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RADIO FREQUENCY (RF) SPECTRUM MANAGEMENT

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This Air Force manual (AFMAN) implements Air Force Policy Directive (AFPD) 33-1, *Command, Control, Communications, and Computers (C4) Systems;* Department of Defense Directive (DoDD) 4650.1, *Management and Use of the Radio Frequency Spectrum*, June 24, 1987; Department of Commerce (DoC) National Telecommunications and Information Administration (NTIA) *Manual of Regulations and Procedures for Federal Radio Frequency Management* (NTIA Manual); United States Military Communications-Electronics Board (USMCEB) procedures; and Air Force Instruction (AFI) 33-118, *Radio Frequency Spectrum Management*. It details responsibilities and provides guidance and procedures for Air Force management of the radio frequency (RF) spectrum. It assists in system planning, tells how to obtain frequency support for new systems, and lists detailed procedures for frequency allocations and assignments. It applies to all Air Force activities using the RF spectrum, including Air Force Reserve Command, Air National Guard, and Civil Air Patrol (CAP) units and members. The term "major command" (MAJCOM), as used in this manual, includes field operating agencies (FOA) and direct reporting units. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force. Refer technical questions on the content of this manual to the Air Force Frequency Management Agency, (AFFMA/SCX), 2461 Eisenhower Avenue, Suite 1203, Alexandria VA 22331-1500. Send recommended changes or comments to Headquarters Air Force Communications Agency, (HQ AFCA/ITPP), 203 W. Losey Street, Room 1100, Scott AFB IL 62225-5222, through appropriate channels, using AF Form 847, **Recommendation for Change of Publication**, with an information copy to AFFMA/SCX. Maintain and dispose of records created as a result of prescribed processes in accordance with AFMAN 37-139, *Records Disposition Schedule* (will convert to AFMAN 33-322V4). The Paperwork Reduction Act of 1974 as amended in 1996 and AFI 33-360, Volume 2, *Forms Management Program*, affect this publication.

SUMMARY OF REVISIONS

This document is substantially revised and must be completely reviewed.

There are major changes to the Spectrum Certification Process (**Chapter 2**), Frequency Actions (**Chapter 3**), and the attachments. Chapter numbers and titles have changed; revisions have been applied to bring data up to date. Several former attachments have been updated and consolidated into **Chapter 3**. Standard frequency action format (SFAF) data items 511-513 are added to **Chapter 3**, **Table 3.4.** Other attachments have been moved into **Chapter 4**, Guidance for Specific Frequency Usage; there are additions such as the distance measuring equipment/tactical air navigation (DME/TACAN) channels table. Significant changes occurred to FCC coordination (**Chapter 4**) and **Attachment 2** is revised. **Attachment 3**, Frequency Assignments Security Classification Guide, has been expanded and updated. Tables have been added and/or updated.

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Chapter 1

MANAGING THE RADIO FREQUENCY SPECTRUM

1.1. Introduction. The RF spectrum is a finite natural resource with many nations and activities competing for its use. As a result, most portions of the RF spectrum are extremely congested, making strict practices and procedures necessary to ensure all valid needs are satisfied. Each sovereign nation regulates their own radio frequency spectrum within their boundaries and since RF energy does not respect political or physical boundaries, practices and procedures are established at the international and national levels to ensure equitable use of the RF spectrum.

1.2. International Frequency Management. The International Telecommunications Union (ITU) is a United Nations body responsible for international frequency allocations, worldwide telecommunications standards and telecommunications development activities. The Radiocommunication Sector ensures the rational, equitable, and economical use of the RF spectrum by all radiocommunication services and is responsible for the recording and registration of frequency assignments used internationally. The Air Force Frequency Management Agency (AFFMA) determines which assignments require international registration and prepares all necessary documentation.

1.3. United States (US) National Frequency Management. *The Communications Act of 1934* established separate control of federal and nonfederal (civil) use of the RF spectrum. Under this act, the only government agencies that assign and control the use of frequencies in the US are the NTIA and the Federal Communications Commission (FCC).

1.3.1. National Telecommunications and Information Administration (NTIA). The NTIA, a Department of Commerce (DoC) agency, develops and implements policy for use of the RF spectrum by US Government (federal) radio stations (including DoD stations), and for assigning frequencies to those stations that are within the United States and its Possessions (US&P). NTIA publishes the NTIA Manual that governs the use of the radio frequency spectrum within the US&P.

1.3.1.1. Interdepartment Radio Advisory Committee (IRAC). The IRAC which reports to NTIA's Office of Spectrum Management is responsible for assigning frequencies to US Government radio stations and in developing and executing policies, programs, procedures and technical criteria pertaining to the allocation, management and use of the RF spectrum. The AFFMA represents the Air Force on the IRAC.

1.3.1.1.1. Frequency Assignment Subcommittee (FAS). The FAS, which reports to IRAC, is responsible for the assignment and coordination of radio frequencies and the development and execution of procedures. The FAS is composed of representatives from 21 government departments and agencies involved with use of the RF spectrum. The AFFMA provides the Air Force FAS representative.

1.3.1.1.1.1. Aeronautical Assignment Group (AAG). The AAG, a subcommittee of the FAS, is chaired by the Federal Aviation Administration (FAA) and is responsible for engineering AAG frequency assignments and determines if applications for frequencies in the aeronautical radionavigation service bands should be approved by the NTIA. Frequency requests in the following bands (**Table 1.1.**) must have precoordination from the appropriate FAA regional office prior to national level submission. FAA regional coordination

information must be listed in the Supplementary Details (SFAF item 520). Subsequently, the AAG is responsible for determining if applications for frequencies in those bands should be approved. Send all frequency requests in the following bands to the AAG for coordination prior to the assignment being made.

Table 1.1. Aeronautical Assignment Group (AAG) Frequency Coordination Bands.

190-285 kHz	*285-435 kHz	*510-535 kHz	74.8-75.2 MHz
108-121.9375 MHz	123.5875-128.8125 MHz	132.0125-136 MHz	328.6-335.4 MHz
978-1020 MHz	1030 MHz	1031-1087 MHz	1090 MHz
1104-1146 MHz	1157-1213 MHz	5000-5250 MHz	

*In these bands, the AAG only coordinates on frequencies in the Aeronautical Radionavigation Service.

1.3.1.1.1.2. Military Assignment Group (MAG). The MAG, a subcommittee of the FAS, is chaired by the AFFMA and is responsible for determining if applications for frequencies in the 225.0-328.6 megahertz (MHz) and 335.4-399.9 MHz bands should be approved by the NTIA.

1.3.1.1.2. Spectrum Planning Subcommittee (SPS). The SPS, a subcommittee of the IRAC, reviews major systems and all space systems to assess electromagnetic compatibility with existing and planned Federal systems. The SPS has the same membership as the IRAC and FAS. Assessments of compatibility and standards compliance are accomplished by the NTIA's System Review Branch and presented to the Federal agencies for review and recommendations to NTIA regarding certification of spectrum support for the system. NTIA requires that certification is accomplished on major and space systems prior to granting a frequency assignment.

1.3.1.1.2.1. Space Systems Group (SSG). The SSG, formally a group under the SPS, reviews all space systems for compatibility and standards compliance and recommends degree of support for the system.

1.3.2. Spectrum Fees. In FY96 Congress passed Public Law 104-134 which authorized the Secretary of Commerce to charge the federal agencies for spectrum management, analysis, operations, and related services. The NTIA, OPR for Federal government spectrum management, is paid the spectrum fees by the Federal agencies that use government spectrum, rather than through direct appropriations by Congress.

1.3.2.1. The AFFMA is designated as the Air Force agency responsible for paying Air Force fees. Fees are based upon the number of Air Force assignments in the government master file (GMF). Air Force units have a responsibility to ensure an accurate database exists to reflect valid spectrum fees.

1.3.3. Federal Communications Commission (FCC). The FCC, which reports to the Congress, regulates frequencies assigned to nonfederal stations, including those of state and local governments. FCC-regulated frequencies are available to US Government stations on a case-by-case basis when agreed to by the FCC. The FCC is not a member of the IRAC, SPS, or FAS; however, a representative is appointed to serve in a liaison capacity.

1.4. Department of Defense (DoD) Frequency Management. The Under Secretary of Defense (Acquisition, Technology, and Logistics) (USD[AT&L]) is responsible for establishing policy for acquiring systems that use the RF spectrum and for ensuring compliance with RF spectrum supportability procedures. The Assistant Secretary of Defense (Command, Control, Communications, and Intelligence) (ASD[C3I]) provides overall policy for managing and using the RF spectrum. The main DoD activities involved in frequency management are:

1.4.1. United States Military Communications-Electronics Board (USMCEB). The USMCEB formulates policy and provides direction in military communications-electronics (C-E) matters, including RF spectrum management. The Air Force member of the USMCEB is the Headquarters United States Air Force Deputy Chief of Staff (DCS) for Communications and Information (HQ USAF/SC). The USMCEB Frequency Panel (FP) deals with military C-E system frequency support matters including requirements for U.S. military operations in foreign countries. Review and recommendations regarding support are collected from joint and allied sources. In addition, the FP assists with support of NTIA-approved interdepartmental operations in the US&P.

1.4.2. DoD Area Frequency Coordinator (AFC). The USMCEB set up the DoD AFC system to ensure compatible operation of C-E systems at national service test and training ranges. Each DoD AFC promotes frequency coordination within, and adjacent to, a designated geographical area of responsibility (AOR). Military activities must coordinate frequency use within a DoD AFC's AOR with the concerned DoD AFC before start of actual operations. See **Chapter 5** for coordination procedures and a list of AFCs and AORs.

1.4.3. Defense Information Systems Agency (DISA). DISA maintains frequency records, analyzes frequency use, and requests assignment of frequencies needed by the Defense Information Infrastructure (DII).

1.4.3.1. Joint Spectrum Center (JSC). The JSC serves as the DoD focal point for electromagnetic compatibility (EMC) analysis matters in support of the unified commands and DoD agencies.

1.4.3.2. Office of Spectrum Analysis and Management (OSAM). The OSAM, under the DISA, is the DoD technical focal point on RF spectrum management issues. OSAM ensures consistent enforcement of DoD spectrum management policy and procedures. OSAM performs technical analysis of all government legislation that may affect DoD access to the federal spectrum.

1.4.4. Military Departments. Each military service has a senior officer responsible for RF spectrum management. In the United States Army it is the Director of Information Systems for Command, Control, Communications, and Computers; in the United States Navy it is the Director for Command, Control, Communications, and Computers; and in the United States Air Force it is HQ USAF/SC).

1.4.4.1. HQ USAF/SC. HQ USAF/SC establishes policy and procedures to implement Air Force use of the RF spectrum.

1.4.4.1.1. The AFFMA, an FOA under HQ USAF/SC, carries out these policies and develops spectrum management guidelines and instructions to support the Air Force mission.

1.4.4.1.2. MAJCOM and using activity responsibilities for management of the RF spectrum are contained in AFI 33-118. Knowledge of Air Force policy, responsibility, and guidance contained in AFI 33-118 must be understood prior to effectively applying the procedures contained in this manual.

Chapter 2

SPECTRUM CERTIFICATION PROCESS

2.1. General. The DoD is the largest user of RF spectrum resources among Federal government agencies. DoD assigned the responsibility for military frequency engineering and management to the USMCEB. To obtain certification of spectrum support, there are two processes: using DD Form 1494, **Application for Equipment Frequency Allocation**, and the frequency assignment proposal or request.

2.1.1. The USMCEB, through the FP's J-12 working group, reviews the characteristics of major C-E equipment purchased or developed by the DoD. This is known as the Joint Frequency Equipment Allocation Process (also called the J/F-12 Process) and is defined by requirements established by the NTIA, the SPS, and military joint or allied system review groups. The USMCEB, through the FP's 208B working group, establishes procedures for submitting frequency assignment requests according to requirements established by the NTIA, the FAS, and military joint or allied frequency assignment groups.

2.1.2. Communications and electronic systems or equipment used overseas must be acceptable to the appropriate host nation and commander in chief (CINC) spectrum managing authority. The system should meet the host nation allocation table and the RF standards. For use in the US and its protectorates, systems must comply with the requirements of the NTIA Manual especially with respect to the allocation table and to RF Spectrum Standards. Noncompliant systems must prove compatibility; both justification and analysis showing compatibility must be submitted with the DD Form 1494. Also, noncompliant systems will only receive a "noninterference status" for use of the spectrum, rather than protected "primary" status. If the desired spectrum for a compliant system is crowded, the user may request proof of compatibility or be asked to consider using an approved planned system.

2.1.3. All transponder systems used as part of or that interfaces with the national and international air traffic control system must obtain certification. This is obtained from the DoD International Air Traffic Control Radar Beacon System, Identification, Friend, or Foe (IFF) Mark X/Mark XII Identification System (AIMS) Program Office (PO) ***before*** submitting an application(s) for frequency allocation and assignment approval processing.

2.1.4. For systems exempt from submitting DD Form 1494 refer to AFI 33-118 for additional guidance. Exemption from applying for equipment allocation does not mean that the requirement for frequency assignment requests is waived. Unless specifically exempted from frequency assignment requirements, frequency assignment requests must be submitted in accordance with MCEB Publication 7, *Frequency Resource Records System (FRRS) Standard Frequency Action Format (SFAF)*.

2.2. Guide to Accomplishing DD Form 1494, Application for Equipment Frequency Allocation.

DD Form 1494 is used to obtain spectrum support guidance from the USMCEB. This guidance outlines the general considerations, provisions, and restrictions that apply to a particular system concerning the use of the electromagnetic spectrum. It is directive upon the submitting MAJCOM or center and the conditions of frequency assignment to the operational user.

2.2.1. Unless specifically exempted, a DD Form 1494 must be submitted for all radio frequency spectrum radiating systems; this must include the system receivers. To assess susceptibility to interference from existing or planned transmitters, a DD Form 1494 may be submitted for receive-only systems. A

system is defined as a set of equipment comprised of a transmitter, a transmit antenna, a receiver, and receive antenna. Where this equipment is installed (e.g., aircraft, tank, shelter) is indicated in the installation block in the form. A MAJCOM or major acquisition center (such as the Electronic Systems Center) typically submits the application to the AFFMA for national level processing. The data required is technical and usually must be provided by a source familiar with the equipment component design such as the design engineer. If the data is deemed proprietary or competition sensitive, the form must be marked and handled accordingly. For equipment being used outside US&P, the release of technical information to foreign governments is necessary to coordinate RF spectrum support for Air Force systems. See AFI 33-118, **Chapter 2** for additional guidance. The DD Form 1494 is composed of six pages of information plus a line diagram and an orbital information sheet for space systems. The MCEB's automated Spectrum Certification System contains the capability to generate a DD Form 1494 and is available to qualified Air Force offices. The form is also available via the DoD forms web site at **http://web1.whs.osd.mil**. The instructions for each page are provided in the following paragraphs.

2.2.2. DoD General Information Page. Following these instructions, enter the appropriate information for each item:

2.2.2.1. Item 1, Application Title. Enter the government nomenclature or the manufacturer's name and model number. Use the Joint Electronics Type Designation System (JETDS) when available (Examples: AN/TRC-170, AN/GRC-27). Include official nicknames. You must use an unclassified title.

2.2.2.2. Item 2, System Nomenclature. Enter the nomenclature of the system for which the specified system in block 1 is a subsystem; if system is not a subsystem, enter application title. Use the JETDS nomenclature when available.

2.2.2.3. Item 3, Stage of Allocation. Mark the appropriate block using the following NTIA definitions:

2.2.2.3.1. STAGE 1 - Conceptual. The initial planning effort is completed, including proposed frequency bands and other available characteristics.

2.2.2.3.2. STAGE 2 - Experimental. The preliminary design is completed and radiation using test equipment or preliminary models is required.

2.2.2.3.3. STAGE 3 - Developmental. The major design is completed and radiation is required during testing.

2.2.2.3.4. STAGE 4 - Operational. Identify final operating constraints or restrictions required to assure compatibility when development is essentially completed.

2.2.2.4. Item 4, Frequency Requirements. Enter the required operational frequency ranges. For equipment designed to operate only at a single frequency, enter the frequency of operation. Enter the emission designator in the block and ensure it conforms to the format set forth in Chapter 9 of the NTIA Manual and paragraph **3.8.**

2.2.2.5. Item 5, Target Starting Date for Subsequent Stages. Enter the proposed date of application submission for each subsequent stage. You must list the target starting date for the stage of submission and previous stages as "NA." The target starting date for stages subsequent to the stage of submission must allow time for processing prior to anticipated contract award dates.

2.2.2.6. Item 6, Extent of Use. Enter the extent of use that will apply to Stage 4, for example, continuous or intermittent. If intermittent, provide information including the expected number of hours of operation per day or other appropriate time period; scheduling capability; and any conditions governing the times of intermittent use.

2.2.2.7. Item 7, Geographical Area. Enter the geographical locations or areas of use for this and subsequent stages. Provide geographical coordinates (degrees, minutes, and seconds) if available. Enter the geographical location in which the system operated during the stages preceding the stage for which the application is submitted as NA. List the geographical location in which the system will operate during the stage for which the application is submitted and subsequent stages.

2.2.2.8. Item 8, Number of Units. Enter the number of units planned for the stage of review requested and later stages. The number of units operated during stages preceding the stage for which the application is being submitted must be entered as “NA.”

2.2.2.8.1. The number of units planned for operation during the stage for which the application is being submitted and subsequent stages must be listed.

2.2.2.9. Item 9, Number of Units Operating Simultaneously in the Same Environment. Enter the maximum number of these units planned for operating simultaneously in the same environment during Stage 4 use.

2.2.2.10. Item 10, Other J/F 12 Application Number(s). Enter the superseded and related spectrum certification application(s).

2.2.2.11. Item 11, Operational Requirement. Indicate whether the equipment will operate with the same or similar equipment used by other United States military services, DoD components, United States Government agencies, or allied nations. If yes, specify in Item 13 the services, agencies, or countries (to include the country’s services).

2.2.2.12. Item 12, Names and Telephone Number(s). Enter the name, office symbol, and telephone number of the program manager and a project engineer. The project engineer should be someone familiar with the RF parameters on the submitted DD Form 1494.

2.2.2.13. Item 13, Remarks. Enter information that continues and expounds upon entries made in preceding blocks.

2.2.2.14. General. Enter the highest level of security classification for the entire document in the classification block. Ensure the classification marking is in bold letters that are larger than the largest typed letters on the form. If the DD Form 1494 is classified, mark each block on the form with the appropriate classification.

2.2.2.14.1. Provide downgrading instructions if application is classified.

2.2.2.14.2. “NA” is entered for Nonapplicable items.

2.2.2.14.3. “NAvail” must be entered for items when appropriate data is not available. However, make every effort to enter required items to the greatest degree possible.

2.2.3. Transmitter Equipment Characteristics Page. Following these instructions, enter the appropriate information for each item.

2.2.3.1. Item 1, Nomenclature, Manufacturer’s Model No. Enter the government nomenclature or the manufacturer's name and model number. Use the JETDS when available.

2.2.3.2. Item 2, Manufacturer's Name. Enter the manufacturer's name if available. If a manufacturer's model number is listed in Item 1, this block must be completed.

2.2.3.3. Item 3, Transmitter Installation. Enter the specific types of vehicles, ships, planes or buildings, etc., where you will install the transmitters.

2.2.3.4. Item 4, Transmitter Type. Enter the generic class of the transmitter by indicating modulation type and purpose (e.g., Amplitude-Modulated (AM) communications, Doppler pulse radar, spread-spectrum, etc.).

2.2.3.5. Item 5, Tuning Range. Enter the frequency range (lowest center frequency - highest center frequency) through which the transmitter is tuned. For fixed frequency systems list the range of tunable frequencies obtainable by crystal substitution or cavity adjustment. If the tuning range is out of band for the requested service, justification must be provided.

2.2.3.6. Item 6, Method of Tuning. Enter the method of tuning by indicating method of effecting change and device ensuring frequency stability (e.g., manually adjusted klystron cavity, fixed crystal, crystal synthesizer, etc.). For equipment not tunable in the field, indicate means by which tuning is accomplished.

2.2.3.7. Item 7, RF Channeling Capability. Describe the RF channeling capability. For uniformly spaced channels, enter the center frequency of the first channel and channel spacing (e.g., 406 MHz, 100 kilohertz (kHz) increments); for continuous tuning, enter the lowest frequency and the word "continuous"; for other cases enter a detailed description. If the transmitter is not readily tunable in the field, describe tuning method.

2.2.3.8. Item 8, Emission Designators. Enter the emission designators, which describe the type emissions radiated from the transmitter. The emission designator must conform to the format in Chapter 9 of the NTIA Manual and paragraph **3.8.**

2.2.3.9. Item 9, Frequency Tolerance. Enter the maximum drift from a transmitter's center frequency after completion of normal warm-up time. Enter the frequency tolerance in parts per million (ppm) for all emission types except single sideband that is indicated in hertz (Hz). Use the following equation to convert frequency drift in Hz to frequency tolerance in ppm. Specify the center frequency in the same units as the frequency drift.

$$\text{ppm} = \frac{\text{Frequency Drift}}{\text{Transmitter Center Frequency}} \times 1{,}000{,}000$$

2.2.3.10. Item 10, Filter Employed. Have you installed a filter between the final RF stage and the antenna? If so, provide the filter type, insertion loss, and attenuation characteristics.

2.2.3.11. Item 11, Spread Spectrum. Indicate whether the transmitter can operate in a spread-spectrum mode. If so, provide an explanation of the signal characteristics in Item 14 to include hop rate, dwell, and number of frequencies for frequency hoppers. For chirp and direct sequence, describe how the emission is generated, e.g., starts at frequency X and sweeps up to frequency Y or is centered on frequency Z.

2.2.3.12. Item 12, Emission Bandwidth. Enter a characterization of the transmitter's transmitted spectral power envelope for each emission designator listed in Item 8. The -3, -20, -40, and -60 decibel (dB) values refer to the RF bandwidth containing all spectral components within 3, 20, 40, and 60 dBs of the peak envelope power (PEP) of the transmitted signal. When using calculations

to determine the necessary bandwidth, use the formulas in Annex J of the NTIA Manual; otherwise, provide the method of calculation. If the emission bandwidth is measured, explain the measurement technique used. The necessary bandwidth for radars is defined as the -20 dB emission bandwidth value stated in Item 8. The -40 dB emission bandwidth is only required for pulsed radar systems. The occupied bandwidth is that band in which 99% of the integrated power spectral density is contained. If the transmitter can operate in the frequency hop mode, provide the instantaneous and hopped bandwidth. All stage 4 allocation papers should contain measured data.

2.2.3.13. Item 13, Maximum Bit Rate. Enter the maximum information bit rate for digital equipment, in bits per second. For spread-spectrum transmissions enter the bit rate after error-correction coding, not the spectrum spreading chip rate.

2.2.3.14. Item 14, Modulation Techniques and Coding. Provide the details on the type modulation and coding techniques employed.

2.2.3.15. Item 15, Maximum Modulation Frequency. Enter the maximum modulation frequency for an angle modulated transmitter.

2.2.3.16. Item 16, Pre-Emphasis. Indicate whether an angle modulated transmitter uses pre-emphasis.

2.2.3.17. Item 17, Deviation Ratio. Enter the deviation ratio for an angle modulated system. The frequency deviation and modulation frequency must have the same units (e.g., Hz).

2.2.3.17.1. Deviation Ratio = $\frac{\text{Maximum Frequency Deviation}}{\text{Maximum Modulation Frequency}}$

2.2.3.17.2. Bandwidth formulas in Annex J of the NTIA Manual use the variable "D" as the maximum frequency deviation.

2.2.3.17.3. D = Maximum Modulation Frequency X Deviation Ratio.

2.2.3.18. Item 18, Pulse Characteristics. Enter the information for pulse modulated transmitters.

2.2.3.18.1. Rate. State the pulse repetition rate (PRR) in the number of individual pulses per second (PPS) for each pulse rate used.

2.2.3.18.2. Width. Enter the pulse width in microseconds as the time during which the pulse voltage level remains at or above half the peak pulse amplitude.

2.2.3.18.3. Rise Time. The pulse rise time is the time in microseconds that it takes the pulse to rise in voltage from 10% to 90% of its peak amplitude. ***NOTE:*** Justification is required on all frequency modulation (FM) pulsed systems using less than 0.1 microsecond pulse rise time.

2.2.3.18.4. Fall Time. The pulse fall time is the time in microseconds that it takes the pulse to fall in voltage from 90% to 10% of its peak amplitude.

2.2.3.18.5. Comp Ratio. The compression ratio is the ratio of the transmitted pulse width to the compressed pulse width in a Linear Frequency Modulated (LFM) pulse modulation system.

2.2.3.19. Item 19, Power. Enter information concerning the transmitter output power.

2.2.3.19.1. Mean. Mean power is the power supplied to the antenna terminal line averaged over a time sufficiently long compared with the period of the lowest frequency encountered in

the modulation. For a pulsed system, compare the mean power with the following formula (Mean Power = Peak Power X Duty Cycle).

2.2.3.19.2. Peak Envelope Power (PEP). Provide the PEP for all amplitude modulated systems and pulse modulated systems. The PEP is the average power supplied to the antenna terminals by a transmitter during one RF cycle at the highest crest of the modulation envelope.

2.2.3.20. Item 20, Output Device. Enter a description of the final RF power output device (e.g., ceramic diode, magnetron, traveling wave tube, transistor, etc.).

2.2.3.21. Item 21, Harmonic Level. Enter the harmonic level of the 2d and 3rd harmonic in dB relative to the fundamental. Item c of this block contains the relative level in dB of the highest powered harmonic above the 3rd.

