used to determine the proper Station Class symbol to be used versus the Service in which the transmitting station will operate. Frequency bands are allocated to Service(s) based upon the Republic of Palau Government Table of Frequency Allocations (see Section 4.1.3)

6.1.3 Stations (alphabetical by symbols)

1. Where a definition is followed by the parenthetical expression “(RR),” it is an indication that the definition is in the ITU Radio Regulations.

2. The suffix “R” shall be added to the established class of station (STC) symbol only if the station is to be used primarily as a repeater in the bands:

29.89-50.00 MHz

138.00-144.00 MHz.

148.00-149.90 MHz.

150.05-150.80 MHz.

162.00-174.00 MHz.

406.10-420.00 MHz.

450.00-470.00 MHz

For this purpose, a repeater consists of a radio transmitter, a radio receiver and coupling between the two so as to retransmit unchanged in intelligence the received signal.

3. The following definitions of Stations and associated Station Class (STC) symbols are used on frequency assignments as applicable.

AL--Aeronautical Radionavigation Land Station: A land station in the aeronautical radionavigation service not intended for use while in motion.

ALA--Aeronautical Marker Beacon Station: A radionavigation land station in the aeronautical radionavigation service which employs a marker beacon.

ALB--Aeronautical Radiobeacon Station: A radiobeacon station in the aeronautical radionavigation service intended for the benefit of aircraft.

ALC--Aeronautical Radar Beacon (racon) Station: A land station in the aeronautical radionavigation service which employs a radar beacon (racon).

ALG--Glide Path (Slope) Station: A radionavigation land station which provides vertical guidance to aircraft during approach to landing.

ALL--Localizer Station: A radionavigation land station in the aeronautical radionavigation service which employs an Instrument Landing System Localizer.

ALO--Omnidirectional Range Station: A radio-navigation land station in the aeronautical radionavigation service providing direct indication of the bearing (omnibearing) of that station from an aircraft.

ALR--Radio Range Station: A radionavigation land station in the aeronautical radionavigation service providing radial equisignal zones. (In certain instances a radio range station may be placed on board a ship.)

ALS--Surveillance Radar Station: A radionavigation land station in the aeronautical radionavigation service employing radar to display the presence of aircraft within its range. (In certain instances, a surveillance radar station may be placed on board a ship.)

ALTM--Radionavigation Land Test Station(Maintenance Test Facility): A radionavigation land station in the aeronautical radionavigation service which is used as a radionavigation calibration station for the transmission of essential information in connection with the testing and calibration of aircraft navigational aids, receiving equipment and interrogators at predetermined surface locations. The primary purpose of this facility is to permit maintenance testing by aircraft radio service personnel.

ALTO--Radionavigation Land Test Station (Operational Test Facility): A radionavigation land station in the aeronautical radionavigation service which is used as a radionavigation calibration station for the transmission of essential information in connection with the testing and calibration of aircraft navigational aids, receiving equipment and interrogators at predetermined surface locations. The primary purpose of this facility is to permit the pilot to check a radionavigation system aboard the aircraft prior to takeoff.

AM--Aeronautical Radionavigation Mobile Station: A mobile station in the aeronautical radionavigation service intended to be used while in motion or during halts at unspecified points.

AMA--Altimeter Station: A radionavigation mobile station in the aeronautical radionavigation service which employs a radio altimeter.

AX--Aeronautical Fixed Station: A station in the aeronautical fixed service. (RR)

BC--Broadcasting Station (sound): A station (sound) in the broadcasting service. (RR)

BT--Broadcasting Station (television): A station (television) in the broadcasting service. (RR)

EB--Broadcasting-Satellite Space Station (sound broadcasting): A space station in

the broadcasting-satellite service (sound broadcasting). (RR)

DGP--Differential-Global-Positioning-System (DGPS) Station: a terrestrial station used for the transmission of differential correction information to DGPS receivers aboard aircraft for navigation.

EC--Fixed-Satellite Space Station: A space station in the fixed-satellite service. (RR)

ED--Space Telecommand Space Station: A space station which receives emissions used for space telecommand. (RR)

EE--Standard Frequency Satellite Space Station: A space station in the standard frequency satellite service. (RR)

EF--Radiodetermination-Satellite Space Station: A space station in the radiodeterminationsatellite service. (RR)

EG--Maritime Mobile-Satellite Space Station: A space station in the maritime mobile-satellite service. (RR)

EH--Space Research Space Station: A space station in the space research service. (RR)

EI--Mobile-Satellite Space Station: A space station in the mobile-satellite service. (RR)

EJ--Aeronautical Mobile-Satellite Space Station: A space station in the aeronautical mobilesatellite service. (RR)

EK--Space Tracking Space Station: A space station which transmits or receives and retransmits emissions used for space tracking.

EM--Meteorological-Satellite Space Station: A space station in the meteorological-satellite service. (RR)

EN--Radionavigation-Satellite Space Station: A space station in the radionavigation-satellite service. (RR)

EO--Aeronautical Radionavigation-Satellite Space Station: A space station in the aeronautical radionavigationsatellite service. (RR)

EQ--Maritime Radionavigation-Satellite Space Station: A space station in the maritime radionavigation-satellite service. (RR)

ER--Space Telemetry Space Station: A space station the emissions of which are used for space telemetry.

ES--Inter-Satellite Space Station: A space station in the inter-satellite service. (RR)

ET--Space Operation Space Station: A space station in the space operation service. (RR)

EU--Land Mobile-Satellite Space Station: A space station in the land mobile-satellite service.

EV--Broadcasting-Satellite Space Station (television): A space station in the broadcasting-satellite service (television). (RR)

EW--Earth Exploration-Satellite Space Station: A space station in the Earth exploration-satellite service. (RR)

EX--Experimental Station: A station utilizing radio waves in experiments with a view to development of science or technique. (RR) (EX is not used on applications.)

FA--Aeronautical Station: A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example on board ship or on a platform at sea. (RR)

FAB--Aeronautical Broadcast Station: An aeronautical station which makes scheduled broadcasts of meteorological information and notices to airmen. (In certain instances, an aeronautical broadcast station may be placed on board a ship.)

FAG--Airdrome Control Station: An aeronautical station providing communication between an airdrome control tower and aircraft.

FAD--Telecommand Aeronautical Station: A land station in the aeronautical mobile service the emissions of which are used for terrestrial telecommand.

FAT--Flight Test Station: An aeronautical station used for the transmission of essential communications in connection with the testing of aircraft or major components of aircraft.

FB--Base Station: A land station in the land mobile service. (RR)

FBD--Telecommand Base Station: A land station in the land mobile service the emissions of which are used for terrestrial telecommand.

FC--Coast Station: A land station in the maritime mobile service. (RR)

FCB--Marine Broadcast Station: A coast station which makes scheduled broadcast of time, meteorological, and hydrographic information.

FCD--Telecommand Coast Station: A land station in the maritime mobile service the emissions of which are used for terrestrial telecommand.

FD--Aeronautical Station (R): An aeronautical station in the aeronautical mobile (R) service.

FG--Aeronautical Station (OR): An aeronautical station in the aeronautical mobile (OR) service. (RR)

FL--Land Station: A station in the mobile service not intended to be used while in motion. (RR)

FLD--Telecommand Land Station: A land station in the mobile service the emissions of which are used for terrestrial telecommand.

FLE--Telemetry Land Station: A land station the emissions of which are used for telemetry.

FLEA--Aeronautical Telemetry Land Station: A telemetry land station used in the flight testing of manned or unmanned aircraft, missiles, or major components thereof.

FLEB--Flight Telemetry Land Station: A telemetry land station the emissions of which are used for telemetry to a balloon; to a booster or rocket, excluding a booster or rocket in orbit about the Earth or in deep space; or to an aircraft, excluding a station used in the flight testing of an aircraft.

FLED--Surface Telemetry Land Station: A telemetry land station the emissions of which are intended to be received on the surface of the Earth.

FLH--Hydrologic and Meteorological Land Station: A land station the emissions of which are used for the automatic transmission of either hydrologic or meteorological data, or both.

FLU--Aeronautical Utility Land Station: A land station located at airdrome control towers and used for control of ground vehicles and aircraft on the ground at airdromes.

FP--Port Station: A coast station in the port operations service. (RR)

FX--Fixed Station: A station in the fixed service. (RR)

FXD--Telecommand Fixed Station: A fixed station in the fixed service the emissions of which are used for terrestrial telecommand.

FXE--Telemetry Fixed Station: A fixed station the emissions of which are used for telemetry.

FXH--Hydrologic and Meteorological Fixed Station: A fixed station the emissions of which are used for the automatic transmission of either hydrologic or meteorological data, or both.

LR--Radiolocation Land Station: A station in the radiolocation service not intended to be used while in motion. (RR)

MA--Aircraft Station: A mobile station in the aeronautical mobile service other than a survival craft station, located on board an aircraft. (RR)

MAD--Telecommand Aircraft Station: A mobile station in the aeronautical mobile service the emissions of which are used for terrestrial telecommand.

MAP--Portable Aircraft Station: A portable station operating in the aeronautical mobile service.

ME--Space Station: A station located on an object which is beyond, is intended to go beyond, or has been beyond, the major portion of the Earth's atmosphere.(RR)
(ME is not used on applications.)

ML--Land Mobile Station: A mobile station in the land mobile service capable of surface movement within the geographical limits of a country or continent. (RR)

MLD--Telecommand Land Mobile Station: A mobile station in the land mobile service the emissions of which are used for terrestrial telecommand.

MLP--Portable Land Mobile Station: A portable station operating in the land mobile service.

MO--Mobile Station: A station in the mobile service intended to be used while in motion or during halts at unspecified points. (RR)

MOB--Radio Beacon Mobile Station: A mobile station the emissions of which are used to determine its location.

MOD--Telecommand Mobile Station: A mobile station in the mobile service the emissions of which are used for terrestrial telecommand.

MOE--Telemetering Mobile Station: A mobile station the emissions of which are used for telemetering.

MOEA--Aeronautical Telemetering Mobile Station: A telemetering mobile station used for transmitting data directly related to the airborne testing of the vehicle, (or major components), on which the station is installed.

MOEB--Flight Telemetering Mobile Station: A telemetering mobile station used for transmitting data from an airborne vehicle, excluding data related to airborne testing of the vehicle itself, (or major components thereof).

MOEC--Surface Telemetering Mobile Station: A telemetering mobile station located on the surface of the Earth and the emissions of which are intended to be received on the surface of the Earth.

MOH--Hydrologic and Meteorological Mobile Station: A mobile station the emissions of which are used for the automatic transmission of either hydrologic or meteorological data, or both.

MOP--Portable Mobile Station: A portable station operating in the mobile service.

MOU--Aeronautical Utility Mobile Station: A mobile station used for communication at airdromes with the aeronautical utility land station, the airdrome control station, the FAA flight service station, ground vehicles, and aircraft on the ground. (All transmissions shall be subject to the control of the airdrome control station and shall be discontinued immediately when so requested by the airdrome control operators.)

MR--Radiolocation Mobile Station: A station in the radiolocation service intended to be used while in motion or during halts at unspecified points. (RR)

MRP--Portable Radiolocation Station: A portable station operating in the radiolocation service.

MS--Ship Station: A mobile station in the maritime mobile service located on board a vessel which is not permanently moored, other than a survival craft station. (RR)

MSD--Telecommand Ship Station: A mobile station in the maritime mobile service the emissions of which are used for terrestrial telecommand.

MSP--Portable Ship Station: A portable station operating in the maritime mobile service.

NL--Maritime Radionavigation Land Station: A land station in the Maritime Radionavigation Service not intended for use while in motion.

NLC--Maritime Radar Beacon (racon) Station: A land station in the maritime radionavigation service which employs a radar beacon (racon).

NLM--Marine Radiobeacon Station: A radio-beacon station in the maritime radionavigation service intended for the benefit of ships.

NR--Radionavigation Mobile Station: A station in the radionavigation service intended to be used while in motion or during halts at unspecified points. (RR)

OD--Oceanographic Data Station: A station in the maritime mobile service located on a ship, buoy or other sensor platform the emissions of which are used for the transmission of oceanographic data.

OE--Oceanographic Data Interrogating Station: A station in the maritime mobile service the emissions of which are used to initiate, modify, or terminate functions of equipment directly associated with an oceanographic data station, including the station itself.

RA--Radio Astronomy Station: A station in the radio astronomy service. (RR)
(This is always a receiving station.)

RG--Radio Direction-Finding Station: A radio-determination station using radio directionfinding. (RR)

RN--Radionavigation Land Station: A station in the radionavigation service not intended to be used in motion. (RR)

RNL--Loran Station: A long distance radio-navigation land station transmitting synchronized pulses. Hyperbolic lines of position are determined by the measurement of the difference in the time of arrival of these pulses.

SA--Meteorological Aids Mobile Station: A mobile station in the meteorological aids service intended to be used while in motion or during halts at unspecified points.

SAR--Radiosonde Station: A station in the meteorological aids service employing a radiosonde.

SM--Meteorological Aids Base Station: A land station in the meteorological aids service not intended for use while in motion.

SMB--Radar Beacon Precipitation Gage Station: A transponder station in the

meteorological aids service, the emissions of which are used for telemetering.

SMD--Meteorological Radar Station: A station in the meteorological aids service employing radar.

SMRG--Radiosonde Ground Station: A station in the meteorological aids service employing a ground station associated with a radiosonde.

SN--Sounder Network Station: A station equipped with an ionosphere sounder used for the realtime selection of frequencies for operational communication circuits.

SP--Sounder Prediction Station: A station equipped with an ionosphere sounder for real-time monitoring of upper atmosphere phenomena or to obtain data for the prediction of propagation conditions.