2.2.3.22. Item 22, Spurious Level. Enter the maximum value of spurious emission (that does not occur on a harmonic frequency) in dB, relative to the fundamental, outside the -60 dB point of the transmitter emission stated in Item 12. Whenever possible, measure the harmonic and spurious power level from the radiated spectrum of the transmitter. If radiated spectrum measurements are not possible, measure the harmonic power levels at the antenna input terminals.

2.2.3.23. Item 23, FCC Type Acceptance No. Provide a number given to the equipment that has been reviewed and approved by the FCC for commercial use. FCC type acceptance does not exempt equipment from the DoD frequency allocation process.

2.2.3.24. Item 24, Remarks. Enter the level of classification in the classification block. NA must be entered for Nonapplicable items. Enter NAvail for items when appropriate data is not available. However, you should make every effort to enter required items to the greatest degree possible.

2.2.4. Receiver Equipment Characteristics Page. Following these instructions, enter the appropriate information for each item.

2.2.4.1. Item 1, Nomenclature, Manufacturer's Model No. Enter the government nomenclature or the manufacturer's name and model number. Use the JETDS designator when available.

2.2.4.2. Item 2, Manufacturer's Name. Enter the manufacturer's name if available. If a manufacturer's name and model number is listed in Item 1, complete this block.

2.2.4.3. Item 3, Receiver Installation. Enter the specific type of vehicle, ship, plane, or building, etc., where you will install the receiver.

2.2.4.4. Item 4, Receiver Type. Enter the generic class of the receiver by indicating number of superheterodyne stages, modulation type, and purpose (e.g., single conversion FM communications, homodyne, Doppler pulse radar, double conversion spread-spectrum communications, etc.).

2.2.4.5. Item 5, Tuning Range. Enter the frequency range (Lowest Frequency - Highest Frequency) through which you can tune the receiver. For fixed systems list the range of tunable frequencies obtainable by crystal substitution or cavity adjustment.

2.2.4.6. Item 6, Method of Tuning. Enter the method of tuning by indicating method of effecting change and device ensuring frequency stability (e.g., autotracking locked loop, interchangeable crystal, manually adjusted synthesizer, etc.). If the equipment is not readily tunable in the field, indicate the means by which tuning is accomplished.

2.2.4.7. Item 7, RF Channeling Capability. Describe the RF channeling capability. For uniformly spaced channels, enter the center frequency of the first channel and channel spacing (e.g., 406 MHz, 100 kHz increments); for continuous tuning, enter the lowest frequency and the word "continuous"; for other cases enter a detailed description. If the equipment is not readily tunable in the field, state tuning complexity.

2.2.4.8. Item 8, Emission Designator(s). Enter the emission designators, which describe the type emissions received by the receiver. The emission designator must conform to the format in Chapter 9 of the NTIA Manual and paragraph **3.8.**

2.2.4.9. Item 9, Frequency Tolerance. Enter the maximum drift from a receiver's center frequency after completion of normal warm-up time. Enter the frequency tolerance in parts per million (ppm) for all emission types except single sideband for which we use Hz. Use the following formula to convert frequency drift in Hz to frequency tolerance in ppm:

$$\text{ppm} = \frac{\text{Frequency Drift}}{\text{Receiver Center Frequency}} \times 1{,}000{,}000$$

2.2.4.10. Item 10, Intermediate Frequency (IF) Selectivity. Enter a characterization of the receiver IF selectivity for each receiver IF stage. The -3, -20, and -60 dB values refer to the IF bandwidth containing all spectral components within 3, 20, and 60 dB of the peak IF envelope value of the received signal in the IF stage. If the receiver is a homodyne or tunable radio frequency (TRF) receiver, enter "NA" in all three lines of this Item. Enter "NA" in the sections not used.

2.2.4.11. Item 11, RF Selectivity. Enter a characterization of the receiver RF selectivity. The -3, -20, and -60 dB values refer to the RF bandwidth containing all spectral components within 3, 20, and 60 dB of the peak envelope value of the received signal. The preselection type (e.g., waveguide cut-off, Yttrium-Iron-Garnet (YIG) bandwidth filter, 6 pole Butterworth, etc.) is also contained in this item.

2.2.4.12. Item 12, IF Frequency. Enter the tuned frequency for each receiver IF stage.

2.2.4.13. Item 13, Maximum Post Detection Frequency. Enter the highest frequency that the receiver recovers and demodulates. If the receiver is a pulse modulated system, enter "NA."

2.2.4.14. Item 14, Minimum Post Detection Frequency. This item only applies to multichannel FM frequency-division multiplexed receivers and contains the nominal frequency at the -3 dB point on the low frequency (LF) side of the receiver baseband.

2.2.4.15. Item 15, Oscillator Tuned. Indicate whether the local oscillator for each respective receiver IF stage is tuned below or above the RF center frequency.

2.2.4.16. Item 16, Maximum Bit Rate. Enter the maximum information bit rate in bits per second that the digital equipment can receive.

2.2.4.17. Item 17, Sensitivity. Enter the information detailing the receiver sensitivity.

2.2.4.17.1. Sensitivity. The sensitivity is the minimum power in dBm (dB referred to 1 milliwatt [mW]) required at the receiver front end to ensure successful detection and demodulation.

2.2.4.17.2. Criteria. The criteria is the basis for the successful detection and demodulation of a received signal (e.g., signal-to-noise ratio [S/N], signal-to-interference plus noise and distor-

tion [SINAD], bit error ratio [BER], minimum discernible signal, etc. Also include the value for the criteria, e.g., 10 dB S/N or 1 X 10 exp –9 BER).

2.2.4.17.3. Noise Fig. The noise figure applies to terrestrial systems and is the noise level in dB that the receiver adds to the received signal.

2.2.4.17.4. Noise Temp. The noise temperature is used only for space or satellite earth stations and is entered in degrees Kelvin.

2.2.4.18. Item 18, De-Emphasis. Indicate whether an angle modulated transmitter uses de-emphasis.

2.2.4.19. Item 19, Image Rejection. Enter the ratio of the image frequency signal level required to produce a specified output, to the desired signal level required to produce the same output. For homodyne and TRF receivers "NA" should be entered.

2.2.4.20. Item 20, Spurious Rejection. Enter the value of spurious rejection in dB that the receiver meets or exceeds at all frequencies outside the -60 dB IF bandwidth of the IF stages as detailed in Item 10. Spurious rejection is the ratio of a particular out-of-band frequency signal level required to produce a specified output, to the desired signal level required to produce the same output.

2.2.4.21. Item 21, Remarks. Enter the level of classification in the classification block. Enter NA for nonapplicable items. Enter NAvail for items when appropriate data is not available. However, make very effort to enter required items to the greatest degree possible.

2.2.5. Antenna Equipment Characteristics Page. Following these instructions, enter the appropriate information for each item.

2.2.5.1. Item 1. Indicate whether you will use the antenna described on this page for reception, transmission, or both.

2.2.5.2. Item 2, Nomenclature, Manufacturer's Model No. Enter the government nomenclature or manufacturer's name and model number. If available, use the JETDS designator.

2.2.5.3. Item 3, Manufacturer's Name. Enter the manufacturer's name if available. If a manufacturer's model number is listed in Item 1, complete this block.

2.2.5.4. Item 4, Frequency Range. Enter the range of frequencies which the antenna is designed, i.e., the frequency range over which the antenna's radiated output power does not vary by more than 3 dB when measured at a fixed location in the main beam.

2.2.5.5. Item 5, Type. Enter the generic class of the antenna by indicating the physical or electrical size, and generic name of the antenna (e.g., half-wave dipole, 5 meter parabolic, etc.).

2.2.5.6. Item 6, Polarization. Enter information relating to the orientation of the propagated wave form from the antenna relative to the ground plane. Polarization is usually either vertical, horizontal, left or right hand circular.

2.2.5.7. Item 7, Scan Characteristics. Describe the antenna's scan pattern or range of motion.

2.2.5.7.1. Type. If the antenna steers its beam electronically while the antenna remains stationary enter "Electronic." If the beam is steered by a continuous rotation of the antenna enter "Mechanical." If the antenna beam is not steerable enter "Fixed."

2.2.5.7.2. Vertical Scan. If antenna beam is steerable about a vertical axis enter how the steering is accomplished and enter details in (1) Max Elev, (2) Min Elev, and (3) Scan Rate. If the antenna beam is not steerable about a vertical axis but is mountable in various orientations enter "Adjustable Mount" and enter details in (1) Max Elev, (2) Min Elev, and enter "NA" in (3) Scan Rate.

2.2.5.7.2.1. If the antenna beam is not steerable and is set up in only one orientation enter "NA." (1) Max Elev. Enter the highest scan or positive angle above the horizon for the antenna. (2) Min Elev. Enter the lowest angle relative to the horizon that the antenna can scan or be positioned. (3) Scan Rate. Enter the vertical angular scanning rate in scans per minute.

2.2.5.7.2.2. If antenna beam is steerable about a horizontal axis, enter how the steering is accomplished and provide details in (1) Sector Scanned, and (2) Scan Rate. If the antenna beam is not steerable about a horizontal axis but is mountable in different horizontal orientations enter "Adjustable Mount" and provide details in (1) Sector Scanned and enter "NA" in (2) Scan Rate.

2.2.5.7.2.3. If the antenna is not steerable and can be set up in only one orientation, such as a vertical monopole whip antenna, enter "NA." (1) Sector Scanned. Enter the angular range within an antenna's horizontal plane through which the antenna may scan or through which the orientation of the antenna is adjusted. (2) Scan Rate. Enter the horizontal angular scanning rate in scans per minute.

2.2.5.8. Item 8, Gain.

2.2.5.8.1. Main Beam. Enter the maximum gain of the antenna relative to an isotropic radiator.

2.2.5.8.2. 1st Major Side Lobe. Enter the nominal gain of the 1st major side lobe of the main beam and the angular displacement of the side lobe from the main beam in degrees.

2.2.5.9. Item 9, Beamwidth.

2.2.5.9.1. Horizontal. Enter the angle within the main beam of the antenna which bounds the horizontal limits of the radiated signal in which the output power is within 3 dBs of the total output power.

2.2.5.9.2. Vertical. Enter the angle within the main beam of the antenna which bounds the vertical limits of the radiated signal in which the output power is within 3 dBs of the total output power.

2.2.5.10. Item 10, Remarks. Enter the level of classification in the classification block. Enter NA for nonappplicable items. Enter NAvail for items when appropriate data is not available. However, make every effort to enter required items to the greatest degree possible.

2.2.6. NTIA General Information Page. Following these instructions, enter the appropriate information for each item.

2.2.6.1. Item 1, Application Title. Enter the government nomenclature or the manufacturer's name and model number. Use the JETDS designator when available.

2.2.6.2. Item 2, System Nomenclature. Enter the nomenclature of the system for which the specified system in Item 1 is a subsystem. Use the JETDS designator when available.

2.2.6.3. Item 3, Stage of Allocation. Mark the appropriate block using the following NTIA definitions.

2.2.6.3.1. Stage 1 - Conceptual. The initial planning effort has been completed, including proposed frequency bands and other available characteristics.

2.2.6.3.2. Stage 2 - Experimental. The preliminary design has been completed. Radiation using test equipment or preliminary models may be required.

2.2.6.3.3. Stage 3 - Developmental. The major design has been completed. Radiation may be required during testing.

2.2.6.3.4. Stage 4 - Operational. Identify final operating constraints or restrictions required to assure compatibility when development has been essentially completed.

2.2.6.4. Item 4, Frequency Requirements. Enter the required frequency bands. For equipment designed to operate only at a single frequency, enter the frequency of operation. Enter the emission designator in this block and ensure it conforms to the format set forth in the NTIA Manual and paragraph **3.8.**

2.2.6.5. Item 5, Purpose of System, Operational and System Concepts. Enter the purpose of the overall system, e.g., collect and disseminate meteorological data using satellite techniques; provide for the transmission of digital voice and data by means of line-of-sight (LOS) or tropo modes of propagation. Also indicate whether the system has a wartime function.

2.2.6.6. Item 6, Information Transfer Requirements. Enter a description of what type of information you are transmitting or receiving and the rate of transmission.

2.2.6.7. Item 7, Estimated Initial Cost of System. Enter information that gives an indication of the relative complexity and importance of the system as a function of cost. State the entry in terms of the current year dollars to deliver a specified quantity of products and services.

2.2.6.8. Item 8, Target Date For. Enter the dates when: application approval is required; use of the system will begin; the system will be taken permanently out of service

2.2.6.9. Item 9, System Relationship and Essentiality. Enter a description of how the system supports a given mission and how it interfaces with other systems to support the mission.

2.2.6.10. Item 10, Replacement Information. Identify RF systems, which may be replaced by the proposed system.

2.2.6.11. Item 11, Related Analysis and/or Test Data. Identify reports, studies, analyses, predictions, and test results related to the system under review.

2.2.6.12. Item 12, Number of Mobile Units. Enter the number of mobile units you will deploy.

2.2.6.13. Item 13, Geographical Area. Enter the geographical locations of use for the current and subsequent stages. Provide geographical coordinates if available. The geographical location of stages preceding the current application submission must be entered as "NA."

2.2.6.14. Item 14, Line Diagram. Enter the page number of the line diagram. Submit a diagram with each application. The diagram must show all the major interrelated RF components of the system of platform. Display each RF link and label it with directions of transmission and frequency range.

2.2.6.15. Item 15, Space Systems. Enter the page number of space system information provided for space-borne components of a space system. Provide the data in accordance with Chapter 10.7.3. of the NTIA Manual.

2.2.6.16. Item 16, Type of Service(s) for Stage 4. Enter the type of services that will apply to the equipment in the operational stage. Valid type of service designators is described in Chapter 6 of the NTIA Manual and paragraph A2.3. If the service is not in accordance with the NTIA allocation tables, enter a justification.

2.2.6.17. Item 17, Station Class(es) for Stage 4. Enter the station classes that apply or will apply to the equipment in the operational stage. Valid station classes are described in Chapter 6 of the NTIA Manual and paragraph A2.3.

2.2.6.18. Item 18, Remarks. Enter information that continues and/or expounds upon entries in preceding items.

2.2.6.19. General. Enter the highest level of security classification for the entire document in the classification block. Place the classification marking in bold letters that are larger than the largest typed letters on the form. If the DoD Form 1494 is classified, mark each block on the form with the appropriate classification. Provide downgrading instructions if the application is classified. Enter NA for nonapplicable items. Enter NAvail for items when appropriate data is not available.

2.2.7. Foreign Coordination General Information Page. Following these instructions, enter the appropriate information for each item.

2.2.7.1. Item 1, Application Title. Enter the government nomenclature or the manufacturer's name and model number. Use the JTEDS designator when available. Keep the title UNCLASSIFIED.

2.2.7.2. Item 2, System Nomenclature. Enter the nomenclature of the system for which the specified system in Item 1 is a subsystem. Use the JETDS designator when available.

2.2.7.3. Item 3, Stage of Allocation. Mark the appropriate block using the following NTIA definitions

2.2.7.3.1. Stage 1 - Conceptual. The initial planning effort has been completed, including proposed frequency bands and other available characteristics.

2.2.7.3.2. Stage 2 - Experimental. The preliminary design has been completed and radiation using test equipment or preliminary models may be required.

2.2.7.3.3. Stage 3 - Developmental. The major design has been completed and radiation may be required during testing.

2.2.7.3.4. Stage 4 - Operational. Identify final operating constraints or restrictions required to assure compatibility when development has been essentially completed.

2.2.7.4. Item 4, Frequency Requirements**.** Enter the required frequency bands. For equipment designed to operate only at a single frequency, enter the frequency of operation. Enter the emission designator in this block and ensure it conforms to the format in Chapter 9 of the NTIA Manual and paragraph **3.8.**

2.2.7.5. Item 5, Proposed Operating Locations. Enter the specific host nations or areas of use. If geographical coordinates for specific locations are available, provide them on a separate page for

each country since specific locations are generally released only to the host nation. Ensure that all areas of intended operations are listed and foreign disclosure authority exists for each area.

2.2.7.6. Item 6, Purpose of System, Operational and System Concepts. Enter the purpose of the overall system (e.g., collect and disseminate meteorological data using satellite techniques; transmission of radar data for air traffic control [ATC]; provide navigational signal from which many users are able to derive navigation data). Also include information on operational and system concepts. This item is also used to indicate the system has a wartime function.

2.2.7.7. Item 7, Information Transfer Requirements. Enter a description of what type of information you are transmitting or receiving and the rate of transmission.

2.2.7.8. Item 8, Number of Units. Enter the total number of units planned for the stage review requested and subsequent stages.

2.2.7.9. Item 9, Replacement Information. Identify existing RF systems, which may be replaced by the proposed system.

2.2.7.10. Item 10, Line Diagram. Enter the page number of the line diagrams. The line diagram is a pictorial diagram, which you must submit with all DD Form 1494 applications. The line diagram must show all the major interrelated RF components of the overall platform. Display each RF link and label it with the directions of transmission, frequency range, and the J/F-12 (USMCEB J-12 Working Group) number of any previously allocated RF component.

2.2.7.11. Item 11, Space Systems. Enter the page number of space system information which you are providing for space-borne components of a space system. Provide this data in accordance with Chapter 10.7.3. of the NTIA Manual.

2.2.7.12. Item 12, Projected Operational Deployment Date. Enter the date by which you need to receive host nation frequency supportability comments.

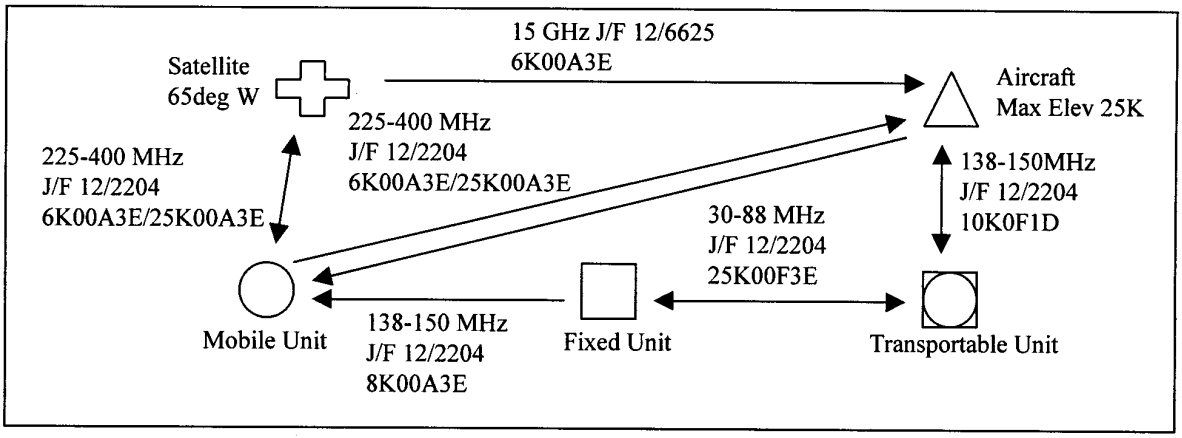
2.2.7.13. General. Enter the highest level of security classification for the entire document in the classification block. Place the classification marking in bold letters that are larger than the largest typed letters on the form. If the DD Form 1494 is classified, mark each block on the form with the appropriate classification. Provide downgrading instructions if the application is classified. Enter NA for Nonapplicable items. Enter NAvail for items when appropriate data is not available.

2.2.8. Line Diagram. Include a line diagram on all applications. The diagram should include pertinent information such as frequency ranges, J/F 12 information, and emission designators and should show connectivity with other communications systems. Do not make elaborate diagrams. Use the following symbols to designate types of operation instead of pictures. See **Table 2.1.** and **Figure 2.1.** for a sample line diagram.

Table 2.1. Line Diagram Type Unit and Symbol.

Type Unit	Symbol	Type Unit	Symbol	Type Unit	Symbol
Mobile	○	Fixed	□	Transportable	⬭
Satellite	✚	Aircraft	△	Missile	

Figure 2.1. Sample Line Diagram.



2.2.9. Operational Description. Include an operational description that explains how the system is intended for use and if it interfaces with other equipment. This description should assist in explaining the line diagram.

2.3. Changing Existing System Reviews and Application Data. Submit a request for a MCEB Note to Holders (NTH) for minor changes to applications that have already completed the system review and allocation process. A NTH may be used, if approved by the MCEB J-12 permanent working group (PWG), to change equipment characteristics that indicate less impact on use of the spectrum or to add a model of equipment to an existing application that has similar RF operating characteristics.

2.4. Foreign Releasability. If the equipment is intended for use outside US&P, foreign release approval must be granted before the MCEB can request CINCs or Defense Attache Offices (DAO) coordinate the DD Form 1494 with the required nations. To begin the process, the submitter must coordinate the DD Form 1494 with the appropriate Air Force foreign disclosure office. The MAJCOM foreign disclosure office will determine whether the information contained on the DD Form 1494 is releasable. If the foreign disclosure office cannot make the decision, the DD Form 1494 will be forwarded through the disclosure channels to the Headquarters Air Force Foreign Disclosure Office (SAF/IAPD). Once foreign disclosure is granted, the submitter must provide the release approval with the case number to AFFMA with the foreign coordination DD Form 1494 package. The AFFMA will provide the foreign coordination package with the foreign release approval to the MCEB J-12 PWG for tasking to the appropriate CINC, the Combined Communications Electronics Board nation representative or to the DAO and foreign coordination can begin.

2.5. MCEB Guidance. The response to the submission of a DD Form 1494, either as an "Application for Equipment Frequency Allocation" or as a "Foreign Coordination Package," is the MCEB Guidance**.** This guidance contains comments received from RF support analysts and granting authorities and outlines the conditions of support. As additional comments are received they are added by the MCEB via NTHs. The MCEB Guidance provides the conditions of RF support including those received from the NTIA and must be considered prior to selecting RF equipment or systems. Guidance received prior to operational fielding regarding required design changes or operational controls must be taken seriously to ensure compatibility and minimize interference. Frequency assignment requests are still required after receiving guidance from

the MCEB and should take into account applicable comments prior to their submittal. MCEB guidance is distributed as both a hard copy and electronically stored with the application in the Spectrum Certification System archive database. This archive database is available to qualified Air Force offices.

Chapter 3

FREQUENCY ACTIONS

3.1. Introduction. *The Communications Act of 1934* established separate control of federal and nonfederal (civil) use of the RF spectrum. Under this act, the only government agencies that assign and control use of frequencies in the US are the NTIA and the FCC.

3.2. Assignment Procedures Within US&P. A frequency request usually begins with a user requiring the use of communications electronics equipment in order to accomplish mission needs. The agency requiring the use of the C-E equipment must initiate the frequency request. Refer to AFI 33-118 for specific guidance of spectral duties at various levels. In most cases, users will submit their frequency request to the installation spectrum manager (ISM). The ISM reviews the request and determines whether existing frequencies can satisfy the requirement or whether the requirement requires a new frequency. If a new frequency is required, the ISM submits the request to the appropriate MAJCOM. The MAJCOM reviews the request and determines the best way to support the requirement, and ensures all required frequency coordination is accomplished. If required, the MAJCOM submits the frequency request in SFAF to the AFFMA for national level action.

3.3. Assignment Procedures Outside US&P. MAJCOMs will submit frequency requirements for use outside US&P to the appropriate Air Force service component. The Air Force service component will submit the requirement as required by theatre directives. Other than making sure the requirement is stated properly, processing lead times and foreign releasability are the two most important issues when submitting requirements for use outside US&P. Foreign nations establish their own lead times; therefore, it is imperative users comply with the lead times stated in AFI 33-118. If proper lead time is not provided, users run the risk of having their requirement refused. Also, all frequency requirements for use outside US&P must contain foreign releasability (SFAF Item 005). If foreign releasability is not provided the Air Force service component cannot coordinate with the required nations. See **Table 3.1.** for theatre/service components.

Table 3.1. Theatre/Service Components

Theatre	Service Component
Europe	USAFE
Pacific	PACAF
SouthCom	12AF
JFComm	8AF
CENTCOM	9AF

3.4. Standard Frequency Action Format (SFAF). The SFAF is the DoD standard used for all radio frequency actions and records. Enter the required data items in sequential order in a vertical format starting with SFAF 005. Other required data items follow in numerical order. **Table 3.2.** provides a quick reference of the SFAF data items. Refer to MCEB Pub 7 for specific guidance on the data items.

Table 3.2. Standard Frequency Action Format (SFAF) Data Items.