SS--Standard Frequency and Time Signal Station: A station in the standard frequency and time signal service. (RR)

TB--Aeronautical Earth Station: An earth station in the fixed-satellite service or in some cases in the aeronautical mobile-satellite service located at a specified fixed point on land to provide a feeder link for the aeronautical mobile-satellite service. (RR)

TC--Fixed-Satellite Earth Station: An earth station in the fixed-satellite service. (RR)

TD--Space Telecommand Earth Station: An earth station the emissions of which are used for space telecommand.

TE--Satellite EPIRB Station: A satellite Emergency Position-Indicating Radio Beacon (EPIRB) in the mobile-satellite service (RR).

TF--Radiodetermination-Satellite Earth Station: A fixed earth station in the radiodetermination-satellite service. (RR)

TG--Ship Earth Station: A mobile earth station in the maritime mobile-satellite service located on board ship. (RR)

TH--Space Research Earth Station: An earth station in the space research service. (RR)

TI--Coast Earth Station: An earth station in the fixed-satellite service or in some cases in the maritime mobile satellite service located at a specified fixed point on land to provide a feeder link for the maritime mobile-satellite. (RR)

TJ--Aircraft Earth Station: A mobile earth station in the aeronautical mobile satellite service located on board an aircraft. (RR)

TK--Space Tracking Earth Station: An earth station which transmits or receives emissions used for space tracking.

TL--Radiodetermination-Satellite Mobile Earth Station: A mobile earth station in the radiodetermination+satellite service. (RR)

TM--Meteorological-Satellite Earth Station: An earth station in the meteorological-satellite service. (RR)

TN--Radionavigation-Satellite Fixed Earth Station: A fixed earth station in the radionavigation-satellite service. (RR)

TO--Aeronautical Radionavigation-Satellite Mobile Earth Station: A mobile earth station in the aeronautical radionavigation-satellite service. (RR)

TP--Earth Station (receiving): An earth station used for receiving. (RR) (TP is not used on applications.)

TQ--Maritime Radionavigation-Satellite Mobile Earth Station: A mobile earth station in the maritime radionavigation-satellite service. (RR)

TR--Space Telemetry Earth Station: An earth station which receives emissions used for space telemetry.

TT--Space Operation Earth Station: An earth station in the space operation service. (RR)

TU--Land Mobile Earth Station: A mobile earth station in the land mobile-satellite service capable of surface movement within the geographical limits of a country or continent. (RR)

TW--Earth Exploration-Satellite Earth Station: An earth station in the Earth exploration-satellite service. (RR)

TX--Maritime Radionavigation-Satellite Earth Station: A fixed earth station in the maritime radionavigation-satellite service. (RR)

TY--Base Earth Station: An earth station in the fixed-satellite service or in some cases in the land mobile-satellite service located at a specified point or within a specified area on land to provide a feeder link for the land mobile-satellite service. (RR)

TZ--Aeronautical Radionavigation-Satellite Earth Station: A fixed earth station in the aeronautical radionavigation-satellite service. (RR)

UA--Mobile Earth Station: An earth station in the mobile-satellite service intended to be used while in motion or during halts at unspecified points. (RR)

UM--Radionavigation-Satellite Mobile Earth Station: A mobile earth station in the radionavigation-satellite service. (RR)

VA--Land Earth Station: An earth station in the fixed-satellite service or in some cases in the mobile-satellite service located at a specified point or within a specified area on land to provide a feeder link for the mobile-satellite service. (RR)

XC--Experimental Contract Developmental Station: An experimental station used for the evaluation or testing under Government contract of electronics equipment or systems in a design or development stage.

XD--Experimental Developmental Station: An experimental station used for evaluation or testing of electronics equipment or systems in a design or development stage.

XE--Experimental Export Station: An experimental station intended for export and used for the evaluation or testing of electronics equipment or systems in the design or development stage.

XM--Experimental Composite Station: An experimental station used in experimental operations of a complex nature not readily specified or used in an operation which is a composite of two or more of the established experimental categories.

XR--Experimental Research Station: An experimental station used in basic studies concerning scientific investigation looking toward the improvement of the art of radiocommunications.

XT--Experimental Testing Station: An experimental station used for the evaluation or testing of electronics equipment or systems, including site selection and transmission path surveys, which have been developed for operational use.

6.2 FREQUENCY NOMENCLATURE

The terms “allocation”, “allotment”, and “assignment” are used to describe the distribution of frequencies or bands of frequencies. Allocations are made to radio services, for example, the fixed service, the aeronautical mobile service, and the space research service. Allotments are made to areas or countries and, within the Republic of Palau, to specific uses. Assignments are instruments of authorization of discrete frequencies to specific radio stations.

In the application of the provisions of these Regulations, letters or numbers shall not be used to designate specific bands of frequencies, e.g., S-band, Xband, Ku-band. Such designations create confusion, because the band limits vary from one designator system or user group to another. This can be avoided by using the international system of citing in Hertz the actual numerical limits of specific frequency bands. Further, broader portions of the spectrum can be described by the following internationally adopted terms:

Frequency Subdivision	Frequency Range
VLF (very low)	3 kHz to 30 kHz
LF (low)	30 kHz to 300 kHz
MF (medium)	300 kHz to 3000 kHz
HF (high)	3 MHz to 30 MHz
VHF (very high)	30 MHz to 300 MHz
UHF (ultra high)	300 MHz to 3000MHz
SHF (super high)	3 GHz to 30 GHz
EHF (extremely high)	30 GHz to 300 GHz

Hz = hertz = cycles per second

K = kilo (10³)

M = Mega (10⁶)

G = giga (10⁹)

T = tera (10¹²)

6.3 EMISSION DESIGNATORS

Emissions are designated according to their classification and their necessary bandwidth.

6.3.1 Classification of Emissions

Emissions are classified according to the type of modulation of the main carrier, the nature of signal(s) modulating the main carrier, and the type of information to be transmitted. For a more complete description of an emission, two optional characteristics can be added; these are the details of signal(s) and the nature of multiplexing.

6.3.2 Necessary Bandwidth

1. Whenever the full designation of an emission is necessary, the symbol for that emission shall be preceded by a number indicating the necessary bandwidth of the emission.

2. The value of bandwidth shall be used when the full designation of an emission is required. However, the necessary bandwidth so determined is not the only characteristic of an emission to be considered in evaluating the interference that may be caused by that emission.

Endnotes for Chapter 6

ⁱ The terms “permissible interference” and “accepted interference” are used in the coordination of frequency assignments between administrations. (RR)

ⁱⁱ In general, duplex operation and semi-duplex operation require two frequencies in radiocommunications; simplex operation may use either one.

CHAPTER 7 AUTHORIZED RADIO FREQUENCY USAGE

7.0 GENERAL

Pursuant to the Republic of Palau Communications Act, within the national territory of the Republic of Palau, all use of the radio frequency spectrum for transmissions by radio for telecommunications or for other purposes shall be made only as authorized by the Division of Transportation and Communication.

7.1 REQUIREMENT FOR RADIO FREQUENCY LICENSE

1. Except as provided in this chapter, a radio frequency license authorizing use of a radio frequency by specific radiocommunications equipment, is required before any radio frequency emitter can be turned on. The requirement for a radio frequency license does not apply to Government employees operating an HF, UHF and VHF radio. Except for FM Radio broadcasting, Republic of Palau citizenship or Foreign Investment Board License is not a requirement to obtain a license.

2. A radio frequency license may be obtained by submitting an application for a license (see Chapter 3) along with the license fee to the Division of Transportation and Communication. All licenses must be renewed at the end of their term if the radiocommunication equipment is still being used. A fee for license renewal must be paid.

7.2 EMERGENCY COMMUNICATIONS

1. In an emergency it is permissible to operate temporarily on regularly assigned frequencies in a manner other than that specified in the terms of an existing assignment or on other appropriate circumstances.

2. An emergency must actually exist or imminently threaten. An emergency for the purpose of this provision means a situation of temporary duration resulting directly or indirectly from a

natural catastrophe or other occurrence that seriously affects the welfare of a community or of an area to the extent of endangering human life and property and in connection with which special communication facilities are required temporarily.

3. Emergency operations shall be discontinued as soon as substantially normal communication facilities are restored.

7.3 RADIO FREQUENCY LICENSES

7.3.1 Amateur Radio Service

1. A license is required for individuals and club stations. For individuals, three classes of amateur operator licenses are issued: novice, technician and general. Amateur radio licenses are issued for a period of ten years unless a special call sign is requested. A five year license is issued if a special call sign is requested.

2. A non-Palauan citizen may obtain a license for use while they are staying in the Republic of Palau if he or she already holds a license issued by another government or successfully achieves a passing grade on an amateur radio examination in the Republic of Palau. A copy of the license issued by his or her home government must be submitted with the application for a license. The class of license that is issued is dependent on the class of license that is held in his or her home country or the level of examination that is passed in the Republic of Palau.

7.3.2 Broadcasting Service

1. A station license is required for all AM, FM and shortwave (high frequency) radio stations, all VHF and UHF television stations, and multi-point distribution service systems providing television and/or radio programming. All licenses in the broadcasting service are for a period of four years.

2. No radio frequency license is required to provide cable television or broadcasting satellite services as long as the satellite is not owned or partially owned or operated by a Republic of Palau legal entity. Broadcasting satellite receive only earth stations are authorized under a blanket license to the service provider.

7.3.3 Business Radio Services

1. All base and mobile or mobile to mobile (including portables/hand held radios) radio systems require a business radio service license. See Annex for the channeling plans of assignable frequencies. A business radio license is also required for "citizens band" radios that operate in the 27.10-27.98 MHz band if the system includes a base station or mobile station with greater than 10 watts of

output power. Hand held citizens band radios operating with an output power of less than 10 watts do not require a license. All licenses in the business radio service are for a period of four years.

2. Users of cellular radios, cordless phones, pagers and hand-held satellite terminals do not require an individual radio license. Authority for operation of such radios is granted to the service provider. Cellular telephones, cordless phones, pagers and hand-held satellite terminals not authorized by the service provider (such as “cloned” cellular telephones) are considered unlicensed and are prohibited.

7.3.4 Aeronautical Radio Services

All aeronautical radio services operated by airlines or private plane owners at or near airports require a business radio license. Radios operated on-board aircraft while they are in movement at an airfield or in flight, do not require a radio license.

7.3.5 Maritime Radio Services

Shipborne radios that operate in the medium frequency (NT), high frequency (BY) or very high frequency (VHF) bands do not require an individual radio license nor do shipborne radars, global positioning satellite receivers or depth finders. Such authorizations are granted by regulation. Operation without individual licenses is allowed provided that the equipment complies with the technical specifications in Chapter 5.

Maritime land coast stations in the MF, HF or VHF bands do require a business radio license.

7.3.6 Common Carrier Services

Companies providing cellular, personal communications and/or paging services are required to have common carrier licenses. Use of very small aperture satellite terminals (VSAT) and wireless local loop technologies (WLL) to extend public switched telephone network services are also required to have a common carrier license. All licenses in the common carrier service are for a period of four years.

7.3.7 Fixed Services

1. All State Governments’ MF and HF fixed networks are authorized under a blanket license issued by the Division of Transportation and Communication. Individual stations do not require a license.

2. All fixed point-to-point microwave links, VHF and UHF point-to-point radio systems, point-to-multi-point radio systems and all over the horizon radio system require a fixed service license. All licenses in the fixed service are for a period of four years.

7.3.8 Satellite Services

1. Any satellite that is owned or partially owned or operated by a Republic of Palau legal entity requires a license. All transmitting and receiving satellite earth stations also require a license. Before they begin operating, all satellites and transmitting earth stations are subject to coordination with neighboring countries under International Telecommunication Union (ITU) coordination procedures with regard to possible harmful interference to terrestrial radio services and other earth stations. Such coordination shall be made through the Joint Telecommunication Board process. All satellite services licenses are for a period of four years.

2. A portable earth station, such as an Inmarsat land terminal, may be authorized if there is special justification. An example of a justification would be use of such equipment in areas beyond the public switched telephone network.

7.3.9 Other Radio Services

All radiocommunications systems that operate in other radio services defined in Chapter 7 require a general radio license. All licenses in the general radio service are for a period of four years.

7.4 NATIONAL, STATE AND LOCAL GOVERNMENTS

All national government departments and offices must obtain a radio frequency license from the Division of Transportation and Communication for all radiocommunication equipment before it can be purchased or operated. Licensing is required before expenditure of funds to ensure the availability of radio frequency support and to ensure that the equipment meets Republic of Palau technical standards. There are no fees for radio licenses for federal government departments. The term of radio licenses for these stations is four years.

7.5 RADIO FREQUENCY LICENSES FOR FOREIGN GOVERNMENTS

1. All radiocommunication equipment operated by foreign embassies (except for the embassy of the United States of America) anywhere in the Republic of Palau on a continuing basis, during emergency conditions or during the visit of senior government officials require either a license or a letter of approval from the Division of Transportation and Communication. Payment of a license fee is required to cover part of the costs incurred in managing the use of the radio spectrum for the benefit of all licensees as a whole, including those associated with ensuring radio operations free of harmful interference.

2. All requests for authority to operate radiocommunication equipment are to be submitted by diplomatic note to the Ministry of State at least ten working days prior to planned commencement of use. Applications for satellite earth stations require 30 working days advance notice. The diplomatic note must include the frequency(ies) requested, emission designator including the bandwidth, transmitter power, station class (or specify base station, repeater, mobiles, portables/hand held radios), coordinates of transmitter and a description of the frequency usage. Requests to establish a transmitting or receiving satellite earth station must include the technical characteristics required by appendix S4 of the ITU Radio Regulations.

3. All requests (including those to renew licenses) for authority to operate radiocommunication equipment by the U.S. embassy or U.S. government agencies are to be submitted to the U.S. Competent Authority for communication issues with the Government of the Republic of Palau at the U.S. Department of State, Washington, D.C. The U.S. Competent Authority will, as appropriate, submit the request to the Division of Transportation and Communication for coordination pursuant to the procedures established by the Compact of Free Association.