SFAF Item Number	Title
Administrative Data	
005	Security Classification
006	Security Classification Modification
010	Type of Action
014	Derivative Classification Authority
015	Unclassified Data Fields
016	Extended Declassification Date
017	Downgrading Instructions
018	Original Classification Authority
019	Reason for Classification
020	Proposal Reference
102	Agency Serial Number
103	IRAC Docket Number
105	List Serial Number
106	Serial replaced, Delete Date
108	Docket Numbers of Older Authorizations
Emission Characteristics	
110	Frequency(ies)
111	Excluded Frequency Band
112	Frequency Separation Criteria
113	Station Class
114	Emission Designator
115	Transmitter Power
116	Power Type
117	Effective Radiated Power
118	Power Type
Time and Date Information	
130	Time
131	Percent Time
140	Required Date
141	Expiration Date
142	Review Date
143	Revision Date
144	Record Indicator
145	ITU BR Registration
146	DCS Trunk ID

SFAF Item Number	Title
Administrative Data	
147	Joint Agencies
151	Coordination Indicator
152	Coordination Data
Organizational Information	
200	Agency
201	Unified Command
202	Unified Command Service
204	Command
205	Subcommand
206	Installation Frequency Manager
207	Operating Unit
208	User Net/Code
209	Area AFC/DoD AFC/Other Organizations
Transmitter Location Data	
300	State/Country
301	Antenna Location
303	Antenna Coordinates
304	Call Sign
306	Authorized Radius
Space Station Data	
315	Equatorial Inclination Angle
316	Apogee
317	Perigee
318	Period of Orbit
319	Number of Satellites
321	Power Density
Transmitter Equipment Data	
340	Equipment Nomenclature
341	Number of Stations, System Name
342	TX Aircraft Nautical Mile Value
343	Equipment Allocation Status
345	Radar Tunability
346	Pulse Duration
347	Pulse Repetition Rate
348	Intermediate Frequency
349	Sidelobe Suppression

SFAF Item Number	Title
Administrative Data	
Transmitter Antenna Data	
354	Antenna Name
355	Antenna Nomenclature
356	Antenna Structure Height
357	Antenna Gain
358	Antenna Elevation
359	Antenna Feed Point Height
360	Antenna Horizontal Beamwidth
361	Antenna Vertical Beamwidth
362	Antenna Orientation
363	Antenna Polarization
373	JSC Area Code
374	ITU Region
Receiver Location Data	
400	State/Country
401	Antenna Location
403	Antenna Coordinates
404	Call Sign
406	Authorized Radius
407	Path Length
408	Repeater Indicator
Space Station Data	
415	Equatorial Inclination Angle
416	Apogee
417	Perigee
418	Period of Orbit
419	Number of Satellites
Receiver Equipment Data	
440	Equipment Nomenclature
443	Equipment Allocation Status
Transmitter Antenna Data	
454	Antenna Name
455	Antenna Nomenclature
456	Antenna Structure Height
457	Antenna Gain
458	Antenna Elevation

SFAF Item Number	Title
Administrative Data	
459	Antenna Feed Point Height
460	Antenna Horizontal Beamwidth
461	Antenna Vertical Beamwidth
462	Antenna Orientation
463	Antenna Polarization
Space Systems	
470	Space Station Noise temperature
471	Earth Station System Noise Temperature
472	Equivalent Satellite Link Noise Temperature
473	RX Minor Area Code
Record Notes/Identifiers	
500	
501	Notes Free Text Comments
502	Description of Requirement
503	Agency Free Text Comments
504	FAS Agenda or OUS&P Comments
505	NATO Pooled Frequency Code Number
511	Major Function Identifier
512	Intermediate Function Identifier
513	Detailed Function Identifier
520	Supplementary Details
530	Authorized Areas
531	Authorized States
Other Assignment Identifiers	
701	Frequency Action Officer
702	Control/Request Number
704	Type of Service
705	System Identifier
707	CINCPAC Complement/FMSC Function Number
710	Host Country Docket Number
711	Aeronautical Service Range and Height
715	Transmitter FMSC MRFL Number
716	Usage Code
Additional Information	
801	Coordination Data/Remarks
803	Requestor Data

SFAF Item Number	Title
Administrative Data	
804	Tuning Range/Tuning Increments
805	Date Response Required
806	Indications if Host Nominations are Acceptable
807	Frequencies to be Deleted
901	Record Status
903	Proposal Status
904	Status Date
905	Proposal Date Time Group
906	Originator
907	Validation Status
910	Exercise Project
911	Date of Last Transaction
922	Participant Code
924	Data Source Indicator
926	Semi-Bandwidth
927	Date of Entry
928	Date of Receipt
950	PC ID
958	Routine Agenda Item
959	Circuit Remarks
964	TX Aircraft Altitude
965	RX Aircraft Altitude

3.5. Intercommand Transfer Procedures of Frequency Assignments. Utilize the following procedures when specific units are reorganized from one MAJCOM to another and assignments are transferred.

3.5.1. Transferring assignments.

3.5.1.1. The losing MAJCOM Spectrum Management Office (SMO) will provide the gaining MAJCOM SMO with a list or an electronic file of the assignment records requiring transfer action.

3.5.1.2. The gaining MAJCOM SMO will initiate frequency assignment action to complete the transfer of the records. The assignment action is normally a modification action to change the SFAF 200 series and item 702 of the assignment record.

3.5.2. Transferring installations.

3.5.2.1. The gaining MAJCOM SMO will contact the AFFMA and request a mass change by SFAF item 206. This procedure may be used when all records with the same 206 code need transfer to the gaining MAJCOM. If some assignment records (with the same 206 code) must remain

with the losing MAJCOM, then individual assignment modification actions must be accomplished for all records being transferred as explained in paragraph **3.5.1.**

3.6. Frequency Band Assignments. Certain operations may necessitate the assignment of a range of frequencies in lieu of a specific operating frequency. Frequency band assignments permit the transmitting station to operate on any specific frequency so located within the range, where the necessary bandwidth plus twice the tolerance does not extend beyond the lower and upper limits of the frequency band, and the bandwidth does not exceed limits listed in the assignment. This is known as a frequency band assignment. A frequency band assignment may be requested if any one of the following conditions is met:

3.6.1. Transmitters that sweep/scan through all frequencies in a band.

3.6.2. Radiosonde transmitters operating in 400.15-406 or 1670-1700 MHz bands.

3.6.3. Frequency agile radar beacons operating in the 2900-3100 or 9300-9500 MHz bands.

3.6.4. Transmitters that use automatic frequency selection based upon changing propagation condition along the transmission path.

3.6.5. Transmitters that automatically pause at fifteen or more specific operating frequencies within a band.

3.6.6. Operations that require the use of fifteen or more specific operating frequencies within a band for research, development, test and/or evaluation purposes.

3.6.7. Operations which involve a multitude of mobile radiolocation or radionavigation transmitters.

3.6.8. Tactical and/or training assignments above 30 MHz which require the use of fifteen or more specific operating frequencies within a band.

3.6.9. Operations devoted exclusively to electronic warfare, electronic countermeasures, and/or electronic counter-countermeasures.

3.7. Interdepartment Radio Advisory Committee (IRAC) Record Notes. IRAC record notes are used to indicate that comments pertain to a particular frequency assignment. IRAC Record Notes can consist of Coordination notes (C-Notes), Emission notes, Limitation notes, Minute notes, Priority notes, or Special notes. SFAF 500 is used to document coordination, emission, limitation, priority, and special notes and SFAF 501 is used to document minute notes.

3.7.1. Coordination Notes. Coordination notes are used to identify whether coordination has been accomplished or whether coordination is required prior to use.

3.7.2. Emission Notes. Emission notes are used to identify any limitations to the emission.

3.7.3. Limitation Notes. Limitation notes are used to identify any restrictions or limitations on the use of the frequency.

3.7.4. Minute Notes. Minute notes are used to identify any individual agency requirements as a condition of concurrence to the operation.

3.7.5. Priority Notes. Priority notes are used to identify the priority of users.

3.7.6. Special Notes. Special notes are used to identify any special parameters or conditions that may apply to the operations.

3.8. Emission Designators. The emission designator is entered in SFAF Item 114 for all frequency actions. The emission designator consists of two parts: the necessary bandwidth and the emission classification symbols.

3.8.1. Necessary bandwidth. The first part of the emission designator consists of a maximum of five numerals and one letter. The letter occupies the position of the decimal point and represents the unit of bandwidth as follows: H for hertz; K for kilohertz; M for megahertz; G for gigahertz.

3.8.2. Fractional bandwidth. Express fractional bandwidths to a maximum of two decimal places following the letter. The first character of the necessary bandwidth is always greater than zero unless the necessary bandwidth is less than 1 Hz. In that case, the first character is the letter H. Express the necessary bandwidths according to the following:

3.8.2.1. Between .01 and 999.99 Hz, use the letter H in place of the decimal. For example, 15H is 15 Hz of bandwidth and 15H01 is 15.01 Hz of bandwidth.

3.8.2.2. Between 1.00 and 999.99 kHz, use the letter K in place of the decimal. For example, 2K is 2 kHz of bandwidth and 2K85 is 2.85 kHz of bandwidth.

3.8.2.3. Between 1.00 and 999.99 MHz use the letter M in place of the decimal. For example, 6M is 6 MHz of bandwidth and 6M25 is 6.25 MHz of bandwidth.

3.8.2.4. Between 1.00 and 999.99 gigahertz (GHz) use the letter G in lieu of the decimal. For example, 10G is 10 GHz of bandwidth and 10G05 is 10.05 GHz of bandwidth.

3.8.3. Internationally, the ITU regulations specify a maximum of three numerals with one letter occupying the decimal position. For example, 100K00A1A expressed according to NTIA rules are expressed as 100KA1A according to the ITU Radio Regulations. Also, 54K00F3E is expressed as 54K0F3E. NTIA format is always entered in the SFAF; however, some nations may require the ITU format for coordination of frequencies to be used in their countries.

3.8.4. Emission classification symbols. The second part of the emission designator consists of classification symbols for the basic emission characteristics. This consists of three, and if desired, two optional symbols as derived from the following information:

3.8.4.1. First symbol--indicates the type of modulation of the main carrier. (see **Table 3.3.**).

Table 3.3. Symbols for Type of Modulation.

SYMBOL	TYPE OF EMISSION
	UNMODULATED:
N	Emission of an unmodulated carrier
	AMPLITUDE-MODULATED (Emission in which the main carrier is amplitude-modulated (includes cases where subcarriers are angle-modulated):
A	Double-sideband
B	Independent sidebands
C	Vestigial sideband
H	Single-sideband, full carrier
J	Single-sideband, suppressed carrier
R	Single-sideband, reduced or variable level carrier
	ANGLE-MODULATED (Emission in which the main carrier is angle-modulated):
F	Frequency modulation
G	Phase modulation
	AMPLITUDE-MODULATED AND ANGLE-MODULATED:
D	Emission in which the main carrier is amplitude-modulated and angle modulated either simultaneously or in a preestablished sequence.
	PULSE, Emission of pulses (Emissions where the main carrier is directly modulated by a signal which has been coded into quantized form (e.g., pulse code modulation), are designated as either an emission in which the main carrier is amplitude-modulated, or an emission in which the main carrier is angle-modulated):
K	Modulated in amplitude
L	Modulated in width or duration
M	Modulated in position or phase
P	Sequence of unmodulated pulses
Q	Carrier is angle-modulated during the period of the pulse
V	A combination of the foregoing or produced by other means
	COMBINATION:
W	Cases, not covered above, in which an emission consists of the main carrier modulated, either simultaneously or in a combination of two or more of the following modes: amplitude, angle, pulse.
X	Cases not otherwise covered.
	NOTE: Provide a full explanation for the selection of the symbol X in SFAF Item 520 unless the application is for a nondirectional beacon in the bands 190-435 and 510-535 kHz. (See **Attachment 3**, paragraph **A3.2.2.**)

3.8.4.2. Second symbol--indicates the nature of signals modulating the main carrier (see **Table 3.4.**).

Table 3.4. Symbols for Nature of Signals in Emission Classification.

SYMBOL	TYPE OF EMISSION
0	No modulating signal
1	A single RF channel containing quantized or digital signals without the use of a modulating subcarrier (excludes time-division multiplex)
2	A single RF channel containing a quantized or digital signal with the use of a modulating subcarrier
3	A single RF channel containing an analog signal
7	Two or more RF channels containing quantized or digital signals
8	Two or more RF channels containing analog signals
9	A composite system with one or more RF channels containing quantized or digital signals, together with one or more channels containing analog signals.
X	Cases not otherwise covered
	NOTE: Provide a full explanation for the selection of the symbol X in SFAF Item 520 unless the application is for a nondirectional beacon in the bands 190-435 and 510-535 kHz. (See **Attachment 3**, paragraph **A3.2.2.**)

3.8.4.3. Third symbol--indicates the type of information to transmit (see **Table 3.5.**).

Table 3.5. Symbols for Type of Information Transmitted in Emission Classification.

SYMBOL	TYPE OF EMISSION
N	No information transmitted
A	Telegraphy -- for aural reception
B	Telegraphy -- for automatic reception
C	Facsimile
D	Data transmission, telemetry, telecommand
	NOTE: The symbol D indicates that data, telemetry or telecommand information is transmitted individually or, that any combination of the three is transmitted simultaneously. If any combination is transmitted simultaneously, you must use one of the multichannel symbols 7, 8, or 9 for the second symbol.
E	Telephony (including sound broadcasting)
F	Television (video)
W	Combination of the above
	NOTE: Only use the symbol W for multichannel systems having the capability of transmitting all information simultaneously.
X	Cases not otherwise covered.
	NOTE: Provide a full explanation for the selection of the symbol X in SFAF Item 520 unless the application is for a nondirectional beacon in the bands 190-435 and 510-535 kHz. (See **Attachment 3**, paragraph **A3.2.2.**)

3.8.4.4. Fourth symbol--indicates the details of the signal (optional but recommended when applicable) (see **Table 3.6.**).

Table 3.6. Symbols for Details of Signal in Emission Classification.

SYMBOL	TYPE OF EMISSION
A	Two-condition code with elements of differing numbers and/or durations
B	Two-condition code with elements of the same number and duration without error-correction
C	Two-condition code with elements of the same number and duration with error-correction
D	Four-condition code in which each condition represents a signal element (of one or more bits)
E	Multicondition code in which each condition represents a signal element (of one or more bits)
F	Multicondition code in which each condition or combination of conditions represents a character
G	Sound of broadcasting quality (monophonic)
H	Sound of broadcasting quality (stereophonic or quadraphonic)
J	Sound of commercial quality (excluding categories defined for symbols K and L below)
K	Sound of commercial quality with the use of frequency inversion or band-splitting
L	Sound of commercial quality with separate frequency-modulated signals to control the level of demodulated signal
M	Monochrome
N	Color
W	Combination of the above
X	Cases not otherwise covered

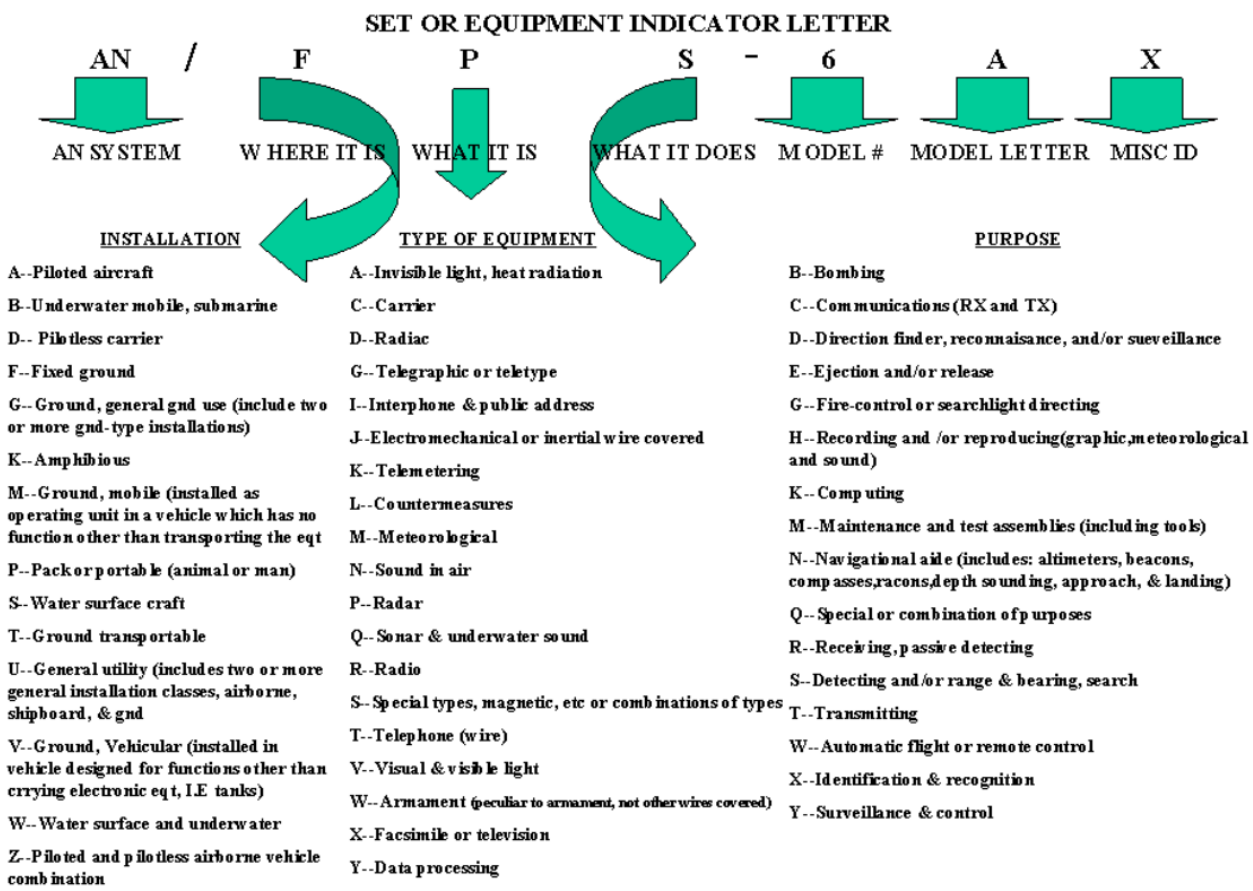
3.8.4.5. Fifth symbol--indicates the nature of multiplexing (optional but recommended when applicable) (see **Table 3.7.**).

Table 3.7. Symbols for Nature of Multiplexing in Emission Classification.

SYMBOL	TYPE OF EMISSION
N	None
C	Code-diversion multiplex (includes bandwidth expansion techniques)
F	Frequency-division multiplex
T	Time-division multiplex
W	Combination of frequency-division multiplex and time-division multiplex
X	Other type of multiplexing

3.9. Standard Military Nomenclature. Use standard military nomenclature in SFAF Item 340 if one exists. **Figure 3.1.** shows the breakdown of government nomenclature.

Figure 3.1. Set or Equipment Indicator Letter.



3.10. Base Realignment and Closure (BRAC). The ISM must become involved in the BRAC actions involving his or her base in the very early stages and must continually work very closely with the Base Closure Coordinator's office. All Air Force frequency assignments for the base must be eventually deleted from the National database for those functions being transferred to civil authorities. A timetable of frequency deletion actions must be established to ensure frequency deletion proposals are submitted as

each function/mission is deactivated. If the airdrome is being turned over to civil authorities, the navigational aids and air traffic control frequency assignments may remain in place for a period of 3 years after the Air Force relinquishes management of the airfield facilities. This time period is to allow sufficient time for the civil authorities to obtain appropriate frequency authorizations from the FCC. The MAJCOM Spectrum Management Office is responsible to ensure all appropriate frequency assignment actions are accomplished before the base is officially closed.

3.11. Assignment Review Program. As directed by the NTIA, the Air Force maintains a program of continuing review of frequency assignments. All assignments must be reviewed by the review date (SFAF item 142) of the assignment. Review each assignment to ensure its current use is properly reflected in the frequency resource records system (FRRS) and GMF. Delete or modify existing assignments as appropriate. Assignment review is a way to more effectively use the spectrum and to assist in reaching a goal of reducing the cost to the Air Force on the spectrum fees (see paragraph **1.3.2.**) in the out years. Each unit can make a difference by deleting assignments that are no longer required to perform Air Force missions.

Chapter 4

GUIDANCE FOR SPECIFIC FREQUENCY USAGE

4.1. General. This chapter lists permissible frequency uses within the US&P. Unless otherwise noted, frequency assignments are needed to use specific frequencies. Request assignments according to AFI 33-118 and **Chapter 3** of this manual.

4.2. High Frequency (HF) 2 – 30 MHz.

4.2.1. Ionospheric Chirpsounders. Before sending frequency requests for ionospheric chirpsounders and similar devices, the applicant must:

4.2.1.1. Ensure no existing authorized sounder can meet the requirement.

4.2.1.2. Operate secondary to authorized radio services.

4.2.1.3. Sweep or step transmissions through the operating range of equipment at a rate or time interval that will avoid causing harmful interference.

4.2.1.4. Immediately cease transmissions that cause harmful interference to authorized radio services when told.

4.2.1.5. Design transmitters to eliminate emissions on any frequency where harmful interference is caused to authorized frequency users.

4.2.1.6. Include in requests, in addition to the minimum information required in the SFAF, the following in Item 520: pulses per channel, sweep rates, sweep intervals, pulse width (duration), PRR, antenna type, antenna orientation, Special Note S383, and the statement, “No existing authorized ionospheric sounder system is capable of meeting this requirement”.

4.2.1.7. Avoid transmitting in the bands listed in **Table 4.1.** for ionospheric sounders capable of frequency suppression.

Table 4.1. Excluded Ionosphere Sounder Bands.

FREQUENCY BANDS (kHz)	FREQUENCY BANDS (kHz)
2495-2505	19990-20010
4995-5005	21850-21870
9995-10005	24990-25010
13360-13410	25550-25670
14990-15010	38000-38250

4.2.2. Chirpcomm. Chirpcomm is a low-power, highly reliable message transmission capability used in conjunction with sounders. The system sends nonsecure narrative messages up to 38 characters, with a two-character transmit station identifier. This subsystem supplements and sustains existing HF communications circuits by enhancing the sounder capability. However, EMC differs significantly from the sounder-only mode. You must consider potential interference to other HF circuits and meet the following conditions:

4.2.2.1. US military chirpcomm systems are authorized only for critical or contingency requirements when standard methods of communication are not feasible.

4.2.2.2. Obtain specific frequency assignments for the chirpcomm mode in addition to those for the chirpsounder.

4.2.2.3. Send chirpcomm system frequency proposals in SFAF. Include a brief statement concerning the chirpcomm operation in Item 520. Also include the emission designator (600H00F1B) in SFAF Item 114 as follows:

4.2.2.3.1. For a new sounder and chirpcomm assignment, enter the chirpcomm emission designator, along with the normal sounder emission designator (2H50N0N), as a multiple SFAF Item 114.

4.2.2.3.2. When you need to modify an existing chirpsounder assignment, include the chirpcomm system and add the chirpcomm emission designator.

4.2.2.4. AFFMA coordinates chirpcomm systems within the US&P with the NTIA.

4.2.3. Special Considerations for the continental United States (CONUS) HF. Air Force activities satisfy new requirements by using time and geographical sharing with existing assignments. The use of HF for domestic, point-to-point service within the CONUS is limited to the following:

4.2.3.1. For instantaneous transmission of emergency, command and control, and alerting traffic of such importance as to affect the immediate defense and survival of the nation. In such cases, the following apply:

4.2.3.1.1. Keep circuits in an operational status at all times and conduct on-the-air tests to ensure readiness.

4.2.3.1.2. Protect frequency assignments for such circuits according to the importance of the communications requirement.

4.2.3.2. When required for emergencies where life, public safety, or important property is jeopardized and other communications means are nonexistent, temporarily disrupted, or inadequate. Use a nonradiating (dummy) load as much as possible to test frequencies in this category. Keep tests using a radiating antenna to a minimum. Do not conduct operator training on these frequencies. These assignments are considered Category 2 assignments and will include record note L012 or L113.

4.2.3.3. When there is a need for a communications system staffed by fully qualified operators who are military reservists, Military Affiliate Radio System (MARS) affiliates, or personnel in tactical or training systems. Do not use these frequencies for traffic routinely handled by other means. These assignments are considered Category 3 assignments and will include record note S012.

4.2.3.4. When other telecommunications facilities, such as the DII and MARS, do not exist or are not practical for the installation and the use of frequencies above 30 MHz is not practical. These assignments are considered Category 4 assignments and will include record note S206.

4.3. Land Mobile Radio (LMR) 30-88, 138-144, 162-174, 406-420 MHz. Because of extreme congestion in the 148-150.8 and 162-174 MHz bands, new LMR frequency assignments are usually made in the 138-144 or 406.1-420 MHz bands unless use of another band is needed for operational reasons. No one

solution works worldwide; therefore, to ensure LMR frequencies are available before deploying equipment overseas, MAJCOMs should contact the appropriate service component for guidance. The following conditions, restrictions, and special provisions apply:

4.3.1. 30-88 MHz

4.3.1.1. 29.89-50 MHz band. This band is shared by government and nongovernment agencies and available frequencies are very limited. Frequency channels begin with 29.90 MHz and move up the band in 20 kHz increments.

4.3.1.2. 30-75 MHz Band on Army Installations. Air Force units needing frequencies in this band on an Army installation for less than 1 year apply via message or letter to the Director of Information Management (ATTN: Frequency Manager) for the Army installation, with information copies to the appropriate DoD or Army AFC and parent MAJCOM. Include in the application:

4.3.1.2.1. A narrative description of the requirement with the proposed use of the frequencies.

4.3.1.2.2. A list of operating parameters including the number of frequencies required, emission and power characteristics, nomenclature of equipment, type and gain of antennas, and required dates.

4.3.1.2.3. A statement of unit's capability to periodically change operating frequencies.

4.3.2. 138-144 MHz band. The military services are the primary users in this band. Channels begin with 138.025 MHz and move up the band in 25 kHz increments.

4.3.2.1. All equipment in this band must operate within a 12.5 kHz narrowband channel according to Chapters 4 and 5 of the NTIA Manual, after 1 January 2008.

4.3.3. 148-150.8 MHz band. This band is allocated for nongovernment mobile-satellite (earth-to-space) operations, on a shared basis with government stations.

4.3.3.1. All equipment in this band must operate in a 12.5 kHz narrowband channel according to Chapters 4 and 5 of the NTIA Manual, after 1 January 2008.

4.3.4. 162-174 MHz band. This band is used primarily by nonmilitary government agencies. Air Force users will satisfy new LMR and pager requirements from other frequency bands. Channels begin with 162.000 MHz and move up the band in 12.5 kHz increments.

4.3.4.1. All equipment in this band must operate within a 12.5 kHz narrowband channel according to Chapters 4 and 5 of the NTIA Manual, after 1 January 2005.