4. The Republic of Palau Government will endeavor to accommodate all embassy requests for radio licenses. However, under normal circumstances, all frequency usage requests must be in accordance with the ITU international Table of Frequency Allocations and Radio Regulations and must not interfere with radio stations already authorized by the Republic of Palau Government.

5. All frequency usage for a period greater than thirty days requires a radio frequency license that is issued for a period of two years and payment of a license fee of \$25. Use of a radio frequency for less than thirty days does not require a license but a letter of approval from the Division of Transportation and Communication is required. This procedure applies to visiting military vessels and airplanes as well.

6. Embassies are expected to use the Palau National Communications Corporation's public switched telephone network or other private service carrier for all regular domestic and international telephone traffic. Any earth station operated as a private network must pay a \$5,000 annual license fee.

7.7 IMPOUNDMENT OF UNAUTHORIZED EQUIPMENT

The Division of Transportation and Communication is authorized to regulate radiocommunications in the Republic of Palau by authorizing the impoundment of equipment operating above 3.0GHz not in compliance with the law, and for other purposes.

7.8 CALL SIGNS

7.8.1 International Provisions

The international provisions concerning the identification of transmissions of radio stations are contained in Article S 19 of the ITU Radio Regulations, 1998

edition.

7.8.2 Use of Call Signs

1. Users of radio are required to comply with the aforementioned ITU Radio Regulations. The following procedure is the recommended practice where applicable in the conduct of operations in the types of services indicated:[sic]

Fixed and Land

2. Each station shall transmit its assigned call sign on each frequency in use at the beginning and end of operation, and at least once an hour. More frequent identification may be made if delay to traffic will not result.

3. Radiotelephony transmissions shall be identified by speaking the words “THIS IS” followed by the letters or alpha-numeric combination of the call sign; or by means of an automatic identifier transmitting in International Morse Code in the prosign, “DE” followed by the call sign. When an automatic identifier is used, it will be programmed to identify the station once every 30 minutes.

Radiotelegraphy transmissions shall be identified by sending in international Morse Code the prosign “DE” followed by the call sign.

4. Radioteletype transmissions shall be identified by transmitting the prosign “DE” followed by the call sign, in teletype characters. Facsimile transmissions shall be identified by any one of the preceding methods after removing the facsimile signal. Pictures need not be interrupted to comply with the hourly identification.

5. Twin-channel single sideband circuits employing telephony on one or both channels shall be identified through the use of radiotelephony identification procedures on either channel. Circuits employing single or multiple tone modulation shall be identified through the use of tone modulated telegraphy on at least one channel employing the procedure described under radio telegraphy transmissions.

Mobile

6. A mobile station associated with a base station which transmits only on the transmitting frequency of the associated base station is not required to transmit any identification.

7. A mobile station which transmits on any frequency other than the transmitting frequency of the associated base station, or which has no associated base station, shall transmit the required identification at the end of each transmission or exchange of transmission or once each hour of the operating period. Identification

procedures shall be those set forth for the fixed service. A mobile station in the maritime mobile service is subject to the applicable provisions of the ITU Radio Regulations and all other international agreements in force to which the Republic of Palau is a party.

Automatic Morse Equipment

8. Automatically activated equipment may be used to identify radiotelephone stations by the International Morse Code providing the following conditions are met:

(1) The signal output of the automatic identification equipment shall be connected to the transmitter at the microphone input or any other manufacturer provided signal input terminal and shall be adjusted to produce 40% + 10% of the maximum permissible modulation/deviation level. This adjustment shall be performed when all other modulating signals are absent.

(2) The Morse Code transmission rate shall be maintained between 20 and 25 words per minute.

(3) The frequency of the keyed tone comprising the identification signal shall be 1200 Hz + 800 Hz

Miscellaneous

9. Stations which are entirely automatic in their operation such as telemetering, hydrological and weather reporting, and aeronautical instrumentation, are exempt from these requirements.

10. Stations employing complex systems which require special terminal equipment for normal reception of traffic will, so far as practicable, identify at least hourly.

7.8.3 Obtaining Call Signs

All stations operating in the Republic of Palau, including all stations generating on land, sea, and in the air, shall have special call letters designated by the Division of Transportation and Communication." [sic] Call signs to be used for the identification of transmissions of radio stations may be obtained by communicating with the Division of Transportation and Communication.

7.9 MARITIME SERVICE IDENTITIES

Under the ITU Radio Regulations (RR S19.30), ship stations and ship earth stations to which the

provisions of Chapter SXI and coast stations or coast earth stations capable of communicating with such ships shall have assigned to them maritime mobile service identities, as the need arises. The maritime identities consist of a code, the Maritime ID, or MID, which is assigned to ships and coast stations, internationally, in accordance with RR S19, and Section VI, and the Preface to List VIIA. Certain blocks of codes are assigned to each administration which then are assigned by the administration to its ships and coast stations. In the Republic of Palau, the Division of Transportation and Communication will be the responsible agency for the assignment of MID codes. MID codes are used as unique addresses for digital selective calling and maritime mobile satellite calling, in some cases.

7.10 NON-LICENSED DEVICES

1. All users of the radio frequency spectrum may purchase “off-the-shelf” non-licensed devices that conform to Part 15 of the United States Federal Communications Commission’s (FCC) Rules and Regulations (47 CFR 15) without further authority from the Division of Transportation and Communication.
2. Non-licensed devices are subject to the FCC equipment authorization programs of certification, notification and verification and shall bear the required appropriate FCC label or statement of limitations to operations.
3. The user operating a non-licensed device that causes interference to an authorized radio service shall promptly take steps to eliminate the interference. Upon notification by the Division of Transportation and Communication that the device is causing interference, the operator of the non-licensed device shall cease all radiations from the device until the interference is eliminated.
4. Users operating a purchased non-licensed device have no vested recognized right to continued use of the device in any part of the radio frequency spectrum. Non-licensed device operations must accept any interference from any authorized radio system, other non-licensed device, or industrial, scientific and medical (ISM) equipment.

7.11 LOW POWER INTENTIONAL, UNINTENTIONAL OR INCIDENTAL RADIATOR OR DEVICE

As stated in Section 7.10 above, a low power intentional, unintentional or incidental radiator or device may be operated without a license as long as the non-licensed FCC Part 15 device is operated in accordance with the standards and procedures set forth in the United States FCC Rules and Regulations. The regulations and standards in these Regulations are a subset of the FCC Part 15 regulations that govern the use of low power devices in the Republic of Palau. See Annex D of these regulations for the definitions and technical standards for the operation of these devices.

7.12 USE OF NON-LICENSED DEVICES

1. Annex D of these regulations is based on Part 15 of the FCC’s Rules and Regulations (47 CFR

15) which governs use of radio frequency devices that do not require an individual license to operate (i.e., “non-licensed devices”). The term “non-licensed device” used in this Section refers only to devices - and operations of such devices - that conform to the technical criteria in Annex D. Users may operate devices that conform to the technical criteria in Annex D without further authority from the Division of Transportation and Communication. Additionally, any operational capability that conforms to the technical criteria in Annex D may be incorporated into otherwise authorized telecommunication systems without further authority.

2. The user operating such developed devices that cause interference shall take steps to eliminate the interference. Upon notification by cognizant spectrum management personnel that the device is causing interference, the operator of the non-licensed device shall cease all radiations from the device until the interference is eliminated.

3. Users operating a device developed under the technical criteria of Annex D, have no vested or recognized right to continued use of the device in any part of the radio frequency spectrum. These devices must accept any interference from any authorized radio system, other non-licensed device, or industrial, scientific or medical (ISM) equipment.

7.13 USE OF FREQUENCIES BY INDUSTRIAL, SCIENTIFIC, AND MEDICAL (ISM) EQUIPMENT

Without further authority from the Division of Transportation and Communication, ISM equipment may be operated under the conditions specified in this section for particular categories of equipment or types of operations.

7.13.1 Operation, on Particular Frequencies Designated for ISM Equipment

1. The following frequencies are designated for use by ISM equipment, the emissions of which shall be confined within the frequency limits associated with each frequency:

- 6780 kHz \pm 15.0 kHz
- 13 560 kHz \pm 17.0 kHz
- 27120 kHz \pm 163.0 kHz
- 40.68 MHz \pm 20.0 kHz
- 915 MHz \pm 13.0 MHz
- 2450 MHz \pm 50.0 MHz
- 5800 MHz \pm 75.0 MHz
- 24.125 GHz \pm 125.0 MHz
- 61.25 GHz \pm 250.0 MHz
- 122.5 GHz \pm 500.0 MHz
- 245 GHz \pm 1.0 GHz

In the event harmful interference is caused by ISM operation to any authorized radio service outside the frequency limits specified, the operator of the ISM equipment shall promptly take necessary steps to eliminate such interference,

except in those cases where the interference is due to direct intermediate frequency pickup by a receiver of the fundamental frequency emissions of ISM equipment operating on an ISM frequency, and the operator otherwise complies with this section.

2. ISM equipment, other than industrial heating equipment, that is operated on the frequencies 915, 2450, 5800 MHz, and 24.125 GHz, is subject to the following conditions:

a. The energy radiated and the bandwidth of emission shall be reduced to the maximum extent practicable.

b. In the event harmful interference is caused to authorized radio services from spurious or harmonic radiation from ISM equipment, the operation of the ISM equipment shall be discontinued until necessary measures have been taken to eliminate such interference.

3. Medical diathermy equipment may be operated on the designated ISM frequencies without regard to the type or power of emissions being radiated, except as specified above. However, any harmonic or other spurious radiation outside the frequency limits specified in this section shall be suppressed so as not to exceed a strength of 25 $\mu\text{V}/\text{m}$ at a distance of 300 meters. Measurements to determine field intensity shall be made in accordance with standard engineering procedures.

4. Medical diathermy equipment shall be provided with a rectified and filtered plate power supply, powerline filters, and shall be constructed so that any radiated radio frequency energy (including harmonic or other spurious emissions) on a frequency outside the frequency limits specified in Section 7.14.1 does not exceed a strength of 15 $\mu\text{V}/\text{m}$ at a distance of 300 meters. Measurements to determine field intensity shall be made in accordance with standard engineering procedures. Industrial heating equipment and RF stabilized arc welders may be operated provided all of the following conditions are met:

5. Miscellaneous ISM equipment may be operated on the designated ISM frequencies without regard to the type or power of emissions being radiated, provided any harmonic or other spurious radiation outside the frequency limits specified in this section is suppressed so as to not exceed: 25 $\mu\text{V}/\text{m}$ at a distance of 300 meters or, for equipment generating more than 500 watts of RF power on the fundamental frequency, 25 $\mu\text{V}/\text{m}$ times the square root of $P/500$ (where P is the actual RF power generated), but not to exceed 10 $\mu\text{V}/\text{m}$ at 1600 meters, provided this increase is not permitted for equipment located in a predominantly residential area and operating on a frequency below 1000 MHz.

7.13.2 Operation on Frequencies Other Than Those Designated for ISM Equipment

1. Operation of ISM equipment within the following safety, search and rescue frequency bands is prohibited: 490-510 kHz, 2170-2194 kHz, 8354-8374 kHz, 121.4-121.6 MHz, 156.7-156.9 MHz, and 242.8-243.2 MHz.

2. In the event harmful interference is caused to any authorized radio service outside the frequency limits specified in Section 7.14.1, by ISM operation conducted pursuant to this section, the operator of the ISM equipment shall promptly take the necessary steps to eliminate the interference.

a. Radiation on the fundamental carrier frequency, as well as spurious and harmonic radiations resulting from any source frequency, and falling outside the frequency limits specified in Section 7.13.1, shall be suppressed so that (1) below 5725 MHz the field strength does not exceed $10 \mu\text{V/m}$ at a distance of 1600 meters and (2) above 5725 MHz it is reduced to the greatest extent practicable.

b. Filtering between the industrial heating equipment and power lines shall be provided to the extent necessary to prevent the radiation of energy from power lines on frequencies other than the designated ISM frequencies, with a field strength in excess of $10 \mu\text{V/m}$ at a distance of 1600 meters from the industrial heating equipment and at a distance of 15 meters from the power line.

3. Miscellaneous ISM equipment may be operated on frequencies other than those designated for ISM equipment provided all of the following conditions are met:

a. The equipment shall be provided with a rectified and filtered plate power supply and power line filters.

b. Any radiated radio frequency energy outside the frequency limits specified in Section 7.13.1 (including harmonic or other spurious emissions) shall not exceed:

$15 \mu\text{V/m}$ at a distance of 300 meters; or, for equipment generating more than 500 watts of RF power on the fundamental frequency, $15 \mu\text{V/m}$ times the square root of $P/500$ (where P is the actual RF power generated), but not to exceed $10 \mu\text{V/m}$ at 1600 meters, provided this increase is not permitted for equipment located in a predominantly residential area and operating on a frequency below 1000 MHz.

4. Operation of ultrasonic equipment shall not result in radiation exceeding the following limits:

a. Below 490 kHz $2400 \mu\text{V/m}$ at 300 meters \div Frequency (in kHz)
Between 490 and 1600 kHz $24000 \mu\text{V/m}$ at 30 meters - Frequency

(in kHz)

Over 1600 kHz (excluding frequencies within the limits specified in Section 7.14.1) 15 $\mu\text{V}/\text{m}$ at 30 meters

b. For equipment operating below 490 kHz and generating more than 500 watts of RF power on the fundamental frequency.

2400 $\mu\text{V}/\text{m}$ at 300 meters \div Frequency (in kHz) times the square root of $P/500$ (where P is the actual RF power generated), but not to exceed 10 $\mu\text{V}/\text{m}$ at 1600 meters, provided this increase is not permitted for equipment located in a predominantly residential area.

c. On any frequency 490 kHz and above, the radio frequency voltage appearing on each power line shall not exceed 200 μV ; below 490 kHz it shall not exceed 1000 PV.