4.3.4.2. Air Force assignments in the 162-174 MHz band are only made when:

4.3.4.2.1. The frequency is needed for dual-channel operation with an existing net.

4.3.4.2.2. The frequency of an existing net must be changed because of interference problems.

4.3.4.2.3. An existing assignment is shared with another unit at the same location.

4.3.5. 406.1-420 MHz band. This band is used primarily by nonmilitary agencies. Channels begin with 406.125 MHz and move up the band in 25 kHz increments.

4.3.5.1. All equipment in this band must operate within a 12.5 kHz narrowband channel according to Chapters 4 and 5 of the NTIA Manual, after 1 January 2008.

4.3.5.2. The Air Force and Army share two subbands (407.225-407.575 and 412.825-413.575 MHz) which must operate within a 16 kHz bandwidth channel.

4.3.6. Off channel Assignment. Air Force users will adjust existing off-channel assignments within the US&P that do not conform with the USMCEB channeling plan (e.g., 148.065 or 150.195) as soon as possible.

4.3.6.1. Spectrum managers at all levels should look for practical, economical opportunities to realign such off-channel frequency assignments.

4.3.6.2. The following special provisions apply to Air Force users of LMR frequencies not conforming to the USMCEB channeling plan:

4.3.6.2.1. When an Air Force unit is planning to replace off-channel equipment, the commander must determine whether to obtain an on-channel frequency assignment before the equipment is ordered.

4.3.6.2.2. When an off-channel LMR net is receiving interference from an on-channel system, and a frequency change is the most economic way to solve the problem, change the off-channel net.

4.3.6.2.3. If all the equipment on an off-channel net is turned in, delete the frequency assignment immediately. Do not reserve the off-channel frequency assignment for a new unit.

4.3.7. Trunked LMR systems. LMR trunking systems are being developed to support government agencies (including DoD) primarily in the 406.1-420 MHz band. IRAC and SPS approval is required for all new LMR trunked systems within the US&P. Send the data required in accordance with Chapter 10.8 of the NTIA Manual at least 60 days before sending the frequency proposal for such systems. Submit frequency proposals after SPS has approved the trunking request.

4.3.7.1. Frequency requirements for shared trunking systems are submitted by the installing or managing agency of the equipment.

4.3.7.2. Air Force LMR trunking systems will:

4.3.7.2.1. Use a method of priority access.

4.3.7.2.2. Not interconnect systems with five or less channels to telephone systems. For systems with more than five channels, use only one interconnection to the telephone system for each five channels.

4.3.7.2.3. Not use more than three interconnections for any size system.

4.3.7.2.4. Minimize the use of links that require a dedicated (nonshared) channel for the duration of a connection.

4.3.7.2.5. Use a hard-copy system to monitor trunked systems with more than five channels.

4.3.7.2.6. Have a capability to rapidly restructure the system (e.g., priorities, groupings, etc.) through software control.

4.3.8. Trunked System Usage Reports. The NTIA requires a trunked system usage report from all federal users annually. The SPS receives the Air Force reports from AFFMA by 15 December and reviews the reports. The AFFMA requires the report from the MAJCOMs by 1 Dec. The trunked sys-

tem usage report shall cover the period of Sep, Oct, Nov, and Dec; and must contain the following information:

4.3.8.1. Operating location:

4.3.8.2. SPS Docket Number of Certification of Spectrum Support:

4.3.8.3. Date of Activation: (if the system is not yet activated, insert the proposed date of activation and provide all applicable frequency assignments serial numbers).

4.3.8.4. System information

4.3.8.4.1. Number of base station locations:

4.3.8.4.2. Number of frequencies used:

4.3.8.4.3. Number of land stations:

4.3.8.4.4. Number of mobiles:

4.3.8.4.5. Number of portables:

4.3.8.4.6. Description of users:

4.3.8.4.7. Number of base station repeaters equipped for telephone interconnect:

4.3.8.5. Data on Busiest Hour. Specify the busiest hour and the time frame over which the following calculations were made:

4.3.8.5.1. Number of dispatch calls:

4.3.8.5.2. Numbers of telephone calls:

4.3.8.5.3. Average duration of dispatch calls:

4.3.8.5.4. Average duration of telephone calls:

4.3.8.5.5. Number of dispatch call busy(s): (if any)

4.3.8.5.6. Average delay for dispatch calls: (if any)

4.3.8.6. Other Federal Agencies Using this System: (if any)

4.3.8.7. Additional Comments:

4.4. Very High Frequency (VHF) Air/Ground (30-50, 118-136, 138-144 MHz). VHF air-to-air and air-to-ground communications supports both ATC and tactical operations.

4.4.1. VHF ATC. VHF ATC operations are conducted in the 118-136 MHz band. The frequencies are controlled by the AAG. The FAA considers normal ATC operations at a location to consist of: 1 ground, 1 local, 2 approach, 1 departure, and 1 Air Transportation Information System (ATIS)/Automated Surface Observation System (ASOS)/Automated Weather Observation System (AWOS). ***NOTE:*** If additional frequencies are required, justification must be provided in SFAF item 520. This justification will be considered by HQ FAA to determine the need for the additional frequencies. All requirements must be coordinated with the local FAA region who will nominate a frequency. A service volume must be included on all ATC assignments. FAA regional coordination information must be listed in the Supplementary Details (SFAF 520).

4.4.2. VHF Tactical Operations. VHF tactical operations are normally conducted in the 30-50 or the 138-144 MHz bands.

4.4.3. VHF Pilot to Dispatch. This function must be moved from M108-118 and placed into the military controlled band of M138-144. Use M139.3 when feasible, to standardize Air Force operations.

4.5. Ultra High Frequency (UHF) (225-400 MHz). The 225-400 band MHz referred to as the UHF band, supports fixed, mobile, aeronautical radionavigation, and satellite operations. Assignments to support the various functions must be in accordance with the channeling plan. Following are brief discussions of the various functions supported in the 225-400 MHz band.

4.5.1. Aeronautical Operations. Within the US&P, the Military Assignment Group controls assignments used to support aeronautical operations. Frequencies are channeled in 25 kHz increments and must be used in accordance with the 225-400 MHz channeling plan. The use includes both air-to-air and air-to-ground operations. Typical uses include air traffic control, squadron operations, etc. When processing assignment requests for aeronautical operations you must include a service range and height.

4.5.1.1. Air-to-Air Refueling. All frequencies used for air-to-air refueling must contain the track number, exit and entry points on the track and the names of the sites with the track geographical coordinates.

4.5.1.2. Air Traffic Control (ATC) Frequencies. ATC frequencies are used to control the movement of aircraft and for no other purpose. ATC services include approach control, departure control, clearance delivery, en route control, ground control, and local control. The AAG controls all frequencies used for ATC and must coordinate prior to an assignment being made. ATC communications support is provided by military and civilian FAA certified facilities in direct support of the National Airspace System (NAS) and conducted under a memorandum of understanding between the facility and regional FAA office. Coordination is required with the local FAA regional office for all ATC requirements.

4.5.1.2.1. ATC Flight Service Station, terminal facilities, and low-altitude en route facilities are only authorized 10 watts.

4.5.1.2.2. Communications between military stations and aircraft operating within a military operating area, after being handed over by FAA control, are not considered ATC operations.

4.5.2. Instrument Landing System (ILS) Glideslope. The frequency band 328.6-335.4 MHz is allocated for aeronautical radionavigation and is used to support ILS Glideslope. The Aeronautical Assignment Group (AAG) control assignments. Coordination is required with the local FAA regional office for all ATC requirements. See paragraph **4.6.3.** for more information.

4.5.3. Wideband Operations. Any bandwidth greater than 25 kHz is considered a wideband requirement. Frequencies used must conform to the designated wideband allotments in the UHF channeling plan.

4.5.3.1. Fixed Multichannel Radio Relay. Fixed multichannel radio relay is not permitted to operate in this band within the US&P, except for tactical exercises or training; or unless demonstrated that its use is the only effective way to satisfy a communications requirement. Multichannel radio relay in normally duplex operations; therefore you need to make sure you request frequencies for both locations

4.5.4. Satellite communications. The 225-400 MHz band is used to support Fleet Satellite Communications (FLTSAT) and Air Force Satellite Communications (AFSAT). Frequencies are protected for this service.

4.6. Navigational Aid (NAVAID) Frequencies. NAVAIDs help provide safe and efficient operation of civil and military aircraft. All frequency assignments for NAVAIDs are under the control of the AAG and require FAA regional coordination except the long-range aid to navigation (LORAN) system. Also the latitude and longitude must be given in seconds. It is recommended that the ISM compare assigned frequencies against the Flight Information Publications (FLIP) periodically. If errors are noted the ISM should contact the airfield manager to ensure the FLIP is updated. Aeronautical NAVAIDs and their allocated frequency bands are:

4.6.1. Low Frequency (LF) and Medium Frequency (MF) Nondirectional Beacons (NDB). Frequencies for LF or MF radiobeacon operations range from 70 to 2000 kHz. Air Force NDBs normally operate in the 200-415 and 510-535 kHz band within the US&P. A Station Class of ALB, emission 2K04A2A, and service volume (SFAF 503) are required for each proposal.

4.6.2. Long-Range Aid to Navigation (LORAN). Station Class RNL; Emission 20K00P0N

4.6.2.1. LORAN A stations operate in the 1800-2000 kHz band. The center frequencies are 1850 and 1950 kHz and each channel requires 40 kHz bandwidth. The same frequency may have several LORAN pairs, but each pair transmits at a different PRR.

4.6.2.2. LORAN C stations operate in the 90 to 110 kHz frequency band. All stations use a center frequency of 100 kHz with different PRRs. The six basic PRRs are: H (33-1/3 PPS), L (25 PPS), S (20 PPS), SH (16-2/3 PPS), SL (12-1/2 PPS), and SS (10 PPS).

4.6.3. Instrument Landing System (ILS). The ILS consists of three components: marker beacon, localizer, and glideslope. The ILS provides guidance for an aircraft on final approach to a runway. The runway number that the ILS will service must be documented in the frequency assignment.

4.6.3.1. Marker Beacon. The marker beacon operates on a standard frequency of 75 MHz. The marker beacon indicates a specific location along the final instrument approach. Station Class: ALA; Emission 6K00A2A

4.6.3.2. Localizer. The localizer operates in the 108.1-111.95 MHz band and transmits horizontal guidance signals to direct the aircraft to the runway centerline. The localizer also transmits a Morse code airfield identifier consisting of the letter "I" followed by a Runway number (SFAF 503) and NAVAIDS Identifier (SFAF 304) that must be included in the proposal. Station Class: ALL; Emission 2K04A1A (without voice)

4.6.3.3. Glideslope. The glideslope operates in the 328.6-335.4 MHz band and transmits vertical guidance signals for descent to the runway. Glideslope and localizer frequencies are paired according to the channeling plan shown in Chapter 4.3.5 of the NTIA Manual. Required SFAF items include: runway number (SFAF 503, antenna orientation (SFAF 362) to include magnetic deviation (variation), station class of ALG, and Emission of 300H00A1N.

4.6.4. Microwave Landing System (MLS). The MLS operates in the 5031-5090.7 MHz band and is the International Civil Aviation Organization (ICAO) approved replacement for the current ILS system. The MLS is based on time-referenced scanning beam, referenced to the runway, allowing aircraft

to determine precise azimuth angle and elevation angle. The FAA engineers frequency support for the MLS and associated precision DME-P (972-1143 MHz).

4.6.4.1. Mobile Microwave Landing System (MMLS). The AN/TRN-45 is a tactical military precision approach and landing system that is compatible and interoperable with the national and international MLS systems. It is designed as a tactical landing guidance for military aircraft and provides azimuth, elevation, data, and range information at off-base landing sites. The AN/TRN-45 has two transmitters. The first transmitter is in the 979-1143 MHz frequency range and is used for Distance Measuring Equipment (DME). A second transmitter is in the 5031-5090.7 MHz frequency range and is used to transmit data, azimuth, and elevation as specified by the ICAO. Coordination is required with the FAA Regional Office as they engineer the frequency support for MMLS systems. This system is highly transportable as it is deployed to off-base landing sites.

4.6.5. Tactical Air Navigation (TACAN). The TACAN provides short-distance range and azimuth information to the aircraft. The TACAN system consists of an airborne interrogator operating in the 1025-1150 MHz band and a ground transponder operating in the 962-1024 MHz or 1151-1213 MHz band. In some cases the transponder is on an airborne platform. This configuration is referred to as air-to-air TACAN. This configuration is used, for example, during air refueling. The band 962-1024 MHz is referred to as low band and 1151-1213 MHz is referred to as high band. This is important when supporting tactical equipment because many systems have a low band antenna and a high band antenna; therefore, you will need to know which is in use in order to request frequency supportability. When making assignments normally only the ground transmit frequency (SFAF 110) is assigned and its paired airborne frequency is assumed. TACANs are classified into three categories depending on their operational use: terminal facility, local en route facility, or high en route facility. The classification of the facility is important because it determines the level of protection afforded the facility. The service volume (SFAF 503) is required on all assignments. Station Class: AL; Emission 650K00V1A. The normal usable altitude and radius distances are:

Terminal facility – below 12,000 ft; 25 MIRAD

Low altitude facility – below 18,000 ft; 40 MIRAD

High altitude facility – below 14,500 ft; 40 MIRAD

14,500-17,999 ft; 100 MIRAD

18,000-45,000 ft; 130 MIRAD

45,000-60,000 ft; 100 MIRAD

4.6.5.1. TACAN Channels. Airborne and ground TACAN frequencies are paired to form 126 "X" channels and 126 "Y" channels as shown in Chapter 4.3.5 of the NTIA Manual. In the "X" configuration, the ground reply frequency is 63 MHz less than the airborne frequency for channels 1-63 (low band) and 63 MHz higher for channels 64-126 (high band). In the "Y" configuration, the ground reply frequency is 63 MHz higher than the airborne frequency for channels 1-63 and 63 MHz lower than the airborne frequency for channels 64-126. The Air Force primarily uses "X" channels within the US&P, except for certain air-to-air TACAN operations.

4.6.5.2. TACAN channels 1-16 and 60-69 are reserved for military tactical and training operations, while the remaining 100 "X" channels are used by the NAS.

4.6.5.3. Air-to-Air TACAN Channels. The following applies to Air Force units that need to use TACAN channels for air-to-air operations:

4.6.5.3.1. IRAC makes assignments to operate on TACAN channels after FAA coordination and approval.

4.6.5.3.2. TACAN frequency assignments are normally for a 10-year period, with renewal, after coordination with FAA.

4.6.5.3.3. Air-to-air DME operations are authorized on an area-wide basis (e.g., state or states, US, or US&P). Send frequency proposals for DME operations in SFAF through command channels to AFFMA. Give the number of channels needed, the maximum number of aircraft involved in the operation, and justification for use of the civil channels. Apply for “Y” channels if technically possible. Include in SFAF item 520 the statement, “Required for DME operations only; will not use the azimuth mode.”

4.6.5.3.4. TACAN operations using the azimuth mode are authorized only within areas bounded by specific geographical coordinates. Send frequency proposals in SFAF to AFFMA through the appropriate MAJCOM. Include in SFAF Item 531/ the geographical coordinates that enclose the desired area of operation. If several states are involved, insert "US/USA/US&P" for United States/United States of America (the 48 contiguous states and DC (excludes Alaska and Hawaii/United States and Possessions)) in items 301 and 401, and list all states in Item 530. Coordinate with all FAA regional offices involved. Ask for "Y" channels if technically possible. State the number of channels needed and justify their use.

4.6.6. Distance Measuring Equipment (DME). DME operates on frequencies in the UHF spectrum between 962-1213 MHz in a line-of-sight principle and furnishes distance information with a high degree of accuracy. In the operation of DME, paired pulses at a specific spacing are sent out from the aircraft (this being the interrogation) and are received at the ground station. The ground station (transponder) then transmits paired pulses back to the aircraft at the same pulse spacing but on a different frequency. The time required for the round trip of this signal exchange is measured in the airborne DME unit and is translated into distance (nautical miles) from the aircraft to the ground station.

4.6.7. VHF Omnidirectional Range (VOR). VOR facilities provide bearing information to aircraft and operate in the 108-117.95 MHz band as shown in Chapter 4.3.5 of the NTIA Manual. Most VORs use voice and Morse code transmissions to identify the ground facility. Service volume and runway number are required (SFAF 503). Station Class: ALO; Emission 20K9A9W (with voice) 20K9A2A (without voice)

4.6.8. VHF Omnidirectional Range/TACAN (VORTAC). The VORTAC is a facility consisting of a collocated VOR and TACAN. The VORTAC is the most common unified aid within the Air Force. Both facilities are located in the same place, transmit simultaneously on a paired channel, and share the same three-letter identifier. If the facilities do not meet the following antenna separation criteria, they are not considered a single NAVAID and must use unpaired channels and different identifiers. Only the FAA may waive these requirements. Service volume (SFAF 503) is required.

4.6.8.1. For stations used in terminal areas for approach procedures, the separation for a standard VOR antenna and the associated DME or TACAN antenna will not exceed 100 feet. For a Doppler VOR antenna and associated DME or TACAN antenna, separation will not exceed 260 feet.

4.6.8.2. VOR and DME or TACAN antenna separation will not exceed 2,000 feet for facilities providing only en route services (see **Table 4.2.**).

Table 4.2. DME/TACAN Antenna Separation.

Channel	VOR (MHz)	DME/TACAN				ILS	
		Airborne		Ground			
		Int. Freq. (MHz)	Pulse Code (µsec)	Reply Freq. (MHz)	Pulse Code (µsec)	Localizer (MHz)	Glide Slope (MHz)
1X		1025	12	962	12		
1Y		1025	36	1088	30		
2X		1026	12	963	12		
2Y		1026	36	1089	30		
3X		1027	12	964	12		
3Y		1027	36	1090	30		
4X		1028	12	965	12		
4Y		1028	36	1091	30		
5X		1029	12	966	12		
5Y		1029	36	1092	30		
6X		1030	12	967	12		
6Y		1030	36	1093	30		
7X		1031	12	968	12		
7Y		1031	36	1094	30		
8X		1032	12	969	12		
8Y		1032	36	1095	30		
9X		1033	12	970	12		
9Y		1033	36	1096	30		
10X		1034	12	971	12		
10Y		1034	36	1097	30		
11X		1035	12	972	12		
11Y		1035	36	1098	30		
12X		1036	12	973	12		
12Y		1036	36	1099	30		
13X		1037	12	974	12		
13Y		1037	36	1100	30		
14X		1038	12	975	12		
14Y		1038	36	1101	30		

Channel	VOR (MHz)	DME/TACAN				ILS	
		Airborne		Ground			
		Int. Freq. (MHz)	Pulse Code (µsec)	Reply Freq. (MHz)	Pulse Code (µsec)	Localizer (MHz)	Glide Slope (MHz)
15X		1039	12	976	12		
15Y		1039	36	1102	30		
16X		1040	12	977	12		
16Y		1040	36	1103	30		
17X	108.00	1041	12	978	12		
17Y	108.05	1041	36	1104	30		
18X		1042	12	979	12	108.10	334.70
18Y		1042	36	1105	30	108.15	334.55
19X	108.20	1043	12	980	12		
19Y	108.25	1043	36	1106	30		
20X		1044	12	981	12	108.30	334.10
20Y		1044	36	1107	30	108.35	333.95
21X	108.40	1045	12	982	12		
21Y	108.45	1045	36	1108	30		
22X		1046	12	983	12	108.50	329.90
22Y		1046	36	1109	30	108.55	329.75
23X	108.60	1047	12	984	12		
23Y	108.65	1047	36	1110	30		
24X		1048	12	985	12	108.70	330.50
24Y		1048	36	1111	30	108.75	330.35
25X	108.80	1049	12	986	12		
25Y	108.85	1049	36	1112	30		
26X		1050	12	987	12	108.90	329.30
26Y		1050	36	1113	30	108.95	329.15
27X	109.00	1051	12	988	12		
27Y	109.05	1051	36	1114	30		
28X		1052	12	989	12	109.10	331.40
28Y		1052	36	1115	30	109.15	331.25
29X	109.20	1053	12	990	12		
29Y	109.25	1053	36	1116	30		
30X		1054	12	991	12	109.30	332.00

Channel	VOR (MHz)	DME/TACAN				ILS	
		Airborne		Ground			
		Int. Freq. (MHz)	Pulse Code (µsec)	Reply Freq. (MHz)	Pulse Code (µsec)	Localizer (MHz)	Glide Slope (MHz)
30Y		1054	36	1117	30	109.35	331.85
31X	109.40	1055	12	992	12		
31Y	109.45	1055	36	1118	30		
32X		1056	12	993	12	109.50	332.60
32Y		1056	36	1119	30	109.55	332.45
33X	109.60	1057	12	994	12		
33Y	109.65	1057	36	1120	30		
34X		1058	12	995	12	109.70	333.20
34Y		1058	36	1121	30	109.75	333.05
35X	109.80	1059	12	996	12		
35Y	109.85	1059	36	1122	30		
36X		1060	12	997	12	109.90	333.80
36Y		1060	36	1123	30	109.95	333.65
37X	110.00	1061	12	998	12		
37Y	110.05	1061	36	1124	30		
38X		1062	12	999	12	110.10	334.40
38Y		1062	36	1125	30	110.15	334.25
39X	110.20	1063	12	1000	12		
39Y	110.25	1063	36	1126	30		
40X		1064	12	1001	12	110.30	335.00
40Y		1064	36	1127	30	110.35	334.85
41X	110.40	1065	12	1002	12		
41Y	110.45	1065	36	1128	30		
42X		1066	12	1003	12	110.50	329.60
42Y		1066	36	1129	30	110.55	329.45
43X	110.60	1067	12	1004	12		
43Y	110.65	1067	36	1130	30		
44X		1068	12	1005	12	110.70	330.20
44Y		1068	36	1131	30	110.75	330.05
45X	110.80	1069	12	1006	12		
45Y	110.85	1069	36	1132	30		

Channel	VOR (MHz)	DME/TACAN				ILS	
		Airborne		Ground			
		Int. Freq. (MHz)	Pulse Code (µsec)	Reply Freq. (MHz)	Pulse Code (µsec)	Localizer (MHz)	Glide Slope (MHz)
46X		1070	12	1007	12	110.90	330.80
46Y		1070	36	1133	30	110.95	330.65
47X	111.00	1071	12	1008	12		
47Y	111.05	1071	36	1134	30		
48X		1072	12	1009	12	111.10	331.70
48Y		1072	36	1135	30	111.15	331.55
49X	111.20	1073	12	1010	12		
49Y	111.25	1073	36	1136	30		
50X		1074	12	1011	12	111.30	332.30
50Y		1074	36	1137	30	111.35	332.15
51X	111.40	1075	12	1012	12		
51Y	111.45	1075	36	1138	30		
52X		1076	12	1013	12	111.50	332.90
52Y		1076	36	1139	30	111.55	332.75
53X	111.60	1077	12	1014	12		
53Y	111.65	1077	36	1140	30		
54X		1078	12	1015	12	111.70	333.50
54Y		1078	36	1141	30	111.75	333.35
55X	111.80	1079	12	1016	12		
55Y	111.85	1079	36	1142	30		
56X		1080	12	1017	12	111.90	331.10
56Y		1080	36	1143	30	111.95	330.95
57X	112.00	1081	12	1018	12		
57Y	112.05	1081	36	1144	30		
58X	112.10	1082	12	1019	12		
58Y	112.15	1082	36	1145	30		
59X	112.20	1083	12	1020	12		
59Y	112.25	1083	36	1146	30		
60X		1084	12	1021	12		
60Y		1084	36	1147	30		
61X		1085	12	1022	12		

Channel	VOR (MHz)	DME/TACAN				ILS	
		Airborne		Ground			
		Int. Freq. (MHz)	Pulse Code (µsec)	Reply Freq. (MHz)	Pulse Code (µsec)	Localizer (MHz)	Glide Slope (MHz)
61Y		1085	36	1148	30		
62X		1086	12	1023	12		
62Y		1086	36	1149	30		
63X		1087	12	1024	12		
63Y		1087	36	1150	30		
64X		1088	12	1151	12		
64Y		1088	36	1025	30		
65X		1089	12	1152	12		
65Y		1089	36	1026	30		
66X		1090	12	1053	12		
66Y		1090	36	1027	30		
67X		1091	12	1154	12		
67Y		1091	36	1028	30		
68X		1092	12	1155	12		
68Y		1092	36	1029	30		
69X		1093	12	1156	12		
69Y		1093	36	1030	30		
70X	112.30	1094	12	1157	12		
70Y	112.35	1094	36	1031	30		
71X	112.40	1095	12	1158	12		
71Y	112.45	1095	36	1032	30		
72X	112.50	1096	12	1159	12		
72Y	112.55	1096	36	1033	30		
73X	112.60	1097	12	1160	12		
73Y	112.65	1097	36	1034	30		
74X	112.70	1098	12	1161	12		
74Y	112.75	1098	36	1035	30		
75X	112.80	1099	12	1162	12		
75Y	112.85	1099	36	1036	30		
76X	112.90	1100	12	1163	12		
76Y	112.95	1100	36	1037	30		

Channel	VOR (MHz)	DME/TACAN				ILS	
		Airborne		Ground			
		Int. Freq. (MHz)	Pulse Code (µsec)	Reply Freq. (MHz)	Pulse Code (µsec)	Localizer (MHz)	Glide Slope (MHz)
77X	113.00	1101	12	1164	12		
77Y	113.05	1101	36	1038	30		
78X	113.10	1102	12	1165	12		
78Y	113.15	1102	36	1039	30		
79X	113.20	1103	12	1166	12		
79Y	113.25	1103	36	1040	30		
80X	113.30	1104	12	1167	12		
80Y	113.35	1104	36	1041	30		
81X	113.40	1105	12	1168	12		
81Y	113.45	1105	36	1042	30		
82X	113.50	1106	12	1169	12		
82Y	113.55	1106	36	1043	30		
83X	113.60	1107	12	1170	12		
83Y	113.65	1107	36	1044	30		
84X	113.70	1108	12	1171	12		
84Y	113.75	1108	36	4045	30		
85X	113.80	1109	12	1172	12		
85Y	113.85	1109	36	1046	30		
86X	113.90	1110	12	1173	12		
86Y	113.95	1110	36	1047	30		
87X	114.00	1111	12	1174	12		
87Y	114.05	1111	36	1048	30		
88X	114.10	1112	12	1175	12		
88Y	114.15	1112	36	1049	30		
89X	114.20	1113	12	1176	12		
89Y	114.25	1113	36	1050	30		
90X	114.30	1114	12	1177	12		
90Y	114.35	1114	36	1051	30		
91X	114.40	1115	12	1178	12		
91Y	114.45	1115	36	1052	30		
92X	114.50	1116	12	1179	12		

Channel	VOR (MHz)	DME/TACAN				ILS	
		Airborne		Ground			
		Int. Freq. (MHz)	Pulse Code (µsec)	Reply Freq. (MHz)	Pulse Code (µsec)	Localizer (MHz)	Glide Slope (MHz)
92Y	114.55	1116	36	1053	30		
93X	114.60	1117	12	1180	12		
93Y	114.65	1117	36	1054	30		
94X	114.70	1118	12	1181	12		
94Y	114.75	1118	36	1055	30		
95X	114.80	1119	12	1182	12		
95Y	114.85	1119	36	1056	30		
96X	114.90	1120	12	1183	12		
96Y	114.95	1120	36	1057	30		
97X	115.00	1121	12	1184	12		
97Y	115.05	1121	36	1058	30		
98X	115.10	1122	12	1185	12		
98Y	115.15	1122	36	1059	30		
99X	115.20	1123	12	1186	12		
99Y	115.25	1123	36	1060	30		
100X	115.30	1124	12	1187	12		
100Y	115.35	1124	36	1061	30		
101X	115.40	1125	12	1188	12		
101Y	115.45	1125	36	1062	30		
102X	115.50	1126	12	1189	12		
102Y	115.55	1126	36	1063	30		
103X	115.60	1127	12	1190	12		
103Y	115.65	1127	36	1064	30		
104X	115.70	1128	12	1191	12		
104Y	115.75	1128	36	1065	30		
105X	115.80	1129	12	1192	12		
105Y	115.85	1129	36	1066	30		
106X	115.90	1130	12	1193	12		
106Y	115.95	1130	36	1067	30		
107X	116.00	1131	12	1194	12		
107Y	116.05	1131	36	1068	30		

Channel	VOR (MHz)	DME/TACAN				ILS	
		Airborne		Ground			
		Int. Freq. (MHz)	Pulse Code (µsec)	Reply Freq. (MHz)	Pulse Code (µsec)	Localizer (MHz)	Glide Slope (MHz)
108X	116.10	1132	12	1195	12		
108Y	116.15	1132	36	1069	30		
109X	116.20	1133	12	1196	12		
109Y	116.25	1133	36	1070	30		
110X	116.30	1134	12	1197	12		
110Y	116.35	1134	36	1071	30		
111X	116.40	1135	12	1198	12		
111Y	116.45	1135	36	1072	30		
112X	116.50	1136	12	1199	12		
112Y	116.55	1136	36	1073	30		
113X	116.60	1137	12	1200	12		
113Y	116.65	1137	36	1074	30		
114X	116.70	1138	12	1201	12		
114Y	116.75	1138	36	1075	30		
115X	116.80	1139	12	1202	12		
115Y	116.85	1139	36	1076	30		
116X	116.90	1140	12	1203	12		
116Y	116.95	1140	36	1077	30		
117X	117.00	1141	12	1204	12		
117Y	117.05	1141	36	1078	30		
118X	117.10	1142	12	1205	12		
118Y	117.15	1142	36	1079	30		
119X	117.20	1143	12	1206	12		
119Y	117.25	1143	36	1080	30		
120X	117.30	1144	12	1207	12		
120Y	117.35	1144	36	1081	30		
121X	117.40	1145	12	1208	12		
121Y	117.45	1145	36	1082	30		
122X	117.50	1146	12	1209	12		
122Y	117.55	1146	36	1083	30		
123X	117.60	1147	12	1210	12		

Channel	VOR (MHz)	DME/TACAN				ILS	
		Airborne		Ground			
		Int. Freq. (MHz)	Pulse Code (µsec)	Reply Freq. (MHz)	Pulse Code (µsec)	Localizer (MHz)	Glide Slope (MHz)
123Y	117.65	1147	36	1084	30		
124X	117.70	1148	12	1211	12		
124Y	117.75	1148	36	1085	30		
125X	117.80	1149	12	1212	12		
125Y	117.85	1149	36	1086	30		
126X	117.90	1150	12	1213	12		
126Y	117.95	1150	36	1087	30		

4.6.9. ATC Radar Beacon System IFF and Selective Identification Feature (SIF). The IFF/SIF consist of a ground interrogator that operates on 1030 MHz and an airborne transponder that replies to the interrogations on 1090 MHz. Frequency assignments are only processed for the ground interrogator. The airborne reply is assumed. The IFF/SIF is normally slaved to the airport surveillance radar (ASR). If the IFF/SIF is paired with and ASR, SFAF Item 503 must cross reference the ASR. For example: P/W AN/TPX-42, PRR250. Station Class ALB

4.6.9.1. The transmitter power of beacon interrogators used with terminal surveillance radars is normally 300 watts.

4.6.9.2. IFF/SIF ramp tester units will use a PRR of 230 PPS, triggered for stability, and limited to 4 watts of transmitter power to the antenna.

4.6.9.3. PRRs for IFF/SIF may be the same as, or submultiples of the ASR PRR. Also, if the ASR operates with a staggered PRR, the IFF/SIF may also operate with a staggered PRR, normally below 400PRR

4.7. Radar. Radar systems operate in various portions of the spectrum.

4.7.1. Aeronautical Radio Navigation Radar. Only ground-based radars performing an ATC function may use these frequency bands. Use includes associated airborne transponders activated by radars operating in the same band. Coordinate with the FAA regional office before sending frequency proposals. Radar equipment performing a function other than listed below will not normally have frequency assignments in these bands. Service volume is required in SFAF item 503.

4.7.1.1. Long Range Radar (LRR). The 1240-1370 MHz band is used for LRR.

4.7.1.2. Airport Surveillance Radar (ASR). ASRs operate in the 2700-2900 MHz band. The FAA controls the frequencies and PRR. In certain areas of the US it is difficult to accommodate new radars in the 2700-2900 MHz band. Radar systems complying with Criteria D of the radar spectrum engineering criteria, under Chapter 5.5 of the NTIA Manual, shall incorporate additional EMC features when intended for use in designated heavily used areas, or for collocated operations with other radars. The FAA regional field office and the agency asking for the assignment assess the need for these additional EMC features when coordinating a frequency assignment in the

2700-2900 MHz band. Frequency assignments for those radars without the additional EMC features installed will contain record note S373. Station Class ALS.

4.7.1.3. Precision Approach Radar (PAR). PARs operate in the 9000-9200 MHz band. Station class AL.

4.7.2. Aircraft Control and Warning (AC&W). The military AC&W radars operate in the 2900-3100 MHz band. The FAA does not control this frequency band; however, since the AC&W radar is normally paired with an IFF/SIF the FAA will need to know the PRR of the AC&W radar so they can properly coordinate on the PRR for the IFF/SIF.

4.8. Radar Speed Guns. Police radar speed guns operate on either 10525 or 24150 MHz. Frequency assignments are required. Station Class: MR.

4.9. Weather Radars. Weather radars normally operate in the 2700-2900 and 5350-5650 MHz bands. Spot frequency assignments are required. Station Class WXD.

4.9.1. Weather radars that use conventional magnetron output tubes have inherent spurious emission levels that may cause radio frequency interference to digital radio-relay microwave systems. Existing radars in the category include the WSR-57, WSR-74S, WSR-74C, AN/FPQ-21, and the AN/FPS-77. Users must install RF waveguide filters that reduce the spurious emission levels by at least 40 dB before using these radars at a new location.

4.10. Telemetry Frequencies . The following bands are allocated for telemetering operations of aeronautical vehicles, upper atmosphere research devices, guided missiles, space system boosters, and space vehicles:

4.10.1. The 1435-1535 MHz and 2310-2390 MHz bands. These frequencies are designated for telemetering and associated telecommand during flight testing of manned and unmanned aircraft, missiles, or their major components. Coordinate all operations in these bands with the Aerospace and Flight Test Radio Coordinating Council (AFTRCC) and the applicable AFC. The NTIA Manual, Chapter 8.3.17, provides detailed AFTRCC procedures. Refer to **Chapter 5** of this manual for the AFTRCC coordination agencies.

4.10.1.1. Assignments in both bands are centered on frequencies at standard intervals of 1 MHz, beginning at 1435.5 and 2310.5 MHz, respectively, and are allowed bandwidths of 1, 3, or 5 MHz. Assignments with bandwidths greater than 1 MHz are centered so they do not extend outside the allocated bands.

4.10.1.2. The 1435-1535 MHz band consists of ninety-nine (99) 1-MHz channels designated for telemetering. Station classes MOEA, FLEA, MOD, and FLD apply.

4.10.1.2.1. Frequencies 1444.5, 1453.5, 1501.5, 1515.5, 1524.5, and 1525.5 MHz are shared with flight telemetering mobile stations. Use limited to 1 MHz bandwidth except for frequencies 1524.5 and 1525.5 MHz where a bandwidth of 2 MHz is permitted. Station classes MOEB, FLEB, MOD, and FLD apply.

4.10.1.3. The 2310-2390 MHz band consists of seventy-three (73) 1-MHz channels designated for telemetering. Station classes MOEA, FLEA, MOD, and FLD apply.

4.10.1.3.1. Frequencies 2312.5, 2332.5, 2352.5, 2364.5, 2370.5, and 2382.5 are shared on a coequal basis with operations of expendable and reusable launch vehicles. Such use is limited to 1 MHz bandwidth. Station classes MOEA, MOEB, MOD, FLEA, FLEB, and FLD apply.

4.10.1.4. Telemetry associated with launching and reentry into the earth's atmosphere, as well as incidental orbiting before reentry of occupied objects undergoing flight tests, is also allowed within these bands.

4.10.1.5. Telecommand stations authorized to operate in these bands must directly support telemetering functions. Assignments are limited to 1 MHz bandwidth and must use antennas having a half-power beamwidth of no more than 8 degrees, and a front-to-back ratio of at least 20 dBs.

4.10.1.6. Channels designated for aeronautical telemetering in the 1435-1535 MHz band are also available for space telemetering on a shared basis.

4.10.1.7. The 1530-1535 MHz band is allocated primarily to maritime mobile satellite service; mobile aeronautical telemetry is secondary.

4.10.2. The 2200-2290 MHz band. These frequencies are available for telemetering from space research stations and aeronautical telemetering; including telemetry associated with launch vehicles, missiles, and upper atmosphere research rockets. Such use is on a coequal shared basis with fixed and mobile LOS operations.

4.10.2.1. This band consists of 90 1-MHz narrowband channels beginning at 2200.5 MHz in 1-MHz increments through 2289.5 MHz.

4.10.2.2. Emission bandwidths greater than 1 MHz are permitted, provided the assigned frequencies are centered on the center frequencies of narrowband channels, and do not extend outside the allocated band.

4.10.2.3. No provision is made in this band for flight testing of piloted aircraft.

4.11. International Distress and Emergency Frequencies. The U.S. Government and DoD have adopted the international distress and emergency frequencies shown in **Table 4.3.** Frequency assignments are not required.

4.11.1. Any mobile station experiencing an emergency may use the frequencies listed in **Table 4.3.** If a mobile station in distress is unable to make contact on emergency frequencies, it may use any available means to obtain help. Policies for using these frequencies are:

4.11.1.1. Send distress calls or messages only on the authority of the person responsible for the ship, aircraft, or other vehicle carrying the mobile station.

4.11.1.2. The frequencies are used only for actual emergencies, not for simulated emergency training.

4.11.1.3. Do not radiate when testing an emergency frequency during experimental, production, or maintenance operations.

4.11.1.4. Do not make operational checks to ensure proper system operation (confidence checks) more than once in any 24-hour period, and keep them as short as possible.

4.11.1.5. Activities completing a communications contact on equipment used for emergency purposes will consider the contact the confidence check for that period.

4.11.1.6. Only make confidence checks with stations authorized to operate on the particular emergency frequency. Do not transmit "in the blind" for confidence checks.

4.11.2. Air Force activities may use the Radio Amateur Civil Emergency Service (RACES) station frequencies listed in **Table 4.3.** to make initial contact with RACES personnel to coordinate on emergency or disaster related matters.

Table 4.3. Emergency Frequencies.

SERVICE	FREQUENCY (EMISSION)	COMMUNICATION SERVICE	FUNCTION
International Distress and Emergency	500 kHz	Aeronautical, Maritime, Survival Craft	Distress (Telegraphy)
	2182 kHz	Aeronautical, Maritime Mobile, Survival Craft	Distress
	3023 kHz	Mobile	Search and Rescue (SAR)
	5680 kHz	Mobile	SAR Operations
	8364 kHz	Aeronautical, Maritime Mobile	SAR
	40.5 MHz	Mobile	Military Joint Common (US&P only)
	121.5 MHz	Aeronautical	Emergency and Safety
	123.1 MHz	Aeronautical, Mobile	SAR, Scene of Action
	156.3	Aeronautical, Maritime Mobile	SAR Operations
	156.8 MHz	Maritime Mobile	Call, Reply and Safety
	243.0 MHz	Military Aeronautical	Emergency and Survival
	406-406.1 MHz	Mobile-Satellite	Emergency Position-Indicating Radiobeacon
Radio Amateur Civil Emergency Service (RACES)	3997 kHz (6K00A3E)	RACES Stations	Civil Emergency
	3998.5 kHz (3K00H3E)		
	53.3 MHz (36K00F3E)		

4.12. Standard Frequency and Time Broadcasts. Frequencies are nationally and internationally allocated and assigned for specific stations to broadcast time and frequency signals. The following are key points about the national standard broadcasts:

4.12.1. US Standard Broadcasts. The National Institute of Standards and Technology of the DoC operates three radio stations providing highly accurate frequency and time signals:

4.12.1.1. WWV near Fort Collins CO, broadcasts on frequencies 2.5, 5, 10, 15, and 20 MHz.

4.12.1.2. WWVB, also near Fort Collins CO, broadcasts on frequency 60 kHz.

4.12.1.3. WWVH, on the island on Kauai HI, broadcasts on frequencies 2.5, 5. 10, and 15 MHz.

4.12.1.4. These stations provide government and private agencies precise time and accurate frequency signals for setting chronometers and calibrating frequency-sensitive equipment.

4.13. DoD Use of Frequencies in Nongovernment Bands. The military may use some frequencies allocated for nongovernment use on a secondary, noninterference basis as outlined below. These frequencies may be used to meet peacetime tactical and training requirements as well as military test range operations. The frequencies are used only when government bands will not satisfy frequency needs and when use does not cause interference to nongovernment users. The military must accept any interference caused by nongovernment authorized users. Military use of a frequency will not bar new nongovernment assignments on that or adjacent frequencies.

4.13.1. The 4-27 MHz Maritime Mobile (MM) and Broadcasts Bands. Air Force activities may use frequencies allocated to the MM service and broadcast services for peacetime military tactical and training purposes within the US&P. Refer to **Table 4.4.**

4.13.1.1. MAJCOM spectrum management offices are delegated assignment authority in these bands. No assignment in either the GMF or the FRRS is required.

4.13.1.2. MAJCOMs will implement procedures to track assignments within their respective command to include unit, location and inclusive dates (not to exceed 1 year). Either spot frequency or band assignments are authorized.

4.13.1.3. MAJCOMs may not use this authority to circumvent standard frequency assignment procedures for fixed terrestrial systems or HF networks.

4.13.1.4. This authority is to support training and field operations around an installation or exercise area where the type of equipment used is either portable or transportable. Aeronautical mobile operations are strictly prohibited.

4.13.1.5. Users will limit transmitter power to the minimum necessary for reliable communications and will not exceed the power for specific types of emissions. Refer to **Table 4.4.**

4.13.1.6. When notified by the FCC or other authority that Air Force transmissions are interfering with a MM or broadcast station, the identified station will immediately cease operation.

4.13.1.7. Users may receive interference on these bands, and will not try to obtain relief from such interference; however, they can request a replacement frequency through command spectrum management channels.

4.13.1.8. AFFMA reserves assignment authority for those frequencies listed in Chapter 7.15.2 of the NTIA Manual for long haul HF operations. Request use of these frequencies through command channels.

Table 4.4. Allowable Frequencies, Emissions, and Power Levels in the 4-27 MHz Bands.

FREQUENCY BANDS (kHz)	EMISSION	MAXIMUM POWER
4005-4063	1K10F1B	100 watts mean
5950-6200	100HA1A	200 watts peak
9500-9900	3K00J3E	250 watts peak
11650-12050	2K00A2B	300 watts peak
13600-13800	3K00J7B / 4K00J7B	400 watts peak
15100-15600	3K00J9W / 4K00J9W 6K00J9W	600 watts peak
17550-17900	6K00B9W	800 watts peak
21450-21850		
25670-26100		

4.13.2. Military use of nongovernment bands above 25 MHz.

4.13.2.1. The military services may use frequencies in the nongovernment bands above 25 MHz for tactical and training operations in the US&P as shown in **Table 4.5.** Air Force activities will coordinate use with their host MAJCOM spectrum management office and the local FCC through the FCC Watch Officer at (202) 632-6975 (UNCLAS) or (202) 632-6464 (STU).

4.13.2.2. Military use of these frequencies will not bar present or future assignments of nongovernment frequencies to nonmilitary government agencies through normal IRAC and FCC coordination.

4.13.2.3. The military will protect specific nongovernment frequencies authorized for government agencies.

4.13.2.4. **Chapter 3** contains procedures for using these frequency bands.

Table 4.5. Military Frequencies in Nongovernment Bands above 25 MHz.

Peacetime Tactical and Training Frequency Bands		
FREQUENCY BANDS (MHz)	**NONGOVERNMENT USE**	**REMARKS**
25.01-25.33	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	
25.85-26.48	Auxiliary Broadcasting Service	
26.96-27.54	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	
29.70-29.80	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	
29.80-29.89	Aeronautical Fixed Service	

Peacetime Tactical and Training Frequency Bands		
FREQUENCY BANDS (MHz)	**NONGOVERNMENT USE**	**REMARKS**
29.91-30.00 29.91-30.00	Aeronautical Fixed Service	
30.56-32.00 33.00-34.00 35.00-35.20 35.68-36.00 37.00-38.00	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	
39.00-40.00 42.00-43.20 43.68-46.60 47.00-49.60	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	
50.00-54.00	Amateur Service	
54.00-72.00	Domestic Broadcasting Service	
72.00-73.00 75.40-76.00	Fixed Service (Excluding Common Carrier)	
76.00-100.00	Fixed Service (Excluding Common Carrier)	In Alaska
76.00-100.00	Domestic Broadcasting Service	Except Alaska
100.00-108.00	Domestic Broadcasting Service	
150.80-152.00 152.24-152.48 152.84-156.25	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	
152.86-153.35	Auxiliary Broadcasting Service	
156.325-156.625 156.675-156.725 156.875-157.025 157.45-157.74 158.10-158.46 158.70-161.775	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	
160.86-161.40	Auxiliary Broadcasting Service	Puerto Rico and Virgin Islands only
161.625-161.675	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	Except Puerto Rico and Virgin Islands
173.20-173.40	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	
174.00-216.00	Domestic Broadcasting Service	

Peacetime Tactical and Training Frequency Bands		
FREQUENCY BANDS (MHz)	**NONGOVERNMENT USE**	**REMARKS**
222.00-225.00 420.00-450.00	Amateur Service	
450.00-451.00	Auxiliary Broadcasting Service	
451.00-454.00	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	
455.00-456.00	Auxiliary Broadcasting Service	
456.00-459.00 460.00-470.00	Public Safety, Citizens Radio, Industrial, Land Transportation and Maritime Mobile	
470.00-608.00 614.00-890.00	Domestic Broadcasting Service	
942.00-952.00	Auxiliary Broadcasting Service	
952.00-960.00	Fixed Service (Excluding Common Carrier)	
1215.00-1300	Amateur Service	
1850.00-1990.00	Fixed Services (Excluding Common Carrier)	
1990.00-2110.00	Auxiliary Broadcasting Service	
2130.00-2160.00 2180.00-2200.00	Fixed Services (Excluding Common Carrier)	
2300.00-2400.00	Amateur Service	

4.13.3. Military Test Range Operations. The FCC and the military services have arranged for the military use of nongovernment bands at the military test ranges shown in **Table 4.6.** The authorized frequency bands to use are in **Table 4.7.** The following procedures apply to use of these nongovernment bands:

4.13.3.1. Do not use these frequencies if government bands can satisfy the requirement.

4.13.3.2. Limit use to those intermittent operations that can be stopped immediately upon notification that they are causing harmful interference.

4.13.3.3. Select frequencies to avoid harmful interference to known nongovernment operations.

4.13.3.4. Where practical, the military station identifies itself using a call sign or periodic interruption according to a prearranged schedule.

4.13.3.5. Do not use these bands to develop military systems that may need a new frequency allocation. Obtain frequency allocation support for new RF radiating equipment according to AFI 33-118 and **Chapter 5** of this manual.

Table 4.6. Military Test Ranges.

ACTIVITY	AREA OF RESPONSIBILITY	SERVICE (MAJCOM)
Air Warfare Center Nellis AFB NV	Entire State of Nevada; Utah west of 111°W and Idaho south of 44°N	Air Force (ACC)
Eastern Range Patrick AFB FL	Area bounded by 24°N, 31°30'N, 77°W and 83°W	Air Force (AFSPC)
Air Force Development and Test Center Eglin AFB FL	Area bounded by 27°N, 33°30'N, 83°W and 90°W	Air Force (AFMC)
Army Electronic Proving Ground Ft Huachuca AZ	Entire State of Arizona	Army
White Sands Missile Range (WSMR) Las Cruces NM	Entire State of New Mexico and other US territory enclosed within a 240 kilometer radius of the HQ Building, plus the area of Utah and Colorado that lies south of 41°N and 108° and 111°W	Army
Atlantic Fleet Weapons Training Facility (AFWTF) Roosevelt Roads PR	Area within 370 kilometers of HQ Building, AFWTF	Navy
Pacific Missile Test Center Pt Mugu CA	Area enclosed within a 322 kilometers radius of the HQ building, PMR, and the area of CA south of 37°30'N	Navy
Military Ranges within the State of Hawaii	Area enclosed by 322 kilometers radius of Honolulu HI	(CINCPAC)

Table 4.7. Military Test Range Frequency Bands.

FREQUENCY BANDS (MHz)	NONGOVERNMENT ALLOCATION	REMARKS
25.01-25.33	Land Mobile	Industrial
25.85-26.48	Broadcasting, Maritime Mobile and Land Mobile	International Broadcasting, Land Mobile
26.95-27.54	Fixed, Mobile (Except aeronautical mobile) and Land Mobile	International fixed, Public Safety, Industrial, Land Transpiration
28.00-29.89	Amateur, Land Mobile and Fixed	Amateur-Satellite, Industrial, Aeronautical fixed public
29.91-30.00	Fixed	Aeronautical fixed, International fixed public
30.56-32.00	Land Mobile	Industrial, Public Safety, Land Transportation,
33.00-34.00	Land Mobile	Industrial, Public Safety, Land Transportation
35.00-36.00	Land Mobile	Industrial, Public Safety
37.00-38.00	Land Mobile	Industrial, Public Safety
39.00-40.00	Land Mobile	Public Safety
42.00-46.60	Land Mobile	Industrial, Public Safety, Land Transportation
47.00-49.60	Land Mobile	Industrial, Public Safety
50.00-73.00	Amateur, Broadcasting, Fixed and Mobile	54.00-72.00 Television Broadcasting
75.40-108.0	Fixed, Mobile and Broadcasting	76.00-88.00 Television Broadcasting, 88.00-108.0 FM Broadcasting
144.0-148.0	Amateur	144.0-146.0 Amateur-Satellite
150.8-156.25	Land Mobile	Industrial, Public Safety, Land Transportation
156.9-157.0375	Maritime Mobile	
157.1875	Land Mobile	

FREQUENCY BANDS (MHz)	NONGOVERNMENT ALLOCATION	REMARKS
162.0125	Land Mobile	
174.0-216.0	Broadcasting	Television Broadcasting
450.0-608.0	Land Mobile and Broadcasting	512.0-608.0 Television Broadcasting
614.0-890.0	Broadcasting	
942.0-960.0	Fixed	
1850-2110	Fixed and Mobile	
2450-2690	Fixed, Mobile, Radiodetermination-Satellite, Mobile-Satellite, and Broadcasting-Satellite	2483.5-2500 Space-to-Earth, 2500-2655 Satellite Broadcasting
6425-7125	Fixed, Mobile and Fixed-Satellite	6525-7075 Earth-to-Space
10550-10680	Earth Exploration-Satellite, Fixed and Space Research	10.7-11.7 Space-to-Earth
11700-13250	Fixed, Fixed-Satellite and Broadcasting-Satellite	11.7-12.2 Space-to-Earth

4.14. Amateur Frequencies. The military services may not use amateur frequencies within the US&P during normal peacetime conditions, except as authorized by the NTIA or FCC.