7.14 USE OF FREQUENCIES 10.525 GHz AND 24.150 GHz OR THE BAND 33.4-36.0 GHz FOR RADIOLOCATION DEVICES

National, state and local law enforcement organizations may operate radio units for the purpose of determining distance, direction, speed or position by means of a radiolocation device on the frequencies 10.525 GHz and 24.150 GHz or in the band 33.4 - 36.0 GHz, provided FCC type-accepted equipment or equipment developed with identical standards or specifications is used.

CHAPTER 8

Procedures and Principles for the Assignment and Coordination of Frequencies

8.1 FREQUENCY ASSIGNMENT PRINCIPLES

8.1.1 Frequency Sharing

1. Sharing of frequencies is necessary for the fullest utilization of the radio spectrum. This may entail the acceptance of some interference but does not contemplate requiring the acceptance of harmful interference.

2. In order to have available the greatest possible spectrum support for future radiocommunication requirements, each new frequency assignment should be made in such a way that the increase in the total spectrum space committed is as small as possible. Accordingly, it shall be the normal practice, where feasible and consistent with frequency allocation and assignment plans, to assign radio frequencies to more than one radio installation when sharing the frequency would not significantly impact use of the frequency by any of the licensees.

8.1.1.1 Stations Located in Close Geographic Proximity

In general, the inherent right of the station first established is recognized as regards a proposed new station whether transmitting or receiving. Nevertheless, for stations located in close geographic proximity and particularly in the case of installations involving very high effective radiated powers (50 kW or greater), digital system receivers having high carrier to noise ratio requirements or receivers intended for reception of very low level radiation (-100 dBW or less), engineering solutions may require the cooperation of all licensees involved in the application of reasonable and practicable measures within the state of the art to avoid causing or being susceptible to harmful interference.

8.1.1.2 Relative Priority of Frequency Assignments

1. Priority, unless specifically qualified, is the right to occupy a specific frequency for authorized uses, free of harmful interference from stations of other licensees.

2. The relative status between radio services and between frequency assignments with respect to their conformity to the Table of Frequency Allocations is indicated in Part 4.1 of these Regulations.

3. Unless specifically agreed otherwise at the time a frequency assignment is made, the relative priority between two frequency assignments which are substantially equal is determined by their dates of assignment. The

frequency assignment with the earlier date has priority over the frequency assignment with the later date.

4. If a frequency assignment is renewed, the applicable date of assignment for priority purposes is the original date from which continuous authorization has been in effect. If the particulars of an existing assignment are expanded (e.g., expansion of bandwidth, addition of new receiver antenna location, increase in power), the applicable date of assignment for priority purposes is the date on which the expanded particulars were authorized.

5. The priority of a mobile station applies only in the geographical area designated in the particulars of the frequency assignment.

6. The priority of a fixed station applies only at the geographical locality of the receiver antenna location designated in the frequency assignment.

7. Experimental classes of stations and classes of stations in support of experimental operations are on a secondary basis to stations of all other services.

8.1.1.3 Authorized Area of Operations of Mobile Stations

For an assignment to a land station and one or more mobile stations, the area described under receiver ANTENNA LOCATION for the reception of transmissions from the land station by the mobile stations shall be considered also as the area in which transmissions from the mobile stations, associated with the land station, are authorized.

8.1.2 Planned Frequency Utilization

In the interest of planned and orderly utilization of the radio frequency spectrum, Republic of Palau government departments and state governments are encouraged to inform the of planned frequency utilization.

8.1.3 Consideration of Applications

Recognizing that the demand for radio frequencies in some frequency bands exceeds the supply, and to make the most efficient and orderly use of available frequencies in the national interest, frequency assignment action is predicated on consideration of all available data, including international regulations, national laws, established Government policies, national interest, availability of other possible communication facilities, and technical aspects.

8.1.4 Withholding Funds Pending Availability of Frequency Support

The obligation of funds by Republic of Palau government departments for the development or procurement of communication-electronic equipments, requiring the assignment and protection of radio frequencies for their use, should be withheld pending assurance of the availability of appropriate frequency assignment support. This is particularly important in the selection of sites and frequencies for earth and terrestrial stations to be operated in bands coequally shared by space and terrestrial services.

8.2 PROGRAMS TO DETERMINE HOW THE SPECTRUM IS USED

8.2.1 Frequency Assignment Review Program

The Division of Transportation and Communication shall maintain a program of continuing review of frequency assignments to its radio stations and shall delete or amend such assignments as appropriate. The objectives of this program are a) to ensure that frequency assignments are in current use by the licensees and are correctly reflected in the frequency assignment list, (b) to ensure that frequency assignments are required for continued operations for the purpose stated in their justification, and c) to ensure that frequency assignments are still qualified for authorization under the provisions of the regulations contained in these Regulations.

8.2.2 Spectrum Measurement Program

1. A spectrum measurement program has been established. The purposes of the program are a) to determine whether radio installations are utilizing authorized frequencies and are operating in accordance with applicable regulations, b) to provide information to help determine whether additional uses can be made in a particular band at a particular location, and c) to provide information to prevent or resolve cases of interference between two or more users.

2. The use of radio frequencies by licensees is subject to observation and measurement by the Division of Transportation and Communication.

8.2.3 Inspection of Radio Installations

All radio installations are subject to periodic inspection. A program to survey radio frequency usage has been established. The objectives of this program are to determine at the operational level the degree of implementation of the applicable provisions of these Regulations, whether frequency usage is in accordance with authorizations, and to exchange information with a view toward improving spectrum management in general. Inspections are conducted by the Division of Transportation and Communication personnel by means of on-site observation of communication-electronic facilities and discussions with licensees.

8.2.4 Spectrum Resource Assessment Program

The Division of Transportation and Communication manages a program to assess spectrum use and to identify potential spectrum sharing problems within specific frequency bands. The objectives of this program include (1) the review and documentation of the characteristics and deployment of existing and proposed systems in specified bands, (2) the identification of potential band sharing problems which may impact on the efficient use of the spectrum, (3) the evaluation of any identified electromagnetic compatibility problems, and (4) the identification of alternative spectrum management approaches to resolving these problems. These studies may be used in the development of spectrum use policies.

8.2.5 Notification of Discontinuance of Service

Assignment of a frequency to a particular station or class of station imposes upon the assignee the responsibility of duly notifying the Division of Transportation and Communication of proposed discontinuance of a station or a material change in character of service rendered.

8.2.6 Guidance on Use of Frequencies by Stations in Certain HF Bands

1. WARC-79 and WARC-92 adopted a number of allocation changes in the 3000-27500 kHz portion of the radio frequency spectrum. The changes reduce the spectrum allocated for the fixed and mobile services and increase the spectrum allocated for HF broadcasting. The effective implementation dates for the expanded radio services will vary over a long period of time, due to the complex reaccommodation process and access restrictions that vary by band. WRC-95 made available for use the HF broadcasting spectrum allocated by WARC-79, effective 1 January 1996. The use of this spectrum is on the basis of Article S12 and taking into account the provisions of RR S5.148.

2. WARC-79 allocated the following HF Bands to the broadcasting service on a primary basis. Exceptionally, fixed service assignments in the bands 9775-9900, 11650-11700, and 11975-12050 kHz, meeting the criteria of RR S5.147, may be retained.

kHz	kHz
9775 - 9900	1540 - 15600
11650 - 11700	17550 - 17700
11975 - 12050	21750 - 21850

3. WARC-92 allocated the following HF bands to the broadcasting service on a primary basis, with an implementation date of 1 April 2007. In these bands, the

broadcasting service is limited to singlesideband emissions and characteristics, specified in ITU RR Appendix S11, and subject to planning procedures contained in Article S12:

kHz	kHz
5900-5950	13570-13600
7300-7350	13800-13870
9400-9500	15600-15800
11600-11650	17480-17550
12050-12100	18900-19020

After 1 April 2007, continued use of these bands by the fixed and mobile services is internationally governed by the provisions of RR S5.136, S5.143, S5.146 and S5.151 as applicable. Additionally, Resolution 21 provides for implementation of these bands for broadcasting by a future WRC and the reaccommodation of “Class of Operation A” frequency assignments contained in the Master International Frequency Register as of 1 April 1992. Resolution S21 also provides for a transition period from 1 April 1992 to 1 April 2007. The following principles should be adhered to when making fixed and mobile service assignments in these bands:

- a. Avoid internationally notifying assignments to the fixed and mobile services. If assignments are notified they are subject to review by the BR on 1 April 2007 to determine if they are in conformity with the Table of Frequency Allocations and other provisions of the Radio Regulations.
- b. Review assignments of “Class of Operation A” in order to determine if they can be downgraded to “Class of Operation B or C”.
- c. Identify “Class of Operation A” assignments during the transition period and move them to appropriate frequency bands with notification to the BR. In this regard if only the assigned frequency and no other characteristics of the assignment are changed, the assignment will retain its original date.
- d. New frequency assignments that are only required for a short period of time or until 1 April 2007, not requiring international protection, should be made in these bands so that the remaining HF bands allocated to the fixed and mobile services can be used to accommodate “Class of Operation A” assignments.

8.2.7 Assignment of a Band of Frequencies to a Station

When a band of frequencies is assigned to a station, e.g., 400-406 MHz, the necessary bandwidth of the station shall be so located within the band that it does not extend beyond the upper or lower limits of the band.

8.2.8 Limitation of Radiated Power

Radio station licensees shall radiate only as much power as is necessary to ensure a satisfactory service.

8.2.9 Use of Ionosphere Sounders

1. The use of ionosphere sounders for realtime selection of frequencies for operational communication circuits, realtime monitoring of upper atmosphere phenomena, and for the predicting of propagation conditions will be authorized only under the following conditions:

- a. When it has been determined that no existing authorized ionosphere sounder transmitter is capable of meeting the requirement under a common user concept.
- b. Operations shall be on a secondary basis to authorized radio services.
- c. Transmissions in the bands 2495-2505, 4995-5005, 9995-10005, 13360-13410, 14990-15010, 19990-20010, 21850-21870, 24990-25010, 25550-25670 kHz and 38.00-38.25 MHz shall be avoided for sounders capable of frequency suppression.
- d. Transmissions shall be swept or stepped through the operating range of the equipment at a rate or time interval expected to avoid harmful interference.
- e. Transmitters shall be designed to eliminate emissions on any frequency channel where harmful interference is caused to authorized radio services.

2. Applications for frequency assignments to sounder network stations or sounder prediction stations shall include the following basic information:

- a. Channeling plan(s) (required for all sounder network stations and, as applicable, for sounder prediction stations) '
- b. Pulse duration(s)
- c. Pulse repetition frequency(ies)
- d. Pulse per channel

- e. Scan rate(s)
- f. Scan interval(s) (time between scans)
- g. Antenna type(s)
- h. Antenna azimuth
- i. Antenna orientation(s) (If directional, indicate orientation of major lobe.)

3. All applications for sounders shall include a statement that the applicant has determined that no existing authorized ionosphere sounder transmitter is capable of meeting the requirement.

8.2.10 Use of Frequencies in the Bands Between 2850 and 22000 kHz Allocated Exclusively to the Aeronautical Mobile Service

1. The bands allocated exclusively to the aeronautical mobile service are subdivided into categories defined in Article S43 of the RR as follows:

- a. Frequencies in any band allocated to the aeronautical mobile (R) service are reserved for communications related to safety and regularity of flight between any aircraft and those aeronautical stations primarily concerned with flight along national or international civil air routes.
- b. Frequencies in any band allocated to the aeronautical mobile (OR) service are reserved for communications between any aircraft and aeronautical stations other than those primarily concerned with flight along national or international civil air routes.

2. National planning for the use of these bands is governed by the provisions of Article S43 and Appendices S20 and S27 of the RR. These appendices allot specific (R) channels for use in particular areas, allot specific (OR) channels for use by particular countries, and set forth technical and operational principles governing this usage.

Aeronautical Mobile (R) Bands

3. Frequency assignments to stations in the aeronautical mobile (R) service, in the bands allocated exclusively to that service between 2850 and 22000 kHz, shall be assigned in conformity with the provisions and the allotment plan of Appendix S27 to the RR. Such assignments shall conform to the plan for the allotment of frequencies to (a) Major World Air Route Areas (MWARA's), (b) Regional and Domestic Air Route Areas (RDARA's), (c) VOLMET Allotment Areas, and (d) Worldwide Allotment Areas contained in Appendix S27 or, to meet operational

requirements not otherwise met by the Allotment Plan, comply with the provisions of Appendix S27 for the adaptation of allotment procedures (S27/20, S27/21 and S27/22). Assignments in support of International Air Routes (MWARA and VOLMET allotments) are also within the purview of applicable ICAO frequency assignment plans that have been agreed internationally and are recognized in the ITU Radio Regulations.

4. Single sideband operations only are permitted in the bands allocated exclusively to the Aeronautical Mobile (R) Service in accordance with the provisions of Appendix S27 Part 1, Section II, C. This section of Appendix S27 also contains information on the use of several emissions subject to compliance with special provisions applicable to each use.

Aeronautical Mobile (OR) Bands

5. Frequencies in bands allocated exclusively to the (OR) service are internationally allocated to countries by Appendix S26 of the RR, which also establishes sharing criteria, protection ratios, and other technical and operational principles. These principles recognize the possible necessity for the adaptation of the allotment plan to meet valid requirements of the various administrations, provided these adaptations do not decrease the protection to frequencies assigned in strict adherence to the plan.

Channels Common to the Aeronautical Mobile (R) and (OR) Services

6. Section 7.5.3 authorizes aircraft, ships, and survival craft stations to use the channels common to the (R) and (OR) services, carrier (reference) frequencies 3023 and 5680 kHz, provided such use is in accordance with Appendix S13 Part A2, Section I, D, § 3 and Appendix. S13 Part A2, Section I, F, § 5 of the RR, the appropriate provisions of Appendices S27. Section 7.5.4 authorizes additional uses by mobile stations engaged in coordinated search and rescue operations. Any use of these channels by land stations engaged in the coordination of search and rescue operations shall be in accordance with the same provisions, and shall be authorized by applications submitted and processed through normal assignment procedures.