4.15. Citizen Band (CB) Radio Service. Air Force CB stations must operate in accordance with FCC Rules and Regulations, Part 95, Subpart D (Code of Federal Regulations (CFR) Title 47, *Telecommunications*, Part 95, *Personal Radio Services*). The AFFMA maintains frequency assignments within this band authorized by the FCC for Air Force CB operations. Frequency proposals for CB frequency assignments are considered on a case-by-case basis based on justification and operational concept. Assignments will include record note S348 in SFAF Item 500 and results of national-level coordination with the FCC.

4.15.1. Law enforcement agencies may communicate with the motoring public on and around an installation for the purpose of providing emergency assistance to the public. Use CB Channel 9 for this purpose.

4.15.2. Emergency vehicles using public highways for travel or guarding military convoys may communicate with the motoring public and civil authorities.

4.15.3. Convoys traveling on public highways may communicate with the motoring public and civil authorities.

4.15.4. Only US government employees may operate the equipment.

4.15.5. Do not use CB radios to conduct military-related communications, or instead of obtaining a frequency assignment to operate on an appropriate military system.

4.15.6. Users will not submit frequency requests for CB assignments, and will only grant authorization to users in accordance with the above rules.

4.16. Broadcasting Service Frequencies. The military services are not authorized to operate any broadcast facility within the US&P, except in select circumstances. Exceptions are Travelers Information System AM broadcast stations that are licensed through the FCC. These stations are noncommercial and are generally restricted to bulletin board-type information such as available installation facilities, travel restrictions, and driving hazards. Submit requirements for broadcast facilities through command channels to the AFFMA for FCC coordination.

4.17. Cellular Telephone Systems. These systems operate on nongovernment frequencies. National regulations do not permit assignment of these frequencies to government agencies (including DoD). Air Force activities requiring cellular service must contract through a local carrier. Frequency authorization for cellular service is a FCC and local carrier function.

4.17.1. Frequency assignments are not required for cellular service leased according to AFI 33-111, *Telephone Systems Management*.

4.18. Pager Systems. The 138-144 MHz band is used for Air Force pager systems, unless another band is required for operational reasons. This is to standardize pager frequencies and allow for interchange of equipment among Air Force installations. Air Force activities will study shared use of existing paging systems in the area before asking for a frequency assignment and obligating funds for equipment. Ensure a pager frequency authorization is available before deploying pager equipment overseas.

4.19. Maritime Mobile (MM) Frequencies. The 156-162 MHz band is allocated primarily for nongovernment maritime mobile communications.

4.19.1. The channels in the MM band are reserved for communications between vessels and designated commercial marine operators and for nongovernment ship-to-shore and intership operations.

4.19.2. Government stations may request the use of specific channels on a case-by-case basis if they have a valid need to communicate with the affected nongovernment licensees. Air Force activities will submit requirements through command channels to the AFFMA.

4.19.2.1. When using MM frequencies, regulations in the NTIA Manual Chapter 8.2.29 must be adhered to. Channel 6, 156.3 MHz, may be authorized for intership communications. This channel is authorized for coordinated operation at the scene of a search and rescue (SAR) incident (refer to Chapter 7.5.4 of NTIA Manual). Coast stations may use this channel during emergencies affecting life or property when other means of communications are not practical. Channel 16, 156.8 MHz, is the international MM distress, safety, and calling frequency. Channel 22, 157.1 MHz, is the primary frequency for liaison communications between ship stations and the United States Coast Guard stations. Air Force activities will submit requirements through command channels to the AFFMA.

4.20. Air Force Experimental Radio Stations. Air Force experimental radio stations listed in **Table 4.8.** are authorized to use any radio frequency except those bands listed in **Table 4.9.** for short or intermittent periods without prior authorization of specific frequencies for short or intermittent periods under the following conditions:

4.20.1. Operations are confined to the immediate vicinity of the station.

4.20.2. The nature or duration of the requirement makes assignment of specific frequencies impractical.

4.20.3. All reasonable measures are taken before such frequencies are used to ensure that harmful interference will not be caused to authorized services. Otherwise, operations must terminate.

4.20.4. This authority is limited to radio frequency usage, which is an integral part of an experimental operation and shall not be construed as authorizing frequency usage for administrative or operational use.

4.20.5. Experimental operations conducted pursuant to this authority shall be terminated immediately upon receipt of notice of harmful interference being caused to an authorized service.

Table 4.8. Air Force Experimental Stations.

Space and Missile Systems Center 61CS/SCML 2420 Velva Way, Suite 1467 Los Angeles CA 90245-4659 Phone: (310) 363-0398/1165, DSN: 833-5280	Air Force Flight Test Center 95CS/SCXF 35 N. Wolfe Avenue Edwards AFB CA 93524-1110 Phone: (805) 277-2390, DSN: 527-2390
Eastern Space and Missile Test Center 45CS/SCMMP 1225 Pershing Street Patrick AFB FL 32925-3340 Phone: (407) 494-5837, DSN: 854-5837/38	Air Armament Center(AAC) 96CG/SCWF 201 W Eglin Blvd, Suite 206 Eglin AFB FL 32542-6829 Phone: (850) 882-4416, DSN: 872-4416
Air Force Research Laboratory Programs (AFMC) AFMC CSO/SCOC 4225 Logistics Avenue, Rm S-132 Wright-Patterson AFB OH 45433-5714 Phone: (937) 257-7541 DSN: 787-7541	
Aeronautical Systems Center (ASC) RF Spectrum Management Section 88CG/SCCF, Bldg 47, Area B 2690 K Street Wright-Patterson AFB OH 45433-7661 Phone: (937) 255-2181, DSN: 785-2181	Electronics Systems Center (AFMC) 66ABW/SCBS 51 Schilling Circle Hanscom AFB MA 01731-2802 Phone: (781) 377-7511, DSN: 478-7511/5510
AFC Nellis 99CS/SCXF 5870 Devlin Drive, Suite 102 Nellis AFB NV 89191-7075 Phone: (702) 652-3417, DSN: 682-3417	
Western Space and Missile Test Center 30 Space Wing 826 13 Street, Suite 402 Vandenberg AFB CA 93437-5212 Phone: (805) 734-8232, DSN: 276-9572	

	Air Force Civil Engineering Center Spectrum Manager (LG) Tyndall AFB FL 32401-6001 Phone: (904) 282-6406, DSN: 970-6406
Frank J. Seiler Research Laboratory (FJSRL) US Air Force Academy CO 80840-6528 Phone: (303) 472-3120, DSN: 259-3120	

Table 4.9. Frequency Bands Excluded From Use by Experimental Stations.

kHz	MHz	GHz
495.0-510.0	73.0-74.8	10.68-10.70
2173.5-2190.5	121.4-121.6	15.35-15.40
8354.0-8374.0	156.7-156.9	23.60-24.00
21850.0-21870.0	242.8-243.2	31.20-31.50
	1215.0-1240.0	52.00-54.25
	1400.0-1427.0	58.20-59.00
	1559.0-1610.0	64.00-65.00
	2690.0-2700.0	86.00-92.00
	4990.0-5000.0	101.00-102.00
		130.00-140.00
		182.00-185.00
		230.00-240.00

4.21. Nonlicensed Devices. A nonlicensed device is a low power intentional, unintentional or incidental radiator or device that meets the technical specifications prescribed in FCC Code of Federal Regulation, Title 47, Part 15 or the NTIA Manual Annex K. Nonlicensed devices are afforded no protection from interference; if interference is caused to an authorized service, the nonlicensed device must cease operation. Because of this, Air Force activities must exercise caution in procuring and using nonlicensed devices. Examples of nonlicensed devices are wireless local area networks, wireless microphones, and cordless telephones. Using activities will not use nonlicensed devices for critical command and control applications essential for mission success, protection of human life or high value assets.

4.21.1. Nonlicensed devices used within the US&P do not require submittal of a DD Form 1494, however, any modification made to a FCC Part 15 device that affects the emissions of the radiator will nullify the Part 15 certification and a DD Form 1494 may be required unless the device still conforms to the technical specifications of the NTIA Manual Annex K. Nonlicensed devices used outside the US&P require submittal of a DD Form 1494 through command channels to the appropriate theater CINC and host nations. Users with operational requirements outside the US&P must understand the following:

4.21.1.1. There is no corresponding international nonlicensed device classification.

4.21.1.2. Any equipment that radiates RF energy in a foreign country requires host nation approval prior to operation.

4.21.2. Nonlicensed devices used within the US&P may be operated officially without a NTIA approved frequency assignment; however, DoD requires a frequency assignment registered in the Frequency Resource Records System. Users will submit frequency proposals for nonlicensed devices through command channels to the AFFMA. Frequency assignments for nonlicensed devices used outside the US&P will be submitted through command channels to the appropriate theater CINC and host nations. Frequency proposals will include the following SFAF entries:

4.21.2.1. Item 144 will be marked “U” or “O.”

4.21.2.2. Item 520 will have the following statement: “Equipment complies with the technical requirements of Annex K of the NTIA Manual. Equipment will not be used for critical command and control applications. User understands device has no recognized right to any part of the RF spectrum, may not claim interference protection, and will be immediately shut off upon notification it is causing interference.”

4.22. Industrial, Scientific, and Medical Equipment. Industrial, scientific and medical equipment is defined as the operation of equipment or appliances designed to generate and use radio frequency energy for industrial, scientific, medical, domestic or similar purposes, excluding application in the field of telecommunications. Assignments are not required to operate industrial, scientific and medical equipment within the US&P under the following conditions:

4.22.1. Operate on the designated industrial, scientific and medical equipment frequencies and within the frequency limits found in **Table 4.10.**

4.22.2. Terminate use of industrial, scientific and medical equipment, or take steps to resolve interference, when interference to authorized frequency users occurs outside the industrial, scientific and medical equipment frequency limits.

4.22.3. Industrial, scientific and medical equipment operations are prohibited on the following SAR frequency bands: 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.

4.22.4. Industrial, scientific and medical equipment must meet conditions in NTIA Manual, Chapter 7.10.

Table 4.10. Industrial, Scientific, and Medical Frequencies.

FREQUENCY	PLUS OR MINUS	FREQUENCY	PLUS OR MINUS
6780 kHz	15.0 kHz	5800.0 MHz	75.0 MHz
13560 kHz	17.0 kHz	24.125 GHz	125.0 MHz
27120 kHz	163.0 kHz	61.25 GHz	250.0 MHz
40.68 MHz	20.0 kHz	122.5 GHz	500.0 MHz
915.0 MHz	13.0 MHz	245.0 GHz	1.0 GHz
2450.0 MHz	50.0 MHz		

4.23. Family Radio Service (FRS). FRS is a FCC unlicensed low powered service that provides coverage up to 2 miles using frequencies within the FRS frequency pool (see **Table 4.11.**). FRS radio may be used on any of the 14 FRS channels, which are shared between all FRS users. This means that users cannot only listen to your conversation, but they can legally transmit into your conversation. No FCC license or permanent frequency assignment is required and no FRS channel may be assigned to any specific individual or organization. Air Force users may use FRS as long as they comply with the policy stated in AFI 33-118.

4.23.1. Privacy codes allow the FRS users to limit the transmissions received to those users with the same channel and privacy code (38 privacy codes for each of the 14 channels). This reduces confusion between multiple conversations on the same channel. The industry is developing numerous models of FRS radios, some of which are in the $20-$30 range. These models lack privacy codes and have limited channeling (less than 14 channels). If a user must go with a FRS solution, then purchasing FRS radios with the full 14 channels and 38 privacy codes should be encouraged.

4.23.2. Use of FRS Outside US&P. FRS is subject to host country and international regulations. Use of FRS radios by Air Force members or employees is not authorized for use outside the US&P without host nation approval. Unified command directives apply. Coordinate FRS use with the appropriate Air Force Component Spectrum Management Office.

Table 4.11. FRS Frequency Pool

FRS Frequency Pool (MHz)			
462.5625	462.5875	462.6125	462.6375
462.6625	462.6875	462.7125	467.5625
467.5875	467.6125	467.6375	467.6625
467.6875	467.7125		

4.24. General Mobile Radio Service (GMRS). The GMRS is a FCC licensed high-powered service that provides coverage up to 5 miles. This service uses some frequencies from the FRS pool and frequencies exclusively assigned to GMRS pool (refer to **Table 4.12.**). This FCC licensed service is forbidden for use by government entities or employees in the line of duty (see FCC Part 95.5 for Eligibility Rules). Private citizens, including government employees, may apply for private use license from the FCC; however, they cannot use this license in the line of duty, or as an employee of any government entity, including non-appropriated fund activities. Bottom line: Air Force users can't use it; Air Force users will not use it.

Table 4.12. GMRS Frequency Pool

GMRS Frequency Pool (MHz)			
462.5625	462.5875	462.6125	462.6375
462.6625	462.6875	462.7125	462.5500
462.5750	462.6000	462.6250	462.6500
462.6750	462.7000	462.7250	467.5500
467.5750	467.6000	467.6250	467.6500
467.6750	467.7000	467.7250	

4.25. Terrestrial and Space Systems within Shared Bands. The following information applies to those bands between 1 GHz and 50 GHz equally shared by space and terrestrial services:

4.25.1. AFFMA determines whether a proposed fixed or mobile station in these bands will be within the normal coordination distance of an earth station listed in the NTIA Manual.

4.25.2. If the location is within the coordination distance, AFFMA coordinates the request with the agency operating the earth station.

4.25.3. Begin coordinating earth stations during the system review using procedures outlined in Chapter 8.3.12 and 8.3.13 of the NTIA Manual. Indicate on applications for frequency assignments the status of coordination with agencies that have terrestrial operations in the same band and within the coordination area of the earth stations.

4.25.4. AFFMA does not take final assignment action until national-level coordination is complete.

4.26. Space and Balloon Systems. Include with each frequency request to radiate electromagnetic energy from spacecraft or balloon systems, either a detailed description of the methods for on-off telecommand capability, or a justified request for an exception.

4.27. Space-Ground Link Subsystem. Eighteen channels in the downlink band (2200-2290 MHz) and 20 channels in the uplink band (1761-1842 MHz) are authorized for field activities at Space Division located at Los Angeles CA; Eastern Space and Missile Center (ESMC); and Western Space and Missile Center (WSMC). Space Division, ESMC, and WSMC spectrum managers manage and issue discrete frequency assignments on a program-by-program basis.

4.28. Antenna Testing Frequencies Above 30 MHz. Include the following information in SFAF Item 520:

4.28.1. Effective radiated power. If unknown, give a reasonable estimate.

4.28.2. Profile of the surrounding terrain by description, maps, or other means. If you are testing within shielded enclosures, so state, and give the attenuation (in dBs) provided by the enclosure.

4.28.3. Antenna configuration, to include:

4.28.3.1. Type.

4.28.3.2. Whether full scale or less than full scale.

4.28.3.3. Beamwidth in azimuth and elevation.

4.28.3.4. The estimated hours of use in local time (e.g., 0800 to 1700 daily, Monday through Friday; daytime only, Monday through Friday).

4.29. Requests for Restricted Frequencies. Except in unusual circumstances, do not ask for bands where regulations prohibit assignments (e.g., radio astronomy bands, standard frequency bands, some space bands, etc.). If a frequency is needed in a prohibited band, explain in SFAF Item 520 why operation is necessary in the prohibited band. Include type of service for which the antenna test is intended, (e.g., radiolocation, radionavigation, fixed, space). Give the government agency and contract number if testing supports a government contract. Explain the mission impact if you are not provided an assignment.

4.30. Line of Sight (LOS) Frequency Diversity. Justify the use of frequency diversity for new LOS transmission systems in the bands 1710-1850, 2200-2290, 4400-4490, 7125-7250, and 8025-8400 MHz. Explain the need for such a high degree of systems reliability and cite the engineering study showing that frequency diversity is needed to get the required reliability. Existing systems using frequency diversity may continue until frequency congestion requires reevaluation.

4.31. Canadian Station Licenses. AFFMA obtains licenses using the data from frequency actions sent by the MAJCOMs. Include in SFAF Item 520 the approximate number of civilian and military personnel, assigned to the radio station on a yearly basis, who directly operate and maintain transmitter and receiver stations.

4.31.1. Amendments to Licenses. Review frequency assignments before 1 December of each year to determine if any changes are needed. If so, send a frequency modification through command channels to reach AFFMA before 1 January of each year. Include in SFAF Item 520 the reason for the change. AFFMA coordinates the changes with the Canadian Department of Communications. MAJCOMs must validate any changes to the technical operation of an installation.

4.31.2. Renewal of Licenses. The Canadian Department of Communications automatically renews radio licenses not requiring amendments on 1 April of each year, without any action by the applicant.

4.32. Operating FCC-Licensed Stations on Air Force Installations.

4.32.1. CBs, amateurs, taxi companies, and other FCC-licensed radio stations may transmit on Air Force installations but are subject to any limitations imposed by the installation commander. Do not impose limitations that unnecessarily infringe on the rights of the individual to operate a radio according to FCC *Rules and Regulations.*

4.32.2. Register FCC-licensed stations operating on an Air Force installation only if the installation commander believes there is a need for registration. Include registration instructions in an installation instruction or manual.

4.32.3. If FCC-licensed stations are involved in interference:

4.32.3.1. Report interference from a FCC-licensed station to Air Force operations according to AFI 10-707, *Spectrum Interference Resolution Program*. The installation commander may direct an on-installation offending station to cease operations and will notify AFFMA, through host MAJCOM, of details of the action within 3 duty days. AFFMA will give this information, includ-

ing action taken, to the FCC, Washington DC, if appropriate, and the local FCC through the FCC Watch Officer at (202) 632-6975 (UNCLAS) or (202) 632-6464 (STU) .

4.32.3.2. Licensees report interference between two FCC-licensed stations to the FCC Watch Officer at (202) 632-6975 (UNCLAS) or (202) 632-6464 (STU).

4.32.3.3. Report Air Force operations interference to FCC-licensed stations according to AFI 10-707.

4.32.3.4. The FCC resolves interference by a FCC-licensed station to the reception of commercial broadcast stations or the use of home entertainment units. Victims of such interference report the problem to the FCC Watch Officer at (202) 632-6975 (UNCLAS) or (202) 632-6464 (STU).

4.33. International Maritime Satellite (INMARSAT). The Communications Satellite (COMSAT) Corporation is the sole agent for commissioning and use of the INMARSAT system in the CONUS. Obtain commissioning application from the COMSAT Corporation, follow the procedures in Annex E of the NTIA Manual, or contact the various vendors of INMARSAT compatible terminal equipment.

4.33.1. Per the INMARSAT web page, **https://www.afca.scott.af.mil/inmarsat**, send completed INMARSAT application to HQ AFCA/GCOM, 203 W. Losey Street, Room 3100, Scott AFB IL 62225-5222, through command channels for coordination and processing with the COMSAT Corporation. Do not submit applications directly to AFFMA, COMSAT Corporation, NTIA, or the DoC.

4.33.2. Use outside the U.S. is subject to restrictions set forth by host nation governments. Coordinate equipment use through the appropriate spectrum management channels. Contact the INMARSAT POC to negotiate host nation approval (HNA) coordination.

4.34. Joint Tactical Information Distribution System (JTIDS). The Joint Tactical Information Distribution System (JTIDS) is a communications, navigation and identification system intended to exchange surveillance and command and control information among various airborne and ground platforms. It operates in the 960-1215 MHz band using advanced synchronous time division multiple access, spread spectrum technology, frequency hopping and cryptographic security. JTIDS randomly hops on fifty-one center frequencies and also uses 1030 and 1090 MHz for identification. The system is jam resistant, providing joint interoperability, battlefield situational awareness, and information superiority through the exchange of tactical digital information link (TADIL) J and Link 16 messages among JTIDS and Multifunctional Information Distribution System (MIDS) terminals. JTIDS is a joint program and the US Navy is the lead service.

4.34.1. Users will process frequency requirements for JTIDS through command channels to the AFFMA JTIDS action officer (T14). All JTIDS frequency actions will be coordinated at the national level with the FAA, military services, and affected military operating area spectrum managers. Frequency requests follow the normal FAS/IRAC process and require a minimum of 60-90 days to complete.

4.34.2. JTIDS/MIDS Terminals. JTIDS/MIDS terminals operate within the frequency band allocated world wide for aeronautical radionavigation. Use of this band in the US&P is controlled by the FAA. The DoD must operate within the strict guidelines set by the FAA to ensure flight safety.

4.34.2.1. Fighter Data Link (FDL). The FDL integrated into the active Air Force and Air National Guard F-15 fighter aircraft provides situational awareness and sensor cueing in support for the air superiority and air interdiction mission areas. FDL supports the exchange of intraflight and inter-

flight information, including real-time intelligence into the cockpit. Information exchanged via Link 16 includes flight member position, targets, and ordnance status. Target identification and sorting messages allow all members in a flight and linked command and control agencies to visually observe target selection, assignments, and battlefield damage assessments.

4.34.2.2. Class 2. The JTIDS class 2 family of terminals provide JTIDS capability in fighter aircraft, command and control platforms and surface-to-air defense units through real-time, jam resistant, high capacity, secure data and voice communications. It is a joint effort used by all services.

4.35. Tactical Digital Information Link (TADIL).

4.35.1. TADIL A/B [Link-11] employs netted communication techniques and a standard message format for exchanging digital information among airborne [TADIL-A] as well as land-based and shipboard [TADIL-B] tactical data systems. Link-11 data communications must be capable of operation in either the HF or UHF bands. TADIL-A/B is used by a number of intelligence platforms such as RIVET JOINT that conduct signal intelligence data collection, including communications intelligence and electronic intelligence. Link 11 provides high speed computer-to-computer digital radio communications in the HF and UHF bands among Tactical Data System equipped ships, aircraft and shore sites.

4.35.2. TADIL C [Link-4A] is a nonsecure data link used for providing vector commands to fighters. It is a netted, time division link operating in the UHF band at 5,000 bits per second. There are 2 separate "Link 4s": Link 4A and Link 4C. Link-4A provides digital surface-to-air, air-to-surface, and air-to-air tactical communications. Originally designated Link-4, this link was designed to replace voice communications for the control of tactical aircraft. The use of Link-4 has since been expanded to include communication of digital data between surface and airborne platforms, but Link-4A's transmissions are not secure, nor are they jam-resistant; however, Link-4A is easy to operate and maintain without serious or long-term connectivity problems.

4.35.2.1. Link 4C is a fighter-to-fighter data link, which is intended to complement Link 4A, although the two links do not communicate directly with each other. Link 4C uses F-series messages and provides some measure of electronic countermeasures resistance. Link 4C is fitted to the F-14 only and the F-14 cannot communicate on Link 4A and 4C simultaneously. Up to 4 fighters may participate in a single Link 4C net. It is planned that Link 16 will assume Link 4A's role in ATC operations and Link 4C's role in fighter-to-fighter operations.

4.35.3. TADIL J [Link-16] uses the JTIDS which is the communications component of Link-16 and operates in the high UHF band (969-1206 MHz). Link-16 does not significantly change the basic concepts of tactical data link information exchange supported for many years by Link-11 and Link-4A. Rather, Link-16 provides certain technical and operational improvements to existing tactical data link capabilities and provides some data exchange elements, which the other data links lack. It provides significant improvements as well, such as jam resistance; improved security; increased data rate (throughput); increased amounts/granularity of information exchange; reduced data terminal size, which allows installation in fighter and attack aircraft; digitized, jam-resistant, secure voice capability; relative navigation; precise participant location and identification and increased numbers of participants.

4.35.3.1. LINK-16 is DoD's primary tactical data link for command, control, and intelligence, providing critical joint interpretability and situation awareness information. Link 16 uses a Time Demand Multiple Access architecture and the "J" message format standard. The "J" series of message standards are designated as the DoD's primary tactical data link, according to the Joint Tactical Data Link Management Plan.

4.35.3.2. The JTIDS terminal is one of two terminals providing LINK-16 capability to the soldiers, sailors, and servicemen in the field. The other LINK-16 terminal is the MIDS terminal--a joint/international ACAT-1D program.

4.35.3.3. Frequency assignments and operations must be in strict adherence to Chairman Joint Chiefs of Staff Instruction (CJCSI) 6232.01B, *Deconflicting JTIDS/MIDS Operations, 1 April 2001*, and the Joint Spectrum Users Guide (JSUG), both of which can be found on the Headquarters Air Combat Command (HQ ACC) web site "**https://totn.acc.mil/**."

4.36. Station Keeping Equipment (SKE) (AN/APN-169 & AN/APN-243). SKE provides transport aircraft (C-130, C-141, and C-17) the ability to fly safely in close formation in all weather. This is accomplished by presenting the aircrew with a situational display that shows the relative position of the other formation members in reference to the lead aircraft, and alerts the crew via audiovisual proximity warning when aircraft come too close to each other. The system transmits high-powered pulses on one of four frequencies (3350, 3390, 3470, 3510 MHz). When used with the zone maker (AN/TPN-027B), the system provides for precision guidance to the drop zone.

4.36.1. The Air Mobility Command Tanker Airlift Control Center (TACC) Spectrum Management Office maintains four frequency assignments for SKE usage within the US&P. The TACC Spectrum Management Office deconflicts SKE usage to ensure safe passage of multiple formations and drop zones.

4.36.2. SKE follow-on (AN/APN-243A) provides transport aircraft (C-17) the ability to fly safely in close formation in all weather. This is accomplished by presenting the aircrew with a situational display that shows the relative position of the other formation members in reference to the lead aircraft, and alerts the crew via audiovisual proximity warning when aircraft come too close to each other. The system allows interoperation of up to 100 aircraft in 100nmi range, utilizing a low probability of detection spread spectrum waveform in the 3100-3600 MHz band. The frequency hop set is programmable based on host nation authorizations. Multiple hop sets may be loaded in to the system depending on each nation's authorizations. The lead aircraft coordinates the manual switching of the hop sets at country borders. When used with the zone maker (AN/TPN-027B), the SKEFO system operates in high-powered pulsed mode on one of four fixed channels, the system provides for precision guidance to the drop zone.