8.2.11 Use of Radio Frequencies to be in Accordance with ITU Provisions

Except as otherwise provided in these Regulations or by the terms of a frequency authorization, present or future, the use of radio frequencies by radio station licensees shall be in accordance with the provisions of the ITU Constitution and Convention and Radio Regulations.

8.2.12 Radiation Hazards

1. Personnel responsible for the operation of telecommunication equipment should be aware that exposure to high intensity levels of RF and other nonionizing electromagnetic energy presents potential health hazards. Actions should be taken consistent with existing safety guides and applicable official standards duly promulgated and prescribed by the United States, to ensure that personnel are protected from such hazards. Although biological effects of electromagnetic radiation have been studied, current knowledge and understanding of these hazards is incomplete, particularly as regards possible hazards of prolonged exposure to microwave and lower frequency radiations at intensity levels below those shown to produce measurable heating. Research in this field is continuing.

2. At present, most safety guidelines and criteria are intended to protect against adverse aspects on body tissues that can occur when the rate of induced heating exceeds the organism's dissipative capacity. Previous studies of heating effects at sufficiently high energy levels (around and above 100 mW/cm²) led to the fairly general acceptance of 10 mW/cm² as a safe level below which such injury from heating would not be expected to occur. This value has thus been used as the basis for various safety criteria and standards, some of which are referenced.

a. References:

(1) The United States Department of Labor Occupational Safety Standard for Nonionizing Radiation, Federal Register, Vol 37, October 18, 1972.

(2) Swanson, J. R., et al., "A Review of International Microwave Exposure Guides," American Industrial Hygiene Association Journal, September/October 1970, available from NTIS as PB 195772.

(3) Glaser, Z., "Bibliography of Reported Biological Phenomena ("Effects") and Clinical Manifestations Attributed to Microwave and Radio Frequency Radiation," U.S. Naval Medical Research Institute, Research Report No. 2, Project MF12.524.015-0004B, October 1971, available from DDC as AD734391.

(4) Moore, W. Jr., "Biological Aspects of Microwave Radiation--A Review of Hazards," U.S. Department of Health, Education, and Welfare (DREW), July 1968, TSB-68-4.

(5) Setter, L.R., et al., "An Annotated Bibliography of Regulations, Standards, and Guides for Microwaves, Ultraviolet Radiation, and Radiation from Lasers and Television Receivers," DREW, PHS No. 999-RR-35, April 1969.

(6) "Laser/Maser Hazards," U.S. Air Force Regulation No. 161-24, January 12, 1967.

(7) "Safe Laser Radiation Exposure Levels," letter from the Office of the Surgeon General, USAF, April 12, 1968.

(8) "Control of Microwave Health Hazard," Navy Bureau of Medicine and Surgery, Instruction 6470.13A, January 28, 1977.

3. In the event that measurement capabilities are required to determine the nature of exposure or suspected hazards from nonionizing electromagnetic radiation, there are a number of U. S. Government agencies that have the necessary equipment and expertise. These capabilities are indicated in the document, "Nonionizing Radiation Measurement Capabilities State and Federal Agencies." This document is maintained by the U.S. Environmental Protection Agency (EPA) The point of contact at EPA is:

Chief, Electromagnetic Radiation Analysis Branch Environmental
Protection Agency
Room 519B, Waterside Mall East 401 M Street, S. W.
Washington, D. C. 20460

Telephone: 202-755-1188 (or 301-427-7604 for the field laboratory in
Silver Spring, Maryland

8.2.13 Use of Frequencies by Stations in the Maritime Mobile Service

1. Stations in the maritime mobile service utilize bands allocated either exclusively to this service or on a shared basis with other services. Several international plans detail the specific uses of certain frequencies. The maritime mobile service is provided with detailed operational and frequency regulations contained in the ITU RR. In addition, an abstracted manual which includes pertinent ITU Radio and Telegraph and Telephone Regulations entitled "Manual for Use by the Maritime Mobile Service," is issued by the ITU, and should be carried by ships (RR Appendix S16).

2. National planning for the use of the maritime mobile bands closely follows the international use. Exceptions are indicated in the National Table of Frequency Allocations (see Chapter 4) and as noted herein. For the bands 4-27.5 MHz, the assignable frequencies listed in RR Appendix S17 Part A for each maritime mobile function are delineated in Annex C.

Maritime Mobile Telegraphy

3. Ship stations use working frequencies in the bands 415-490 kHz and 510-535

kHz, specified by RR S52.39, for transmissions to coast stations. Coast stations transmit on other frequencies in these bands. Initial contact is usually established by calling on 500 kHz and shifting to appropriate working frequencies. Special provisions for morse telegraphy calling allow the use of 512 kHz when 500 kHz is being used-for distress (RR S52.41 - S52.44). All ship stations equipped with narrowband direct-printing to work in these bands shall be able to receive class FIB emissions on 518 kHz, if complying with the provisions of RR Chapter SVII (GMDSS). (See RR S51.45 and S52.97).

4. Frequencies in the bands between 4 and 27.5 MHz, allocated exclusively for this service, are used for several telegraphy modes. The frequency sub-bands available for assignment for each mode to coast and ship stations shall be as specified in RR S52.12, S5213[sic], and Appendix S17. Coast station frequencies for Maritime Safety Information (MSI) use are listed in Annex C (Table 11).

5. Several limitations apply to use of frequencies in the exclusive maritime mobile bands between 4 and 27.5 MHz:

a. Power limits for coast stations are:

(1) Single Channel A1 A or FIB emissions (RR S52.56 and S52.104):

Maximum Power (kW)		
Band (MHz)	A1A (x)	FIB (Y)
4	10	5
6	10	5
8	20	10
12	30	15
16	30	15
18	No AIA	15
22	30	15
25	No AIA	15

(2) Multichannel telegraphy (RR S52.172): 2.5 kW (mean) per 500 Hz bandwidth

(3) For digital selective calling and acknowledgement, and for types of transmissions other than those indicated in (1) or (2)

above, the maximum mean power shall not exceed the power specified for FIB emission in (1) above,

b. Power limits for ship stations:

Except for transmissions, in the exclusive maritime mobile bands between 4 and 27.5 MHz, of digital selective calls and acknowledgements, which are limited to a mean power of 1.5 kW, international radio regulations have no power limit for ship stations (MS) operating in the radiotelegraphy mode. The power used should be the minimum power, consistent with transmitter capability, necessary to provide satisfactory communications. The power listed in Annex C is not intended to serve as a power limit, but is a guide reflecting current practice.

c. RR Appendix S17 provides for ship and coast use in several functional allocations:

(1) Wideband telegraphy, facsimile and special transmission systems--Assignments to ship stations using wideband telegraphy, facsimile and special transmission systems may be adjusted to meet needs of systems using these bands provided they remain within the band limits (RR S52.170). The shared use of certain of these ship station frequencies between Government and non-Government shall be in accordance with US296. See Annex C, Table 3 for frequencies available to ship stations and Annex C, Table 10 for frequencies available to coast stations.

(2) A /A Morse calling--See Annex C, Table 7 for frequencies available.

(3) Oceanographic data transmission--Use of these frequencies is limited to the transmission of oceanographic and meteorological data from ships and buoys. Oceanographic data interrogating stations may use these frequencies for interrogation of ships and buoys. The power of ship stations used for oceanographic data transmission (Station Class OD), including buoys or other sensor platforms, is limited to 100 Watts. See Annex C, Table 4 for frequencies available.

(4) Narrowband direct printing telegraph and data transmission systems--See Annex C, Tables 5 and 6 for frequencies available.

(a) Narrowband direct-printing telegraph--International technical standards for narrowband direct printing telegraphy systems are contained in ITU-R M.476-5 and

shall be used nationally.

(b) Data transmission systems--Standards for data transmission systems have not been established by the ITU.

(5) A1A Morse working--See Annex C, Table 9 for frequencies available.

(6) Digital selective calling--See Annex C, Tables 8 and 11 for frequencies available.

Maritime Mobile Radiotelephony

6. Bands available to the maritime mobile service for radiotelephony are divided generally into exclusive maritime bands and bands shared with other services. The class of emission authorized in each band is described below. Where single sideband is specified, the authorized bandwidth is 2.8 kHz, upper sideband mode only is permitted, the assigned frequency must be 1.4 kHz above the carrier, and technical standards of ITU-R M.1173 shall be followed. Where FM is specified, technical standards of ITU-R M489-2 shall be followed. The principal bands within which maritime mobile radiotelephony may be authorized are:

a. 1605-3500 kHz--Portions of these bands are allocated to the Maritime Mobile Service exclusively, while other portions are shared with the fixed, mobile, and other services. Class J3E emission only may be authorized for ship and coast stations.

(1) Coast stations shall be limited to 5 kW PEP when located north of 32° N and 10 kW peak envelope power (PEP) when located south of 32° N.

(2) The use of J3E emission is encouraged on carrier frequency 2182 kHz; however, H3E emission is also authorized for communications with foreign ship and coast stations (Appendix S13, Part A2, Section I, C § 2). Class A3E emission on this frequency is no longer authorized except for such apparatus (at ship stations) provided solely for distress, urgency and safety purposes (S51.53).

(3) Digital selective calling for distress and safety purposes shall be conducted on the frequency 2187.5 kHz. Digital selective calling for other than distress and safety purposes may be conducted on 2189.5 kHz (ship-to-shore) and 2177 kHz (ship-to-ship and shore-to-ship).

(4) Provisions for the use of the single sideband radiotelephone channels within the band 2170 - 2173.5 kHz and 2190.5 - 2194 kHz are:

(a) The assignable frequencies are 2171.9 and 2192.4 kHz.

(b) Emission is limited to BE.

(c) Power is limited to 400 Watts PEP.

b. 4.0-23.0 MHz--Nationally and internationally only single sideband class BE emission may be authorized. The PEP of ship stations shall not exceed 1.5 kW. The PEP of coast stations shall not exceed 10 kW. Within these limitations, frequencies in certain cases, are available to the maritime mobile service in exclusive bands for duplex and simplex use as set forth below:

(1) Duplex--Both ship station and coast station single sideband frequencies are designated in RR Appendix S17, Part A, Section 1, Subsection A, on a paired basis, as shown in Annex C, Table 1. In addition, RR Appendix S25 provides an international frequency allotment plan by areas for use of those frequencies designated in Appendix S17, Part A, Section 1, Subsection A. International notification of allocated channels are made in accordance with the provisions of ITU Appendix S25 and Article S17.

(2) Simplex--The frequencies of RRS17 Part B, Section I, Sub-section B as shown in Annex C, Table 2 may be authorized for use on a simplex basis by coast and ship stations. Additionally, the assigned frequencies 4126.4, 4418.4 and 6517.4 kHz also may be so authorized. The use of 6517.4 kHz for this purpose should be limited to day-time operation. Simplex frequencies may be authorized for both ship/coast stations and intership communications. Intership operations may be on two frequencies if they are cross banded. Power for these simplex frequencies shall not exceed 1 kW peak, and emission is limited to class J3E.

c 156-162 MHz--Within these limits, the band is divided into numbered channels which are listed in RR Appendix S18, along with recommended use.

(1) The band 157.0375 - 157.1875 MHz is divided into six channels. Two of these channels have a specialized use. Channel 22, 157.1 MHz, is the primary frequency for liaison communications with the U.S. Coast Guard. Channel 81, 157.075

MHz, is primarily for environmental protection operations as outlined in Section 7.5.6 of these Regulations.

(2) The remainder of the VHF channels in the band 156-162 MHz available for specific purposes. Several of those purposes are as set forth below:

(a) Channels 12 and 14, 156.6, 156.7 MHz, and the Channel 20 duplex pair, 157.0 and 161.6 MHz, may be authorized for port operations.

(b) Channel 6, 156.3 MHz, may be authorized for intership operations. It is also authorized for coordinated operations at the scene of a SAR incident as outlined in Section 7.5.4. Coast stations may use 156.3 MHz for exchange of traffic dealing with safety of life or property when other means of communication are not practicable.

(c) Channel 13, 156.65 MHz, may be authorized for bridge-to-bridge operations according to provisions set forth hereafter.

(d) Channel 16, 156.8 MHz, is designated nationally and internationally for distress, safety and calling. Ship and coast stations, during their hours of service of VHF radiotelephony, shall maintain a watch for reception of 156.8 MHz whenever practicable.

(e) For public correspondence purposes ship stations are authorized to communicate with public correspondence coast stations. In these instances, the ship station shall transmit on the designated ship frequency appropriate to the public correspondence channel assigned to the coast station

(3) Stations on board aircraft may communicate with stations of the maritime mobile service. The communications of an aircraft station shall be brief and limited to operations in which maritime mobile stations are primarily involved, and where direct communications between aircraft and the ship or coast station is required.

(a) The mean power of aircraft stations shall not exceed five Watts, however, a power of one Watt or less shall be used to the maximum extent possible.

(b) While using the frequency band the altitude of aircraft stations should not exceed 305 meters (1000 feet) except for reconnaissance aircraft participating in ice-breaking operations where an altitude of 457 meters (1500 feet) is allowed. The frequencies 156.3 and 156.8 MHz may be used by aircraft stations for safety purposes only.

(4) Stations operating in the maritime mobile service in the band 156-162 MHz are subject to the technical standards and power limitations of Sections 5.3.2 and 5.2.1.