4.37. Single Channel Ground/Airborne Radio Subsystem (SINCGARS). The Air Force acquires ground SINCGARS radios from the Army. This program encompasses the following program elements: Airborne SINCGARS Jam Resistant VHF radio (AN/ARC222) and the Ground SINCGARS Jam Resistant VHF Communications. The increased usage of tactical Unmanned Aerial Vehicles (UAV) and other Airborne Communications Node platforms requires a thorough understanding of the request procedures as well as potential limiting factors when considering employing the SINCGARS radio in either ground based and/or airborne based operations, hopping or nonhopping mode. The guidance below applies to CONUS only.

4.37.1. Ground Based SINCGARS. The objective of ground SINCGARS is to obtain a jam-resistant VHF ground radio capability.

4.37.1.1. Hopping Mode and Nonhopping Mode. Frequency assignments and coordination for use are subject to the spectrum resources available in the local area.

4.37.2. Airborne Based SINCGARS. The objective of Airborne SINCGARS is to achieve a jam-resistant VHF voice radio capability for Air Force aircraft.

4.37.2.1. Hopping mode:

4.37.2.1.1. 30-88 MHz - Below 1000 feet elevation above ground level (AGL), hopping operations are coordinated with the supporting AFC.

4.37.2.1.2. 30-50 MHz - Above 1000 feet elevation AGL, all frequencies must be coordinated with the supporting AFC.

4.37.2.1.3. 50-54 MHz - Above 1000 feet elevation AGL, any and all use of this radio amateur band must be coordinated through the supporting AFC.

4.37.2.1.4. 54-88 MHz - Above 1000 feet elevation AGL, the SINCGARS hopping mode may be permitted at selected sites within CONUS. Use can potentially interfere with commercial television, operational use is based on a case-by-case noninterference basis. This requires national level coordination with the FCC through proper frequency management channels.

4.38. HAVE QUICK. The basic HAVE QUICK radio is a single channel UHF radio system modified to include a slow frequency hopping capability to counter jamming threats encountered in the early 1980s. During the mid to late 1980s HAVE QUICK II evolved as a minimal cost modification of the basic HAVE QUICK that provided additional anti-jam protection, improved frequency hopping algorithms, and expanded hopsets. With an anticipated increase in jamming threats in the late 1980s, and in an effort to refine the system's capabilities, the development of HAVE QUICK IIA was initiated. HAVE QUICK IIA was designed to provide faster frequency hopping rates, additional hopset's capability resulting from narrower channel bandwidth, and support for the transmission of digital data. HAVE QUICK IIA was designated as the second-generation antijam tactical UHF radio for North Atlantic Treaty Organization (NATO) (SATURN) upon being accepted as the NATO standard, STANAG 4372. Although the US supports STANAG, SATURN remains an unfunded requirement and is not presently part of our radio inventory. The Air Force uses many different types of equipment for HAVE QUICK operations (AN/ARC-164/171/204/210/215/225; AN/GRC-171B(V)4/206(V)3/240; AN/PRC-113; AN/TRC-176; AN/TSQ-198; AN/URC-98A/99A; AN/VRC-83(V)3. Frequencies for Air Force operations are set aside in the M225-400 channeling plan for HAVE QUICK I and HAVE QUICK II operations. CJCSM 6230.05A, *Joint HAVE QUICK Planner's Manual*, June 1999, provides information and guidance to personnel planning the joint employment of HAVE QUICK.

4.39. Commercial Satellite Communications. The use of commercial satellite services is becoming more and more prevalent within DoD. Once the responsibilities are understood, the type of service must be decided. Fixed satellite service provides users a leased transponder from a commercial satellite provider. Mobile Satellite Service (MSS) provides users a service at a monthly service fee similar to telephone service.

4.39.1. The fixed satellite service requires the user to lease a transponder from a commercial satellite provider. All equipment used to access a commercial satellite must conform to FCC part 25 standards.

If the equipment is leased or commercially owned, the commercial provider is responsible for securing FCC Part 25 certifications. If the equipment is DoD owned, DoD must request FCC Part 25 certification. When processing the DD Form 1494 the user must also submit the following information. The AFFMA will submit the information to the FCC along with the DD Form 1494. Once Part 25 certification (see **Table 4.13.**) is approved, comments will be entered in the MCEB guidance.

Table 4.13. FCC Part 25 Certification

Operational description	Include an operational description and any supporting information you feel the FCC may need to understand your use.
FCC Radio License	If the assignment was supported by a commercial license, include the owner of the license, locations authorized on the license, the call sign, and the file number.
Location of Earth Station	Include the site ID, city, state, coordinates, and site elevation (meters) for each earth station. ***NOTE:*** The site ID is a name used to identify a specific earth station. This name will be used any time the site ID is requested.
Points of Communications	Include the satellites you desire to use and their location. Note: If the requirement will be for any US domestic satellite, you may enter ALSAT (All US Domestic Satellites).
Destination Points for Communications using non-US Licensed Satellites	Include the satellite name and all destination points for any requirements using non-US satellites
Earth Station Antenna Facilities	Include the site ID, antenna ID, quantity, manufacturer, model, antenna size (meters), and the antenna transmit/receive gain (____dBi at ____GHz) for all earth station antennas. ***NOTE:*** As with the site ID the antenna ID is also a name used to identify a particular antenna and will be used any time the antenna ID is requested.
Antenna Heights and Maximum Power Limits	Include the antenna ID, maximum antenna height above ground level (meters), maximum antenna height above mean sea level (meters), building height above ground level (meters), maximum antenna height above rooftop (meters), total input power at antenna flange (watts), and total EIRP for all carriers (dBW) for all antennas.
Frequency Coordination Limits	Include the antenna ID, frequency limits (MHz), range of satellite arc eastern limit, range of satellite arc western limit, antenna elevation angle eastern limit, antenna elevation angle western limit, earth station azimuth angle eastern limit, earth station azimuth angle western limit, maximum EIRP density toward the horizon (dBW/4kHZ) for all antennas.

Particulars of Operation	Include the antenna ID, frequency bands (MHz), mode of operation (transmit/receive), antenna polarization (H, V, L, R), emission designator, maximum EIRP per carrier (dBW), maximum EIRP density per carrier (dBW/4kHz), and a description of the modulation for all antennas. ***NOTE:*** You must list all frequency bands and all emission designators for each band.

4.39.2. The MSS normally refers to a service where the user pays a monthly service fee much like we do with the telephone. In most cases DoD owns the equipment; however, since the DoD is just another user, the service provider is responsible for all spectrum supportability issues to include host nation coordination. For this reason government users must verify host nation supportability before deploying overseas with the service.

4.40. Frequency Requests for Canada and Canadian Border Areas. The United States and Canada have made arrangements to coordinate frequency requests for radio transmitters operating close to both countries.

4.40.1. Frequency Assignments in United States-Canadian Border Areas. Frequency assignments in the United States-Canadian border areas are coordinated by the IRAC with the Canadian Government according to the NTIA Manual Chapter 3.4.

4.40.2. Assignments for Air Force Radio Stations in Canadian Territory. The Canadian Government (in agreement with the US Government) licenses United States military radio stations in Canada. The Canadian-US defense agreement must authorize each station; however these radio stations do not need individual licenses.

4.40.2.1. The following procedures apply to US military activities within Canada:

4.40.2.1.1. A Canadian-US defense agreement must authorize each installation or activity.

4.40.2.1.2. US military radio stations that support an US activity need a Canadian license.

4.40.2.1.3. Multiple equipment installations, such as communications complex transmitter sites, are licensed as individual stations.

4.40.2.1.4. Airborne radio stations do not need a Canadian license for communications with a licensed ground station, but do require frequency coordination and approval from the Canadian Frequency Allocation Coordinating Subcommittee and the Joint Telecommunications Committee for airborne radio operations. AFFMA processes the coordination and clearance through the USMCEB FP for Air Force airborne radio stations operating in Canada.

4.40.2.1.5. Licenses issued to parent fixed stations include associated vehicular radio stations.

4.41. Performing Electronic Attack in the United States and Canada for Tests, Training, and Exercises**.** The NTIA recognizes CJCSM 3212.02, *Performing Electronic Attack in the United States and Canada for Tests, Training, and Exercises*, 1 October 1998, as the official guidance for frequency clearance procedures for performing Electronic Attack.

4.42. Mutual Aid. When the equipment is owned by the civil agency and is given to the government agency for the purpose of mutual aid, a government frequency assignment does NOT require entry into

the GMF. When the government entity owns fixed station equipment, and the purpose of the frequency usage is "mutual aid," then the frequency assignment must be registered into the GMF. Government owned mobile or portable assets, unless used in a fixed station mode that is specifically intended to provide "mutual aid" support under a licensed nongovernment fixed station operating environment does not have to be registered into the GMF. During the registration process, the FCC performs coordination required by paragraphs 7.12 and 8.3.3 of the NTIA Manual. In addition, a Letter of Agreement must be on file and have been signed by the nongovernment or government parties requesting the aid agreement.

4.43. Foreign Military Sales (FMS). With regard to FMS one of two situations must apply. Either the government owns the equipment and will transfer the equipment directly to a foreign government, or a contractor owns the equipment and will transfer the equipment to the foreign government. If the government owns the equipment for transfer, but has never operated the equipment in the US&P and never intends to operate the equipment in the US&P, then no DD Form 1494 is required, and the government may apply for a temporary frequency assignment through the NTIA process. The frequency proposal application will clearly state, using S-Note 303, that there is no intent to use the equipment in the US&P and a remark in SFAF item 503 should state: Foreign Military Sales. The station class of the proposed assignment will be "XE." If the government owns the equipment and HAS operated or intends to operate the equipment in the US&P, then the normal DD Form 1494 and frequency assignment process must be followed. If the equipment is currently in the Air Force inventory then there should be an existing DD Form 1494/J-12 on file. If the contractor owns the equipment for transfer, then the contractor must obtain a license from the FCC. (See contractor owned equipment below). AFFMA Action Officers have been instructed to challenge ownership on all future "Experimental/Temporary" frequency assignment proposals. If the ownership is not clearly the Air Force then the proposal will be rejected.

4.44. Contractor-Owned Equipment. Reference: NTIA Manual Chapter 9, para 9.1.4. The determination that must be made by the government agency is based on "whether the radio station/equipment is owned by the Government or the Contractor." If the Government has not taken possession of the equipment (and now owns the equipment) then the contractor must apply to the FCC for the license to operate the station/equipment. If the government has taken possession/ownership of the equipment then the government must apply for the license (frequency assignment) through the NTIA process. When the contractor owns the equipment, the contracting government agency is responsible to the FCC to (1) verify the validity of the contract, and (2) certify that the contractor requires the proposed frequency assignment necessary for the fulfillment of the contract. AFFMA action officers have been instructed to challenge ownership on all future "Experimental/Temporary" frequency assignment proposals. If the ownership is not clearly the Air Force then the proposal will be rejected.

4.45. Civil Air Patrol (CAP). CAP, an auxiliary of the Air Force under Title 10 United States Code (U.S.C.), *Armed Forces*, Chapter 909, *Civil Air Patrol*, is a nonprofit, civilian corporation under 36 U.S.C., *Patriotic and National Observances, Ceremonies, and Organizations*, Chapter 403, *Civil Air Patrol*. It receives support from the Department of Defense (DoD) and other departments or agencies of the United States under Title 10 USC. A Memorandum of Agreement between the AFFMA, Air Education and Training Command (AETC), and CAP contain the spectrum management processes and responsibilities involving CAP.

4.45.1. The CAP function and organization is contained in AFI 10-2701, *Organization and Function of the Civil Air Patrol*. The processing of spectrum interference reports is outlined in AFI 10-707. CAP follows Air Force procedures for processing their spectrum support requirements: CAP will pro-

cess spectrum requirements through AETC; AETC will process CAP requirements in accordance with the current level guidance.

4.45.2. CAP may use frequencies in the M138 – 144 and M148 – 150.8 VHF LMR subbands to support Air Force assigned operations. Typical CAP command and control requirements in this band consist of the following:

4.45.2.1. Two pair of VHF frequencies for repeater operations.

4.45.2.2. One simplex talk-around frequency.

4.45.2.3. One simplex air-to-ground frequency.

4.45.2.4. One simplex data frequency.

4.45.3. CAP also has interests and operations in other frequency bands such as:

4.45.3.1. HF, conventional and ALE.

4.45.3.2. Aeronautical AM.

4.45.3.3. Emergency Locator Transmitter (ELT) training in VHF and UHF.

4.45.3.4. Repeater control.

4.45.3.5. Video.

4.45.4. AFFMA will maximize the use of regional and US&P frequency assignments to meet CAP spectrum requirements and registration in the GMF. Notable exceptions will encompass requirements within border zone areas (Canada and Mexico) and proximity assignments to high density metropolitan or military area facilities, as defined or required by the NTIA for management of spectrum use in the United States. Location specific spectrum requirements will be documented in the FRRS.

Chapter 5

FREQUENCY COORDINATION PROCEDURES

5.1. Aerospace and Flight Test Radio Coordinating Council (AFTRCC). AFTRCC is comprised of representatives of the aerospace manufacturing industry using the government/nongovernment shared 1435-1535 and 2310-2390 MHz bands during research and development phases of manned and unmanned aircraft, missiles, booster rockets and other expendable vehicles. Since the bands are shared, coordination must be accomplished between agencies in order to minimize the possibility of interference. All frequency assignment actions for use of frequencies in the bands 1435-1535 and 2310-2390 MHz by US government radio stations within the conterminous United States must be coordinated with the appropriate agency listed in **Table 5.1.** The agency will complete field level coordination and notify the requestor upon completion. The appropriate coordination C-Note must be entered in SFAF item 500 on all assignment requests.

Table 5.1. AFTRCC Coordination Agencies.

Coordination Agency	Area of Responsibility	C-NOTES
Western Area Frequency Coordinator Pt Mugu CA 93042-5001 Telephone: (805) 989-7983 DSN: 351-7983	California south of 37°30'N, including all off shore islands	C003
Area Frequency Coordinator 99CS/SCXF 5870 Devlin Drive Nellis AFB NV 89191-7075 Telephone: (702) 652-3417 Fax: (702) 652-7354 DSN: 682-3417	Nevada; Utah west of 111°W; Idaho south of 44°N	C068
Area Frequency Coordinator State of Arizona ATTN: SFIS-FAC-SS Ft Huachuca AZ 85613-5000 Telephone: (520) 538-6423 DSN: 879-6423	Arizona	C008
Area Frequency Coordinator ATTN: SFIA-FAC-SS White Sands Missile Range NM 88002-5526 Telephone: (505) 678-5417 DSN: 258-3702	New Mexico; Texas west of 104°W; Utah and Colorado between 108°W and 111°W	C007

Coordination Agency	Area of Responsibility	C-NOTES
Army Frequency Management Office (AFMO) – CONUS ATTN: SFIS-FAC-SC Ft Sam Houston TX 78234-5000 Telephone: (210) 221-2820/2050 DSN: 258-2820	Arkansas; California north of 37°30'N; Colorado east of 108°W; Idaho north of 44°N; Illinois; Indiana; Iowa; Kansas; Louisiana west of 90°W; Michigan; Minnesota; Missouri; Montana; North Dakota; Oklahoma; Oregon; South Dakota; Texas east of 104°W; Wisconsin; Wyoming	C019
Gulf Area Frequency Coordinator 96CCG/SCWZ Eglin AFB FL 32542-6829 Telephone: (850) 882-4416 Fax: (850) 882-4202 DSN: 872-4416	Alabama south of 33°30'N; Florida west of 83°W; Georgia west of 83°W, south of 33°30'N; Louisiana east of 90°W, south of 33°33'N	C011
Eastern Area Frequency Coordinator 45CS/SCXF 1225 Pershing Street Patrick AFB FL 32925-3340 Telephone: (407) 494-5838/9408 Fax: (407) 494-8715 DSN: 854-5838	Florida east of 83°W; Georgia east of 83°W, south of 31°30'N	C005
Mid-Atlantic Area Frequency Coordinator (514000A) Mail Stop 3, Building 1406 Naval Air Warfare Center Aircraft Division 22953 Cedar Point Road Patuxent River MD 20374-5304 Telephone: (301) 342-1194/1532 Fax: (301) 342-1200 DSN: 342-1194/1532	That area of the eastern US and the Atlantic Ocean south of 41°N; east of a line starting at the intersection of 41°N and 75°30'W running southwest to the intersection of 33°30'N and 83°W; north of 31°30'; west of 68°40'W	C086
Area Frequency Coordinator AFFMA Hoffman I, Suite 1203 2361 Eisenhower Avenue Alexandria VA 22331-1500 Telephone: (703) 428-1544 DSN: 328-1544	Alabama north of 33°30'N; Connecticut; Kentucky; Maine; Massachusetts; Mississippi less east of 90°W, south of 33°30'N; New Hampshire; New Jersey north of 41°N; Ohio; Rhode Island; Tennessee; Vermont; West Virginia; and those areas of the following states west of the Mid-Atlantic AFC area: Georgia; north of 33°30'N; Maryland; North Carolina; Pennsylvania including north of 41°N; South Carolina; Virginia	C016

5.2. Federal Aviation Administration (FAA). The FAA is responsible for the around-the-clock operation of our nation's air traffic control system and helps develop commercial space transportation. In order to accomplish this task several frequency bands have been allocated for aeronautical radionavigation. Any use of frequencies in these bands must be coordinated with the FAA prior to use. The FAA coordinates on the required service volume, the desired-to-undesired signal protection (in dBs), nominates channels/frequencies for ILS, VOR, TACAN, and ATC operations, and provides the PRR for radars.

5.2.1. The FAA coordinator provides a FAA coordination serial number that must be entered in SFAF Item520.

5.2.2. Air Force installations having an ATC support agreement with a FAA facility for local control of civil aircraft will be assigned suitable VHF frequencies for control of civil aircraft.

5.2.3. All agencies requiring frequencies in the bands listed in **Table 5.2.** will coordinate all frequency actions with the appropriate FAA frequency coordinator listed in **Table 5.3.**

Table 5.2. Federal Aviation Administration Frequencies and Bands.

190-285 kHz	132.0125-136 MHz	1104-1146 MHz
285-435 kHz	328.6-335.4 MHz	1157-1213MHz
510-535 kHz	978-1020 MHz	1215-1400 MHz
74.8-75.2 MHz	1030 MHz	2700-2900 MHz (DoD AFC)
108-121.9375 MHz	1031-1087 MHz	5000-5250 MHz
123.5875-128.8125 MHz	1090 MHz	9000-9200 MHz (DoD AFC)

Table 5.3. Federal Aviation Adminsitration Frequency Coordinators.

FAA Coordinator	Area of Responsibility	C-NOTE
Federal Aviation Administration Frequency Management Office ANM-464 1601 Lind Avenue, S.W. Renton WA 98055-4056 Telephone: (206) 227-2464	Colorado; Idaho; Montana; Oregon; Utah; Washington; Wyoming	C041
Federal Aviation Administration Frequency Management Office AWP-483 P.O Box 92007 Worldway Postal Center Los Angeles CA 90009-2007 Telephone: (310) 297-1872	Arizona; California; including all offshore islands; Nevada	C035
Federal Aviation Administration Frequency Management Office ACE-461 601 E. 12th Street Kansas City MO 64106-2894 Telephone: (816) 426-5647	Iowa; Kansas; Missouri; Nebraska	C033

FAA Coordinator	Area of Responsibility	C-NOTE
Federal Aviation Administration Frequency Management Office ASW-483 4400 Blue Mound Road Fort Worth TX 76193-0483 Telephone: (817) 740-3237	Arkansas; Louisiana; New Mexico; Oklahoma; Texas	C034
Federal Aviation Administration Frequency Management Office AGL-483 2300 East Devon Avenue Des Plaines IL 60018 Telephone: (312) 694-7412	Illinois; Indiana; Michigan; Minnesota; North Dakota; South Dakota; Ohio; Wisconsin	C039
Federal Aviation Administration Frequency Management Office ASO-483 P.O. Box 20636 Atlanta GA 30320-0344 Telephone: (404) 763-7385/6	Alabama; Florida; Georgia; Kentucky; Mississippi; North Carolina; Puerto Rico; South Carolina; Tennessee; US Possessions in the Caribbean; Virgin Islands	C032
Federal Aviation Administration Frequency Management Office AEA-483 Fitzgerald Federal Building JFK International Airport Jamaica NY 11430 Telephone: (718) 712-8343	Delaware; District of Columbia; Maryland; New Jersey; New York; Pennsylvania; Virginia; West Virginia	C031
Federal Aviation Administration Frequency Management Office ANE-480 12 New England Executive Park Burlington MA 01803 Telephone: (781) 273-7177	Connecticut; Maine; Massachusetts; New Hampshire; Rhode Island; Vermont	C038
Federal Aviation Administration Frequency Management Office AAL-483 222 West 7th Avenue Anchorage AK 99513-0087 Telephone: (907) 243-5563	Alaska	C036
Federal Aviation Administration Frequency Management Office AWP-480H P.O Box 50109 Honolulu HI 96850-4983 Telephone: (808) 734-6627	Hawaii; US Possessions in the Pacific Ocean	C037

5.3. DoD Area Frequency Coordinator (AFC). The DoD AFC is responsible for ensuring successful frequency coordination in the areas that lie within, adjacent, and within radio line-of-sight to any range spectrum-dependent system. Although the military departments provide DoD AFCs, these coordinators are responsible to the MCEB.

5.3.1. Military activities will coordinate with the appropriate DoD AFC prior to assignment of all frequencies, or activation of any intended electromagnetic spectrum use within, adjacent, and within line-of-sight of a DoD AFC's area of responsibility. **Table 5.4.** lists the DoD AFCs, their area of responsibility, and the applicable C-Notes that must be entered in SFAF item 500 on all frequency assignments.

5.3.1.1. When an assigned frequency is different from the frequency requested and coordinated with the DoD AFC, the agency making the assignment will coordinate the new frequency with the appropriate DoD AFC.

5.3.2. Line of sight (LOS) is defined as the distance to the horizon at a given height approximated by the formula: $D = \sqrt{2ht} + \sqrt{2hr}$, where D = LOS (miles), ht = height of the transmitter in feet, and hr = height of the receiver in feet.

Table 5.4. DoD Area Frequency Coordinators.

AFC	Area of Responsibility	C-NOTES
Western Area Frequency Coordinator Pt Mugu CA 93042-5001 Telephone: (805) 989-7983 Fax: (805) 989-4854 DSN: 351-7983	California south of 37°30'N, Including all off shore islands	C003
Area Frequency Coordinator 99CS/SCXF 5870 Devlin Drive Nellis AFB NV 89191-7075 Telephone: (702) 652-3417 Fax: (702) 652-7354 DSN: 682-3417	Nevada; Utah west of 111°W; Idaho south of 44°N	C068
Area Frequency Coordinator State of Arizona ATTN: SFIS-FAC-SH Ft Huachuca AZ 85613-5000 Telephone: (520) 538-6423 Fax: (520) 538-8528 DSN: 879-6423	Arizona	C008
Area Frequency Coordinator White Sands Missile Range NM 88002-5526 Telephone: (505) 678-5417 Fax: (505) 678-5281 DSN: 258-3702	Entire state of New Mexico; Texas west of 104°W; areas of Utah and Colorado between 108°W and 111°W	C007

AFC	Area of Responsibility	C-NOTES
Gulf Area Frequency Coordinator 96CG/SCWF Eglin AFB FL 32542-6829 Telephone: (850) 882-4416 Fax: (850) 882-4202 DSN: 872-4416	Alabama south of 33°30'N; Florida west of 83°W; Georgia west of 83°W, south of 33°30'N; Louisiana east of 90°W, south of 33°33'N	C011
Eastern Area Frequency Coordinator 45CS/SCXF 1225 Pershing Street Patrick AFB FL 32925-3340 Telephone: (407) 494-5838/9408 Fax: (407) 494-8715 DSN: 854-5838	Florida east of 83°W; Georgia east of 83°W, south of 31°30'N	C005
DoD AFC Puerto Rico Atlantic Fleet Weapons Training Facility (AFWTF) Box 3023 PSC 1008 Code 017 FPO AA 34051-9000 Telephone: (809) 865-5227 Fax: (809) 865-5212 DSN: 831-5227	Area enclosed within a 200 mile radius of the Operational Control Center, Atlantic Fleet Weapons Range	
AFC Kwajalein Atoll (USAKA)	Area enclosed within a 200 mile radius of the headquarters building, USAKA	

5.4. Army Area of Responsibility. Air Force users operating on or in the vicinity of an Army installation must coordinate with the appropriate Army AOR prior to operation; see **Table 5.5.**

Table 5.5. Army Area of Responsibility (AOR).

AFC	Area of Responsibility	C-NOTES
Army Frequency Management Office (AFMO) – CONUS ATTN: SFIS-FAC-SC 1214 Stanley Road, Suite 32 Ft Sam Houston TX 78234-5000 Telephone: (210) 221-2820/2050 DSN: 258-2820	Arkansas; California north of 37°30'N; Colorado east of 108°Idaho north of 44°N; Illinois; Indiana; Iowa; Kansas; Louisiana west of 90°Michigan; Minnesota; Missouri; Montana; North Dakota; Oklahoma; Oregon; South Dakota; Texas east of 104°W; Wisconsin; Wyoming	
Area Frequency Coordinator State of Arizona ATTN: SFIS-FAC-SH Ft Huachuca AZ 85613-5000 Telephone: (520) 538-6423 Fax: (520) 538-8528 DSN: 879-6423	Arizona	

AFC	Area of Responsibility	C-NOTES
Area Frequency Coordinator White Sands Missile Range NM 88002-5526 Telephone: (505) 678-5417 Fax: (505) 678-5281 DSN: 258-3702	Entire state of New Mexico; Texas west of 104°W; areas of Utah and Colorado between 108°W and 111°W	
AFC Kwajalein Atoll (USAKA)	Area enclosed within a 200 mile radius of the headquarters building, USAKA	

5.5. Navy Area of Responsibility. Air Force users operating on or in the vicinity of a Navy installation must coordinate with the appropriate Navy AOR prior to operation; see **Table 5.6.**

Table 5.6. Navy Area of Responsibility (AOR).

AFC	Area of Responsibility	C-NOTES
DoD AFC Puerto Rico Atlantic Fleet Weapons Training Facility (AFWTF) Box 3023 PSC 1008 Code 017 FPO AA 34051-9000 Telephone: (809) 865-5227 Fax: (809) 865-5212 DSN: 831-5227	Area enclosed within a 200 mile radius of the Operational Control Center, Atlantic Fleet Weapons Range	
Western Area Frequency Coordinator Pt Mugu CA 93042-5001 Telephone: (805) 989-7983 Fax: (805) 989-4854 DSN: 351-7983	California south of 37°30’N, Including all off shore islands	C003
Mid-Atlantic Area Frequency Coordinator Commander Code 5.1.4A Building 1406 Naval Air Warfare Ctr Aircraft Div 23029 Cedar Point Road, Unit 4 Patuxent River MD 20670-1183 Telephone: (301) 342-1194/1532 FAX/STU III: ext. 1200 ASPECTS BBS: ext. 1195 DSN: 342-1194/1532	That area of the eastern United States and the Atlantic Ocean south of 41°N; east of a line starting at the intersection of 41° N and 75°30’W running southwest to the intersection of 33°30’N and 83° W; north of 31° 30’; west of 68°40’W	
JFMO Lant (USACOM, J642) 1562 Mitscher Ave., Suite 200 Norfolk VA 23511-2488 Telephone: (757) 836-8006 Fax: (757) 565-9267 DSN: 564-8006	All areas east of the Mississippi River	

5.6. Coordination for Frequency Requests in Canada or along the US Canadian Border.

5.6.1. Regular and Temporary Assignments. The U.S. and Canada have made arrangements to coordinate frequency requests for radio transmitters operating in Canada or near the US/Canadian border. All regular frequency assignments and temporary assignments required for longer than 90 days that conform to the arrangements will be coordinated by the IRAC with the Canadian Government according to Chapter 3.4 of the NTIA Manual.

5.6.2. Short Term Assignments. All short term frequency assignments for 90 days or less will be coordinated by the AFFMA with National Defense Headquarters, Ottawa, Canada.

5.7. Information Collections, Records, and Forms.

5.7.1. Information Collections. No information collections are created by this publication.

5.7.2. Records. No records are created by this publication

5.7.3. Forms (Adopted and Prescribed).

5.7.3.1. Adopted Forms: DD Form 1494, **Application for Equipment Frequency Allocation**; and AF Form 847, **Recommendation for Change of Publication**.

5.7.3.2. Prescribed Forms. No forms are prescribed by this publication.

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DCS/Communications and Information

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

Title 5, U.S.C., *Government Organizations and Employees*, Section 552

Title 10, U.S.C., *Armed Forces*, Chapter 909, *Civil Air Patrol*

Title 36, U.S.C., *Patriotic and National Observances, Ceremonies, an*d *Organizations*, Chapter 403, *Civil Air Patrol*

Executive Order 12958, *Classified National Security Information*, April 17, 1995

The Communications Act of 1934

DoDD 4650.1, *Management and Use of the Radio Frequency Spectrum*, June 24, *1987*

DoD 5200.1-R, *Information Security Program Regulation*, January 14, 1997

DoD Frequency Assignment Security Classification Guide

DoC NTIA, *Manual of Regulations and Procedures for Federal Radio Frequency Management* (NTIA Manual), January 2000, w/May and September 2000 Revisions

FCC Rules and Regulations (CFR Title 47, *Telecommunications*, Part 95, *Personal Radio Services*)

CJCSM 3212.02, *Performing Electronic Attack in the United States and Canada for Tests, Training, and Exercises*, 1 October 1998

CJCSM 6230.05A, *Joint Have Quick Planner's Manual*, June 1999

CJCSM 6232.01B, *Deconflicting JTIDS/MIDS Operations*, 1 April 2001

Joint Spectrum Users Guide (JSUG)

MCEB PUB 7, *Frequency Resource Records System (FRRS) Standard Frequency Action Format (SFAF)*, 1 October 1998, w/Changes 1 and 2

AFPD 33-1, *Command, Control, Communications, and Computer (C4)* Systems

AFI 10-706, *Electronic Warfare (EW)*

AFI 10-707, *Spectrum Interference Resolution Program*

AFI 10-2701, *Organization and Function of the Civil Air Patrol*

AFI 31-401, *Information Security Program Management*

AFI 33-111, *Telephone Systems Management*

AFI 33-118, *Radio Frequency Spectrum Management*

AFDIR 33-303, *Compendium of Communications and Information Technology*

Abbreviations and Acronyms

AAG—Aeronautical Assignment Group

ACC—Air Combat Command

AC&W—Aircraft Control and Warning

AETC—Air Education and Training Command

AFC—Area Frequency Coordinator

AFCA—Air Force Communications Agency

AFFMA—Air Force Frequency Management Agency

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFMC—Air Force Materiel Command

AFPD—Air Force Policy Directive

AFSAT—Air Force Satellite Communications

AFTRCC—Aerospace and Flight Test Radio Coordinating Council

AGL—Above Ground Level

AIMS—Mark X/Mark XII Identification System

AM—Amplitude Modulation

AOR—Area of Responsibility

ASD(C3I)—Assistant Secretary of Defense (Command, Control, Communications, and Intelligence)

ASOS—Automated Surface Observation System

ASR—Airport Surveillance Radar

ATC—Air Traffic Control

ATIS—Air Transportation Information System

AWOS—Automated Weather Observation System

BER—Bit Error Ratio

BRAC—Base Realignment and Closure

CAP—Civil Air Patrol

C4—Command, Control, Communications, and Computers

CB—Citizen Band

C-E—Communications-Electronics

CFR—Code of Federal Regulations

CINC—Commander in Chief

CINCPAC—Commander in Chief, Pacific Command

CJCSI—Chairman Joint Chiefs of Staff Instruction

CJCSM—Chairman Joint Chiefs of Staff Manual

C-NOTES—Coordination Notes

COMSAT—Communications Satellite (Corporation)

CONUS—Continental United States

DAO—Defense Attache Office

dB—Decibel

dBm—dB referred to 1 milliwatt

DII—Defense Information Infrastructure

DISA—Defense Information Systems Agency

DME—Distance Measuring Equipment

DoC—Department of Commerce

DoD—Department of Defense

DSN—Defense Switched Network

EMC—Electromagnetic Compatibility

EMI—Electromagnetic Interference

ESMC—Eastern Space and Missile Center

EW—Electronic Warfare

FAA—Federal Aviation Administration

FAS—Frequency Assignment Subcommittee

FCC—Federal Communications Commission

FDL—Fighter Data Link

FLIP—Flight Information Publications

FLTSAT—Fleet Satellite Communications

FM—Frequency Modulation

FOA—Field Operating Agency

FMS—Foreign Military Sales

FP—Frequency Panel (USMCEB)

FRRS—Frequency Resource Records System

FRS—Family Radio Service

GHz—Gigahertz

GMF—Government Master File

GMRS—General Mobile Radio Service

GW—Gigawatt

HF—High Frequency

HQ—Headquarters

HNA—Host Nation Approval

Hz—Hertz

ICAO—International Civil Aviation Organization

ID—Identification

IF—Intermediate Frequency

IFF—Identification, Friend or Foe

ILS—Instrument Landing System

INMARSAT—International Maritime Satellite

IRAC—Interdepartment Radio Advisory Committee

ISM—Installation Spectrum Manager

ITU—International Telecommunications Union

JETDS—Joint Electronics Type Designation System

J/F-12—USMCEB J-12 Working Group

JFMO—Joint Frequency Management Office

JSC—Joint Spectrum Center

JTIDS—Joint Tactical Information Distribution System

kHz—Kilohertz

LF—Low Frequency

LFM—Linear Frequency Modulated

LMR—Land Mobile Radio

LORAN—Long Range Aid to Navigation

LOS—Line of Sight

LRR—Long Range Radar

MAG—Military Advisory Group

MAJCOM—Major Command

MARS—Military Affiliate Radio System

MF—Medium Frequency

MHz—Megahertz

MIDS—Multifunctional Information Distribution System

MLS—Microwave Landing System

MM—Maritime Mobile

MMLS—Mobile Microwave Landing System

MRFL—Master Radio Frequency List

MSS—Mobile Satellite Service

mW—Milliwatt

NAS—National Airspace System

NATO—North Atlantic Treaty Organization

NAVAID—Navigational Aids

NDB—Nondirectional Beacons

NTH—Note to Holders

NTIA—National Telecommunications and Information Administration

OSAM—Office of Spectrum Analysis and Management

OUS&P—Outside United States and Possessions

PACAF—Pacific Air Forces

PAR—Precision Approach Radar

PC—Personal Computer

PEP—Peak Envelope Power

PO—Program Office

PPM—Parts Per Million

PPS—Pulses Per Second

PRR—Pulse Repetition Rate

PWG—Permanent Working Group

RACES—Radio Amateur Civil Emergency Services

RADHAZ—Radiation Hazard

RF—Radio Frequency

RFA—Radio Frequency Authorization

RR—ITU Radio Regulations

RX—Receiver

SAR—Search and Rescue

SATURN—Second-Generation Antijam Tactical UHF Radio for NATO

SFAF—Standard Frequency Action Format

SIF—Selective Identification Feature

SINAD—Signal-to-Interference plus Noise-and-Distortion

SINCGARS—Single Channel Ground/Airborne Radio Subsystem

SKE—Station Keeping Equipment

S/N—Signal-to-Noise Ratio

SMO—Spectrum Management Office

SPS—Spectrum Planning Subcommittee

TACAN—Tactical Air Navigation

TACC—Tanker Airlift Control Center

TADIL—Tactical Digital Information Link

TAG—The Adjutant General

TRF—Tunable Radio Frequency

TX—Transmitter

UAV—Unmanned Aerial Vehicles

UHF—Ultra High Frequency

US—United States

USA—US of America (The 48 contiguous States and DC. Excludes AK and HI)

USAF—United States Air Force

USC—United States Code

USMCEB—United States Military Communications-Electronics Board

US&P—United States and Possessions

VHF—Very High Frequency

VOR—VHF Omnidirectional Range

VORTAC—VOR Tactical Air Navigation

WSMC—Western Space and Missile Center

WSMR—White Sands Missile Range

Terms

NOTE: The following are definitions of frequency management terms extracted from international, national, and DoD regulations and directives. Where appropriate, the source is given in parentheses following each definition: **(RR)**--International Telecommunications Union Radio Regulations, **(NTIA)**--*National Telecommunications and Information Administration Manual of Regulations and Procedures for Federal Radio Frequency Management.*

Allocation (of a frequency band)—Entry in the Table of Frequency Allocations of a given frequency band for its use by one or more (terrestrial or space) radio communication 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 component conference, for use by one or more administrations for a (terrestrial or space) radiocommunications service in one or more identified countries or geographical areas and under specified conditions **(RR)**.

Amateur Service—A radiocommunication service of self-training, intercommunication, and technical investigation carried out by amateurs (i.e., duly authorized persons interested in radio techniques solely with a personal aim and without pecuniary interest) **(RR)**.

Assigned Frequency—The center of the frequency band assigned to a station **(NTIA)**.

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 RF or RF channel under specified conditions **(RR)**.

Authorized Bandwidth—The necessary bandwidth required for transmission and reception of intelligence (does not include allowance for transmitter drift or Doppler shift) **(NTIA)**.

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

Channeling Plan—The plan by which the frequencies within a frequency band are to be assigned.

Characteristic Frequency—A frequency 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**).

Coordination Distance—Distance on a given azimuth from an Earth station beyond which a terrestrial station, sharing the same frequency band, neither causes nor is subject to interference emissions greater than a permissible level **(RR)**.

Data Item—A SFAF data item is made up of a data item number, a data item security classification indicator (if required), and the data entry.

Data Item Number—The number (also referred to as a data item identifier) used to identify each data item in a SFAF frequency assignment transaction. It consists of a unique 3-digit number followed by a period and a space. For example, **005.** is used to identify the record's security classification.

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)**.

Electromagnetic Compatibility (EMC)—(1) The ability of systems, equipment, and devices that utilize the electromagnetic spectrum to operate in their intended operational environments without suffering unacceptable degradation or causing unintentional degradation because of electromagnetic radiation or

response. It involves the application of sound electromagnetic spectrum management; system, equipment, and device design configuration that ensures interference-free operation; and clear concepts and doctrines that maximize operational effectiveness (AFDIR 33-303)

Electromagnetic Interference (EMI)—Any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronic or electrical equipment. It is induced intentionally, as in some forms of electronic warfare (EW), or unintentionally, as a result of spurious emissions and responses, intermodulation products, and the like.

Electromagnetic Spectrum—The range of frequencies of electromagnetic radiation from zero to infinity. It is divided into 26 alphabetically designated bands **(JP 1-02)**.

Electronic Warfare (EW) —Any military action involving the use of electromagnetic or directed energy to control the electromagnetic spectrum or to attack the enemy (MOP 6). The components of EW are Electronic Attack, Electronic Protection, and EW Support. (AFI 10-706, *Electronic Warfare [EW]*).

Fixed Service—A radiocommunication service between specified fixed points **(RR)**.

Frequency Allocation—See Allocation (of a frequency band).

Frequency Allotment—See Allotment (of a frequency or radio frequency channel).

Frequency Assignment—See Assignment (of a radio frequency or radio frequency channel).

Frequency Assignment, Group—Frequencies assigned to a MAJCOM to satisfy short-term requirements throughout the US&P. Group assignments are not assigned exclusively to a single MAJCOM.

Frequency Assignment, Regular —An assignment made for an unspecified period of time, subject to the provisions of the NTIA Manual of Federal Regulations 8.2.6.” (NTIA 9.6.3)

Frequency Assignment, Short Term—An assignment effective for 90 days or less.

Frequency Assignment, Temporary —An assignment made for a specified period of time; more than 90 days but not to exceed five years. All assignments with experimental station classes are temporary assignments.**”** (NTIA 9.6.3)

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 expressed in part 10_6 or Hz **(RR)**.

Harmful Interference—Interference that endangers the functioning of a radio navigation service or other safety services, or that seriously degrades, obstructs, or repeatedly interrupts a radio communication service operating in accordance with the radio regulations **(RR)**.

Hertz (Hz)—A unit of frequency equal to one cycle per second **(NTIA)**.

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

Instrument Landing System (ILS)—A system of radio navigation intended to assist aircraft in landing which provides lateral and vertical guidance, which may include indications of distance from the optimum point of landing (JP 1-02.) A radionavigation system that 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 ILS that 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 ILS that 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 radio communication system, manifested by any performance degradation, misinterpretation, or loss of information that is extracted in the absence of such unwanted energy **(RR)**.

Ionospheric Sounder—A device that transmits signals for the purpose of determining ionospheric conditions **(NTIA)**.

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

Low-Power Communication Device—A restricted radiation device, exclusive of those employing conducted or guided RF 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 **(RR)**.

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)**.

Marker Beacon—A transmitter in the aeronautical radionavigation service that vertically radiates a distinctive pattern to provide 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)**.

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

Microwave Landing System (MLS)—A radionavigation system that provides the same information as an ILS but operates in the 5000-5250 MHz band.

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)**.

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

Nominal Coordination Distance—The maximum coordination distance for flat terrain on an overland path or, if applicable, on an over-water path. It does not take into account the effects of possible terrain shielding.

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

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

Radiation Hazard (RADHAZ)—RADHAZs are of three types. One deals with the effects on the human body of nonionizing radiation caused by exposure to high-power transmitters or electronic equipment that produces x-rays. The other types deal with the danger of RF transmissions accidentally detonating explosive devices or igniting fuels.

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

Radio Frequency (RF) Spectrum—The RF spectrum includes the frequencies from 3.0 kHz to 400 GHz. The presently allocated spectrum is from 9 kHz to 381 GHz.

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

Range Commander—In this publication, the commander of an Air Force test or tactical range.

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.**)

Restricted Radiation Device—A device in which the generation of RF energy is intentionally incorporated into the design, and in which the RF energy is conducted along wires or is radiated, exclusive of transmitter for which provisions are made under those parts of Chapter 7 of the NTIA Manual other than part 7.9, and exclusive of ISM equipment **(NTIA)**.

Space Operation Service—A radiocommunication service concerned exclusively with the operation of spacecraft, particularly 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 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 Telemetry—The use of telemetry for the transmission from a space station of results of measurements made in a spacecraft, including those relating to functioning of spacecraft **(RR)**.

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

Standard Frequency and Time Signal Service—A radio communication 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**).

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

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

United States and Possessions (US&P) —The term "United States and Possessions" includes the 50 States, the District of Columbia, the Commonwealth of Puerto Rico, and the territories and possessions (but less the Canal Zone).

Attachment 2

OFFICES OF INTEREST

A2.1. Federal Communications Commission (FCC) Field Offices. Local FCC offices and phone numbers are not listed. All local coordination is conducted through the FCC Watch Officer at (202) 632-6975. The Watch Officer will provide the appropriate local POC.

A2.2. Electromagnetic Compatibility Services.

Joint Spectrum Center

2004 Turbot Landing

Annapolis MD 21402-5064

Telephone: (410) 293-2452/9815, DSN: 281-2452/9815

Fax: (410) 293-3763, DSN: 281-3763

738 Engineering Installation Squadron/EEEX

801 Vandenberg Avenue, Suite 201

Keesler AFB MS 39534-2634

Telephone: (601) 377-3920, DSN: 597-3920

Fax: (601) 377-3956, DSN: 597-3956

Attachment 3

FREQUENCY ASSIGNMENT SECURITY CLASSIFICATION GUIDE

A3.1. Security Classification. Primarily the association with the function they support determines security classification of DoD and Federal Government frequency assignments and the information in them. Classification of individual data items is marked according to DoDR 5200.1, *Information Security Program Reguation,* and AFI 31-401, *Information Security Program Management.*

A3.2. Individual Air Force Frequency Assignments.

A3.2.1. The following frequency assignment information, standing alone or in combination and not associated with any other assignment information, is UNCLASSIFIED. Mark these items as (U) in the SFAF.

A3.2.1.1. Overall classification of the frequency assignment (SFAF Item 005).

A3.2.1.2. Security classification modification (SFAF Item 006).

A3.2.1.3. Type of action (SFAF Item 010).

A3.2.1.4. Agency serial number (SFAF Item 102).

A3.2.1.5. IRAC docket number (SFAF Item 103).

A3.2.1.6. List serial number (SFAF Item 105).

A3.2.1.7. Serial replaced, delete date (SFAF Item 106).

A3.2.1.8. Docket number of older authorizations (SFAF Item 108).

A3.2.1.9. Operating frequency or frequency band and excluded frequency or frequency band (SFAF Items 110 and 111).

A3.2.1.10. Agency (SFAF Item 200).

A3.2.1.11. Command (SFAF Item 204).

A3.2.1.12. IRAC Notes (SFAF Item 500).

A3.2.1.13. Frequency action officer (SFAF Item 701).

A3.2.1.14. Control/request number (SFAF Item 702).

A3.2.2. Other assignment information, standing alone or in combination with other information (including **A3.2.1.** above), is classified according to DoDR 5200.1 and AFI 31-401 by the appropriate classification authority. Include the appropriate classification marking with the corresponding SFAF item.

A3.3. Lists of Air Force Frequency Assignments.

A3.3.1. Although most individual frequency assignment records in the Air Force radio frequency authorization (RFA) are individually unclassified, the total RFA is classified according to the highest classification level of the assignments it contains. Lists (two or more frequencies) of unclassified frequency assignment records in a given range of frequencies, or in a given area, can be classified because they may provide information leading to the disclosure of military or national security-related

operations and scientific and technological matters relating to national security. These lists can indicate the overall strategic telecommunications capabilities of the United States, and their disclosure could cause damage to national security. The continued protection of this information is essential to national security because it pertains to communications security and reveals vulnerabilities and capabilities. Its unauthorized disclosure can reasonably be expected to result in nullifying the effectiveness of telecommunications networks and the capability of the United States.

A3.3.2. The *DoD Frequency Assignment Security Classification Guide* gives guidance on classifying compilations of frequency assignment records. Based on this guidance:

A3.3.2.1. Classify RFAs or frequency lists at the highest level of any individual frequency assignment it contains.

A3.3.2.2. When RFAs or frequency lists contain the aggregation of UNCLASSIFIED DoD, MILDEP, or NSA frequency assignment records, it is classified as CONFIDENTIAL, except as exempted by paragraph **A3.5.** below.

A3.3.2.3. A RFA or frequency list containing only UNCLASSIFIED assignments of one unit or location are considered UNCLASSIFIED. For example, to select all records where SFAF data item 200 (Agency) = USAF would result in a CONFIDENTIAL aggregate list; whereas, select all records where SFAF item 301 (Transmitter Location) or 401 (Receiver Location) = Hill would result in an UNCLASSIFIED aggregate list. Users that plan to operate in an UNCLASSIFIED environment should select from the FRRS only those UNCLASSIFIED records that are applicable to their operational requirements.

A3.3.2.4. CD ROMs containing UNCLASSIFIED FRRS data must be marked and controlled as CONFIDENTIAL and stored in appropriate GSA security containers because they contain aggregate data. These CONFIDENTIAL CDs may be inserted into UNCLASSIFIED computers for the purpose on downloading an UNCLASSIFIED portion of the FRRS for local use. Users operating in an UNCLASSIFIED mode must still use caution to ensure they download only the data necessary for local use.

A3.4. Marking.

A3.4.1. All DoD frequency assignment material must contain proper warnings/markings, as outlined, whether computer-generated or manually applied. DoD data extracted from frequency assignment databases will be marked with one of the following warning statements, depending upon which of the categories is applicable.

A3.4.2. Documents/material containing UNCLASSIFIED frequency assignment records/data that are classified CONFIDENTIAL under Section 3 of the *DoD Frequency Assignment Security Classification Guide*, will be marked CONFIDENTIAL and carry markings in accordance with existing DoD security regulations and AFI 31-401. For example:

Derived From: DoD Frequency Assignment Security Classification Guide

Source Dated: 1 January 1998

Declassify on: X4

A3.4.3. The documents/material will have the following warning attached:

A3.4.3.1. WARNING – This document/listing has been classified CONFIDENTIAL IAW DoD Frequency Assignment Security Classification Guide. The UNCLASSIFIED frequency assignment records/data must be protected IAW Section 3 of the DoD Frequency Assignment Security Classification Guide.

A3.4.3.2. The destruction of UNCLASSIFIED records/data in this document must be IAW existing directives governing destruction of classified material.

A3.4.3.3. This document contains records/data that is exempt from release under the provisions of Title 5 U.S.C., *Government Organizations a*nd *Employees*, Section 552. The release of any records to any non-DoD organization requires approval of the authority (agency) that made the assignment.

A3.4.4. Material containing SECRET or CONFIDENTIAL frequency assignment records and, either UNCLASSIFIED DoD frequency assignment records which meet the aggregation criteria set forth in Section 3 of the *DoD Frequency Assignment Security Classification Guide* or UNCLASSIFIED DoD frequency assignment records/data extracted from the aggregated lists, will be marked IAW current security directives and contain the following warning statement:

A3.4.4.1. WARNING – In addition to SECRET or CONFIDENTIAL data, this document contains UNCLASSIFIED frequency assignment records/data that must be protected IAW Section 3 of the DoD Frequency Assignment Security Classification Guide.

A3.4.4.2. The destruction of UNCLASSIFIED records/data in this document must be IAW existing directives governing destruction of classified material.

A3.4.4.3. This document contains records/data that are exempt from release under the provisions of the Section 552(b)(1) of Title 5, United States Code. The release of any records to any non-DoD organization requires approval of the authority (agency) that made the assignment.

A3.4.5. Documents/material containing one or more UNCLASSIFIED frequency assignment record(s)/data which have been extracted from aggregated lists that are classified CONFIDENTIAL as set forth in Section 3 of the *DoD Frequency Assignment Security Classification Guide* will be marked UNCLASSIFIED and contain the following warning:

A3.4.5.1. WARNING – This document/listing is UNCLASSIFIED; however, it contains frequency assignment records/data that must be protected IAW Section 3 of the DoD Frequency Assignment Classification Guide.

A3.4.5.2. The destruction of UNCLASSIFIED records/data in this document must be IAW existing directives governing destruction of classified material.

A3.4.5.3. This document contains records/data that are exempt from release under the provisions of the Section 552(b)(1) of Title 5, United States Code. The release of any records to any non-DoD organization required approval of the authority (agency) that made the assignment.

A3.5. Exemptions.

A3.5.1. The following types of frequency assignment records are exempt from the classification requirements listed in paragraph **A3.3.2.2.** above:

A3.5.1.1. Lists of UNCLASSIFIED frequency assignments to government users that are not intended to be made public (e.g., travelers information stations, weather broadcast stations, certain

stations in the maritime radionavigation and maritime mobile services, and stations in the international broadcast services).

A3.5.1.2. Lists of aeronautical station frequencies under the purview of the Aeronautical Assignment Group when used in the National Airspace System.

A3.5.1.3. Lists of UNCLASSIFIED frequency assignment records that operate on frequencies authorized to nongovernment stations, where such use is necessary to intercommunicate with nongovernment stations for coordination with nongovernment activities.

A3.5.1.4. Lists of frequencies in NTIA or DoD channel plans when specific location, technical parameters, and organization are not collectively included in the channel plan.