7. Radiotelephone Installation. Each vessel shall be fitted with radiotelephone installations that are capable of effectively transmitting and receiving ME emissions on at least the following VHF channels:

Channel 16--156.8 MHz (Distress, safety and calling) Channel 6--156.3 MHz (Primary intership)

Channel 13--156.65 MHz (Navigational bridge-to-bridge)

Channel 12--156.6 MHz Channel 14--156.7 MHz

a. Additionally, such other frequencies as required for the vessel's service and to include the capability to receive VHF-FM marine navigation warnings for the area of operation.

b. The radiotelephone station, exclusive of the antennas and source of electric energy, shall be located as high as practicable on the vessel, preferably on the bridge.

c. The principal operating position of the radiotelephone installation shall be on the bridge, convenient to the conning position.

d. Where the radiotelephone station is located elsewhere than on the bridge, provision shall be made for complete operational control of the equipment at that location and at the bridge operating position. However, provision shall be made to take immediate and complete control of the equipment at the bridge operating position.

e. Provision shall be made for illuminating the operating controls at the principal operating position.

f. Means shall be provided for charging any storage battery used in connection with the radiotelephone station.

g. The radiotelephone transmitter shall be capable of delivering at least 10 Watts carrier power to the antenna. Provision shall be made to reduce this power readily to one Watt.

h. The radiotelephone receiver shall have a sensitivity of at least two microvolts across 50 ohm or equivalent input terminals, for a 20 decibel signal-to-noise ratio.

i. The associated antennas shall be effective, vertically polarized, and located as high as practicable on the masts or superstructure of the vessel. The transmission line shall be effective and, to the extent practicable, shall impose a minimum loss.

j. The radiotelephone installation is subject to the technical standards in Chapter 5 of these Regulations.

8. Vessel Bridge-to-Bridge Watch. Each vessel shall, when underway, maintain a continuous and effective watch on channel 13 (156.65 MHz).

a. Sequential monitoring techniques alone are not sufficient to meet this requirement.

b. Portable VHF equipment may be used to meet this requirement.

c. This watch shall be maintained by the master, or person designated by the master, who may perform other duties provided they do not interfere with the effectiveness of the watch.

9. The UHF frequencies and technical standards for on-board communication stations as provided by RR S5.287, S5.288 and ITU-R M.1174, respectively are:

a. The preferred two simplex (duplex) frequencies for use for on-board communications are paired as follows:

On-Board Communications

On-Board Repeater (Transmit) (MHz)	On-Board Mobile (Transmit) (MHz)
457.525	467.750
457.55	467.775
457.575	467.800
457.6	467.825

b. Technical characteristics:

- (1) Effective radiated power not to exceed 2 Watts. Whenever practicable the equipment should include a device to readily reduce the power by at least 10 dB.
- (2) In the case of equipment installed at a fixed point on the ship, the height of antenna shall not be more than 3.5 meters (approximately 10 feet) above the highest working deck.
- (3) Only FM with a pre-emphasis of 6 dB/octave (phase modulation) shall be used.
- (4) Deviation not to exceed ± 5 kHz.
- (5) Tolerance shall be 5 parts in 10⁶.
- (6) The audio-frequency band shall be limited to 3000 Hz.

8.2.14 Procedure in a Case of Harmful Interference

1. In the use of the radio frequency spectrum, interference must be expected; however, the acceptance of harmful interference is not contemplated.
2. Harmful interference is “Interference which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs, or repeatedly interrupts a radiocommunication service operating in accordance with these Regulations.” (RR)
3. When harmful interference is received, the following actions should be taken in the absence of agency instructions to the contrary:
 - a. Determine the source, if possible. The Division of Transportation and Communication can assist in determining the source of harmful interference and may be contacted directly for such assistance.
 - b. If the source is identified, try to eliminate the harmful interference by dealing directly with individuals located at the source.
 - c. If direct action is impracticable or unsuccessful, report the circumstances to the Division of Transportation and Communication.
4. In taking any of these actions, provide all possible information concerning the interference. An interference report should include as much of the following as practicable:

a. Particulars concerning the station causing the interference:

- (1) Name or call sign
- (2) Frequency measured
- (3) Class of emission
- (4) Bandwidth
- (5) Station class
- (6) Bearing
- (7) Nature of interference

b. Particulars concerning the transmitting station whose transmissions are being interfered with:

- (1) Name or call sign
- (2) Frequency assigned
- (3) Frequency measured
- (4) Class of emission
- (5) Bandwidth
- (6) Station class
- (7) Geographic location

c. Particulars furnished by the receiving station experiencing the interference:

- (1) Name or call sign
- (2) Station class
- (3) Geographic location
- (4) Dates and times of occurrence of harmful interference

d. Other information

8.2.15 Conversion of Stations in the Aeronautical Mobile Service to SSB or ISB Transmission

In the bands below 30 MHz, equipment procured for the aeronautical mobile service shall be capable of single sideband or independent sideband emission with suppressed or reduced carrier. In the case of stations in the aeronautical mobile (R) service, the use of single sideband shall be determined by the international requirements pertaining to that service.

8.2.16 Control of Emissions from Space Stations

The use of frequencies by space stations will be authorized only in those cases where such stations are equipped so as to ensure the ability to turn on or to provide immediate cessation of emissions by telecommand.

8.2.17 Selection of Sites and Frequencies for Earth and Terrestrial Stations in the Bands above 1 GHz Shared with Equal Rights by Terrestrial Radiocommunication and Space Radiocommunication Services

Sites and frequencies for terrestrial stations and earth stations, operating in frequency bands shared with equal rights between terrestrial radiocommunication and space radiocommunication services, shall be selected having regard to the relevant ITU-R Recommendations with respect to geographical separation between earth stations and terrestrial stations.

8.2.18 Power and Direction of Maximum Radiation of Stations in the Fixed or Mobile Service in Certain Bands Shared with Stations in the Space Radiocommunication Services (Earth-to-Space) on an Equal Rights Basis

1. As far as practicable, sites for transmitting stations, in the fixed or mobile service, employing maximum values of equivalent isotropically radiated power (e.i.r.p.) exceeding the values given in Table 8.2.18-1 in the frequency bands indicated, should be selected so that the direction of maximum radiation of any antenna will be separated from the geostationary-satellite orbit (GSO) by at least the angle in degrees shown in the Table, taking into account the effect of atmospheric refraction. Information on this subject is given in the most recent version of Recommendation ITU-R SF.765.

2. For their own protection receiving stations in the fixed or mobile service operating in bands shared with space radiocommunication services (space-to-Earth) should also avoid directing their antennas toward the GSO if their sensitivity is sufficiently high that interference from space station transmissions may be significant.

3. For frequency bands above 15 GHz (except 25.25 - 27.5 GHz), there is no

restriction on the angular separation for transmitting stations of the fixed or mobile service. This matter is being studied, e.g., in the ITU-R.

Table 8.2.18-1

Frequency band (GHz)	E.i.r.p. value (dBW) (see also paragraphs 1 and 5)	Minimum separation angle with respect to geostationary-satellite orbit (degrees)
1 - 10	+35	2
10 - 15	+45	1.5
25.25 - 27.5	+24 (in any 1 MHz band)	1.5
Other bands above 15 GHz	+55	No limit

4. The maximum e.i.r.p. of a station in the fixed or mobile service shall not exceed +55 dBW.

5. Where compliance with paragraph 1 for frequency bands between 1 GHz and 10 GHz is impracticable, the maximum e.i.r.p. of a station in the fixed or mobile service shall not exceed +47 dBW in any direction within 0.5° of the GSO; or +47 dBW to +55 dBW, on a linear decibel scale (8 dB per degree), in any direction between 0.5° and 1.5° of the GSO, taking into account the effect of atmospheric refraction.

6. The power delivered by a transmitter to the antenna of a station in the fixed or mobile service shall not exceed +13 dBW in frequency bands between 1 GHz and 10 GHz or +10 dBW in frequency bands above 10 GHz.

7. The limits given in paragraphs 1, 5, 6, and 7 apply, where applicable, to the services and frequency bands indicated in Table 8.2.18-2 for reception by space stations where the frequency bands are shared with equal rights with the fixed or mobile service:

Table 8.2.18-2

Frequency Band	Service	Limit as specified in paragraphs
2 200 - 2 290 MHz	Fixed-Satellite	1, 4, 5, and 6
7 900 - 8 025 MHz	Meteorological-Satellite Space Research	
8 025 - 8 400 MHz	Space Operation	
	Earth Exploration-Satellite	
	Mobile-Satellite	

14.4 - 14.5 Ghz 14.5 - 14.7145 GHz 14.7145-14.8 GHz	Fixed-Satellite	1, 4, and 6
25.25 - 27.5 GHz	Inter-Satellite	1, 4, and 6

8. Trans-horizon systems in the 1 700 - 1 710 MHz band may exceed the limits given in paragraphs 4 and 6, but the provisions of paragraphs 1 and 5 should be observed. Considering the difficult sharing conditions with other services, the number of trans-horizon systems in these bands should be kept to a minimum.

9. A computer program is available at the Division of Transportation and Communication for checking compliance of fixed stations with the foregoing provisions. To provide more general assistance to licensees in the earlier stages of planning of fixed and mobile systems for operation in these bands, a table is provided in Annex B which identifies transmitter pointing angles that should be avoided under certain postulated conditions.

8.2.19 Power and Direction of Maximum Radiation of Earth Stations in Certain Bands Shared with Stations in the Fixed or Mobile Service

1. The equivalent isotropically radiated power (e.i.r.p.) transmitted in any direction towards the horizon by an earth station shall not exceed the following limits except as provided in paragraphs 3 or 4:

a) in frequency bands between 1 GHz and 15 GHz +40 dBW in any 4 kHz band for $\theta < 0^\circ$ +40 +3 θ dBW in any 4 kHz band for $0^\circ < \theta < 5^\circ$; and

b) in frequency bands above 15 GHz +64 dBW in any 1 MHz band for $\theta < 0^\circ$ +64 + 3 θ dBW in any 1 MHz band for $0^\circ < \theta < 5^\circ$, where θ is the angle of elevation of the horizon viewed from the centre of radiation of the antenna of the earth station and measured in degrees as positive above the horizontal plane and negative below it.

2. For angles of elevation of the horizon greater than 5° there shall be no restriction as to the e.i.r.p. transmitted by an earth station towards the horizon.

3. As an exception to the limits given in paragraph 1, the eir.p. towards the horizon for an earth station in the space research service (deep space) shall not exceed +55 dBW in any 4 kHz band in frequency bands between 1 GHz and 15 GHz, or +79 dBW in any 1 MHz band in frequency bands above 15 Ghz.

4. The limits given in paragraphs 1 and 3, as applicable, may be exceeded by not more than 10 dB. However, when the resulting coordination area extends into the territory of another country, such increase shall be subject to agreement by the

administration of that country.

5. The limits given in paragraph 1 apply, where applicable, to the services and frequency bands indicated in Table 8.2.19 below for transmission by earth stations where the frequency bands are shared with equal rights with the fixed or mobile service:

Table 8.2.19

Frequency band	Services
1761-1842 MHz	Fixed-satellite
2 025 - 2 110 MHz	Earth-exploration-satellite
7 900 - 7 975 MHz	Meteorological-satellite
8 025 - 8 400 MHz	Mobile-satellite Space operation Space research

6. Earth Stations Operating in the 1610-1626.5 MHz Band

a. In accordance with No. 55.364 of the RR: a mobile earth station operating in either the mobile-satellite service or radiodetermination-satellite service in the band 1610-1626.5 MHz shall not produce a peak e.i.r.p. density in excess of -15 dB(W/4 kHz) in the part of the band used by systems operating in accordance with the provisions of RR S5.366 (airborne electronic aids to air navigation and any directly associated ground-based or satellite-borne facilities) unless agreed by affected administrations.

In the part of the band where such systems are not operating, the mean e.i.r.p. density of a mobile earth station shall not exceed -3 dB(W/4 kHz).

b. The e.i.r.p. transmitted in any direction by an earth station in the radiodetermination-satellite service in the band 1610-1626.5 MHz shall not exceed -3 dBW in any 4 kHz band.

7. Earth station antennas shall not be employed for transmission at elevation angles of less than 3° measured from the horizontal plane to the direction of maximum radiation, except when agreed to by administrations concerned and those whose services may be affected. In case of reception by an earth station, the above value shall be used for coordination purposes if the operating angle of elevation is less than that value.

8. As an exception to paragraph 7, earth station antennas in the space research service (near Earth) shall not be employed for transmission at elevation angles of less than 5°, and earth station antennas in the space research service (deep space) shall not be employed for transmission at elevation angles of less than 10°, both

angles being those measured from the horizontal plane to the direction of maximum radiation. In the case of reception by an earth station, the above values shall be used for coordination purposes if the operating angle of elevation is less than those values.

9. Earth Station Off-axis Power Limitations

The level of (e.i.r.p.) emitted by the earth station at angles in the direction the geostationary satellite orbit off the main beam axis has a significant impact of interference caused to other geostationary satellite networks. Enhanced utilization of the geostationary-satellite orbit and easier coordination would be attained by minimizing such offaxis radiation and administrations are encouraged to achieve the lowest value practicable bearing in mind the latest studies, e .g, ITU-R Recommendations. Minimizing such levels is particularly important in intensively used uplink bands.

8.2.20 Power Flux Density Limits

1. Limits at the Surface of the Earth from Space Stations

a. The power flux-density at the surface of the Earth produced by emissions from a space station, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limit given in Table 8.2.20. The limit relates to the power flux density which would be obtained under assumed free-space propagation conditions and applies to emissions by a space station of the service indicated where the frequency bands are shared with equal rights with the fixed or mobile service, unless otherwise stated.

TABLE 8.2.20

Frequency band	Service	Limit in dB(W/m ²) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-70°	70°-90°	
410 - 420 MHz	Space Research (S-S) (Limited to Communications within 5 km of an orbiting manned space vehicle, see No. S5.268)	-153	$153+0.077(\delta-5)$	-148	4 kHz

Frequency band	Service	Limit in dB(W/m ²) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	
460 - 470 MHz	Earth Exploration-Satellite (S-E) (Secondary allocation, see US201)	-152			4 kHz
1 670-1 700 MHz	Earth Exploration-Satellite Meteorological-Satellite	-133(value based on sharing with meteorological aids service)			1.5 MHz
1 525 - 1 530 MHz ¹⁾ (R1, R3)	Meteorological-Satellite (S-E)	-154 ³⁾	-154+0,5(8-5) ³⁾	-144 ³⁾	4 kHz
1 670 - 1 690 MHz ⁵⁾	Space Research (S-E) (S-S)				
1 690- 1 700MHz (Nos. S5.381 and S5.382)	Space Operation (S-E) (S-S)				
1 700-1 710MHz	Earth Exploration-Satellite (S-E) (S-S)				
1761 - 1842 MHz ⁷⁾ (See G42)					
2 025 - 2 110 MHz ⁷⁾					
2 200-2 300MHz					

TABLE 8.2.20 (cont.)

Frequency band	Service	Limit in dB(W/m ²) for angle of arrival (δ) above the horizontal plane			Reference bandwidth
		0°-5°	5°-25°	25°-90°	

7 250 - 7 850 MHz	Fixed-Satellite (S-E) Meteorological-Satellite (S-E) Mobile-Satellite	-152	-152 + 0.5 (δ -5)	-142	4 kHz
8 025 - 8 500 MHz	Earth Exploration-Satellite (S-E) Space Research (S-E)	-150	-150 + 0.5 (δ -5)	-140	4 kHz
13.4 - 14.05 GHz ⁷⁾	Space Research (secondary allocation)	-152			4 kHz
14.6 - 15.35 GHz ⁷⁾	Space Research (secondary allocation)	-152	-152 + 0.5 (δ -5)	-142	4 kHz
17.8 - 19.3 GHz ¹⁾	Fixed-Satellite (S-E)	-115 or 125 ⁶⁾	-115+0.5(δ -5) or-125+(δ -5) ⁶⁾	-105 or -105 ⁶⁾	1 MHz
19.3 -19.7 GHz ¹⁾ 22.55 - 23.55 GHz 24.45 - 24.75 GHz 25.25 - 27.5 GHz	Fixed-Satellite (S-E) Inter-Satellite Earth Exploration Satellite (S-E)	-115	-115 + 0.5(δ -5)	-105	1 MHz
18.6 -18.8 GHz	Fixed-Satellite (S-E)	-101 (Value based on sharing with the Earth exploration-satellite (passive) service and space research (passive) service. See US255.)			200 MHz
37.0-38.0 GHz 39.5-40.5 GHz	Fixed-Satellite Mobile-Satellite Space Research	-115 ⁴⁾	-115+0.5 (δ -5) ⁴⁾	-105 ⁴⁾	1 MHz

[Footnotes for Table 8.2.20]

¹⁾ The equality of right to operate when a frequency band is allocated in different Regions to different services of the same category is established in No. S4.8. Therefore, any limits concerning inter-Regional interference which may appear in ITU-R Recommendations should, as far as practicable, be observed by administrations.

2) Not used in the above table.

3) These power flux-density values are derived on the basis of protecting the fixed service using line-of-sight techniques. Where a fixed service using tropospheric scatter operates in the bands listed in the first column and there is insufficient frequency separation, there must be sufficient angular separation between the direction to the space station and the direction of maximum radiation of the antenna of the receiving station of the fixed service using tropospheric scatter, in order to ensure that the interference power at the receiver input of the fixed-service station does not exceed -168 dBW in any 4 kHz band.

4) The values given in this box shall apply until such time as modified by a competent world radiocommunication conference.

5) These values are applicable where this band is shared with equal rights with meteorological aids service.

6) These values shall apply provisionally only to emissions of space stations on nongeostationary satellites in networks operating with a large number of satellites; that is systems operating with more than 100 satellites, (see Resolution 131 (WRC-97)).

7) The limits set forth in this table are applicable to the Space Transportation System and the Tracking and Data Relay Satellite System or any satellites or spaceborne radiocommunication transmitters associated with these systems.

8.2.21 Station Keeping of Space Stations

1. Space stations on geostationary satellites shall have the capability of maintaining their positions within the tolerance specified. In the case of space stations on board geosynchronous satellites with circular orbits having an angle of inclination greater than 5 degrees, the positional tolerance shall relate to the nodal point.

2. Space stations on board geostationary satellites which use any frequency band allocated to the fixed-satellite service or the broadcasting-satellite service: ⁱ

a. shall have the capability of maintaining their positions within ± 0.1 degrees of the longitude of their nominal positions;

b. shall maintain their positions within ± 0.1 degree of longitude of their normal positions; but

c. experimental stations on board geostationary satellites need not comply with a) or b) above, but shall maintain their positions within ± 0.5 degree of longitude of their nominal positions;

d. however, space stations need not comply with b) or c) above, as

appropriate, as long as the satellite network to which the space station belongs does not cause unacceptable interference to any other satellite network whose space station complies with the limits given in b) and c) above.

3. Space stations on board geostationary satellites which do not use any frequency band allocated to the fixed-satellite service or the broadcasting-satellite service:

a. shall have the capability of maintaining their positions within ± 0.5 degree of longitude of their nominal positions,

b. shall maintain their positions within ± 0.5 degree of longitude of their nominal positions; but

c. need not comply with b) above as long as the satellite network to which the space station belongs does not cause unacceptable interference to any other satellite network whose space station complies with the limits given in b) above.

8.2.22 Pointing Accuracy of Antennas on Geostationary Satellites

1. The pointing direction of maximum radiation of any earthward beam of antennas (intended for less than earth coverage) on geostationary satellites shall be capable of being maintained within:

a. 10% of the half power beamwidth relative to the nominal pointing direction or

b. 0.3 degree relative to the nominal pointing direction, whichever is greater. ⁱⁱ

2. In the event that the beam is not rotationally symmetrical about the axis of maximum radiation, the tolerance in any plane containing this axis shall be related to the half power beamwidth in that plane.

3. This accuracy shall be maintained only if it is required to avoid unacceptable interference ⁱⁱ to the other systems.

8.2.23 Trunked Land-Mobile Radio Systems

1. Trunked land-mobile radio systems may be established in any frequency band allocated on a primary basis to the fixed and mobile services. Accommodating a trunked system requires consolidation of existing land mobile systems by the applicant(s) unless they present justification.

2. Innovative methods of using commercial entities to design and operate trunking systems are encouraged. Frequency assignments for shared trunked land-mobile radiocommunication systems shall be obtained by the installing entity, which is responsible for managing the system. Individual users are not required to obtain frequency assignments to share the system.

8.2.24 Specialized Mobile Radio Service

1. Republic of Palau Government Departments and State Governments are authorized to use the Specialized Mobile Radio (SMR) services in the land mobile bands only as an END USER of a licensed private carrier on a contractual basis. SMR systems are established by private commercial carriers and licensed by the Division of Transportation and Communication. Republic of Palau Government Departments and State Governments are encouraged to evaluate the efficiency and cost effectiveness between leasing an SMR service, establishing a new land mobile radio system, or expanding their existing system to satisfy their operational requirements.

8.2.25 Coordination of Frequencies Used by Republic of Palau Government Departments with State Governments

1. A Republic of Palau Government radio station may use any frequency authorized to a State Government where such utilization is necessary for intercommunication or required for coordination of activities, provided a mutually-approved arrangement has been concluded between the Government department concerned, and the licensee involved.

2. Two steps are required to conclude a mutually-approved arrangement. The Government department must obtain from the licensee a written certification that the Government operation is necessary, and, after receipt of the certification, the Government department must provide a copy of the certification to the Division of Transportation and Communication to obtain a license.

8.2.26 Shared Use of Frequencies for Meteorological Aids in the Bands 400.15-406 and 1668.4-1700 MHz

1. The characteristic frequency drift of radiosonde equipment and the requirement for flexibility in the operation of radiosondes preclude effective suballocation, channeling, or the granting of authority to use specific frequencies in the bands 400.15-406 and 1668.4-1700 MHz. The shared use of these bands corresponds essentially, for interference considerations, to shared use of a single nominal centerband frequency assignment.

2. Interference to the meteorological aids service that can result in spoiled observations is, by the nature of the service and the resources usually available,

inherently difficult to identify and locate.

3. Mutual interference is possible between radiosondes operating simultaneously within 160 kilometers of each other. Line-of-sight distance to the horizon is greater than 480 kilometers from a radiosonde at an altitude of 15 kilometers.

4. Since these bands are available for the use by any entity responsible for the conduct of meteorological observations, each user shall take appropriate measures to avoid interference through local coordination of specific operations.

8.3 COORDINATION BETWEEN TERRESTRIAL AND SPACE STATIONS

8.3.1 Coordination of Assignments for Transmissions by Terrestrial Stations Located Within the Coordination Area of a Receiving Earth Station

1. General Provisions

a. Before an assignment to a terrestrial station is brought into use within the coordination area of a receiving earth station of another country utilizing the same band above 1 GHz allocated internationally with equal rights to terrestrial and space radiocommunication services (space-toEarth) and within the bands listed in 2 below, coordination must be effected with that country to ensure interference will not be caused to the receiving earth station. (See S9.18 of the RR).

b. Nationally, the ITU Radio Regulations (RR) procedure for coordinating terrestrial stations also is followed to identify possible interference to receiving earth stations located within the Republic of Palau.

2. Frequency Bands

The coordination procedure specified in this Section applies in the following frequency bands:

1215-1260 MHz
1559-1610 MHz
1670-1710 MHz
2200-2300 MHz
3600-3700 MHz
4500-4635 MHz
4685-4800 MHz
5150-5216 MHz
7250-7750 MHz
8025-8500 MHz
15.43-15.63 GHz
81-84 GHz

102-105 GHz
134-142 GHz
149-164 GHz
190-200 GHz
231-241 GHz
252-265 GHz

3. Specific Provisions

- a. For major terrestrial systems, or major modifications of existing systems, national and international coordination will be initiated when a frequency assignment application is filed with the Division of Transportation and Communication. The Division of Transportation and Communication shall initiate through the JTB Process the coordination, as appropriate, with the country having the receiving earth station.
- b. Final assignment action shall not be taken until national coordination has been accomplished, and international coordination has been initiated, where it has been determined to be necessary.
- c. The provisions of this Section are equally applicable to any proposed change in the technical characteristics of a currently authorized frequency assignment for transmission by a terrestrial station, if the change increases the probability of harmful interference being caused by the terrestrial station.
- d. Coordination pursuant to this Section is not required for an experimental station or for a station whose frequency assignment would not be in accordance with the national or international Table of Frequency Allocations.

8.3.2 Coordination of Assignments for Transmission or Reception by Earth Stations

1. General Provisions

- a. Before an assignment to an earth station, whether for transmitting or receiving, is brought into use in a particular band allocated with equal rights to space and terrestrial radiocommunication services in the spectrum above 1 GHz and in the bands listed in 2a below, coordination must be effected with any country whose territory lies within the coordination area of the earth station to ensure that interference will not be caused to or by terrestrial stations. (See S9.17 of the RR). The coordination area is determined in accordance with Appendices S5 and S7 of the RR.
- b. Before an assignment to an earth station, whether for transmitting or

receiving, is brought into use in a particular band allocated with equal rights to space radiocommunication services in both directions of transmission and in the bands listed in 2b below, coordination must be effected with any country whose territory lies within the coordination area of the earth station or the earth station is located within the coordination area of a coordinated earth station to ensure that interference will not be caused to or by earth stations operating in the opposite direction of transmission. (See No. S9.17A of the RR) The coordination area is determined based on Recommendations ITU-R IS.847, IS.848, and IS.849.

c. Nationally, the ITU Radio Regulations procedures for coordinating earth stations also is followed to identify possible interference between such earth stations and terrestrial stations located within the Republic of Palau.

d. Coordination contours should be submitted to the Division of Transportation and Communication with the frequency assignment application. The applicant will be provided assistance in the coordination of the earth station with Republic of Palau radio frequency licensees and those in neighboring countries as required.

e. A computer program for the calculation of coordination areas, with respect to terrestrial stations, has been developed by the ITU. The ITU Radiocommunication Bureau has also developed a PC-based version of Appendix S7 which can be purchased from the ITU. Applicants that have earth stations that require international coordination should consider purchasing the ITU program since this program will be used to determine all of the countries with whom coordination is required. The ITU also has for sale a PC-based version of Recommendation ITUR IS.847.

2. Frequency Bands

a. (Earth Station/Terrestrial Station Coordination)

The coordination procedure specified in sub-paragraph 1 a of this section applies in the following frequency bands:

1215-1260 MHz
1559-1610 MHz
1610-1626.5 MHz
1675-1710 MHz
1761-1842 MHz
2025-2120 MHz
2200-2300 MHz
7125-7235 MHz
7250-7750 MHz
7900-8500 MHz
32-32.3 GHz

34.2-34.7 GHz
37-38 GHz
39.5-40.0 GHz
42.5-43.5 GHz
45.5-47 GHz
47.2-50.2 GHz
50.4-51.4 GHz
66-71 GHz
71-75.5 GHz
81-84 GHz
92-100 GHz
102-105 GHz
134-142 GHz
149-164 GHz
190-200 GHz
202-217 GHz
231-241 GHz
252-275 GHz

b. (Earth Station/Earth Station Coordination)

The coordination procedure specified in sub-paragraph lb of this Section applies in the following frequency bands:

8025-8400 MHz
19.3-19.7 GHz
25.5-27 GHz
40-40.5 GHz
45.5-47 GHz
66-71 GHz
95-100 GHz
134-142 GHz
190-200 GHz
252-265 GHz

3. Specific Provisions

a. Applications for frequency assignments to earth stations shall indicate the status of coordination with affected Republic of Palau licensees and neighboring countries. Final assignment action shall not be taken by the Division of Transportation and Communication until national coordination has been accomplished, and international coordination initiated where it has been determined to be necessary.

b. The provisions of this Section are equally applicable to any proposed change in the technical characteristics of a currently authorized frequency assignment, for transmission or reception by an earth station, if the change increases the probability of harmful interference being caused to or by a

terrestrial station or earth station, as appropriate.

8.3.3 Administrative Due Diligence Applicable to Some Satellite Communication Services

1. Resolution 49 (WRC-97) of the RR requires the application of an administrative due diligence procedure as from 22 November 1997 for a satellite network or satellite system of the fixed-satellite service or mobile-satellite service for which the advance publication information under No. S9.2B of the Radio Regulations has been received by the ITU's Radiocommunication Bureau from 22 November 1997. The administrative due diligence procedure is as follows.

2. Any satellite network or satellite system of the fixed-satellite service or mobile-satellite service with frequency assignments that are subject to coordination under Nos. S9.7, S9.12, S9.13 and Resolution 46 (Rev.WRC-97) of the RR, shall be subject to these procedures.

3. When the Republic of Palau Administration requests coordination for a satellite network under paragraph 2 above, it shall send to the Bureau through the JTB Process as early as possible before bringing into use, but in any case to be received before the end of the 5-year period established as a limit to bringing into use in No. S9.1 of the RR, the due diligence information relating to the identity of the satellite network and the spacecraft manufacturer specified in 8.3.4.

4. The information to be submitted in accordance with paragraph 3 above shall be signed by an authorized official of the Republic of Palau Administration.

5. On receipt of the due diligence information under paragraph 3 above, the Bureau will examine that information for completeness. If the information is found to be complete, the Bureau will publish the complete information in a special section of the Weekly Circular.

6. If the information is found to be incomplete, the Bureau will request the Republic of Palau Administration to submit the missing information. In all cases, the complete due diligence information shall be received by the Bureau within the appropriate time period specified in paragraph 3 above, as the case may be, relating to the date of bringing the satellite network into use.

7. Six months before expiry of the period specified in paragraph 3 above and if the Republic of Palau Administration has not submitted the due diligence information under paragraph 3 above, the Bureau will send a reminder to the Republic of Palau Administration.

8. If the complete due diligence information is not received by the Bureau within the time limits specified, the networks covered by paragraph 2 above will no

longer be taken into account and will not be recorded in the MIFR. The provisional recording in the MIFR will be deleted by the Bureau after it has informed the Republic of Palau Administration. The Bureau will publish this information in the Weekly Circular.

9. Before the Bureau extends the date of bringing into use under No. S11.44 of the Radio Regulations, the complete due diligence information under paragraph 3 above shall have been submitted by the Republic of Palau Administration.

10. When the Republic of Palau Administration notifies a satellite network under paragraph 2 above for recording in the MIFR, it shall send to the Bureau as early as possible before bringing into use, but in any case before the date of bringing into use, the due diligence information relating to the identity of the satellite network and the launch services provider specified in 8.3.4.

11. When the Republic of Palau Administration has completely fulfilled the due diligence procedure but has not completed coordination, this does not preclude the application of No. S11.41 of the RR by the Republic of Palau Administration.

8.3.4 Administrative Due-diligence Information

1. Identity of the satellite network

- a) Identity of the satellite network
- b) Name of the administration
- c) Country symbol
- d) Reference to the advance publication information
- e) Reference to the request for coordination
- f) Frequency band(s)
- g) Name of the operator
- h) Name of the satellite
- i) Orbital characteristics

2. Spacecraft manufacturer

- a) Name of the spacecraft manufacturer
- b) Date of execution of the contract
- c) Contractual "delivery window"
- d) Number of satellites procured

3. Launch services provider

- a) Name of the launch vehicle provider
- b) Date of execution of the contract
- c) Anticipated launch or in-orbit delivery window
- d) Name of the launch vehicle
- e) Name and location of the launch facility

4. In cases where a contract for satellite procurement covers more than one satellite, the relevant information shall be submitted for each satellite.

8.3.5 Coordination of Assignments to Earth and Space Stations Which Utilize Geostationary-Satellites Networks

1. General Provisions

a. Before bringing into use an assignment to an earth or space station in a satellite network using the geostationary-satellite orbit (GSO), coordination must be effected, in certain cases, with other countries operating or planning such networks in the same band to ensure compatibility between different satellite networks. (See No. S9.7 of the RR). Coordination is required if the proposed satellite network would cause or receive a 6% or greater increase in receiving system or equivalent satellite link noise temperature, as appropriate, with respect to other geostationary satellite networks. (See Appendix S8 of the RR.)

b. Additionally, in certain frequency bands to which Nos. S9.11A and S9.21 of the RR apply, coordination of frequency assignments to geostationary-satellite networks may be required with assignments of nongeostationary-satellite networks or systems or terrestrial stations.

c. Nationally, coordination of assignments to stations in satellite networks using the GSO is effected through the Division of Transportation and Communication.

2. Specific Provisions

a. International coordination of satellite networks which utilize the GSO will be initiated by the Division of Transportation and Communication as outlined in Section 3.3.2 of these Regulations.

b. For systems utilizing the GSO, which require international advance publication, under the provisions of No. S9.1, and coordination under the provisions of Nos. S9.7, S9.11A and S9.21, as appropriate, of the ITU RR, the Division of Transportation and Communication shall initiate advance publication and coordination with the Radiocommunication Bureau and the country(ies) involved.

c. Applications for frequency assignments to either earth or space stations in networks using the GSO shall indicate the status of coordination with agencies and countries having or planning space systems in the same band which employ the GSO. Final assignment action shall not be taken until national coordination has been accomplished, and international

coordination has been initiated, where it has been determined to be necessary.

8.3.6 Coordination of Assignments to Stations of Non-geostationary-Satellite Networks in Accordance with No. S9.1 1A or S9.21 of the ITU Radio Regulations

1. General Provisions

a. Before bringing into use an assignment to an earth or space station in a geostationary or nongeostationary satellite network, in bands subject to No. S9.11A or S9.21 of the RR, coordination must be effected, in certain cases, with other countries operating or planning geostationary-satellite networks, nongeostationary satellite networks or systems, or terrestrial stations, as appropriate, to ensure compatibility. The requirements for coordination are dependent on the frequency band concerned.

b. Nationally, coordination of assignments to stations of nongeostationary-satellite networks or systems is effected through the Division of Transportation and Communication.

2. Specific Provisions

a. International coordination of non-geostationary-satellite networks or systems will be initiated by the Division of Transportation and Communication as outlined in Section 3.3.2.

b. For non-geostationary-satellite networks or systems which require international advance publication and coordination under the provisions of Nos. S9.1 and S9.11A or S9.1 and S9.21, respectively, of the ITU RR; the SSG shall initiate advance publication and coordination with the Radiocommunication Bureau and the country(ies) involved.

c. Determination of the need for coordination between space stations (space-to-Earth) and terrestrial services sharing the same frequency band below 1 GHz

Coordination of space station assignments in the 137-138 MHz and 400.15-401 MHz bands is required only if the power flux-density produced by the space station exceeds $-125 \text{ dB(W/m}^2\text{/4kHz)}$ at the surface of the Earth.

d. Method for the determination of the need for coordination between MSS space stations (space-to-Earth) and terrestrial services sharing the same frequency band in the 1 to 3 GHz range

Coordination of transmitting space station assignments of the mobile satellite service with respect to terrestrial services is not required if the power flux-density produced at the surface of the Earth or the fractional degradation in performance (FDP) of a station in the fixed service does not exceed the threshold values in RR Resolution 46.

e. Applications for frequency assignments to either earth or space stations in non-geostationary satellite networks or systems shall indicate the status of coordination with affected agencies and countries. Final assignment action shall not be taken by the Division of Transportation and Communication until national coordination has been accomplished, and international coordination has been initiated, where it has been determined to be necessary.

8.3.7 List Of Coordinated Earth Stations

The Republic of Palau has no coordinated earth stations at present.

8.3.8 Procedures for the Coordination of the Use of the Frequencies 1030 and 1090 MHz and Frequencies in the Bands 1215-1400, 2700-2900 and 9000-9200 MHz

1. Applicability--These procedures are applicable for all frequency assignment actions for use within the Republic of Palau for the purposes indicated:

1030 MHz--Interrogators

1090 MHz--Ground Transponders

1215-1400 MHz--Radars

2700-2900 MHz--Radars

9000-9200 MHz--Radars

These procedures are implemented to provide for the selection of frequencies and minimize, through effective coordination, the possibility of harmful interference.

2. The U.S. Federal Aviation Administration (FAA), is the National Airspace System (NAS) manager and has primary responsibility for flight safety in the Republic of Palau. The FAA selects and coordinates the frequencies used for control of aeronautical operations within the Republic of Palau.

3. Procedures

a. General--All proposed frequency assignment actions as described above shall be coordinated by the applicant with the FAA Regional Coordinator in Honolulu, Hawaii. The FAA Regional Coordinator will recommend a frequency and pulse repetition rate (PRR) based on the applicant's requirements and the technical particulars furnished by the applicant. If an interference free frequency or PRR can not be engineered, the FAA Regional Coordinator will inform the applicant of such and will

recommend alternatives and/or restrictions to preclude such interference problems.

b. Interrogators (1030 MHz) and Transponders (1090 MHz)

(1) The concentration of usage for secondary surveillance radar (SSR) (IFF/SIF) systems on a single pair of frequencies, 1030 MHz and 1090 MHz, requires special measures to assure compatibility of operations. Strict control of operational parameters (i.e., power, pulse repetition rate, side lobe suppression, etc.) is necessary to prevent unacceptable degradation to the military mission and flight safety.

(2) Applicants shall cooperate with the FAA in the coordination, selection, and control of critical operational parameters to provide optimum sharing and maximum assurance of compatible operations within the limits of equipment availability and operational requirements. This cooperation shall include timely responses to FAA proposals for changes of PRRs, powers, SLS, etc., which may be required for relief of harmful interference, and submission of a modification or replacement action to the FAS to amend that frequency assignment record.

(3) Accordingly, all applicants requiring the use of 1030 MHz for interrogators or 1090 MHz for ground transponders, and either frequency for test equipments that radiate pulsed emissions, shall, prior to filing applications for new and modified requirements, coordinate the planned operational parameters for each new interrogator or ground transponder and every change of each existing interrogator with the FAA Regional Coordinator.

(4) Shipboard Interrogators -- Operational agreements with the FAA Regional Coordinator are required when operations are within 185 kilometers of the Republic of Palau airports or its possessions or as modified by local agreement. Further coordination is not required when parameters are within guidelines established by operational agreements.

c. Radars (1215-1400, 2700-2900, 9000-9200 MHz)

(1) The usage for radar systems requires special measures to assure compatibility of operations. The planning, coordination, and control required to provide separation between frequencies and pulse repetition rates and operations within mutual interference range, are necessary to prevent unacceptable degradation where

flight safety and meteorological radars are concerned.

(2) Applicants shall cooperate with the FAA in the coordination, selection, and control of power, frequencies and PRRs to provide optimum sharing and maximum assurance of compatible operations within the limits of equipment availability and operational requirements. This cooperation shall include timely responses to FAA proposals for changes of power, frequencies and PRRs which may be required for relief of harmful interference. Amendment to the frequency assignment record is required to reflect changes requested by the FAA.

(3) Accordingly, all applicants requiring the use of 1215-1400, 2700-2900, 9000-9200 MHz for radars and for test equipments that radiate pulsed emissions, shall, prior to filing applications for new and modified requirements, coordinate the planned power, frequencies and PRRs for new radars and every change of existing radars through the FAA Regional Coordinator.

(4) Shipboard Radars -- Operational agreements with the FAA Regional Coordinator are required when operations are within 100 NM of Republic of Palau airports or its possessions or as modified by local agreement. Further coordination is not required when parameters are within guidelines established by operational agreements.

8.3.9 Coordination of High Frequencies for Projects and Systems Involving Oceanographic Data Transmissions

1. Radio frequencies in the bands 4063.3-4064.8, 6261.3-6262.5, 8340.3-8341.5, 12420.3-12421.5, 16617.3-16618.5, and 22240.3-22241.5 kHz used for transmission and reception of oceanographic data require specialized coordination procedures.

2. Accordingly, any operational use of the Appendix S17 oceanographic data transmission frequencies should be in accord and/or compatible with the Plan(s) developed by the IOC/WMO, if international protection and BR registration are desired.

Endnotes for Chapter 8

ⁱ Stations operating in a radio service on a secondary basis shall comply with the provisions of this Chapter with respect to stations operating in a radio service allocated on a primary basis.

ⁱⁱ e.g.-- First octave: 2.075 to 3.975 MHz, 20 channels spaced 100 kHz.

Second octave: 4.150 to 7.950 MHz, 20 channels spaced 200 kHz.

Third octave: 8.300 to 15.900 MHz, 20 channels spaced 400 kHz.

Fourth octave: 16.600 to 31.800 MHz, 20 channels spaced 800 kHz.

For those sounders in which the tuning rate is independent of the pulse rate (e.g., Sounder Types C2, C3, and C4) wherein the specific frequencies sounded differ from scan to scan, a channeling plan is not a meaningful item. On applications for such sounders, so state.

ⁱⁱⁱ [the text of Chapter 8 has no footnote ⁱⁱⁱ] Space stations in the broadcasting-satellite service on geostationary satellites operating in the band 11.7-12.7 GHz are exempted from these provisions but shall maintain their positions in accordance with Appendix 30 of the Radio Regulations.

^{iv} [the text of Chapter 8 has no footnote ^{iv}] Transmitting antennas of space stations in the broadcasting-satellite service operating in the band 11.7-12.7 GHz are not subject to these provisions but shall maintain their pointing accuracy in accordance with 3.14.1 of Annex 8 of Appendix 30 of the Radio Regulations.

These Radiocommunications Regulations are hereby approved and shall be promulgated and published according to law.

/s/

Tommy E. Remengesau, Jr.
President, Republic of Palau

9/12/05

Date: