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Supplement**

**9 MAY 2007**

**Communications and Information**

**ELECTROMAGNETIC SPECTRUM  
MANAGEMENT**

**COMPLIANCE WITH THIS PUBLICATION IS MANDATORY**

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This Air Force manual (AFMAN) implements Air Force Policy Directive (AFPD) 33-1, *Information Resources Management*; Department of Defense Directive (DODD) 4650.1, *Policy for Management and Use of the Electromagnetic Spectrum*; 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, *Electromagnetic Spectrum Management*. It details responsibilities and provides guidance and procedures for Air Force management of the radio frequency (RF) portion of the electromagnetic (EM) spectrum in peacetime. (Under other conditions, not all of the procedures contained in this publication will be valid.) 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 (DRU). 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/XP), 2461 Eisenhower Avenue, Suite 1203, Alexandria VA 22331-1500. Send recommended changes or comments to Headquarters Air Force Communications Agency, (HQ AFCA/EASD), 203 W. Losey Street, Room 1100, Scott AFB IL 62225-5222, through appropriate channels, using AF Form 847, *Recommendation for Change of*

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(USAFE) AFMAN33-120, 19 September 2006, is supplemented as follows: This supplement applies to all United States Air Forces in Europe (USAFE) units, all United States (U.S.) Air Force units deploying to the United States European Command (USEUCOM) area of responsibility (AOR), Air National Guard (ANG) and Air Force Reserve Command (AFRC) personnel. Submit recommended changes, questions, and notification of conflicts between this supplement and other publications to USAFE, Computer Systems Squadron, Frequency Management Flight, (USAFE CSS/SCF) UNIT 3325 APO, AE 09094-3325. Use AF Form 847, Recommendation for Change of Publication, through channels when making recommended changes. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 37-123 (will convert to AFMAN 33-363), *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located in AFRIMS (AF Portal).

**SUMMARY OF CHANGES**

This document is substantially revised and must be completely reviewed. There are changes to **Chapter 1**, Managing the Radio Frequency Spectrum, and **Chapter 2**, Spectrum Certification Process. There are major changes to **Chapter 3**, Frequency Actions, and the attachments. Revisions have been applied to bring data up to date. Many tables have been deleted because more up-to-date information will be found in the NTIA Manual. Information concerning LORAN has been deleted. Information concerning the Space Systems Subcommittee has been added. A new definition for Ionospheric Chirpsounders has been included. The definitions have been broadened for “Note To Holder,” “Mutual Aid” and “Foreign Military Sales.”

(USAFE) This document is substantially revised and must be completely reviewed. Extensive changes in policies and procedures of the basic publication required a complete revision of the USAFE supplement.

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## Chapter 1

### THE ELECTROMAGNETIC SPECTRUM

#### 1.1. Introduction.

The electromagnetic (EM) spectrum is the range of frequencies of electromagnetic radiation extending from zero to infinity (measured in Hertz). The radio frequency (RF) spectrum is the group of frequency sub-bands within the EM spectrum associated with radiowave propagation. This publication is concerned with the management of the RF portion of the EM spectrum in peacetime.

## 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 frequency panel's (FP) J-12 working group, reviews the characteristics of major communications-electronics (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 Spectrum Planning Subcommittee (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 Frequency Assignment Subcommittee (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 combatant commander (COCOM) spectrum managing authority. The system should meet the host nation allocation table and 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 "non-interference basis" 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 XII 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 USMCEB Publication 7, *Frequency Resource Records System (FRRS) Standard Frequency Action Format (SFAF)*.

2.1.5. **(Added-USAFE)** Frequency requests for systems to be operated in the USEUCOM AOR must follow guidance outlined in the USEUCOM Spectrum Management Manual (SMM).

**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 and the NTIA. 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 details 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 to 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 of the United States and Its Possessions (US&P), the release of technical information to foreign governments is necessary to coordinate RF spectrum support for Air Force systems. See paragraph 2.4. (host Nation Coordination) of this publication, AFI 33-118, and the NTIA Manual 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 USMCEB's automated Spectrum Certification System contains the capability to generate a DD Form 1494 and is available to qualified Air Force offices. The software to generate a DD Form 1494 is available via the DOD forms web site at <http://www.jsc.mil/SMITECH/specert.asp>. The instructions for each page are provided in the following paragraphs. **The line diagram of the system must be created separately from the software and attached to the application.**

2.2.2. Due to the length of time necessary to obtain equipment certification at the DOD and national levels, it is imperative that systems are submitted for approval at the earliest phases of development. Even when some of the system details are not known, it is possible to obtain national and DOD level guidance regarding system design concerns that could prevent programmatic delays or cost increases prior to initial production. In order to obtain the best possible guidance, any known system information should be provided, however, for DD Form 1494 submissions at the early phases of development, it is not necessary to fill in every item.

2.2.2.1. At the Conceptual Phase (Stage 1), a DD Form 1494 should be submitted as soon as a frequency range has been selected. Following submittal to the USMCEB and the NTIA (if required), the DD Form 1494 will be analyzed and guidance provided to the program office on the feasibility of obtaining certification at subsequent stages. The 1494 submittal at this stage only requires general program information and any system details that are known. At a minimum, the submission should include Items 1-5 on the DOD General Information Page of the DD Form 1494, and Items 16 and 18 on the NTIA General Information Page (see paragraph 2.2.3.).

2.2.2.2. Certification at the Experimental Phase (Stage 2) is a prerequisite to obtaining authorization to radiate in support of experimentation. In addition to providing guidance for spectrum support at Stages 3 and 4, it provides guidance for initial design models that can be used to determine which of several frequency bands, or several proposed equipment configurations, should be selected for continued investigation. At a minimum, the submission should include Items 1-18 on the General Information Page of the DD Form 1494 and Items 1-9 on the Transmitter Page (see paragraph 2.2.3.). Depending on the type of system that is being submitted (i.e., satellite, radar, etc.) more information may be requested prior to submitting the certification request to the DOD or NTIA for approval.

2.2.2.3. For DD Form 1494 Submittals at the Developmental and Operational Phases (Stages 3 and 4), all applicable information should be provided in the DD Form 1494 as spelled out in the

following paragraphs. Certifications at the Developmental and Operational Phases (Stages 3 and 4) are a prerequisite to obtaining authorization to radiate in support of development testing and operational deployment of the systems, respectively. This information is critical to obtaining approval to radiate from other DOD and national level agencies.

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

2.2.3.1. 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 (e.g., AN/TRC-170, AN/GRC-27). Include official nicknames. You must use an unclassified title.

2.2.3.2. 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.

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

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

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

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

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

2.2.3.4. 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 paragraph 3.8. and the NTIA Manual.

2.2.3.5. 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.

2.2.3.6. 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.

2.2.3.7. 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 NA for the stages preceding the stage for which the application is submitted.

2.2.3.8. 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."

2.2.3.9. 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.

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

2.2.3.11. 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, US Government agencies, or allied nations. If yes, specify in Item 13 the services, agencies, or countries (to include the country's services).

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

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

2.2.3.14. General. Enter the highest level of security classification for the entire document in the classification block. (See [Attachment 2](#) for a list of the various classifications). 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.

2.2.3.14.1. Provide downgrading instructions if application is classified.

2.2.3.14.2. "NA" is entered for Non-applicable items.

2.2.3.14.3. "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.

2.2.4. Transmitter 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 when available.

2.2.4.2. 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.

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

2.2.4.4. 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.).

2.2.4.5. 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.

2.2.4.6. Item 6, Method of Tuning. Enter the method of tuning by indicating method of effecting change and device ensuring frequency stability (e.g., manually adjusted klystron cavity, fixed

crystal, crystal synthesizer, etc.). For equipment not tunable in the field, indicate means by which tuning is accomplished.

2.2.4.7. 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 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.

2.2.4.8. 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 paragraph 3.8. and the NTIA Manual.

2.2.4.9. 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.

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

2.2.4.10. 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.

2.2.4.11. 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.

2.2.4.12. 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 dB 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.

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

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

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

- 2.2.4.16. Item 16, Pre-Emphasis. Indicate whether an angle modulated transmitter uses pre-emphasis.
- 2.2.4.17. 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).
- 2.2.4.17.1. Deviation Ratio =  $\frac{\text{Maximum Frequency Deviation}}{\text{Maximum Modulation Frequency}}$
- 2.2.4.17.2. Bandwidth formulas in Annex J of the NTIA Manual use the variable "D" as the maximum frequency deviation.
- 2.2.4.17.3.  $D = \text{Maximum Modulation Frequency} \times \text{Deviation Ratio}$ .
- 2.2.4.18. Item 18, Pulse Characteristics. Enter the information for pulse-modulated transmitters.
- 2.2.4.18.1. Rate. State the pulse repetition rate (PRR) in the number of individual pulses per second (PPS) for each pulse rate used.
- 2.2.4.18.2. 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.
- 2.2.4.18.3. 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.
- 2.2.4.18.4. 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.
- 2.2.4.18.5. Compression 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.
- 2.2.4.19. Item 19, Power. Enter information concerning the transmitter output power.
- 2.2.4.19.1. 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. Duty Cycle = Pulse Width X Pulse Rate (except for pulse compression systems)).
- 2.2.4.19.2. 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.
- 2.2.4.20. Item 20, Output Device. Enter a description of the final RF power output device (e.g., ceramic diode, magnetron, traveling wave tube, transistor, etc.).
- 2.2.4.21. Item 21, Harmonic Level. Enter the harmonic level of the 2d and 3d harmonic in decibel (dB) relative to the fundamental. Item c of this block contains the relative level in dB of the highest-powered harmonic above the 3d.
- 2.2.4.22. 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.

2.2.4.23. Item 23, Federal Communications Commission (FCC) Type Acceptance Number. Provide a number given to the equipment that has been reviewed and approved by the FCC for commercial use. **NOTE:** FCC type acceptance does not exempt equipment from the DOD frequency allocation process.

2.2.4.24. Item 24, Remarks. Enter the highest level of classification of all comments in the Remarks section of the classification block and precede each individual paragraph in the Remarks with the appropriate classification of the additional information. Every effort should be made to explain required items to the greatest degree possible.

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

2.2.5.1. Item 1, Nomenclature, Manufacturer's Model Number. Enter the government nomenclature or the manufacturer's name and model number. Use the JETDS designator when available.

2.2.5.2. 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.

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

2.2.5.4. 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.).

2.2.5.5. 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.

2.2.5.6. 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.

2.2.5.7. 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.

2.2.5.8. 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 paragraph 3.8. and the NTIA Manual.

2.2.5.9. 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:

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

2.2.5.10. 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.

2.2.5.11. 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.

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

2.2.5.13. 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."

2.2.5.14. Item 14, Minimum Post Detection Frequency. This item only applies to multi-channel 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.

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

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

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

2.2.5.17.1. 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.

2.2.5.17.2. Criteria. The criteria are 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 distortion [SINAD], bit error ratio [BER], minimum discernible signal, etc. Also include the value for the criteria, e.g., 10 dB S/N or  $1 \times 10^{-9}$  BER).

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

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

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

2.2.5.19. 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.

2.2.5.20. 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.

2.2.5.21. Item 21, Remarks. Enter the highest level of classification of all comments in the Remarks section of the classification block and precede each individual paragraph in the Remarks with the appropriate classification of the additional information. Every effort should be made to explain required items to the greatest degree possible.

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

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

2.2.6.2. Item 2, Nomenclature, Manufacturer's Model Number. Enter the government nomenclature or manufacturer's name and model number. If available, use the JETDS designator.

2.2.6.3. 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.

2.2.6.4. Item 4, Frequency Range. Enter the range of frequencies for 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.

2.2.6.5. 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.).

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

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

2.2.6.7.1. 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."

2.2.6.7.2. 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.

2.2.6.7.3. Horizontal Scan. 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.

2.2.6.7.3.1. 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.

2.2.6.7.3.2. 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.

#### 2.2.6.8. Item 8, Gain.

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

2.2.6.8.2. 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. (The value to be provided is the "directivity" gain and must be given relative to an isotropic antenna.)

#### 2.2.6.9. Item 9, Beamwidth (Half-Power).

2.2.6.9.1. 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 dB of the total output power.

2.2.6.9.2. 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 dB of the total output power.

2.2.6.10. Item 10, Remarks. Enter the highest level of classification of all comments in the Remarks section of the classification block, and precede each individual paragraph in the Remarks with the appropriate classification of the additional information. Every effort should be made to explain required items to the greatest degree possible.

2.2.7. NTIA 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 JETDS designator when available.

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. Radiation using test equipment or preliminary models may be required.
- 2.2.7.3.3. Stage 3 - Developmental. The major design has been completed. 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 set forth in the NTIA Manual.
- 2.2.7.5. 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 tropospheric modes of propagation. Also indicate whether the system has a wartime (or National Security Emergency Preparedness [NSEP]) function.
- 2.2.7.6. Item 6, Information Transfer Requirements. Enter a description of what type of information you are transmitting or receiving and the rate of transmission.
- 2.2.7.7. 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.
- 2.2.7.8. 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.
- 2.2.7.9. 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.
- 2.2.7.10. Item 10, Replacement Information. Identify RF systems, which may be replaced by the proposed system.
- 2.2.7.11. Item 11, Related Analysis and/or Test Data. Identify reports, studies, analyses, predictions, and test results related to the system under review.
- 2.2.7.12. Item 12, Number of Mobile Units. Enter the number of mobile units you will deploy.
- 2.2.7.13. 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."
- 2.2.7.14. Item 14, Line Diagram. Enter the page number of the line diagram. Submit a diagram with each application and insert it immediately following the last antenna page. The diagram must provide a general representation of the equipment defined in the application and its perceived operating environment and show linkage to other electromagnetic systems or platforms with which it interfaces. Display each electromagnetic link and label it with directions of transmission and frequency range.
- 2.2.7.15. 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 the NTIA Manual.

2.2.7.16. 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 are described in the NTIA Manual. If the service is not in accordance with the NTIA allocation tables, enter a justification.

2.2.7.17. 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 the NTIA Manual.

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

2.2.7.19. General. Enter the highest level of security classification for the entire document in the classification block. (See [Attachment 2](#) for a list of the various classifications). 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.

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

2.2.8.1. 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.

2.2.8.2. 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.

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

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

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

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

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

2.2.8.4. 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 the NTIA Manual.

2.2.8.5. 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.

2.2.8.6. 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 signals 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.

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

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

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

2.2.8.10. 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.

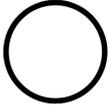
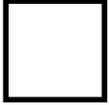
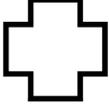
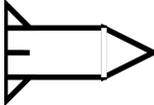
2.2.8.11. Item 11, Space Systems. Enter the page number of space system information that you are providing for space-borne components of a space system. Provide this data in accordance with the NTIA Manual.

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

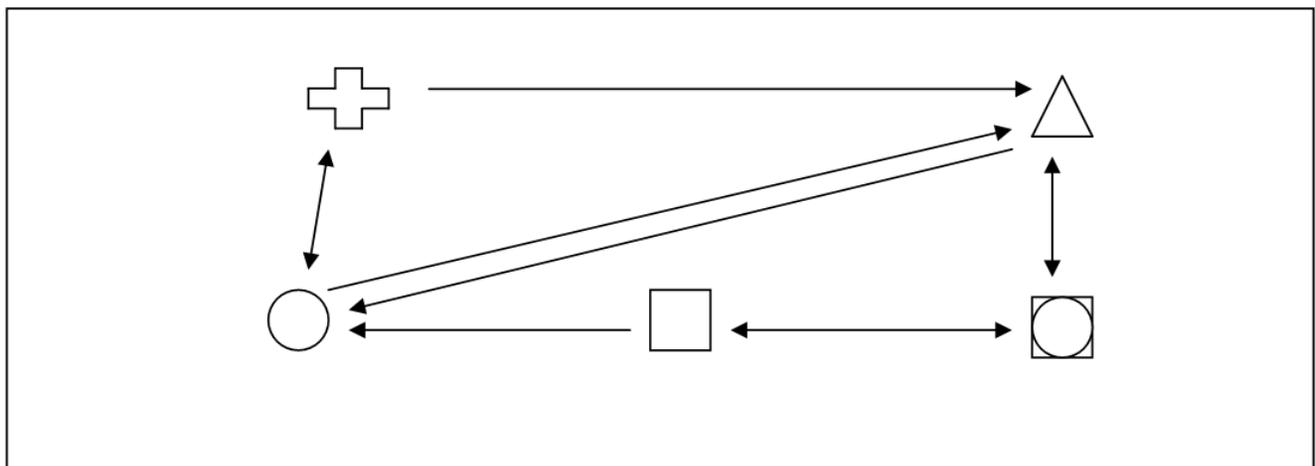
2.2.8.13. General. Enter the highest level of security classification for the entire document in the classification block. (See [Attachment 2](#) for a list of the various classifications). Place the classification marking in bold letters that are larger than the largest typed letters on the form. If 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.

2.2.9. 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 of Unit	Symbol	Type of Unit	Symbol	Type of Unit	Symbol
Mobile		Fixed		Transportable	
Satellite		Aircraft		Missile	

**Figure 2.1. Sample Line Diagram.**



2.2.10. 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 Military Communications-Electronics Board (USMCEB) Note to Holder (NTH) for minor changes to applications that have already completed the system review and allocation process. An NTH may be used, if approved by the USMCEB Equipment Spectrum Guidance (ESG) 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. An NTH is not coordinated with host nations. If equipment parameters change significantly, ensure a new DD Form 1494 is created and coordinated with the appropriate host nations.

2.3.1. **(Added-USAFE)** Note to Holder (NTH) actions for systems to be used outside the United States and its Possessions (US&P) must have foreign releasability. The NTH must then be forwarded to the respective Combatant commander (COCOM) for coordination with each nation into which the system is to be deployed.

2.3.2. **(Added-USAFE)** Prior to overseas shipment of a modified system based upon a NTH action, the NTH must have received favorable host nation comments. This will ensure the system can be deployed to, and operated in, the respective nation.

**2.4. Host Nation Coordination.** Each government has its own rules for using the spectrum. US military use of the spectrum has varying priority from nation to nation. Submitters must consider US forces that are garrisoned in other nations and must use equipment on a day-to-day basis for training. Equipment that has not obtained Host Nation approval is not authorized for use. This loss of capability can have serious mission impact.

2.4.1. Similar to the US process, the submitters of DD Forms 1494 coordinate with their local spectrum manager in preparing the Host Nation Coordination package. The process for gaining authorization to use equipment in other nations is separate and distinct from the US procedure. All equipment that will be used by deploying or garrisoned forces in another nation must obtain spectrum support using the Host Nation Coordination process. The processing time for this Host Nation Coordination can take from months to years.

2.4.2. The following are Host Nation Coordination procedures.

2.4.2.1. Contents of the Host Nation Coordination Package. A submission package that is separate from the US package must be prepared. The first step is to determine the nations where the equipment will likely operate. Each nation is aligned under a Combatant Command Area of Responsibility (AOR) in accordance with the Unified Command Plan. The Combatant Commands have unique processes. **Table 2.2.** shows the contents of the Host Nation coordination package each Combatant Command requires to perform Host Nation Coordination. Packages that are submitted to AFFMA must contain these items.

**Table 2.2. Contents of Host Nation Coordination packages. See [Attachment 3](#) for examples of the documents that must accompany the DD Form 1494.**

Combatant Command	DD Form 1494	Foreign Disclosure Letter	Standard Frequency Action Format (SFAF)	Abbreviated SFAF
USCENTCOM	X	X		X
USEUCOM	X	X		
USPACOM (Japan and Korea only)	X	X	X	
USPACOM (All others)	X	X		
USSOUTHCOM	X	X		
CCEB (Note)	X	X		

**NOTE:** Combined Communications Electronic Board (CCEB) nations include United Kingdom, Canada, Australia and New Zealand. Any Host Nation package that has foreign disclosure for all four of these nations will be coordinated via CCEB. Every effort should be made to obtain disclosure to all four nations. If a package has foreign disclosure for a subset of the four nations, the appropriate COCOM will perform the coordination, which could add time to the process. CCEB coordination requires disclosure to all four nations due to the fact that Supportability data can be viewed by all member nations.

2.4.2.2. Foreign Disclosure Letter. Determine the nations where the equipment will be used. If this determination is uncertain, use the best approximation available. The data on a DD Form 1494 must be deemed releasable to these nations. To begin the process, the submitter must coordinate the DD Form 1494 with the appropriate Air Force foreign disclosure office. The Air Force Materiel Command (AFMC) Center or 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 of the DD Form 1494 must provide a letter indicating the release approval with the case number to their local spectrum management office with the foreign coordination DD Form 1494 package. If the data changes due to separate release rules for a given nation, separate DD Form 1494 and other documents specified in [Table 2.2.](#) containing the releasable data must accompany the appropriate foreign disclosure release letter. The foreign disclosure release letter indicates the nations that can receive the different data.

2.4.2.3. SFAF. All Host Nation Coordination packages for Japan and Korea must include an SFAF. If Japan and Korea support the equipment, the SFAF will be made available to USPACOM as follow-up to Host Nation Coordination in the event further documentation of equipment use is required. See the example in [Attachment 3](#) for the required data fields the SFAF must contain. The intent of Host Nation Coordination with Japan is for near future intended use of the equipment. Coordination cannot be used for possible future deployments. Coordination for notional

equipment use is not permitted. As a result, Host nation coordination with Japan and Korea requires knowledge of specific location(s) where the equipment will operate. In the Remarks section of the DD Form 1494 Foreign Coordination Page, specific bases or installations and facility number must be indicated. See Appendix 1 for a list of installations and facility numbers in Japan.

2.4.2.4. Abbreviated SFAF. US Central Command requires an SFAF with selected data fields (see [Attachment 3](#)). This document facilitates coordination with the nations in the USCENTCOM AOR.

2.4.3. Submission Procedures. As in the US DD Form 1494 process, the submitter's local spectrum manager will distribute the completed host nation coordination package to the spectrum manager in the next level of the chain of command. AFFMA will provide the foreign coordination package to the USMCEB for tasking to the appropriate Combatant Command, the Combined Communications Electronics Board nation representative or to the Defense Attaché Office for foreign coordination.

**2.5. Military Communications-Electronics Board (USMCEB) 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 USMCEB 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 USMCEB via NTHs. The USMCEB guidance provides the conditions of RF support including those received from the NTIA and must be considered prior to selecting or developing 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 USMCEB and should take into account applicable comments prior to their submittal. USMCEB guidance is distributed as both a hard copy and electronically stored with the application in the Spectrum Certification System archive database and the Host Nation Spectrum Worldwide Database (HNSWD). This archive database is available to authorized Air Force offices and personnel.

## 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. The installation commander can prohibit use of ANY RF emitter (cease and desist) when anticipating interference to mission essential electromagnetic equipment. All RF emitters must have a frequency assignment prior to operation. Before making a permanent or temporary frequency assignment, the USMCEB must review the RF equipment via a DD Form 1494, unless specifically exempted per AFI 33-118. Frequency assignment parameters must match the technical characteristics of the equipment as recommended in the USMCEB guidance.

**3.2. Assignment Procedures Within the United States and Its Possessions (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.

3.2.1. This includes new equipment installed in connection with programs and projects within AFMC being turned over to operational commands. In these instances, the appropriate AFMC Spectrum Management Office (SMO), typically a product center SMO, will advise the gaining command SMO of the requirement for frequency support and provide a basic SFAF template for submission. The gaining MAJCOM SMO will then take action to document and support the requirement. Refer to AFI 33-118 for specific guidance of spectrum duties at various levels

3.2.2. Any acquisition center, such as Aeronautical Systems Center (ASC), often requires the continued use of frequency assignments to support its continued research, development, test, and evaluation role, while at the same time the gaining MAJCOM SMO needs to initiate frequency assignment actions to support the operational mission requirements. In these cases, the gaining SMO will create a new assignment that identifies the operating units, locations, station classifications, and scenarios.

**3.3. Temporary Assignment Procedures.** The NTIA, Office of Spectrum Management (OSM), FAS of the Interdepartmental Radio Advisory Committee (IRAC) grants "short-term, temporary" (90 - 180 days in duration), "long-term, temporary" (180 days to 5 years) and "permanent" (5 - 10 years) licensed access (assignments) to the electromagnetic spectrum in the US. Refer to paragraph [3.3.2.](#) for information on temporaries for 90 days duration or less.

3.3.1. Experimental Stations. Refer to the *NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management*.

3.3.2. Temporary Assignments:

3.3.2.1. Special Temporary Authorizations (STA) Requiring Spectrum XXI (SXXI) Registration. AFFMA recognizes that for a variety of reasons, our customers require us to broker short-notice, short-term, documented spectrum access with NTIA and other federal/nonfederal users of the spectrum. The NTIA also recognizes this requirement and has instituted a process called "Special Temporary Authorization," or STA. This process requires that AFFMA provide the NTIA a **minimum** of 5 "business days" (excluding holidays and weekends) in order to circulate the request among the other stakeholders of US national spectrum and gain their consensus. Process accord-

ing to AFI 33-118. This type of assignment will be coordinated at the national level and submitted to the FAS for approval and recommendation to the NTIA for assignment. The assignment is entered into SXXI, with an appropriate expiration date.

3.3.2.2. Lead-times: AFFMA requires a minimum 30-day lead-time for assignments that do not require national level coordination. There is a minimum 60-day lead-time for assignments requiring national level coordination. This lead-time is necessary for all actions requiring coordination with the FCC or Federal Aviation Administration (FAA). Requirements that are not in accordance with the national table of allocations, or those having unusual technical parameters may require additional engineering time or study, consequently requiring *even longer lead-times*.

3.3.2.3. Impact Statement: If the lead-time is not satisfied, include in the proposal a detailed impact statement in item number 520. As a reminder, the audience for this statement is not DOD, so tailor the impact statement accordingly and explain all acronyms used. AFFMA must have all of the facts necessary to defend your requirement to the other federal/nonfederal agencies.

3.3.2.4. Short Term (90 Days or Less): Per AFI 33-118 short-term temporary frequency support for durations of 90 days or less is processed but may not be entered in government master file (GMF). These types of assignments are renewable up to 180 days from initial start date. Submit requirements according to AFI 33-118.

3.3.2.5. Long-Term Temporary (180 Days or more): Requirements that necessitate continued licensing beyond the 180 days listed above must be documented into the GMF. A permanent record must be generated via a "P"-type proposal to satisfy this requirement.

### 3.3.3. Temporary Assignment. Refer to AFI 33-118.

3.3.3.1. Where possible, a temporary spectrum access requirement can be supported with a permanent assignment already registered in the GMF.

3.3.3.2. Assignments that do not require national level coordination and approval are those assignments for which a MAJCOM already has an approved permanent "US/USA/USP" assignment registered in the GMF. An example would be AF XXXXXX, assigning 143.850 MHz as a USA assignment controlled by a MAJCOM. When the Thunderbirds deploy to a site-specific location and short-term use, coordination can be accomplished by the requestor/user with the owning MAJCOM; temporary assignments can then be recorded by the requestor in SXXI without AFFMA or other any other national-level intervention.

3.3.3.3. As long as the temporary requirement maintains the parameters listed in the permanent assignment, a temporary assignment can be approved by the MAJCOM against the permanent assignment in the SXXI to show site-specific, short-term use. **NOTE:** All temporary frequency requirements must be precoordinated with applicable local spectrum management offices (i.e., DOD Area Frequency Coordinator [AFC], etc.) prior to assigning a short-term temporary assignment in SXXI.

3.3.3.4. If the MAJCOM subordinate is the same as the MAJCOM listed in SFAF 204, the MAJCOM can assign temporary radiating authority without AFFMA intervention. If another MAJCOM owns the assignment, prior coordination with that MAJCOM is required before short-term temporary assignments can be recorded in SXXI.

### 3.3.4. Special Considerations: Where possible, a temporary spectrum access requirement can be supported within a capability that is already registered (i.e., a permanent assignment that has been regis-

tered by AFFMA into the GMF). An example would be AF 010222, assigning 294.525 MHz to the US&P and controlled by HAF (HAF=AFFMA).

3.3.4.1. Use of US/USA/USP GMF Assignments: Assignments that do not require national level coordination and approval are those assignments for which the MAJCOM already has an approved, permanent "US/USA/USP" assignment registered in the GMF. An example would be AF 791387, assigning 143.850 MHz to the USA and controlled by Air Combat Command (ACC). When the Thunderbirds deploy to a site-specific location, temporary assignments can be recorded by the owning command without AFFMA or any other national-level intervention.

3.3.4.2. Conditions of Usage: As long as the temporary requirement maintains the parameters listed in the permanent assignment, a temporary assignment can be approved by the MAJCOM against the permanent assignment in the SXXI database to show site-specific, short-term use. **NOTE:** All temporary frequency requirements must be precoordinated with applicable agencies, as required (i.e., FAA, FCC, DOD Arcs, local spectrum management offices, etc.) prior to assigning a short-term temporary assignment in SXXI.

3.3.5. MAJCOM/AFC /Other Agency Coordination: Access must be coordinated with all impacted individuals and agencies. If the MAJCOM subordinate is the same as the MAJCOM listed in SFAF 204, the MAJCOM can assign temporary radiating authority without AFFMA intervention. If another MAJCOM owns the assignment, prior coordination is required before short-term temporary assignments can be registered to the Frequency Resource Records System (FRRS).

3.3.6. SFAF Line Item Guidance: Temporary proposal serial numbers will be the same numbers assigned to the MAJCOMs at the beginning of each calendar year. In order to identify the requirement as "temporary," use the following naming convention: AFT XXXXXX and create the proposal as type "S" in SXXI vice type "P." Submit proposals to job account "AF T11" and follow-up with a phone call and/or e-mail if your request is urgent. Provide a realistic start /stop date in SFAF line 140/141. Explain any anomalies in the SFAF 520, supplementary details. Provide detailed impact if not approved and provide a detailed justification for not meeting required, documented lead-times. "Stop/Cease Buzzer" information shall also be provided, especially if the request impacts another federal agency or the FCC. Enter agency coordination data in SFAF 520 as well.

3.3.6.1. Requirements that necessitate continued licensing beyond the 180 days listed above must be documented into the GMF. This action will require the creation of a permanent proposal for documentation in the GMF. Refer to AFI 33-118.

3.3.7. Lead times for temporary spectrum access are detailed in AFI 33-118.

3.3.7.1. If the lead-time is not satisfied, include a detailed mission impact statement in nonmilitary language and terms and a statement how the unit plans on ensuring future requirements will comply with proper lead times. Lead-time information should be placed in line SFAF 520.

3.3.7.2. Access must be coordinated with all impacted individuals and agencies. Enter all known items into the proposal in SXXI. Explain any anomalies in the SFAF 520, supplementary details. Provide detailed impact if not approved and provide a detailed justification for not meeting required, documented lead-times. "Stop/Cease Buzzer" information shall also be provided, especially if the request impacts another federal agency or the FCC.

**3.4. Assignment Procedures Outside the United States and Its Possessions (US&P).** MAJCOMs will submit frequency requirements for use outside of the US&P to the appropriate Air Force service com-

ponent. The Air Force service component will submit the requirement as required by theater 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. 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 of the US&P must contain a foreign releasability code (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 theater/service components.

**Table 3.1. Theater/Service Components**

Theater	Service Component
EUCOM	USAFE
PACOM	PACAF
SOUTHCOM	12AF
JFCOM	8AF
CENTCOM	9AF
NORTHCOM	ACC
STRATCOM	AFSPC
SOCOM	AFSOC

3.4.1. **(Added-USAFE)** Joint Frequency Panel (JFP) Assignments. Frequency assignments that fall under the control of the JFP are not submitted to the USAFE Frequency Management Office (FMO) for action. JFP frequency actions go from the lead agency or service component (for the Air Force this is the Air Force Frequency Management Agency [AFFMA]) directly to the COCOM responsible for the AOR in which the assignments will be used. For more detailed guidance see the USEUCOM SMM and Military Communications-Electronics Board (MCEB) pub 1, Organization Missions and Functions Manual.

3.4.2. **(Added-USAFE)** Lead time requirements in the USEUCOM AOR are dictated by the respective host nations. Minimum required lead times are as follows:

3.4.2.1. **(Added-USAFE)** For permanent assignments, the minimum required lead time is 180 days.

3.4.2.2. **(Added-USAFE)** For temporary assignments, the minimum required lead time is 90 days.

3.4.3. **(Added-USAFE)** Proposals that fail to meet the lead time requirement must contain the following information in Standard Frequency Action Format (SFAF) item 502.

3.4.3.1. **(Added-USAFE)** Reason unit failed to meet the required lead time.

3.4.3.2. **(Added-USAFE)** Operational impact if frequencies cannot be assigned.

3.4.3.3. **(Added-USAFE)** Steps taken by unit to preclude further short notice frequency requests.

3.4.4. **(Added-USAFE)** Proposals submitted without the required information will be rejected to the originating office. When required information has been added, proposals can be re-submitted to the USAFE FMO for action.

**3.5. 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. Refer to USMCEB Publication 7 for specific guidance on the data items.

3.5.1. **(Added-USAFE)** Other required data items follow in numerical order. Units needing frequencies in the USEUCOM AOR must refer to MCEB Pub 7, Frequency Resource Records System (FRRS) Standard Frequency Action Format (SFAF) and the USEUCOM SMM for specific guidance on SFAF data items.

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

3.6.1. Transferring assignments.

3.6.1.1. The losing MAJCOM SMO will provide the gaining MAJCOM SMO with a list or an electronic file of the assignment records requiring transfer action.

3.6.1.2. 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.

3.6.2. Transferring installations.

3.6.2.1. 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 are transferred 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 **3.6.1**.

**3.7. 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:

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

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

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

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

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

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

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

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

3.7.9. **(Added-USAFE)** Band assignments in the USEUCOM AOR are generally restricted to spread spectrum equipment. US&P guidelines for band assignments do not apply in the USEUCOM AOR. Requests for band assignments must contain specific detailed justification in SFAF item 502. These requests will be considered, on a case by case basis, by the respective host nation spectrum management office.

**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 and 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 International Telecommunications Union (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 3.2.](#)).

**Table 3.2. Symbols for Type of Modulation.**

<b>SYMBOL</b>	<b>TYPE OF EMISSION</b>
	<b>UNMODULATED:</b>
N	Emission of an unmodulated carrier
	<b>AMPLITUDE-MODULATED</b> (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
	<b>ANGLE-MODULATED</b> (Emission in which the main carrier is angle-modulated):
F	Frequency modulation
G	Phase modulation
	<b>AMPLITUDE-MODULATED AND ANGLE-MODULATED:</b>
D	Emission in which the main carrier is amplitude-modulated and angle modulated either simultaneously or in a pre-established sequence.
	<b>PULSE</b> , 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
	<b>COMBINATION:</b>
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.
	<b>NOTE:</b> 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.

3.8.4.2. Second symbol--indicates the nature of signals modulating the main carrier (see [Table 3.3](#)).

**Table 3.3. 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
	<b>NOTE:</b> 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.

3.8.4.3. Third symbol--indicates the type of information to transmit (see [Table 3.4.](#)).

**Table 3.4. 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
	<b>NOTE:</b> 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
	<b>NOTE:</b> Only use the symbol W for multichannel systems having the capability of transmitting all information simultaneously.
X	Cases not otherwise covered.
	<b>NOTE:</b> 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.

3.8.4.4. Fourth symbol--indicates the details of the signal (optional but recommended when applicable) (see [Table 3.5.](#)).

**Table 3.5. Symbols for Details of Signal in Emission Classification.**

<b>SYMBOL</b>	<b>TYPE OF EMISSION</b>
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 3.6](#)).

**Table 3.6. 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. Base Realignment and Closure (BRAC).** The MAJCOM SMO and the installation spectrum manager (ISM) must be involved in the BRAC actions involving his or her base in the very early stages and must continually work 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. (Expiration dates will be added to impacted records). This time period is to allow sufficient time for the civil authorities to obtain appropriate frequency authorizations from the FCC. The MAJCOM SMO is responsible to ensure all appropriate frequency assignment actions are accomplished before the base is officially closed.

**3.10. Frequency Assignment Review Program.** As directed by the NTIA, each government agency shall maintain a program of continuing review of frequency assignments (see NTIA Manual). These assignments (licenses) must be reviewed, per national level policy, prior to the specified review date documented on the RF license. Each license is owned by a MAJCOM and managed by an ISM to support operational requirements. It is the responsibility of each ISM and parent MAJCOM to review their licenses prior to the review date and revalidate the license parameters in SXXI. Validate all assignments by the review date (SFAF item 142) and review each assignment to ensure its current use is properly reflected in the FRRS and GMF. Delete or modify existing assignments as appropriate. It is recommended that each MAJCOM establish a program to ensure that periodic reviews of their frequency assignments are conducted in order to prevent operational impacts and reduce overhead costs to the Air Force.

3.10.1. Frequency 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 in the out years. Each unit can make a difference by deleting assignments that are no longer required to perform Air Force missions.

3.10.2. **(Added-USAFE)** As directed by host nation agreements, international treaties, and North Atlantic Treaty Organization (NATO) Directives, the USAFE FMO maintains a program of continuing review of frequency assignments. All assignments must be reviewed by the review date (SFAF

item 142) of the assignment. Submit reviews not later than sixty days before the date shown in SFAF item 142 to ensure the frequency assignment is updated and current by the review date, failure to do this will result in the loss of assignment and approval to legally operate on assigned frequencies. Review each assignment to ensure its current use is properly reflected in the frequency resource records system (FRRS). Use the checklist in AFI 33-118\_USAFE supplement, Attachment 3 when accomplishing frequency reviews. Delete or modify existing assignments as appropriate. Assignment review shows proper stewardship of this valuable natural resource and helps maintain credibility with the host nations from which we must obtain spectrum resources.

**3.11. (Added-USAFE)** Frequency Management Sub-Committee (FMSC) Function Codes. All frequency actions in the USEUCOM AOR must contain the appropriate FMSC function code (SFAF item 707). All air to air, air to ground and NAVAID frequencies must also contain the associated service volume in SFAF item 711. See **Table 3.7. (Added)** for the complete list of FMSC function codes.

**Table 3.7. (Added-USAFE) FMSC Function Code Table.**

SECTION I: MILITARY AIR TRAFFIC CONTROL		
<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
100	005000	Ground Control: For voice communications to control the movement and positioning of aircraft (not airborne) on the aerodrome.
101	025004	VFR Control: For voice communications between a control tower or other facility for the control of aircraft taking off, landing, or flying within the control zone of the aerodrome under visual flight rules (VFR).
102	050030	IFR/Departure/Approach Control: For voice communications between a terminal type air traffic control facility and aircraft taking off, landing or flying within the controlled vicinity of the aerodrome under Instrument Flight Rules (IFR). Note: Uses covered by this function code may be combined on a single frequency, on separated with dedicated frequencies for each use, as required, to meet aerodrome traffic load needs.
105	025005	Radar Approach: For voice communications to direct aircraft by precision or surveillance radar, during its final approach, to a point from which a visual landing can be made. This function code also applies to single channel approach.
Sub-section B: Military Area Service		
130	200050	Military Area Services: For voice communications to control military air traffic that does not conform to International Civil Aviation Organization (ICAO) procedures; or for controlling aircraft approaching or leaving an aerodrome but which are beyond the range of control of normal approach or departure control facilities.
133	150050	Flight Information Service: A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.
134	100070	Fixer Service: For navigational assistance and/or fixing aircraft by directional finding (D/F) triangulation.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
Sub-section C: General Air Traffic Service		
160	025004	Aerodrome control service direction finding service.
161	025005	Radar approach: For voice communication to direct aircraft by precision or surveillance radar, during final approach, to a point from which a visual landing can be made.
162	025010	Low level approach control service. Low level direction finding service. Low level surveillance radar service.
163	040025	Intermediate level approach control service. Intermediate level direction finding service. Intermediate level surveillance radar service.
164	050015	Terminal control area service.
165	050040	High level approach control service. High level direction finding service. High level surveillance radar service.
166	100025	Area control service (Lower Airspace). Surveillance radar service (Lower Airspace).
167	100025	Flight Information Service: For navigational assistance and/or fixing aircraft by D/F triangulation.
168	100050	Area Control Service (Upper Airspace). Surveillance radar service (Upper Airspace).
SECTION II: AIR OPERATIONS		
200	100050	General air/ground/air (A/G/A) and air/air (A/A) Communications for operational A/G/A and occasional A/A communications not covered by other specific function codes. Typical applications might include command post, squadron common meteorological (pilot to forecaster) service, and A/G/A operational communications for reconnaissance, bomber, combat air patrol and tactical use, and activities. This function code is always associated with a ground transmitter/ receiver as well as aircraft.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
201	200050	General A/A Communications: For operational air/air communications not covered by other more specific function codes. Typical applications may include squadron or major command (MAJCOM) common or in-flight frequencies or interplane frequency for formation flying, or other A/A operational frequencies for reconnaissance, bomber operations, combat air patrol, tactical use, etc.
202	150025	Transport Aircraft Operations: For voice or data communications use A/A or A/G/A for the conduct and control of air transport operations.
203	200035	Air-to-Air Refueling: For A/A communications for the conduct and control of in-flight refueling operations.
209	250060	Airborne Data and Airborne Relay Links: For A/A, A/G, or G/A/G data transmission links (to include video data) or airborne relay links (A/A or G/A/G links using an airborne repeater. If repeater input/output frequencies are different, some function codes apply, but separate ABNFs with different station classes should be submitted for A/A or A/G and G/A links.
210	250060	Ground Control Intercept (GCI): For A/G/A voice or data communications between GCI facilities for the intercept control of fighter aircraft.
211	250060	Non-GCI Air Defense Sector Communications: For communications by which an Air Defense Center can control movement of fighters not engaged in GCI operations as well as other aircraft flying within an air defense sector.
215	----035	Airborne Early Warning (AEW) Operations (AEW - AEW): For voice or data communications used A/A between AEW aircraft for coordinating AEW operations and exchanging information.
216	----055	Airborne Early Warning (AEW) Operations (AEW - Non-AEW): For voice or data communications between an AEW and other aircraft being controlled or otherwise assisted by an AEW.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
217	150050	AEW Compliment Frequency Used by Ground Facility: An AEW complements frequency, which, for operational reasons, must be assigned for shared use by a fixed or mobile ground facility.
218	---055	Tactical Air Control System (TACS): For communications to support a mobile or transportable TACS for planning, directing, and controlling offensive and defensive air operations within a designated area of responsibility.
219	200035	Non-AEW Airborne Command Post Operations: For A/G or A/G/A single or multi-channel voice, data, or combined voice and data simplex or duplex communications for non-AEW Airborne Command Post Operations for which no other function code exists.
<b>SECTION III: SPECIALIZED OPERATIONS</b>		
300	150030	Flying Training: For A/A or A/G/A communications between student and instructor during non-operational flight training activities.
302	150020	Weapon Training Range and Radar Bomb Scoring: For A/G/A voice communications to control/clear aircraft engaged in simulated or live ordnance delivery or gunnery practice at established weapons training ranges. May also be used to transmit special tones between ground bomb scoring station facilities and aircraft carrying out simulated bomb attacks to enable the determination of a hypothetical impact point of a bomb to be plotted by electronic means.
304	050020	Research (R) and Development (D), Testing and Calibration: Frequencies to be used A/A and/or A/G/A for research development and testing activities which may include calibration and/or testing of experimental equipment or actual communications for aircraft testing.
306	200050	Electronic Countermeasures (ECM) Training: Specific frequencies on which ECM are broadcast during exercise or for training.
307	100050	Pilotless Aircraft: Radio communications used for the control of pilotless aircraft.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
309		Television (TV): Terrestrial communications employing TV transmission techniques.
310		Terrestrial Telemetry: Communication between terrestrial stations involving one-way data transmission for measuring purposes.
311		Radio Sound Broadcasting: For a frequency assignment to a station in the broadcasting service (Broadcasting Service (BC) station Class) transmitting either amplitude modulation (AM) or frequency modulation (FM) monaural or stereophonic signals to a general or specific audience.
312		Ionospheric Sounders: For transmission of signal of suitable duration across the whole or part of a frequency band or only on discrete number of frequencies for the purpose of real time or near real time evaluation of the propagation characteristics of the band or certain frequencies.
313		Meteor Scatter and/or Packet Radio Systems: A one or two-way simplex, duplex or semi-duplex system employing meteor scatter technology and/or digital type packet radio format message format handling. If applicable, this function code may be used in lieu of code 811 or 812.
314		Communications for Sensors, Security Devisors: For which no other specific code exists. If applicable, this function code may be used in lieu of 812 (not to be used for band 225-400 megaHertz (MHz)).
SECTION IV: NAVIGATIONAL AIDS		
400	150050	Eureka Beacon Mk 7: Secondary radar homing and detection and monitoring (DM) systems employing an airborne interrogating system (Rebecca) and a ground responding beacon (Eureka).
401		Voice Rotating Beacon: An automatic very high frequency (VHF) radio-telephone beacon system having a radiation pattern which is continuously rotated.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
402		YE/YG Beacon: A sector coded VHF homing beacon operating on carrier frequencies, installed on ships and on bases, to provide bearing only to aircraft equipped with VHF homing receivers.
403		VHF Omnidirectional Range (VOR): A short range VHF omnidirectional beacon which provides an indication in the aircraft of the bearing of the beacon, or left-right track information.
404		Instrument Landing System (ILS) Localizer: A directional radio beacon associated with the ILS, which provides an aircraft, during approach and landing, with indication of its lateral position.
405		ILS Glidepath: A radio beacon associated with ILS, which provides an aircraft, during approach and landing, indication of its vertical position.
406	20060	Tanker airlift control Center (TACAN) Beacon High Cover: The TACAN Beacon is a coded polar coordinated system in which the ground installation provides bearing distance information to aircraft.
407		TACAN Beacon Low Cover (Definition as for function 406).
408	040025	TACAN Approach Beacon (Definition as for function 406).
409		VHF Omnidirectional Range (VORTAC): VOR and TACAN Beacons either integrated or co-sited.
410		Distance Measuring Equipment (D.M.E.) Beacon: The D.M.E. Beacon is a coded system in which the ground installation provides distance information to aircraft (always co-located with VOR).
413		TACAN Air-to Air: The TACAN used in the A/A mode is a code system in which an airborne installation provides to aircraft distant.
414		Microwave Landing System (MLS): MLS is a precision approach and landing guidance system which provides position information and various ground to air data. The position information is provided in a wide coverage sector and is determined by an azimuth angle measurement, an elevation angle measurement, and a range (distance) measurement.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
415		Non-Directional Beacon (NDB): Station in the radio navigation service, emitting in a non-directional pattern, emissions which are intended to enable a mobile station to determine its bearing or direction in relation to the radio beacon station.
SECTION V: NON-ALLOTTED COMMON AND COMBINED FREQUENCY USES		
500	100020	Search and Rescue: For communication between parties involved in actual search and rescue operations on an assigned (non-allotted) frequency.
501		Search and Rescue Training: For communication between parties involved in search and rescue training activities on an assigned (non-allotted) frequency.
SECTION VI: NAVAL OPERATIONS		
600		Ship/Ship (Sea): Communication between ships at sea for maneuvering and control of forces and for passing urgent tactical messages concerning all aspects of naval warfare; to include passing urgent messages of a logistical and administrative nature.
601		Ship/Air (Helicopter) (Sea): Communication between ships at sea and helicopters, when the latter are engaged on screening operations, during helicopter transfers, and on Anti Submarine Warfare (ASW) operations. The helicopter may operate as a relay station.
602		Ship/Air (Carrier Aircraft) (Sea): Communication between ships at sea and carrier-borne aircraft cooperating with surface forces on ASW, Air Defense, AEW, Strike, Surveillance, and Electronic Warfare (EW) operations. The aircraft may operate as a relay station.
603		Ship/Air (Shore-based Aircraft): Communications between ships at sea and shore-based aircraft cooperating with surface and sub-surface forces on ASW, Anti Surface Warfare (ASUW), AEW, Air Defense, Strike, Surveillance, and EW operations.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
604		Ship/Shore/Ship (Harbor): Communication between ships in harbor and port authorities for passing operational and administrative traffic.
605		Air/Air: Communication between Maritime Patrol Aircraft (MPA) and Radar Reconnaissance aircraft involving surveillance and search operations.
606		Air Defense Operation Center/Ship/Air: Communication between an Air Defense Operation Center, Air Defense Control Ships, and aircraft during air defense operations when handing over control of aircraft.
607		Ship/Shore/Ship (Cruising): Communication between ships and shore authorities (including communication stations) for relay of tactical, operational, administrative and Tactical Data System (TDS) messages.
608		Ship/Air/Shore: Communication between ships, aircraft, and shore authorities for ASW, AEW, operations, naval gunfire support, etc.
<b>SECTION VII: SPACE OPERATIONS</b>		
700		Telecommand, Telemetry and Tracking: Communication between terrestrial and space stations involving telemetering, tracking and command guidance of the spacecraft.
701		Research: A space service in which spacecraft or other objects in space are used for scientific or technological research purposes. An earth station involved in space research is included in this definition.
702		Communication Satellites: A service using space techniques for communications between terrestrial stations which may be on land, sea, or airborne.
703		Radio navigation Satellites: A service using space stations on earth satellites for purpose of radio navigation including, in certain cases, transmission or retransmission of supplementary information necessary for the operation of the radio navigation system. An earth station involved in radio navigation would be included in this definition.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
704		Meteorological Satellites: A space service in which the results of meteorological observation, made by instruments on earth satellites, are transmitted to earth stations by space stations on these satellites. An earth station involved in meteorological/ observation would be included in this definition.
SECTION VIII: LAND FORCES OPERATIONS		
800	150020	Navy Close Air Support - High Level: A function used by the Tactical Air Control Party Air Liaison Officer/Forward Air Controller in offensive support operations. Communications are provided for A/G liaison and for control of aircraft assigned offensive close air support missions.
801	025010	Navy/Army/Air Close Air Support - Low Level: (Definition as for 800).
802	050003	Light Aircraft A/G/A Support: A/G/A communications between light aircraft and ground stations. In the ultra high frequency (UHF) (225-400 MHz) band requirements for these codes are accommodated by allotment. Assignments on non-allotted frequencies require approval by Allied Radio Frequency Agency (ARFA) (FMSC) Plans and Policy Section for the ARFA (FMSC) Plenary. See Function Code Instructions/Information (Para 4. of EUCOM Spectrum Management Manual) and NATO Frequency Management Handbook and ACP 190, NATO supplement 1 & 2.
810		Multi-Channel Radio Relay: Point-to-Point communication systems using highly directional antennas over a line-of-sight path capable of accommodating only one channel of intelligence.
811		Single Channel Radio Relay: Point-to-Point communication systems using highly directional antennas over a line-of-sight path capable of accommodating only one channel of intelligence.
812		Local Ground Services Network: A network, confined to a local area of operations, of fixed and/or mobile stations operating in the simplex or duplex mode.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
813		Stand-by to Primary Systems: A system established for point-to-point use in the event that a primary communications system fails.
<b>SECTION IX: COMBINED FREQUENCIES</b> (See Notes 1 thru 7)		
900		NATO Combined Distress and Emergency: (121.5, 243.0 MHz) (See Notes 3. & 5.). For use in distress and emergency by mobile stations including survival craft stations and equipment.
901		NATO Combined Control Tower: (257.8 MHz) (See Note 2.). For communications between all military towers in the NATO area (See Notes 3. and 4.) and aircraft which cannot readily operate on the specific local control frequency of its airfield of destination or diversion.
903		NATO Combined Ground Controlled Approach (GCA) Marshaling/Search: (344.0 MHz) (See Note 2.). For communications between military GCA units in the NATO Area (See Note 3.) and aircraft which cannot readily operate on the specific GCA Marshaling frequency of its airfield of destination or diversion.
904		NATO Combined GCA Talkdown/Final: (385.4MHz) (See Note 2.). For communications between military GCA units in the NATO Area (See Note 3.) and aircraft which cannot readily operate on the specific GCA Talkdown frequency of its airfield of destination or diversion.
905		NATO Combined Interceptor Control: (See Note 6.). A service carried out by selected control stations and navigational centers, (i.e. Space Operations Center (SOC)/Airspace Control Center (ACC), Control and Reporting Center (CRC)/Control and Reporting Post (CRP)/GCI, Tactical Air direction Post (TADP), Air Defense Section (ADS)) (see Note 3.) for the operational control of fighter aircraft flying beyond their adjacent sectors when no pre-planned frequency can readily be put into operation.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
906		NATO Combined Navigational Fixer/Guard: (See Note 6.). A service carried out by selected control stations and navigational centers, by all fixer stations and fixer triangulation centers in the NATO Area (See Note 3.) for navigational assistance and/or fixing aircraft when operating outside their parent sector and when a pre-planned frequency cannot readily be put into operation.
907		NATO Combined Combat Scene of Action: (See Note 6.). A channel to be operated (See Note 3.) in all NATO navy ships, army units, and military aircraft engaged in direct support of either or all services for tactical communications in combat operations in which two or more elements of the same or different arms are employed in circumstances precluding the prior agreement of a communication plan.
908		NATO Combined Air Traffic Control/Approach Control: (362.3 MHZ). A channel to be operated by all Air Traffic Control Centers (ATCC) for the control of military aircraft through ATCC areas, in the NATO Area (See Note 3.) when the specific ATCC frequency cannot readily be put into operation.
909		NATO Combined Transport Control: (See Note 6.). For communications between Selected Control Stations in the NATO area (See Note 3.) and NATO aircraft involved in all operational aspects of transport operation throughout the NATO European area.
911		NATO Combined Scene of Search and Rescue: (282.8 MHz) (See Note 5.). A channel to be operated (See Note 3.) in NATO ships, Search and Rescue aircraft, vehicles, and where necessary, Rescue Coordination Centers for intercommunications among aircraft, ships, and rescue teams engaged in the conduct of land or sea rescue operations.
912		NATO Combined Conship/Conshore: (See Notes 3. and 6.). A channel to be operated (See Note 3.) at Selected Ground Control Stations and NATO ships for the operations control of aircraft which have to be transferred from the control of a selected ground station to the control of a naval unit (or vice versa) when a pre-planned frequency cannot readily be put into operation.

<b>Function Code SFAF Item 707</b>	<b>Service Volume SFAF Item 711</b>	<b>Function Code Description of Use</b>
913		NATO Combined Search and Rescue Training: (See Note 6.). A channel operated by NATO ships, Search and Rescue aircraft, vehicles and other elements and, where necessary, Rescue Coordination Centers for intercommunication and coordination between units (land, sea, and air) engaged in training for land or sea rescue operations.
916		Secondary Emergency: (242.6, 243.4, 243.8MHZ). For safety communications in emergency when use of the international distress frequency is not appropriate.

**NOTES:**

1. Because of the special nature of NATO combined frequencies, they are only to be used for the agreed NATO functions to which they are assigned. All 900-series frequencies are agreed to be NATO-wide. 900-series assignment function codes will not be entered in the Master Radio Frequency List (MRFL). They have been listed here because of the existence of assignments on some of these function codes to augment the NATO Frequency Management Handbook and ACP 190, NATO supplement 1 & 2 and preserve their descriptions.
2. The frequency may be used by aircraft of NATO Nations to communicate, without prior notice, with selected airfields, but only if such aircraft cannot use the appropriate local control or approach control frequency. The selection of such airfields is the prerogative of the national authority concerned. This prerogative will be exercised after consideration of requirements, which have been stated by NATO Major Subordinate Commanders in the connections.
3. The decision as to whether continuous, non-continuous, or on request watch is to be maintained will be made by the appropriate NATO and/or National Commanders.
4. The phrase "All Military Towers in the NATO area" applies only to airfields, which have been selected by agreement between national authorities and the appropriate NATO Commanders.
5. The VHF and UHF frequencies for DISTRESS and SCENE, and SEARCH and RESCUE functions are only to be used in cases of actual need and they may not be used for exercise/ training purposes.
6. Some NATO combined frequencies have not been listed due to classification. Refer to the NATO Frequency Management Handbook and ACP 190, NATO supplement 1 & 2.
7. Should the need arise for a combined type function at a national or command level on a non-allotted frequency, assignment(s) may be possible and existing or specifically established 500 series function codes will be used.

## 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 necessary for the specific frequencies. Request assignments according to AFI 33-118 and **Chapter 3** of this manual.

4.1.1. **(Added-USAFE)** Units must request assignments according to AFI 33-118, USEUCOM SMM, and **Chapter 3** of this manual. USAFE specific guidance on SFAF items required for all frequency proposals is contained in **Attachment 5 (Added)**.

4.1.2. **(Added-USAFE)** Each nation manages their spectrum to accommodate its needs; because of this there is no one set of rules that apply to ALL countries. To view the European and each individual country's Table of Allocations see the following website: <http://www.ero.dk/>.

#### **4.2. High Frequency (HF) 2 – 30 MHz.**

4.2.1. Ionospheric Chirpsounders. The use of ionosphere sounders for real-time selection of frequencies for operational communication circuits, real-time monitoring of upper atmosphere phenomena, and for the predicting of propagation conditions will be authorized only under the following conditions listed below:

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. Transmitters need to be configured 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: pulses per channel, sweep rates, sweep intervals, pulse width (duration), PRR, antenna type, antenna orientation, and the statement, "No existing authorized ionospheric sounder system is capable of meeting this requirement." Also, include on line SFAF 500, special note - S383.

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.**

<b>FREQUENCY BANDS (kHz)</b>	<b>FREQUENCY BANDS (kHz)</b>
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 system 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, electromagnetic compatibility (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. AFFMA coordinates chirpcomm™ systems within the US&P with the NTIA.

4.2.3. Special Considerations for the Continental United States (CONUS) High Frequency (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. 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 non-radiating (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 Defense Information Infrastructure (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, 148-150.8, 162-174, 380-399.9, 406-420 MHz.** Because of extreme congestion in the 162-174 MHz band, new LMR frequency assignments are usually made in the 138-144, 380-399.9, or 406.1-420 MHz bands unless use of another band is needed for operational reasons. No one solution works everywhere; therefore, to ensure LMR frequencies are available before deploying equipment overseas, MAJCOMs must contact the appropriate service component for guidance. The following conditions, restrictions and special provisions apply:

4.3.1. 30-88 MHz, please refer to the NTIA Manual for complete guidance pertaining to use in this band. This band can only be used when approved by FCC.

4.3.1.1. 29.89-50 MHz band. Government and nongovernment agencies share this band 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. **(Added-USAFE)** Land Mobile Radio (LMR). Frequency bands and restrictions for LMR assignments differ throughout the USEUCOM AOR. Units requiring LMR frequency support should contact the USAFE FMO, through established command channels, for current guidance. Units must request assignments according to AFI 33-118, USEUCOM SMM, and **Chapter 3** of this manual.

4.3.2. 138-144 MHz band. The military services are the primary users in this band. Channels begin with 138.0125 MHz and move up the band in 12.5 kHz increments.

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

4.3.2.2. **(Added-USAFE)** There is no narrowband mandate in the USEUCOM AOR. The use of narrowband equipment is encouraged where technically and operationally feasible. This shows good stewardship of the spectrum and will aid in easing the congestion in highly saturated LMR frequency bands.

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 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 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.
  - 4.3.4.2.4. **(Added-USAFE)** There is no narrowband mandate in the USEUCOM AOR. The use of narrowband equipment is encouraged where technically and operationally feasible. This shows good stewardship of the spectrum and will aid in easing the congestion in highly saturated LMR frequency bands.
- 4.3.5. 406.1-420 MHz band. This band is used primarily by nonmilitary agencies. Channels begin with 406.0125 MHz and move up the band in 12.5 kHz increments.
- 4.3.5.1. All equipment in this band must operate within a 12.5 kHz narrowband channel according to the NTIA Manual, after 1 January 2008.
  - 4.3.5.2. **(Added-USAFE)** There is no narrowband mandate in the USEUCOM AOR. The use of narrowband equipment is encouraged where technically and operationally feasible. This shows good stewardship of the spectrum and will aid in easing the congestion in highly saturated LMR frequency bands.
- 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 and 380 – 399.9 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 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. Frequency requirements for shared trunking systems are submitted by the installing or managing agency of the equipment.
- 4.3.7.1. **(Added-USAFE)** Trunked LMR systems in the USEUCOM AOR do not require Interdepartment Radio Advisory Committee (IRAC) or Spectrum Planning Committee (SPS) approval. Due to the infrastructure costs associated with the implementation of a trunked LMR system, units must first coordinate with the USAFE FMO and the USAFE Personal Wireless Communications

Systems office to ensure compliance with current host nation and USAFE guidance regarding implementation of trunked LMR systems.

4.3.8. **(Added-USAFAE)** Trunked System Usage Reports. The National Telecommunications and Information Administration (NTIA) requirement for trunked system usage reports does not apply to USAFAE units.

**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 Aeronautical Assignment Group (AAG) controls the frequencies. The FAA considers normal ATC operations at a location to consist of: 1 ground, 1 local, 2 approach, 1 departure, and 1 Automatic Terminal Information Service (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 headquarters FAA to determine the need for the additional frequencies. All requirements must be coordinated first with the applicable local FAA region. A service volume must be included on all ATC assignments (SFAF 503). FAA regional coordination information must be listed in the Supplementary Details (SFAF 520). Additionally, in certain RF saturated regions not all normal ATC operations can be supported with a FAA VHF band assignment.

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

4.4.2.1. **(Added-USAFAE)** VHF Tactical Operations. The use of the 30-88MHz band, for airborne operations, is severely restricted in Europe. Units should not plan on using this band for airborne operations. The 138-144 MHz band is also severely congested in Europe. Requests for frequencies in this band may take several years to coordinate, and restrictions for use must be expected. Units should not plan on using the VHF band for tactical operations in Europe.

4.4.3. VHF Pilot to Dispatch. This function cannot reside in the 108-136 MHz frequency band. Place this function into the band of 138-144 MHz. Use 139.3 MHz when feasible, to standardize Air Force operations.

4.4.4. **(Added-USAFAE)** VHF Air Traffic control (ATC) operations conducted in the 118-136MHz band are controlled by the civil aviation authorities of each host nation. Frequencies in this band must be used for ATC communications. Units requiring frequencies in this band must include detailed justification in SFAF item 502. Justification must include specific operational impacts why a military band frequency is not acceptable. Due to the severe congestion throughout the USEUCOM AOR and the multi-nation coordination required, requests for frequency assignments in this band may take more than one year to obtain. Units must request assignments according to AFI 33-118, USEUCOM SMM, and **Chapter 3** of this manual.

**4.5. Ultra High Frequency (UHF) (225-399.9 MHz).** The 225-399.9 MHz band, 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 225-399.9 MHz band.

4.5.1. Aeronautical Operations. Within the US&P, the Military Advisory Group (MAG) recommends assignment action used to support aeronautical operations. Frequencies are channeled in 25 kHz increments and must be used in accordance with the 225-399.9 MHz allotment 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, 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.

4.5.1.1.1. **(Added-USAFE)** Assignments to support these functions within the USEUCOM AOR must be in accordance with the channeling plans in the NATO Frequency Management Handbook.

4.5.1.1.2. **(Added-USAFE)** Aeronautical Operations. Within the NATO Europe AOR all UHF air-to-air and air-to-ground frequencies are controlled by the NATO Spectrum Management Branch (SMB).

4.5.1.2. Air Traffic Control (ATC) Frequencies. ATC frequencies are used solely to control the movement of aircraft. 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. Communications between military stations and aircraft operating within a military operating area, after being handed over by FAA control, are not considered ATC operations.

4.5.1.3. **(Added-USAFE)** Pilot to Metro. The NATO common Pilot-to-Metro frequency is M284.425. Individual assignments are not required.

4.5.2. 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 allotment plan.

4.5.2.1. 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 is normally a duplex operation; therefore make sure frequencies are requested for both locations.

4.5.3. Satellite communications. The 225-399.9 MHz band is used to support Fleet Satellite Communications (FLTSAT) and Air Force Satellite Communications (AFSAT). Per MCEB-M-003-04, the allotment plan for the 225-399.9 MHz frequency band, Annex D provides the plan for satellite communications.

**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. There are many radio frequencies used to support airfield operations at a typical Air Force installation. Periodically, the ISM should compare assigned frequencies against the DOD flight information publications (FLIP). Errors should be brought to the attention of the airfield manager so the FLIP can be corrected, or frequencies changed to those assigned. Aeronautical NAVAIDs and their allocated frequency bands are:

4.6.1. Low Frequency (LF) and Medium Frequency (MF) Non-directional Beacons (NDB). Frequencies for LF or MF radio beacon 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 of 2K04A2A, and service volume (SFAF 503) are required for each proposal.

4.6.2. 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.

4.6.2.1. 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

4.6.2.2. 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)

4.6.2.3. Instrument Landing System (ILS) Glideslope. The frequency band 328.6-335.4 MHz transmits vertical guidance signals for descent to the runway. The glideslope is allocated for aeronautical radionavigation and is used to support ILS Glideslope. Glideslope and localizer frequencies are paired according to the channeling plan shown in the NTIA Manual. The AAG controls these assignments. Coordination is required with the local FAA regional office for all ATC requirements.

4.6.2.4. **(Added-USAFE)** Frequencies for NAVAID systems are controlled by each nation. In order to provide for safe flight operations these systems require a high level of engineering and coordination. Guidance on USAFE specific SFAF items is contained in **Attachment 5 (Added)**.

4.6.3. 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 support the MLS and associated precision DME-P (972-1143 MHz).

4.6.3.1. 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.

4.6.4. 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, 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 enroute facility, or high enroute facility. The classification of the facility is important because it determines the level of protection afforded the facility. The standard service volume (SFAF 503) is required on all assignments.

4.6.4.1. Standard Service Volumes (SSV). Ground stations are classified according to their intended use. These stations are available for use within their service volume. Outside the service volume, reliable service may not be available. For standard use, the airspace boundaries are called standard service volumes. They are defined in [Table 4.2.](#) below, for the three station classes.

**Table 4.2. Standard Service Volumes.**

<u>SSV Class Designator</u>	<u>Altitude and Range Boundaries</u>
T (Terminal)	From 1000 feet (305 m) above ground level (AGL) up to and including 12,000 feet (3,658 m) AGL at radial distances out to 25 nautical miles (nmi) (46 km).
L (Low Altitude)	From 1000 feet (305 m) AGL up to and including 18,000 feet (5,486 m) AGL at radial distances out to 40 nmi (74 km).
H (High Altitude)	From 1000 feet (305 m) AGL up to and including 14,500 feet (4,420 m) AGL at radial distances out to 40 nmi (74 km).  From 14,500 feet (4,420 m) AGL up to and including 60,000 feet (18,299 m) at radial distances out to 100 nmi (185 km).  From 18,000 feet (5,486) AGL up to and including 45,000 feet (13,716 m) at radial distances out to 130 nmi (241 km).

4.6.4.2. TACAN Channels. Airborne and ground TACAN frequencies are paired to form 126 "X" channels and 126 "Y" channels as shown in 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.

4.6.4.2.1. 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.

4.6.4.2.2. **(Added-USAFE)** There are no specifically reserved TACAN channels available for training use in the USEUCOM AOR. Requests for TACAN training channels must be sub-

mitted at least ninety days prior to needed by date (SFAF item 805). Submit requests in accordance with MCEB Pub 7, **Chapter 3** to this manual, and the USEUCOM SMM.

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

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

4.6.4.3.2. 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."

4.6.4.3.3. 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 "USP" in items 300 and 400 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 in SFAF 520.

4.6.4.3.4. **(Added-USAFE)** The use of air-to-air TACAN channels, in the NATO AOR, is the responsibility of the NATO SMB. Submit requests to the NATO SMB in accordance with MCEB Pub 7, **Chapter 3** of this manual, and the USEUCOM SMM for assignment.

4.6.5. 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.

4.6.6. VHF Omnidirectional Range (VOR). VOR facilities provide bearing information to aircraft and operate in the 108-117.95 MHz band as shown in the NTIA Manual. Most VORs use voice and Morse code transmissions to identify the ground facility.

4.6.7. 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.

4.6.7.1. 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.

4.6.7.2. VOR and DME or TACAN antenna separation will not exceed 2,000 feet for facilities providing only en route services. Refer to the NTIA Manual for complete table.

4.6.8. ATC Radar Beacon System IFF and Selective Identification Feature (SIF). The IFF/SIF consists 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 and no assignment is required. The IFF/SIF is normally paired with the airport surveillance radar (ASR). If the IFF/SIF is paired with an ASR, SFAF Item 506 must cross reference the ASR. For example: P/W AN/TPX-42, PRR250.

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

4.6.8.2. 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.

4.6.8.3. 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.

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 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 with the additional EMC features installed will contain record note S373.

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

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.

4.8.1. **(Added-USAFE)** Security Forces (SF) RADAR speed guns have no pre-assigned frequencies within the USEUCOM AOR. Any RADAR gun operating in the USEUCOM AOR must have an

approved DD Form 1494, Application for Equipment Frequency Allocation, with positive host nation comments, and a valid frequency assignment prior to use. Submit requests in accordance with MCEB Pub 7, **Chapter 3** to this manual, and the USEUCOM SMM. Additionally many bases are now utilizing laser technology for this purpose. Laser systems do not require frequency support. However, laser systems must have valid European Certification prior to use.

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

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 2360-2390 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 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 1435-1525 MHz band consists of ninety-nine (99) 1-MHz channels designated for telemetering.

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.

4.10.1.3. The 2310-2390 MHz band consists of seventy-three (73) 1-MHz channels designated for telemetering.

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.

4.10.1.3.2. **(Added-USAFE)** The European allocated frequency band for telemetry operations is 2300-2400MHz. However, as with all frequency bands, each nation has further sub-allocated this band for other purposes. Units requiring frequencies for telemetry operations must ensure the SFAF proposal lists the complete tuning characteristics of the equipment. This will provide the host nation the greatest measure of flexibility to accommodate the

frequency request. Submit requests in accordance with MCEB Pub 7, **Chapter 3** to this manual, and the USEUCOM SMM.

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 dB.

4.10.1.6. Channels designated for aeronautical telemetering in the 1435-1525 MHz band are also available for space telemetering on a shared basis.

4.10.1.7. The 1530-1525 MHz band is allocated primarily to maritime mobile satellite service; mobile aeronautical telemetry is secondary.

4.10.2. The 2025 –2100 MHz and 2200-2290 MHz bands. These frequencies are designated for telemetry and associated telecommand for launch vehicles, missiles and upper atmosphere research rockets, in addition to space missions (of extended duration). Such use is on a coequal shared basis with fixed and mobile LOS operations. All (space-related) operations in these bands must be coordinated with DOD and National Aeronautics and Space Administration (NASA).

4.10.2.1. The 2200-2290 MHz 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 the 2200-2290 MHz 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.

**Table 4.3. Emergency Frequencies.**

<b>SERVICE</b>	<b>FREQUENCY (EMISSION)</b>	<b>COMMUNICATION SERVICE</b>	<b>FUNCTION</b>
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)		

4.11.1. 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.

**4.12. Radio Amateur Civil Emergency Service (RACES).** Air Force activities may use the RACES station frequencies listed in [Table 4.3](#). to make initial contact with RACES personnel to coordinate on emergency or disaster related matters. Additional information can be found in the NTIA Manual.

**4.13. 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:

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

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

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

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

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

**4.14. DOD Use of Frequencies in Non-Federal Government Bands.** The military may use some frequencies allocated for nonfederal government 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 non-federal government users. The military must accept any interference caused by nonfederal government-authorized users. Military use of a frequency will not bar new nonfederal government assignments on that or adjacent frequencies.

4.14.1. 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 the NTIA Manual.

4.14.1.1. MAJCOM SMOs are delegated assignment authority in these bands to exclude use of long haul communications (see paragraph [4.14.1.8](#)). No assignment in either the GMF or the FRRS is required.

4.14.1.2. 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.

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

4.14.1.4. 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.

4.14.1.5. 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 the NTIA Manual for the allowable frequencies, emissions and power levels in the 4-27 MHz band.

4.14.1.6. 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.

4.14.1.7. 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.

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

4.14.1.9. **(Added-USAFE)** Department of Defense (DoD) Use of Frequencies in Non-government Bands. The military use of non-government (civil) frequencies is highly discouraged in the USEUCOM AOR. This is due to the extreme congestion of civil bands in Europe and the highly complex rules for multi-national coordination. The operational requirement for a civil band frequency must be fully justified in SFAF item 502. Be advised that justification based upon an Air Force Instruction does not require a host nation to assign a frequency, for military use, in their civil frequency band. Assignments in civil bands may also contain severe restrictions on operational parameters to include reduced output power and antenna gains. Assignments may also require our acceptance of the frequencies on a non-interference basis. Units must submit requests in accordance with MCEB Pub 7, **Chapter 3** to this manual, and the USEUCOM SMM.

#### 4.14.2. Military use of nonfederal government bands above 25 MHz.

4.14.2.1. The military services may use frequencies in the nonfederal government bands above 25 MHz for tactical and training operations in the US&P as shown in the NTIA Manual. 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) (see **Attachment 4**).

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

4.14.2.3. The military will protect specific nonfederal government frequencies authorized for government agencies.

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

4.14.3. Military Test Range Operations. The FCC and the military services have arranged for the military use of nonfederal government bands at the military test ranges shown in the NTIA Manual. The authorized frequency bands are listed in the NTIA Manual. The following procedures apply to use of these nonfederal government bands:

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

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

4.14.3.3. Select frequencies to avoid harmful interference to known nonfederal government operations.

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

4.14.3.5. Do not use nonfederal government 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.

**4.15. 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.

**4.16. Citizen Band (CB) Radio Service.** Air Force CB stations must operate in accordance with FCC Rules and Regulations, Part 95, Subpart D (Title 47, Code of Federal Regulations (CFR), 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.

4.16.1. 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.

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

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

4.16.4. Only US government employees may operate the equipment.

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

4.16.5.1. **(Added-USAFE)** U.S. Specification Citizen band (CB) radios are not authorized for use in the USEUCOM AOR. Personnel wanting to use CB type services while overseas must obtain host nation accepted equipment and comply with all host nation laws regarding use of such equipment. Users may also require licensing through the host nation civil authorities governing use of such services. CB type radios will not be used for operational purposes in the USEUCOM AOR.

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

**4.17. 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.

4.17.1. **(Added-USAFE)** The use of frequencies for broadcasting services is governed by each respective host nation. The U.S. government has negotiated bi-lateral treaties and agreements with many nations regarding the use of broadcast frequencies by U.S. forces within that nation's borders. Units requiring use of a frequency for broadcast services must submit a SFAF request according to MCEB Pub 7, the USEUCOM SMM, and **Chapter 3** of this manual.

**4.18. Cellular Telephone Systems.** These systems operate on nonfederal government 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.

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

**4.19. Pager Systems.** The 138-144 MHz band is used for Air Force pager systems, unless another band is required for operational reasons. 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.

**4.20. Maritime Mobile (MM) Frequencies.** The 156-162 MHz band is allocated primarily for nonfederal government maritime mobile communications.

4.20.1. The channels in the MM band are reserved for communications between vessels and designated commercial marine operators and for nonfederal government ship-to-shore and inter-ship operations.

4.20.2. 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 nonfederal government licensees. Air Force activities will submit requirements through command channels to the AFFMA.

4.20.2.1. When using MM frequencies, regulations in the NTIA Manual must be adhered to. Channel 6, 156.3 MHz, may be authorized for inter-ship communications. This channel is authorized for coordinated operation at the scene of a Search and Rescue (SAR) incident (refer to the NTIA Manual). Coast stations may use this channel during emergencies affecting life or property when other means of communications are not practical. 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. Channels 81A and 82A are allocated for "U.S. Government Only" and can be requested to support Air Force operations.

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

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

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

4.21.3. 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.

4.21.4. 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.

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

4.21.6. **(Added-USAFE)** There are no specifically designated frequencies available for experimental stations in the USEUCOM AOR. All radio frequency dependent equipment must have a valid frequency assignment prior to operation. Units must submit requests in accordance with MCEB Pub 7, **Chapter 3** to this manual, and the USEUCOM SMM.

**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, see **Table 4.5** and within the frequency limits found in the NTIA Manual.

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 the NTIA Manual.

**Table 4.4. 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 4.6**). FRS radio may be

used on any of the 14 FRS channels, which are shared between all FRS users. This means that users can listen to your conversation and 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.

**Table 4.5. 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		

4.23.1. 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 the 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 SMO.

**4.24. Intra-Squad Radio (ISR).** The ISR is the military FRS radio operating in the 380-399.975 MHz sub-band. It is recommended over the commercial FSR for Air Force members and employees. Because it is in the government electromagnetic band and the potential for electromagnetic interference is less, it can be used for tactical or training operations unlike the FRS that uses civil spectrum. Other operations permitted with the ISR are cantonment areas and roving/walking guard posts.

4.24.1. Do not modify the ISR.

4.24.2. Only Air Force members and employees will use the ISR.

4.24.3. Do not use the ISR for personal use.

4.24.4. **(Added-USAFE)** Prior to using an Intra-Squad Radio (ISR) in the USEUCOM AOR users must ensure the ISR has host nation supportability and a frequency assignment. Frequency requests must be submitted in accordance with MCEB pub 7, the EUCOM SMM, and **Chapter 3** of this manual.

**4.25. 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. 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 nonappropriated fund activities. Bottom line: Air Force users are not authorized to use GMRS.

**4.26. Multi-Use Radio Service (MURS).** The FCC established MURS in 2002 as a Citizens Band Radio Service. This equipment cannot be used by government employees in the line of duty, or as an employee of any government entity, including nonappropriated fund activities. Reference: [http://wireless.fcc.gov/services/index.htm?job=operations&id=multi\\_use#Permissible%20Communication](http://wireless.fcc.gov/services/index.htm?job=operations&id=multi_use#Permissible%20Communication).

**4.27. 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:

4.27.1. 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.

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

4.27.3. Begin coordinating earth stations during the system review using procedures outlined in 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.

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

**4.28. 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.

**4.29. Space-Ground Link Subsystem (SGLS) and Unified S-Band (USB).** Satellite operations for military satellites are authorized for SGLS uplinks in the band 1761-1842 MHz and USB uplinks in the band 2025-2110 MHz and SGLS and USB downlinks in the band 2200-2290 MHz. Spectrum managers at Space and Missile Systems Center (SMC) located at Los Angeles AFB CA; Eastern Space and Missile Center (ESMC), located at Patrick AFB FL; and Western Space and Missile Center (WSMC) located at Vandenberg AFB CA manage and issue discrete frequency assignments on a program-by-program basis for all operations in these bands and coordinate with Federal Satellite Operations (per DOD/NASA MOU, 23 October 2003) and also the Electronic News Gatherers for uplink operation in the 2025-2110 MHz band. **NOTE:** Dual-Band satellite operations policy requires shared Air Force, NASA and National Oceanic & Atmospheric Administration (NOAA) operation in the 2025-2110 and 2200-2290 MHz bands.

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

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

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

4.30.3. Antenna configuration, to include:

4.30.3.1. Whether full scale or less than full scale.

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

**4.31. 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, fully 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.

**4.32. Line of Sight (LOS) Frequency Diversity.** Justify the use of frequency diversity for new LOS transmission systems in 1710-1850, 2200-2290, 4400-4990, 7125-7250, 7300-7975 and 8025-8400 MHz bands. Explain the need for such a high degree of systems reliability and cite the engineering study showing that frequency diversity is necessitated by the required reliability. Existing systems using frequency diversity may continue until frequency congestion requires reevaluation.

**4.33. Canadian Frequency Assignments.** 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 that directly operate and maintain transmitter and receiver stations.

4.33.1. 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 National Defence Headquarters, Director General Information Management Technologies //Director Information Management Technologies, Products and Services 5 (NDHQ DGIMT OTTAWA//DIMTPS 5).

4.33.2. Renewal of Licenses. The National Defence Headquarters, Director General Information Management Technologies //Director Information Management Technologies, Products and Services 5 (NDHQ DGIMT OTTAWA//DIMTPS 5) automatically renews radio licenses not requiring amendments on 1 April of each year, without any action by the applicant.

**4.34. Operating FCC-Licensed Stations on Air Force Installations.**

4.34.1. 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 (Title 47, Code of Federal Regulations, Part 73, *Radio Broadcast Services*).

4.34.2. 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.

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

4.34.3.1. 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, including action taken, to the FCC, Washington DC if appropriate, and the local FCC through the FCC Watch Officer at (202) 418-1192 (UNCLAS).

4.34.3.2. Licensees report interference between two FCC-licensed stations to the FCC Watch Officer at (202) 418-1192 (UNCLAS).

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

4.34.3.4. 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) 418-1192 (UNCLAS).

**4.35. Joint Tactical Information Distribution System (JTIDS)/Multifunctional Information Distribution System (MIDS).** 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 Air Force is the lead service; MIDS is a joint/international program and the US Navy is the lead service.

4.35.1. Users will process frequency requirements for JTIDS through command channels to the AFFMA JTIDS action officer. 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 IRAC/FAS process and require a minimum of 60-90 days to complete.

4.35.2. JTIDS/MIDS Terminals. JTIDS/MIDS terminals operate within the frequency band allocated world wide for aeronautical radionavigation. The FAA controls use of this band in the US&P. The DOD must operate within the strict guidelines set by the FAA to ensure flight safety.

4.35.3. Frequency assignments and operations must be in strict adherence to Chairman Joint Chiefs of Staff Instruction (CJCSI) 6232.01C, *LINK-16 Spectrum Deconfliction*, at [www.dtic.mil/cjcs\\_directives/cdata/unlimit/6232\\_01.pdf](http://www.dtic.mil/cjcs_directives/cdata/unlimit/6232_01.pdf) and the *JTIDS/MIDS Spectrum Users Guide (JSUG)*, at <https://totn.acc.af.mil/>.

4.35.4. **(Added-USAFE)** Spectrum clearance for Joint Tactical Information Distribution System (JTIDS)/Multifunctional Information distribution system (MIDS) networks is obtained according to each nation's Frequency Clearance Agreement (FCA). The FCAs are posted on the Directorate of Air and Space Operations, Aerospace C2 Execution Branch's (HQ USAFE/A3YO) home page on the Air Force Portal. The link is: <https://www.my.af.mil/gcss-af/afp40/USAF/ep/globalTab.do?command=org&channelPageId=-1099587&pageId=681742>. Units must contact the USAFE FMO for additional information specific to the operation of JTIDS/MIDS ground and airborne terminals.

**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) SMO maintains four frequency assignments for SKE usage within the US&P. The TACC SMO deconflicts SKE usage to ensure safe passage of multiple formations and drop zones.

4.36.2. SKE follow-on (SKEFO) (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 and the system provides for precision guidance to the drop zone.

4.36.3. **(Added-USAFE)** The usage of station keeping equipment (SKE) frequencies in the USEU-COM AOR is managed by the 86 Operations Support Squadron, Wing Tactics Branch (86OSS/OSP). Units requiring usage of SKE frequencies must first contact the 86OSS/OSP at DSN 314-480-2822 for guidance.

**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/ARC-222) 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 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 1,000 feet elevation above ground level (AGL), hopping operations are coordinated with the supporting AFC.

4.37.2.1.2. 30-50 MHz - Above 1,000 feet elevation AGL, all frequencies must be coordinated with the supporting AFC.

4.37.2.1.3. 50-54 MHz - Above 1,000 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 1,000 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. Refer to NTIA Manual for subbands authorized for usage when training with ground-based SINCGARS.

4.37.2.1.5. **(Added-USAFE)** Airborne frequency hopping using Single Channel Ground/ Airborne Radio Subsystem (SINCGARS) radios is severely restricted in the USEUCOM AOR. Contact the USAFE FMO for information on how to request a SINCGARS airborne hopset.

**4.38. Military Aircraft Collision Avoidance System (MILACAS).** MILACAS is the next generation technology version and replacement of TCAS II V7 and ETCAS. The system has advanced surveillance functions to support improved overall performance. MILACAS-XR supports improved TCAS performance and extended range coverage, while MILASCAS-FR supports formation rendezvous capability utilizing Mode "S" data link and ultimately replacing SKE on C-130 and C-17 platforms.

**4.39. 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 hop set's capability resulting from narrower channel bandwidth and support for the transmission of digital data. HAVE QUICK IIA was designated as the Second-generation Anti-jam 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. For example: (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 225-399.9 MHz channeling plan for HAVE QUICK I and HAVE QUICK II operations. Additional information for HAVE QUICK requirements can be found in AFTTP(I) 3-2.49, *Multi-Service Tactics, Techniques, and Procedures For HAVE QUICK Radios*.

4.39.1. **(Added-USAFE)** The assignment of HAVE QUICK frequencies in NATO Europe is controlled by the NATO SMB. Units requesting a HAVE QUICK hopset must submit a SFAF proposal for an air-to-air or air-to-ground network. The proposal must include in item 502 the request is for a HAVE QUICK hopset and net number. Requests must be submitted according to MCEB Pub 7, The USEUCOM SMM, and **Chapter 3** of this manual.

**4.40. Commercial Satellite Communications.** The use of commercial satellite services is becoming more and more prevalent within DOD. DOD policy and guidance are described in Chairman Joint Chiefs of Staff Instruction (CJCSI) 6250.01B, *Satellite Communications*.

4.40.1. Once the responsibilities are understood, the type of radiocommunication service must be decided. These services are either Fixed-Satellite Service (FSS) or Mobile-Satellite Service (MSS).

4.40.1.1. FSS uses fixed earth stations and one or more space stations to route radio signals between fixed locations. FSS provides users with a leased transponder from a commercial satellite provider.

4.40.1.1.1. Refer to MCEB-M-008-03, *DOD Spectrum Procedures for the Use of Commercial Satellite Earth Terminals Outside United States and Possessions*, for procedures and guidance regarding DOD users of earth terminals utilizing commercial FSS outside of the US&P.

4.40.1.1.2. Users must contact the Defense Information Systems Agency (DISA), through command channels, for guidance on leased FSS under the DISN Satellite Transmission Services – Global (DSTS-G) contract. Additional information may be obtained at [www.disa.mil/gscst/](http://www.disa.mil/gscst/).

4.40.1.2. MSS provides for communications between mobile earth stations by means of one or more space stations. (A mobile earth station is an earth station operating while in motion on land, at sea or in the air, or when halted at an unspecified location.) MSS provides users a service at a monthly fee similar to telephone service.

4.40.1.2.1. Refer to Assistant Secretary of Defense/Command, Control, Communications and Intelligence (ASD[C3I]) (now ASD/Networks and Information Integration [NII]) Policy Letter, *DOD Policy Letter on Managing MSS*, August 29, 2001.

4.40.1.2.2. Since the DOD is considered as just another user, the service provider is responsible for all spectrum supportability issues, *including* host nation coordination.

4.40.1.3. In some cases, the FSS and the MSS include satellite-to-satellite links, which also may be operated in the Inter-Satellite Service (ISS). Also, these services may include feeder links necessary for their operation.

4.40.2. All equipment used to access a commercial satellite must conform to FCC Rules and Regulations (Title 47, Code of Federal Regulations, Part 25, *Satellite Communications*). One of two situations must apply. Either the government owns and operates the terminal equipment, or the terminal equipment is leased.

4.40.2.1. If the equipment is leased or commercially owned, the commercial provider is responsible for securing FCC Part 25 certifications and the frequency assignments.

4.40.2.2. If the equipment is DOD owned, DOD must request FCC Part 25 certification in order to obtain spectrum certification. When processing the DD Form 1494, the user must also submit the information in Table 4.7.

**Table 4.6. 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. <b>NOTE:</b> 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. <b>NOTE:</b> 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. <b>NOTE:</b> 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 Effective Isotropic Radiated Power (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. <b>NOTE:</b> All frequency bands and all emission designators must be listed for each band.

4.40.2.3. The FCC requires the following information for federal government use of commercial satellite spectrum:

- 4.40.2.3.1. A letter of acceptance or agreement from the satellite service provider.
- 4.40.2.3.2. A letter from the commercial satellite regional coordinator (for the earth station location) that indicates the earth station operations are accepted.
- 4.40.2.3.3. Documentation that the earth station terminal complies with Part 25 of the FCC Rules and Regulations.
- 4.40.2.3.4. A letter of request from the federal agency for use of the commercial spectrum. (It must include the information in Table 4.7.)

4.40.3. Use outside of the US&P is subject to restrictions set forth by host nation governments. Equipment use must be coordinated through the appropriate spectrum management channels. Users must verify host nation supportability for equipment use and satellite service before deploying overseas with the service.

**4.41. International Maritime Satellite (Inmarsat™).** Inmarsat™ is a commercial satellite system, operating in the Mobile-Satellite Service using geosynchronous satellites. It is subject to international law and treaty and can only be used for peaceful purposes. Inmarsat™ uses a satellite link to interface with terrestrial telephone systems or other Inmarsat™ terminals. Neither spectrum certification nor frequency assignments are required; however, special procedures exist for the purchase and use of Inmarsat™ terminals. Users must contact HQ AFCA/ECWM, through command channels, for guidance. Additional information may be obtained at <https://private.afca.af.mil/mss/>, Annex E of the NTIA Manual or contact the various vendors of Inmarsat™ compatible terminal equipment.

4.41.1. Per the MSS web page, <https://private.afca.af.mil/mss/>, send the completed Inmarsat™ application to HQ AFCA/ECWM (ATTN: MSS LCM, 203 West Losey Street, 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, the DOC or the FCC.

4.41.2. Use outside of the US&P is subject to restrictions set forth by host nation governments. Equipment use must be coordinated through the appropriate spectrum management channels. Users should contact the Inmarsat POC to negotiate host nation approval (HNA) coordination. Refer to AFI 33-134, *Mobile Satellite Services (MSS) Management*, for procedures regarding MSS resources.

4.41.3. **(Added-USAFE)** USAFE point of Contact (POC) for International Maritime Satellite (INMARSAT) is Computer Systems Squadron, Contingency Systems ( USAFE CSS/SCMC), DSN 314-480-7689.

**4.42. Iridium.** Iridium is a commercially available, satellite-based, global wireless personal communications network designed to permit any type of narrow band wireless transmission. It operates in the Mobile-Satellite Service using a non-geosynchronous satellite constellation. Per ASD(NII) policy, Iridium is approved for use as a commercial leased service without a waiver. Neither spectrum certification nor frequency assignments are required; however, special procedures exist for the purchase and use of Iridium service and equipment.

4.42.1. Users must contact HQ AFCA/ECWM and DISA, through command channels, for guidance. Additional information is located at <https://private.afca.af.mil/mss/>. Refer to AFI 33-134 for procedures regarding MSS resources. Refer to DISA Circular 310-130-1, *Submission of Telecommunications Service Requests*, for the provisioning procedure.

4.42.2. Use outside of the US&P is subject to restrictions set forth by host nation governments. Equipment use must be coordinated through the appropriate spectrum management channels. Users should contact HQ AFCA/ECWM to determine whether the host nation has authorized the use of Iridium. Contact the Iridium POC to negotiate host nation approval coordination.

**4.43. 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.

4.43.1. 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.

4.43.2. 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.

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

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

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

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

4.43.2.1.4. 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.

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

**4.44. Performing Electronic Attack (EA) in the United States and Canada for Tests, Training and Exercises.** The NTIA recognizes Chairman Joint Chiefs of Staff Manual (CJCSM) 3212.02B, *Performing Electronic Attack in the United States and Canada for Tests, Training, and Exercises*, as the official guidance for frequency clearance procedures for performing Electronic Attack.

**4.45. 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 nonfederal government fixed station operating environment does not have to be registered into the GMF. During the registration process, the FCC performs coordination required in the NTIA Manual. In addition, a Letter of Agreement must be on file and have been signed by the non-federal government or government parties requesting the aid agreement.

**4.46. Sales of RF-Dependent Equipment to Foreign Governments.** Before Air Force spectrum support for equipment being sold to foreign governments can be obtained, it must be decided if Air Force spectrum support is required. This will depend on how the sale is being processed.

4.46.1. Foreign Military Sales (FMS). With regard to FMS, the US government owns the equipment and will transfer the equipment directly to a foreign government. If the US government owns the equipment to be transferred, 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 US government may apply for a temporary frequency assignment through the NTIA process for developmental tests. 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." If the US 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 there should be an existing DD Form 1494/J-12 already on file.

4.46.2. Direct Commercial Sales (DCS). If a US manufacturer owns the equipment to be transferred to a foreign government, that process is called Direct Commercial Sales. Unlike FMS sales, direct commercial sales are negotiated directly between the foreign government and the US manufacturer without the Pentagon serving as an intermediary. The equipment involved is typically slightly different from the equipment that same US manufacturer built for or sold to the US government. The US manufacturer must obtain any required spectrum support from the FCC for developmental and operational tests, if needed. Essentially, neither the US manufacturer nor the foreign government intends to operate the equipment within the US&P on a permanent basis.

4.46.3. However, there exists a hybrid scenario whereby a US manufacturer makes a sale to a foreign government via the DCS process with FMS support. The foreign government is accepting equipment directly from the US manufacturer but training on that equipment will occur in the US&P through a DOD systems program office (SPO). For example, US-type aircraft/equipment being sold to an allied country with training on that new aircraft/equipment being provided by the US Air Force. These equipments may have RF-dependent equipment on board that operates similarly to that of the Air Force. In these instances, spectrum support must be obtained through Air Force channels for developmental testing and eventually, operational testing and training.

4.46.4. AFFMA action officers will challenge ownership on all "Experimental/Temporary" frequency assignment proposals. If the Air Force does *not* have clear ownership, then the AFFMA action officers will ask for clarification.

**4.47. Contractor-Owned Equipment.** According to the NTIA Manual, the determination of whether the Air Force is responsible for spectrum support is based on "whether the radio station/equipment is owned by the Government or the Contractor."

4.47.1. If the Air Force has accepted and taken possession/ownership of the equipment then the Air Force must apply for spectrum support through the NTIA process. If the equipment is being manufactured under direct Air Force contract, the Air Force must provide spectrum support through the NTIA process.

4.47.2. If the equipment being supported is not in direct support of an Air Force contract, then the contractor must apply to the FCC for the license to develop/test/operate the equipment.

4.47.3. AFFMA action officers will challenge ownership on all future “Experimental/Temporary” frequency assignment proposals. If the Air Force does *not* have clear ownership, then the AFFMA action officers will ask for clarification.

**4.48. Civil Air Patrol (CAP).** CAP, an auxiliary of the Air Force under *Title 10 United States Code* Chapter 909, is a nonprofit, civilian corporation under *Title 36 United States Code*, Chapter 403. It receives support from 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.

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

4.48.2. CAP may use frequencies as needed to support daily operations in addition to Air Force assigned operations.

4.48.3. AFFMA will maximize the use of regional and the US&P frequency assignments to meet CAP spectrum requirements and registration in the GMF. Exceptions will encompass requirements, which require GMF registration as defined or required by the NTIA for management of spectrum use in the United States, most notably, stations within border zone areas (Canada and Mexico), on federal real estate, at civil airports and stations in proximity to high-density metropolitan or military area facilities. Other location specific stations operating under the auspices of regional or US&P assignments will be registered in FRRS.

**4.49. (Added-USAFE) USAFE Unique SFAF Formatting Requirements.** Due to host nation and NATO agreements, there are several SFAF items that are used in a different manner in the USEUCOM AOR. These items are detailed in **Attachment 5 (Added)**. Any unit submitting proposals to the USAFE FMO must ensure proposals are in compliance with **Attachment 5 (Added)**. Proposals not in compliance or missing mandatory items from **Attachment 5 (Added)** will be rejected to the originating office for corrections.

## 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/nonfederal government shared 1435-1525, 2200-2290, 2310-2320 and 2345-2390 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 (see [Table 5.1](#)). All frequency assignment actions for use of frequencies in the bands 1435-1525, 2200-2290, 2310-2320 and 2345-2390 MHz by US government radio stations within the conterminous United States must be coordinated with the appropriate agency listed in Annex D of the NTIA Manual. 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.**

<p><u>AFTRCC Non-Government Frequency Coordinator</u>  The Boeing Company  Enterprise Services  Spectrum Management  P.O. Box 516, MC S306-2005  Mr. Darryl J. Holtmeyer  Email: <a href="mailto:darryl.j.holtmeyer@boeing.com">darryl.j.holtmeyer@boeing.com</a>  Tel: 314-233-1117 / Fax: 425-965-8233  Ms. Gina Criman  Email: <a href="mailto:gina.m.criman@boeing.com">gina.m.criman@boeing.com</a>  Tel: 314-233-4237/ Fax: 425-965-8233  <a href="http://www.aftrcc.org/">http://www.aftrcc.org/</a></p>
<p><u>Western Area Frequency Coordinator</u>  <u>Naval Warfare Weapons Division</u>  Code 521E00E  575 I Ave, Suite 1  Point Mugu CA 93042-5049  DSN: <u>351-XXXX</u>  Mr. Clint Seal  NIPR: <a href="mailto:Clinton.seal@navy.mil">Clinton.seal@navy.mil</a>  COM: 805-989-0539  Mr. Steve Tozon  NIPR: <a href="mailto:steve.tozon@navy.mil">steve.tozon@navy.mil</a>  COM: 805-989-7983/4856  Mr. Michael S. Fahey  NIPR: <a href="mailto:Michael.fahey@navy.mil">Michael.fahey@navy.mil</a>  COM: 805-989-7985/1003  Mr. Paul E. Crice  NIPR: <a href="mailto:paul.crice@navy.mil">paul.crice@navy.mil</a>  COM: 805-989-1003/7985  Fax: 805-989-5179, Alternate Fax: 805-989-4854  <a href="http://www.nawcwpns.navy.mil/">http://www.nawcwpns.navy.mil/</a></p>

DOD Area Frequency Coordinator, Nellis AFB

99CS/SCML

5870 Devlin Drive

Nellis AFB NV 89191-7075

Mr. Dennis G. Pack, Sr.

NIPR: [dennis.pack@nellis.af.mil](mailto:dennis.pack@nellis.af.mil)

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SSgt James Beeler

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DSN: 682-3416

COM: (702) 652-XXXX

MSgt Ennis White

NIPR: [ennis.white@nellis.af.mil](mailto:ennis.white@nellis.af.mil)

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COM: (702) 652-XXXX

Office NIPR: [dodafc@nellis.af.mil](mailto:dodafc@nellis.af.mil)<https://wwwmil.nellis.af.mil/units/99cs/scm/scml.HTM>DOD Area Frequency Coordinator, State of Arizona

ATTN: NETC-EST-HU (58)

Ft. Huachuca AZ 85613-5000

DSN: 879-XXXX

Mr. Rodney A. Hanson

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COM: 520-538-6423 / Fax: 520-538-8525

Mr. Kenneth Wong

NIPR: [Kenneth.wong@us.army.mil](mailto:Kenneth.wong@us.army.mil)

COM: 520-538-6424 / Fax: 520-538-8525

<http://www.army.mil/spectrum/coordination/arizona.htm>DOD Area Frequency Coordinator, WSMR

ATTN: SFIA-FAC-SS, WSMR

White Sands NM 88002-5526

Mr. Stanley F. Greene

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DOD Gulf Area Frequency Coordinator

96CG/SCWF

201 W. Eglin Blvd., Ste. 206

Eglin Air Force Base FL 32542-6829

Mr. Joe Giangrosso

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COM: 850-882-4416 / Fax: 850-882-3523

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SIPRNET: [joe.giangrosso@eglin.af.smil.mil](mailto:joe.giangrosso@eglin.af.smil.mil)<http://www.eglin.af.mil/>DOD Eastern Area Frequency Coordinator

45 SCS/SCXF

45 SW Frequency Management

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Patrick AFB FL 32925-3341

Mr. Richard H. Akers, Sr.

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DSN: 854-5838

COM: 321-494-5838 / Fax: 321-494-8715

<https://www.patrick.af.mil/>Joint Frequency Management Office, Pacific

P.O. Box 64029

Camp H.M. Smith HI 96861-4029

Mr. Keith Van Blarcom

NIPR: [keith.Vanblarcom@pacom.mil](mailto:keith.Vanblarcom@pacom.mil)

DSN: (315) 477-1051

COM: 808-477-1051 / Fax: 808-477-0691

<http://www.pacom.mil/>Joint Frequency Management Office, Alaska

HQ Alaskan Command/J64 STE 310

Elmendorf AFB AK 99506-2001

Mr. Timothy P. Woodall

NIPR: [timothy.woodall@elmendorf.af.mil](mailto:timothy.woodall@elmendorf.af.mil)

DSN: (317) 552-8223

COM: 907-552-8223 / Fax: 907-552-8120

<http://www.elmendorf.af.mil/>

Army Frequency Management Office, Continental US  
NETC-EST-VA

1214 Stanley Road, Suite 32, Bldg 125  
Fort Sam Houston TX 78234-5034

Mr. Luis G. (Guillo) Sanchez

NIPR: [luis.sanchez@us.army.mil](mailto:luis.sanchez@us.army.mil)

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Mr. Steve Spear

NIPR: [Stephen.spear@samhouston.army.mil](mailto:Stephen.spear@samhouston.army.mil)

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COM: 210-221-0435 / Fax: 210-221-2844

Office NIPR: [afmo-conus@samhouston.army.mil](mailto:afmo-conus@samhouston.army.mil)

[http://www.army.mil/ciog6/offices/NETCCG/NETCESTV/spectrum\\_home.html](http://www.army.mil/ciog6/offices/NETCCG/NETCESTV/spectrum_home.html)

HQ USAF Frequency Management Agency

2461 Eisenhower Ave.  
Hoffman I, Suite 1203  
Alexandria VA 22331-1500

Mr. Duane Williams

NIPR: [duane.Williams@pentagon.af.mil](mailto:duane.Williams@pentagon.af.mil)

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USN-Mid-Atlantic Area Frequency Coordinator

Naval Air Warfare Center Aircraft Division

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Mr. Robert Goddard

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<http://www.nawcad.navy.mil/>

**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 Item 520.

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 (see **Table 5.3.**). Refer to Annex D, Table 1 in the NTIA Manual for a list of the FAA Frequency Coordinators.

**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 Administration Frequency Coordinators.**

<b>FAA Coordinator</b>	<b>Area of Responsibility</b>	<b>C-NOTE</b>
Federal Aviation Administration Frequency Management Officer ANM-473 1601 Lind Avenue, S.W. Renton WA 98055 Telephone: (425) 227-2354 Fax: (425) 227-1234	Colorado; Idaho; Montana; Oregon; Utah; Washington; Wyoming	C042
Federal Aviation Administration Frequency Management Officer AWP-471 P.O Box 92007 Los Angeles CA 90009-2007 Telephone: (310) 725-3471 Fax: (310) 725-6865	Arizona; California; including all offshore islands; Nevada	C043
Federal Aviation Administration Frequency Management Officer ACE-474 911 Locust Kansas City MO 64106-2641 Telephone: (816) 329-3477 Fax: (816) 329-3657	Iowa; Kansas; Missouri; Nebraska	C045
Federal Aviation Administration Frequency Management Officer ASW-473 2601 Meacham Blvd. Fort Worth TX 76137-4298 Telephone: (817) 222-4730 Fax: (817) 222-5977	Arkansas; Louisiana; New Mexico; Oklahoma; Texas	C046
Federal Aviation Administration Frequency Management Officer AGL-474 O'Hare Lake Office Center 2300 East Devon Avenue Des Plaines IL 60018 Telephone: (847) 294-7670 Fax: (847) 294- 7133	Illinois; Indiana; Michigan; Minnesota; North Dakota; South Dakota; Ohio; Wisconsin	C047

FAA Coordinator	Area of Responsibility	C-NOTE
Federal Aviation Administration Frequency Management Officer ASO-473 P.O. Box 20636 Atlanta GA 30320 Telephone: (404) 305-6621 Fax: (404) 305-6677	Alabama; Florida; Georgia; Kentucky; Mississippi; North Carolina; Puerto Rico; South Carolina; Tennessee; US Possessions in the Caribbean; Virgin Islands	C048
Federal Aviation Administration Frequency Management Officer AEA-472 1 Aviation Plaza JFK International Airport Jamaica NY 11430-4809 Telephone: (718) 977-6511 Fax: (718) 977-6549	Delaware; District of Columbia; Maryland; New Jersey; New York; Pennsylvania; Virginia; West Virginia	C049
Federal Aviation Administration Frequency Management Officer ANE-471 12 New England Executive Park Burlington MA 01803 Telephone: (781) 238-7939 Fax: (781) 238-7459	Connecticut; Maine; Massachusetts; New Hampshire; Rhode Island; Vermont	C050
Federal Aviation Administration Frequency Management Officer AAL-472 222 West 7th Avenue Anchorage AK 99513 Telephone: (907) 271-5345 Fax: (907) 271-2378	Alaska	C071
Federal Aviation Administration Frequency Management Officer AWP-471 P.O Box 50109 Honolulu HI 96850-4983 Telephone: (808) 541-1241 Fax: (808) 541-2630	Hawaii; US Possessions in the Pacific Ocean	C072

**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 USMCEB.

5.3.1. Military activities will coordinate with the appropriate DOD AFC (see [Table 5.4.](#)) prior to assignment of all frequencies, or activation of any intended electromagnetic spectrum use within, adjacent and within line-of-sight of a DOD AOR. Refer to Annex D, Table 3 of the NTIA Manual for a list of the DOD AFCs, their area of responsibility, and the applicable coordination notes (C-Notes) that must be entered in SFAF item 500 on all frequency assignments.

**Table 5.4. DOD Area Frequency Coordinators.**

AFC	Area of Responsibility	C-NOTES
<p><u>Western Area Frequency Coordinator</u>  <u>Naval Warfare Weapons Division</u>            Code 521E00E            575 I Ave, Suite 1            Point Mugu CA 93042-5049            DSN: <u>351-XXXX</u>            Mr. Clint Seal            NIPR: <a href="mailto:Clinton.seal@navy.mil">Clinton.seal@navy.mil</a>            COM: 805-989-0539            Mr. Steve Tozon            NIPR: <a href="mailto:steve.tozon@navy.mil">steve.tozon@navy.mil</a>            COM: 805-989-7983/4856            Mr. Michael S. Fahey            NIPR: <a href="mailto:Michael.fahey@navy.mil">Michael.fahey@navy.mil</a>            COM: 805-989-7985/1003            Mr. Paul E. Crice            NIPR: <a href="mailto:paul.crice@navy.mil">paul.crice@navy.mil</a>            COM: 805-989-1003/7985            Fax: 805-989-5179, Alternate Fax: 805-989-4854  <a href="http://www.nawcwpns.navy.mil/">http://www.nawcwpns.navy.mil/</a></p>	<p>California south of            37°30'N, Including            all off shore islands</p>	<p>C003</p>

AFC	Area of Responsibility	C-NOTES
<p><u>DOD Area Frequency Coordinator, Nellis AFB</u>            99CS/SCML            5870 Devlin Drive  <u>Nellis AFB NV 89191-7075</u></p> <p>Mr. Dennis G. Pack, Sr.            NIPR: <a href="mailto:dennis.pack@nellis.af.mil">dennis.pack@nellis.af.mil</a>            DSN: 682-3393            COM: (702) 652-XXXX</p> <p>SSgt James Beeler            NIPR: <a href="mailto:james.beeler@nellis.af.mil">james.beeler@nellis.af.mil</a>            DSN: 682-3416            COM: (702) 652-XXXX</p> <p>MSgt Ennis White            NIPR: <a href="mailto:ennis.white@nellis.af.mil">ennis.white@nellis.af.mil</a>            DSN: 682-3391            COM: (702) 652-XXXX</p> <p>Office NIPR: <a href="mailto:dodaafc@nellis.af.mil">dodaafc@nellis.af.mil</a>  <a href="http://www.nellis.af.mil">http://www.nellis.af.mil</a></p>	<p>Nevada; Utah west of 111°W; Idaho south of 44°N</p>	<p>C068</p>
<p><u>DOD Area Frequency Coordinator, State of Arizona</u>            ATTN: NETC-EST-HU (58)            Ft. Huachuca AZ 85613-5000</p> <p>DSN: <u>879-XXXX</u></p> <p>Mr. Rodney A. Hanson            NIPR: <a href="mailto:Rodney.hanson@us.army.mil">Rodney.hanson@us.army.mil</a>            COM: 520-538-6423 / Fax: 520-538-8525</p> <p>Mr. Kenneth Wong            NIPR: <a href="mailto:Kenneth.wong@us.army.mil">Kenneth.wong@us.army.mil</a>            COM: 520-538-6424 / Fax: 520-538-8525</p> <p><a href="http://www.army.mil/spectrum/coordination/arizona.htm">http://www.army.mil/spectrum/coordination/arizona.htm</a></p>	<p>Arizona</p>	<p>C009</p>
<p><u>DOD Area Frequency Coordinator, WSMR</u>            ATTN: SFIA-FAC-SS, WSMR            White Sands NM 88002-5526</p> <p>Mr. Stanley F. Greene            NIPR: <a href="mailto:greenes@wsmr.army.mil">greenes@wsmr.army.mil</a>            DSN: 258-5417</p> <p>COM: 505-678-5417 / Fax: 505-678-5281</p> <p><a href="http://www.wsmr.army.mil/">http://www.wsmr.army.mil/</a></p>	<p>Entire state of New Mexico; Texas west of 104°W; areas of Utah and Colorado between 108°W and 111°W</p>	<p>C007</p>

AFC	Area of Responsibility	C-NOTES
<p><u>DOD Gulf Area Frequency Coordinator</u>            96CG/SCWF            201 W. Eglin Blvd., Ste. 206            Eglin Air Force Base FL 32542-6829_</p> <p>Mr. Joe Giangrosso            NIPR: <a href="mailto:joe.giangrosso@eglin.af.mil">joe.giangrosso@eglin.af.mil</a>            DSN: 872-4416 (Unclassified)            COM: 850-882-4416 / Fax: 850-882-3523</p> <p>Secure Nets:            Comm/FAX: DSN: 872-4082/Commercial: (850) 882-4082            SIPRNET: <a href="mailto:joe.giangrosso@eglin.af.smil.mil">joe.giangrosso@eglin.af.smil.mil</a></p> <p><a href="http://www.eglin.af.mil/">http://www.eglin.af.mil/</a></p>	<p>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</p>	<p>C011</p>
<p><u>DOD Eastern Area Frequency Coordinator</u>            45 SCS/SCXF            45 SW Frequency Management            1225 Pershing Place            Patrick AFB FL 32925-3341</p> <p>Mr. Richard H. Akers, Sr.            NIPR: <a href="mailto:richard.akers@patrick.af.mil">richard.akers@patrick.af.mil</a>            DSN: 854-5838            COM: 321-494-5838 / Fax: 321-494-8715</p> <p><a href="https://www.patrick.af.mil/">https://www.patrick.af.mil/</a></p>	<p>Florida east of 83°W and north of 24°N; Georgia east of 83°W; south of 31°30'N; Atlantic Ocean south of 31°30'N; west of 77° W and north of 24°N</p>	<p>C005</p>
<p><u>Joint Frequency Management Office, Pacific</u>            P.O. Box 64029            Camp H.M. Smith HI 96861-4029</p> <p>Mr. Keith Van Blarcom            NIPR: <a href="mailto:keith.Vanblarcom@pacom.mil">keith.Vanblarcom@pacom.mil</a>            DSN: (315) 477-1051            COM: 808-477-1051 / Fax: 808-477-0691</p> <p><a href="http://www.pacom.mil/">http://www.pacom.mil/</a></p>		
<p><u>Joint Frequency Management Office, Alaska</u>            HQ Alaskan Command/J64 STE 310            Elmendorf AFB AK 99506-2001</p> <p>Mr. Timothy P. Woodall            NIPR: <a href="mailto:timothy.woodall@elmendorf.af.mil">timothy.woodall@elmendorf.af.mil</a>            DSN: (317) 552-8223            COM: 907-552-8223 / Fax: 907-552-8120</p> <p><a href="http://www.elmendorf.af.mil/">http://www.elmendorf.af.mil/</a></p>		

AFC	Area of Responsibility	C-NOTES
<p><u>Army Frequency Management Office, Continental US</u>  <u>NETC-EST-VA</u>            1214 Stanley Road, Suite 32, Bldg 125            Fort Sam Houston TX 78234-5034</p> <p>Mr. Luis G. (Guillo) Sanchez            NIPR: <a href="mailto:luis.sanchez@us.army.mil">luis.sanchez@us.army.mil</a>            DSN: 471-1922            COM: 210-221-1922</p> <p>Mr. Steve Spear            NIPR: <a href="mailto:Stephen.spear@samhouston.army.mil">Stephen.spear@samhouston.army.mil</a>            DSN: 471-0435            COM: 210-221-0435 / Fax: 210-221-2844</p> <p>Office NIPR: <a href="mailto:afmo-conus@samhouston.army.mil">afmo-conus@samhouston.army.mil</a>  <a href="http://www.army.mil/ciog6/offices/NETCCG/NETCESTV/spectrum_home.html">http://www.army.mil/ciog6/offices/NETCCG/NETCESTV/spectrum_home.html</a></p>		
<p><u>HQ USAF Frequency Management Agency</u>            2461 Eisenhower Ave.            Hoffman I, Suite 1203            Alexandria VA 22331-1500</p> <p>Mr. Duane Williams            NIPR: <a href="mailto:duane.Williams@pentagon.af.mil">duane.Williams@pentagon.af.mil</a>            DSN: 328-1534            COM: 703-428-1534 / Fax: 703-428-1575</p> <p>Office NIPR: <a href="mailto:mla-affma-afttrcc@pentagon.af.mil">mla-affma-afttrcc@pentagon.af.mil</a>  <a href="http://www.affma.hq.af.mil/">http://www.affma.hq.af.mil/</a></p>		

AFC	Area of Responsibility	C-NOTES
<p><u>USN-Mid-Atlantic Area Frequency Coordinator</u>            Naval Air Warfare Center Aircraft Division            Code 5.2.2.2, Unit 4, Bldg. 2118            23013 Cedar Point Road            Patuxent River MD 20670</p> <p>Mr. Robert Goddard            NIPR: <a href="mailto:robert.n.goddard@navy.mil">robert.n.goddard@navy.mil</a>            SIPR: <a href="mailto:ryanmr2@navair.navy.smil.mil">ryanmr2@navair.navy.smil.mil</a>            COM: 301-342-1194            DSN: 342-1194            FAX: 342-1200            STU III: 342-1195</p> <p>Mr. Mikel R. Ryan  <a href="mailto:mikel.ryan@navy.mil">mikel.ryan@navy.mil</a>            DSN: 342-1532            COM: 301-342-1532, FAX: X1200</p> <p><a href="http://www.nawcad.navy.mil/">http://www.nawcad.navy.mil/</a></p>		

5.3.2. Radar Line-of-Sight (LOS) Equation (*aka* Radio Horizon Range) — The distance at which a direct radiowave from a transmitting antenna of given height can reach a receiving antenna of given height. **NOTE:** The radio horizon range  $R_{smi}$  in statute miles is given by:

$$R_{smi} = \sqrt{2h_t} + \sqrt{2h_r} = 1.414 \left( \sqrt{h_t} + \sqrt{h_r} \right)$$

where  $h_t$  and  $h_r$  are the heights of the transmitting and receiving antennas, respectively, in feet. The radio horizon range  $R_{nmi}$  in nautical miles is also given by:

$$R_{nmi} = 1.23 \left( \sqrt{h_t} + \sqrt{h_r} \right)$$

where  $h_t$  and  $h_r$  are the heights of the transmitting and receiving antennas, respectively, in feet. Alternatively, the radio horizon range  $R_{km}$  in kilometers is given by:

$$R_{km} = 4.12 \left( \sqrt{h_t} + \sqrt{h_r} \right)$$

where  $h_t$  and  $h_r$  are the heights of the transmitting and receiving antennas, respectively, in meters. The effective earth radius (i.e., 4/3 times the actual earth radius) is used in deriving these formulas. Second-order differentials are neglected since they are on the order of 0.1%.

#### **5.4. Coordination for Frequency Requests in Canada or along the US Canadian Border.**

5.4.1. Regular and Temporary Assignments. The US 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 the NTIA Manual.

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

#### **5.5. Forms (Adopted and Prescribed).**

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

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

MICHAEL W. PETERSON, Lt Gen, USAF  
Chief of Warfighting Integration and  
Chief Information Officer

**(USAFE)**

STEVEN J. SPANO, Colonel, USAF  
Director of Communications and Information

**Attachment 1****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

*Title 5 United States Code Section 552*

*Title 10 United States Code Chapter 909*

*Title 36 United States Code Chapter 403*

Title 47, Code of Federal Regulations, Part 25, *Satellite Communications*

Title 47, Code of Federal Regulations, Part 73, *Radio Broadcast Services*

Title 47, Code of Federal Regulations, Part 95, *Personal Radio Services*

*The Communications Act of 1934*

DODD 4650.1, *Policy for Management and Use of the Electromagnetic Spectrum*, June 8, 2004

DOD 5200.1-R, *Information Security Program*, January 1997

*DOD Frequency Assignment Security Classification Guide*

DOC NTIA, *Manual of Regulations and Procedures for Federal Radio Frequency Management* (NTIA Manual), May 2003, w/ January (May) 2005 Revision

CJCSM 3212.02B, *Performing Electronic Attack in the United States and Canada for Tests, Training, and Exercises*, 15 October 2003

CJCSI 6232.01C, *LINK-16 Spectrum Deconfliction*, 30 June 2004

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*JTIDS/MIDS Spectrum Users Guide (JSUG)*

USMCEB PUB 7, *Frequency Resource Records System (FRRS) Standard Frequency Action Format (SFAF)*, December 2003

AFPD 33-1, *Information Resources Management*, 27 June 2006

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AFI 31-401, *Information Security Program Management*, 1 November 2005

AFI 33-111, *Voice Systems Management*, 24 March 2005 (with IC 06-1, 19 May 2006 and IC 06-2, 11 July 2006)

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AFTTP(I) 3-2.49, *Multi-Service Tactics, Techniques, and Procedures for HAVE QUICK Radios*  
ASD (C3I) [now ASD(NII)] Policy Letter, *DOD Policy Letter on Managing MSS*, 29 August 2001  
MCEB-M-008-03, *DOD Spectrum Procedures for the Use of Commercial Satellite Earth Terminals Outside United States and Possessions*, 18 August 2003

### ***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  
**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 (NII)**—Assistant Secretary of Defense (Networks and Information Integration)  
**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  
**CCEB**—Combined Communications Electronics Board  
**C-E**—communications-electronics  
**CFR**—Code of Federal Regulations  
**CJCSI**—Chairman Joint Chiefs of Staff instruction  
**CJCSM**—Chairman Joint Chiefs of Staff manual  
**C-NOTES**—coordination notes  
**COCOM**—Combatant Commander  
**CONUS**—Continental United States  
**dB**—deciBel  
**dB<sub>i</sub>**—dB referred to an isotropic antenna  
**dB<sub>m</sub>**—dB referred to 1 milliWatt  
**dB<sub>w</sub>**—dB referred to 1 Watt  
**DCS**—direct commercial sales  
**DII**—defense information infrastructure  
**DISA**—Defense Information Systems Agency  
**DME**—distance measuring equipment  
**DOC**—Department of Commerce  
**DOD**—Department of Defense  
**DODD**—Department of Defense Directive  
**DSN**—Defense Switched Network  
**EA**—electronic attack  
**EIRP**—Effective Isotropic Radiated Power  
**EM**—electromagnetic  
**EMC**—electromagnetic compatibility  
**ESG**—equipment spectrum guidance  
**ESMC**—Eastern Space and Missile Center  
**EW**—electronic warfare  
**FAA**—Federal Aviation Administration  
**FAS**—Frequency Assignment Subcommittee  
**FCC**—Federal Communications Commission  
**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  
**FSS**—Fixed Satellite Service  
**GHz**—GigaHertz  
**GMF**—government master file  
**GMRS**—General Mobile Radio Service  
**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  
**ISR**—intra-squad radio  
**ITU**—International Telecommunications Union  
**JETDS**—Joint Electronics Type Designation System  
**J/F-12**—USMCEB J-12 Working Group  
**JTIDS**—Joint Tactical Information Distribution System  
**kHz**—kiloHertz  
**km**—kilometer  
**LF**—low frequency  
**LFM**—linear frequency modulation

**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

**MILACAS**—Military Aircraft Collision Avoidance System, (XR = Extended Range, FR = Formation Rendezvous)

**MLS**—Microwave Landing System

**MM**—maritime mobile

**MMLS**—Mobile Microwave Landing System

**MSS**—Mobile Satellite Service

**MURS**—**Multi-Use Radio Service**

**mW**—milliWatt

**NAS**—National Airspace System

**NASA**—National Aeronautics and Space Administration

**NATO**—North Atlantic Treaty Organization

**NAVAID**—navigational aids

**NDB**—non-directional beacons

**nmi**—nautical mile

**NSEP**—National Security Emergency Preparedness

**NTH**—note to holder

**NTIA**—National Telecommunications and Information Administration

**OPR**—Office of Primary Responsibility

**OSM**—Office of Spectrum Management

**PACAF**—Pacific Air Forces

**PAR**—precision approach radar

**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  
**RF**—radio frequency  
**RFA**—radio frequency authorization  
**RR**—ITU radio regulations  
**SAR**—search and rescue  
**SATURN**—Second-Generation Anti-jam Tactical UHF Radio for NATO  
**SFAF**—standard frequency action format  
**SGLS**—Space-Ground Link Subsystem  
**SIF**—selective identification feature  
**SINAD**—signal-to-interference plus noise-and-distortion  
**SINCGARS**—Single Channel Ground/Airborne Radio Subsystem  
**SKE**—station keeping equipment  
**SKEFO**—Station keeping equipment follow-on  
**S/N**—signal-to-noise ratio  
**SMC**—Space and Missile Center  
**SMO**—Spectrum Management Office  
**SPS**—Spectrum Planning Subcommittee  
**SXXI**—Spectrum XXI  
**TACAN**—tactical air navigation  
**TACC**—Tanker Airlift Control Center  
**TADIL**—tactical digital information link  
**TRF**—tunable radio frequency  
**TX**—transmitter  
**UAV**—unmanned aerial vehicles  
**UHF**—ultra high frequency  
**US**—United States  
**USA**—United States of America  
**USAF**—United States Air Force

**USB**—Unified S-Band

**USC**—United States Code

**USMCEB**—United States Military Communications-Electronics Board

**US&P**—United States and Its Possessions

**VHF**—Very High Frequency

**VOR**—VHF Omnidirectional Range

**VORTAC**—VOR Tactical Air Navigation

**WSMC**—Western Space and Missile Center

### *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) radiocommunication service in one or more identified countries or geographical areas and under specified conditions **(RR)**.

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

**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)**.

**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)**—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

**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]*).

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

**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 5 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 parts per million 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).

**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).

**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).

**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).

**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).

**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 275 GHz. The presently allocated spectrum is from 9 kHz to 275 GHz.

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

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

**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**.)

**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)**.

**Spurious Emission**—Emission on a frequency or frequencies that is 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 Its Possessions (US&P)**—For use only when transmitting and/or receiving throughout the US (50 States and District of Columbia), the Commonwealth of Puerto Rico, and the Territories and Possessions (does not include the former Trust Territory of the Pacific Islands)

**Attachment 1 (USAFE)****GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION*****References***

AFI 33-118 USAFE Supplement, Electromagnetic Spectrum Management, 20 September 2006  
NATO Frequency Management Handbook, 2006  
ACP 190, NATO supplement 1, 9 October 2003  
ACP 190, NATO supplement 2, 23 November 2005  
MCEB Publication 1, Organization Missions and Functions Manual, 1 March 2002  
EUCOM Spectrum Management Manual, June 2002

***Abbreviations and Acronyms***

**A/A**—Air/Air  
**A/G/A**—Air/Ground/Air  
**ABNF**—ARFA Basic Notification Form  
**AEW**—Airborne Early Warning  
**ARFA**—Allied Radio Frequency Agency  
**ASW**—Anti Submarine Warfare  
**ASUW**—Anti Surface Warfare  
**ATCC**—Air Traffic Control Center  
**D/F**—direction finding  
**D.M.E.**—Distance Measuring Equipment  
**ECM**—Electronic Countermeasures  
**FCA**—Frequency Clearance Agreement  
**FMO**—Frequency Management Office  
**FMSC**—Frequency Management Sub-Committee  
**GCA**—Ground Controlled Approach  
**GCI**—Ground Control Intercept  
**IFR**—Instrument Flight Rules  
**JFP**—Joint Frequency Panel  
**MCEB**—Military Communications Electronics Board  
**MRFL**—Master Radio Frequency List  
**POC**—Point of Contact

**SFAF**—Standard Frequency Action Format

**SMB**—Spectrum Management Branch

**SMM**—Spectrum Management Manual

**TACS**—Tactical Air Control System

**TV**—Television

**USAFE**—United States Air Forces in Europe

**USEUCOM**—United States European Command

**VFR**—Visual Flight Rules

## Attachment 2

### FREQUENCY ASSIGNMENT SECURITY CLASSIFICATION GUIDE

**A2.1. 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 DOD 5200.1-R, *Information Security Program*, and AFI 31-401, *Information Security Program Management*.

#### **A2.2. Individual Air Force Frequency Assignments.**

A2.2.1. 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.

A2.2.1.1. Overall classification of the frequency assignment (SFAF Item 005).

A2.2.1.2. Security classification modification (SFAF Item 006).

A2.2.1.3. Type of action (SFAF Item 010).

A2.2.1.4. Agency serial number (SFAF Item 102).

A2.2.1.5. IRAC docket number (SFAF Item 103).

A2.2.1.6. List serial number (SFAF Item 105).

A2.2.1.7. Serial replaced, delete date (SFAF Item 106).

A2.2.1.8. Docket number of older authorizations (SFAF Item 108).

A2.2.1.9. Operating frequency or frequency band and excluded frequency or frequency band (SFAF Items 110 and 111).

A2.2.1.10. Agency (SFAF Item 200).

A2.2.1.11. Command (SFAF Item 204).

A2.2.1.12. IRAC Notes (SFAF Item 500).

A2.2.1.13. Frequency action officer (SFAF Item 701).

A2.2.1.14. Control/request number (SFAF Item 702).

A2.2.2. Other assignment information, standing alone or in combination with other information (including paragraph [A2.2.1](#) above), is classified according to DOD 5200.1-R and AFI 31-401 by the appropriate classification authority. Include the appropriate classification marking with the corresponding SFAF item.

#### **A2.3. Lists of Air Force Frequency Assignments.**

A2.3.1. 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.

A2.3.2. The *DOD Frequency Assignment Security Classification Guide* gives guidance on classifying compilations of frequency assignment records. Based on this guidance:

A2.3.2.1. Classify RFAs or frequency lists at the highest level of any individual frequency assignment it contains.

A2.3.2.2. 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 A2.5.

A2.3.2.3. An RFA or frequency list containing only UNCLASSIFIED assignments of one unit or location is 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.

## A2.4. Marking.

A2.4.1. 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 which category is applicable.

A2.4.2. 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:

A2.4.2.1. Derived From: *DOD Frequency Assignment Security Classification Guide*

A2.4.2.2. Source Dated: 1 January 1998

A2.4.2.3. Declassify on: Source marked X4

A2.4.3. The documents/material will have the following warning attached:

A2.4.3.1. **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.

A2.4.3.2. The destruction of UNCLASSIFIED records/data in this document must be according to existing directives governing destruction of classified material.

A2.4.3.3. This document contains records/data that are exempt from release under the provisions of 5 USC § 552. The release of any records to any non-DOD organization requires approval of the authority (agency) that made the assignment.

A2.4.4. 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 according to current security directives and contain the following warning statement:

A2.4.4.1. **WARNING** – In addition to SECRET or CONFIDENTIAL data, this document contains UNCLASSIFIED frequency assignment records/data that must be protected according to Section 3 of the *DOD Frequency Assignment Security Classification Guide*.

A2.4.4.2. The destruction of UNCLASSIFIED records/data in this document must be according to existing directives governing destruction of classified material.

A2.4.4.3. This document contains records/data that are exempt from release under the provisions of the 5 USC § 552(b)(1). The release of any records to any non-DOD organization requires approval of the authority (agency) that made the assignment.

A2.4.5. 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:

A2.4.5.1. **WARNING** – This document/listing is UNCLASSIFIED; however, it contains frequency assignment records/data that must be protected according to Section 3 of the *DOD Frequency Assignment Security Classification Guide*.

A2.4.5.2. The destruction of UNCLASSIFIED records/data in this document must be according to existing directives governing destruction of classified material.

A2.4.5.3. This document contains records/data that are exempt from release under the provisions of the 5 USC § 552(b)(1). The release of any records to any non-DOD organization required approval of the authority (agency) that made the assignment.

## A2.5. Exemptions.

A2.5.1. The following types of frequency assignment records are exempt from the classification requirements listed in paragraph A2.3.2.2. above:

A2.5.1.1. Lists of UNCLASSIFIED frequency assignments to government users that are not intended to be 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).

A2.5.1.2. Lists of aeronautical station frequencies under the purview of the AAG when used in the National Airspace System.

A2.5.1.3. Lists of UNCLASSIFIED frequency assignment records that operate on frequencies authorized to nonfederal government stations, where such use is necessary to intercommunicate with nonfederal government stations for coordination with nonfederal government activities.

A2.5.1.4. Lists of frequencies in NTIA or DOD channel plans when specific location, technical parameters, and organization are not collectively included in the channel plan.

**Attachment 3****EXAMPLE STANDARD FREQUENCY ACTION FORMATS (SFAF)****A3.1. Example SFAF for USPACOM.**

005. UH  
010. N  
102. AF XXXXXX  
110. M1030  
113. AM  
114. 10M0K1D  
114/2. 10M0V1D  
115. W158  
116. P  
130. 1  
131. 99  
140. 20031101  
144. U  
200. USAF  
202. PACAF  
204. PACAF  
205. 5AF  
206. AFAMC  
207. ACFT  
209. JPN  
300. J  
301. KADENA  
303. AIRCRAFT  
340. C,MILACAS-XR TRANSMITTER  
343. J/F 12/08010  
346. .8  
347. 1300  
354. DIPOLE

- 355. TCAS 071-50001-8XXX
- 357. -7.4
- 360. 85
- 361. 45
- 362. S
- 363. V
- 400. J
- 401. KADENA
- 403. AIRCRAFT
- 440. C,MILACAS-XR RECEIVER
- 454. DIPOLE
- 455. TCAS 071-50001-8XXX
- 457. -7.4
- 460. 85
- 461. 45
- 462. S
- 463. V
- 502. MILACAS-XR IS THE NEXT GENERATION TECHNOLOGY VERSION OF
- 502. TCAS II V7/E-TCAS SYSTEM WITH ADVANCED SURVEILLANCE
- 502. FUNCTIONS TO SUPPORT IMPROVED TCAS PERFORMANCE AS WELL AS
- 502. EXTENDED RANGE COVERAGE.
- 511. AIR OPERATIONS
- 512. NAVAIDS
- 513. ETCAS
- 701. T06
- 803. AFAMC, 618-229-5712/6910/5411

**A3.2. Example of Abbreviated SFAF for USCENTCOM Coordination**

**Nations: Afghanistan, Bahrain, Djibouti, Egypt, Eritrea, Ethiopia, Jordan, Kenya, Kuwait, Kyrgyzstan Republic, Oman, Pakistan, Qatar, Saudi Arabia, Seychelles, Somalia, Tajikistan, Togolese Republic, Tristan da Cunha, Turkmenistan, United Arab Emirates, Uzbekistan, Western Sahara, and Yemen.**

**System Name: Honeywell Next Generation ACAS II**

TX Frequency range: 1030 MHz, Require 1 TX Frequency

RX Frequency range: 1090 MHz, Require 1 RX Frequency

Type of Modulation: PAM Signaling for Mode C Transponders and Mixed PAM and DPSK @ 4 Mbps rate

Channel Necessary Bandwidth: Max 10 MHz

Emission Type: TX 10M0K1D, 10M0V1D, RX 14M0V1D, 14M0K1D

Antenna Type: Four-Element Directional Antenna

Antenna Gain: 3.6 dBi

Transmitter Output Power: .8 Watts (mean) 345 Watts (pep)

Site Name: CINCCENT AOR

Longitude: CINCCENT AOR

Latitude: CINCCENT AOR

Date of Operation: November 11, 2003 for the next 19 years

**Attachment 4****OFFICES OF INTEREST**

**A4.1. 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) 418-1192. The Watch Officer will provide the appropriate local POC.

**A4.2. Electromagnetic Compatibility Services.**

Joint Spectrum Center

2004 Turbot Landing

Annapolis MD 21402-5064

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

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

85th Engineering Installation Squadron (85 EIS/SCYM)

670 Maltby Hall Drive, Suite 234

Keesler AFB MS 39534-2633

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

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

## Attachment 5 (Added-USAFE)

## EUCOM REQUIRED SFAF ITEM DESCRIPTIONS

**A5.1. (Added-USAFE)** EUCOM Unique SFAF requirements. In the USEUCOM AOR there are several SFAF items that are used in a differing manner than in the US&P. All proposals submitted to the USAFE FMO must contain the items identified below:

A5.1.1. **(Added-USAFE)** All frequency proposals for the USEUCOM AOR must contain, at a minimum, the SFAF items identified in **Table A5.1. (Added)**.

**Table A5.1. (Added-USAFE) EUCOM Required SFAF Items.**

005	SECURITY CLASSIFICATION AND SPECIAL HANDLING CODE
010	TYPE OF ACTION
102	AGENCY SERIAL NUMBER
108	DOCKET NUMBER OF OLD ASSIGNMENT (ALL MODIFICATION PROPOSALS)
110	FREQUENCY(IES)
113	STATION CLASS (ONLY USE TWO CHARACTER STATION CLASS CODE)
114	EMISSION DESIGNATOR
115	OUTPUT POWER
116	TYPE POWER
130	TIME
131	PERCENT TIME
140	REQUIRED DATE
141	EXPIRATION DATE
144	RECORD INDICATOR (THE LETTER "O" MUST BE ENTERED)
147	JOINT AGENCIES
151	COORDINATION INDICATOR
ORGANIZATIONAL INFORMATION	

200	AGENCY
201	UNIFIED COMMAND (MUST BE ENTERED AS EUCOM)
202	UNIFIED COMMAND SERVICE
204	COMMAND
205	SUBCOMMAND
206	INSTALLATION FREQUENCY MANAGER
207	OPERATING UNIT
TRANSMITTER SPECIFIC INFORMATION	
300	STATE/COUNTRY (SEE EUCOM SMM FOR SPECIALIZED NATO AREA CODES FOR MULTIPLE COUNTRY ASSIGNMENTS)
301	ANTENNA LOCATION
303	ANTENNA COORDINATES
340	EQUIPMENT NOMENCLATURE
343	EQUIPMENT CERTIFICATION IDENTIFICATION NUMBER
348	INTERMEDIATE FREQUENCY
354	ANTENNA NAME
356	ANTENNA STRUCTURE HEIGHT (NOT REQUIRED FOR MOBILE ASSIGNMENTS)
357	ANTENNA GAIN
361	ANTENNA VERTICAL BEAMWIDTH
362	ANTENNA DIRECTIONALITY
363	ANTENNA POLARIZATION
RECEIVER SPECIFIC INFORMATION	
400	STATE/COUNTRY (SEE EUCOM SMM FOR SPECIALIZED NATO AREA CODES FOR MULTIPLE COUNTRY ASSIGNMENTS)

401	ANTENNA LOCATION
403	ANTENNA COORDINATES
408	REPEATER INDICATOR (AS APPLICABLE FOR REPEATER NETWORKS)
440	EQUIPMENT NOMENCLATURE
443	EQUIPMENT CERTIFICATION IDENTIFICATION NUMBER
454	ANTENNA NAME
456	ANTENNA STRUCTURE HEIGHT (NOT REQUIRED FOR MOBILE ASSIGNMENTS)
457	ANTENNA GAIN
462	ANTENNA DIRECTIONALITY
463	ANTENNA POLARIZATION
502	DESCRIPTION OF REQUIREMENT
511	MAJOR FUNCTION IDENTIFIER
512	INTERMEDIATE FUNCTION IDENTIFIER
513	DETAILED FUNCTION IDENTIFIER
702	CONTROL/REQUEST NUMBER
704	TYPE OF SERVICE
707	FMSC FUNCTION NUMBER
710	HOST COUNTRY DOCKET NUMBER (FOR ALL MODIFICATIONS WHERE THE HOST NATION HAS PREVIOUSLY ASSIGNED A DOCKET NUMBER)
711	SERVICE VOLUME
715	TRANSMITTER FMSC MRFL NUMBER (FOR ALL MODIFICATIONS OF MRFL REGISTERED RECORDS)
716	USAGE CODE

801	COORDINATION REMARKS (WILL ALWAYS BE THE REQUESTOR POC INFORMATION I.E. TSGT JONES, 44CS, DSN 314-555-1234)
803	REQUESTOR DATA (WILL ALWAYS READ USAFE FMO, DSN 314-480-2592)
804	TUNING RANGE/TUNING INCREMENTS
805	DATE RESPONSE REQUIRED
806	INDICATION IF HOST NATION NOMINATIONS ACCEPTABLE
910	EXERCISE PROJECT

**A5.2. (Added-USAFE)** Modification Records. All SFAF modification records, SFAF item 010 of M, must have SFAF item 108. This will be the command tracking number for the original assignment being modified.

EXAMPLE: 108. REPLACES USAFE98-722A

**A5.3. (Added-USAFE)** Duplex and Paired with Records. All requests for duplex systems and systems with paired frequencies (i.e. TACAN channels, microwave links, LMR repeaters, etc...) must have a separate request for each frequency in the link. Submit all requests at the same time using the following SFAF guidelines:

A5.3.1. **(Added-USAFE)** Use SFAF item 506 for ALL duplex and/or paired with system records. Use multiple lines as required.

EXAMPLES:

506. M14653, EUR 039669, TSSR

506. M108.100, EUR 036871, ILS LOC

506/02. M334.700, EUR 036872, ILS GS

**A5.4. (Added-USAFE)** NAVAIDS One-way Transmit Systems. All NAVAIDS systems that transmit one-way (i.e. ILS, VOR, Beacons) use the following SFAF guidance.

A5.4.1. **(Added-USAFE)** SFAF 300 series will be all required ground station data.

A5.4.2. **(Added-USAFE)** SFAF 400 series will read as follows.

A5.4.2.1. **(Added-USAFE)** SFAF item 400 applicable country code.

A5.4.2.2. **(Added-USAFE)** SFAF item 401 will read AIRCRAFT.

A5.4.2.3. **(Added-USAFE)** SFAF item 440 will read U, VARIOUS.

A5.4.3. **(Added-USAFE)** Paired with frequencies. Add SFAF item 506 for all paired with frequencies as appropriate.

A5.4.4. **(Added-USAFE)** Service Volume. For authorized service volume use SFAF item 711. Do not use SFAF items 406 or 503.

**A5.5. (Added-USAFE) TACAN Systems.** Submit proposals for both the airborne interrogator and ground reply together. Use the following SFAF guidance:

A5.5.1. **(Added-USAFE)** Ground station proposal:

A5.5.1.1. **(Added-USAFE)** SFAF 300 series will list all ground station parameters.

A5.5.1.2. **(Added-USAFE)** SFAF 400 series will read as follows:

A5.5.1.3. **(Added-USAFE)** SFAF item 400 applicable country code.

A5.5.1.4. **(Added-USAFE)** SFAF item 401 will read AIRCRAFT.

A5.5.1.5. **(Added-USAFE)** SFAF item 440 will read U,VARIOUS.

A5.5.1.6. **(Added-USAFE)** SFAF item 502 will list assigned channel number.

A5.5.1.7. **(Added-USAFE)** SFAF item 506 will list paired with frequency as appropriate.

A5.5.1.8. **(Added-USAFE)** Enter service volume in SFAF item 711.

**A5.6. (Added-USAFE)** Airborne station proposal:

A5.6.1. **(Added-USAFE)** SFAF 300 series will read as follows:

A5.6.2. **(Added-USAFE)** SFAF item 300 applicable country code.

A5.6.3. **(Added-USAFE)** SFAF item 301 will read AIRCRAFT.

A5.6.4. **(Added-USAFE)** SFAF item 340 will read U,VARIOUS.

A5.6.5. **(Added-USAFE)** SFAF 400 series will list all ground station parameters.

A5.6.6. **(Added-USAFE)** SFAF item 502 will list assigned channel number.

A5.6.7. **(Added-USAFE)** SFAF item 506 will list paired with frequency as appropriate.

A5.6.8. **(Added-USAFE)** Enter service volume in SFAF item 711.

**A5.7. (Added-USAFE) RADAR Systems.** Proposals for RADAR systems will be formatted as follows:

A5.7.1. **(Added-USAFE)** SFAF 300 series will reflect the ground station parameters.

A5.7.2. **(Added-USAFE)** SFAF 400 series will reflect the ground station parameters.

**A5.8. (Added-USAFE) LMR.** For LMR requests, use the following guidance.

A5.8.1. **(Added-USAFE)** SIMPLEX OPS (FB/ML). SFAF will reflect all emission designators of the worst case transmitter. (Reminder - multiple 114 entries will require associated 113, 115, and 116 entries).

A5.8.2. **(Added-USAFE)** SFAF 300 series will reflect the worst case fixed station parameters (worst case--highest transmit power, highest antenna gain, highest antenna feed point and/or site elevation) within the installation's boundaries.

A5.8.3. **(Added-USAFE)** SFAF 303 will be the coordinates of the worst-case fixed station transmitting antenna.

A5.8.4. **(Added-USAFE)** SFAF 400 series will reflect the mobile stations equipment parameters (worst case--highest transmit power, highest antenna gain).

A5.8.5. **(Added-USAFE)** SFAF item 403 coordinates of fixed station's transmit antenna (same as stated in SFAF Item 303.).

A5.8.6. **(Added-USAFE)** SFAF item 406 will be maximum requested radius of operations for the mobile stations.

A5.8.7. **(Added-USAFE)** SFAF item 440 will be the vehicle mounted mobile radio as it has the greatest output power. Only use nomenclature or model of handheld radio if there are no vehicle mounted mobiles, then, use the nomenclature or model of the most predominant type of handheld radio.

**A5.9. (Added-USAFE)** Repeater Networks. Users must submit requests for both frequencies necessary for repeater operations. Submit both records at the same time. Use the following guidelines for submitting the frequency proposals.

A5.9.1. **(Added-USAFE)** Repeater Transmit Record:

A5.9.2. **(Added-USAFE)** SFAF item 113 must be FB. Do not use three character station classes in the USEUCOM AOR.

A5.9.3. **(Added-USAFE)** SFAF item 114 will reflect all emission designators of the repeater station transmitter. (Reminder - multiple 114 entries will require associated 113, 115, and 116 entries).

A5.9.4. **(Added-USAFE)** SFAF item 115 will be the output power of repeater station.

A5.9.5. **(Added-USAFE)** SFAF 300 series will reflect all parameters of repeater station.

A5.9.6. **(Added-USAFE)** SFAF 400 series will reflect all parameters of the receive station. If the repeater is transmitting to mobile stations and fixed stations, then both receive station(s) information needs to be stated using multiple receiver functionality (R01, R02).

A5.9.7. **(Added-USAFE)** SFAF item 502 will have net designator listed.

Example: 502. REPEATER TRANSMIT BASE CE NET

A5.9.8. **(Added-USAFE)** SFAF item 506 will list paired with frequency information.

A5.9.9. **(Added-USAFE)** SFAF item 704 will be H.

**A5.10. (Added-USAFE)** Mobile Transmit Record:

A5.10.1. **(Added-USAFE)** SFAF item 113 will be ML.

A5.10.2. **(Added-USAFE)** SFAF item 114 will reflect all emission designators of the worst case transmitter, typically the vehicle mounted mobile radio. Reminder - multiple 114 entries will require multiple associated 113, 115, and 116 entries.

A5.10.3. **(Added-USAFE)** SFAF 300 series will reflect the worst-case mobile transmitter parameters. This is typically the vehicle mounted mobile radio.

A5.10.4. **(Added-USAFE)** SFAF item 303 will be the coordinates of the repeater station in the paired with record.

A5.10.5. **(Added-USAFE)** SFAF item 306 will be the authorized radius of operations for the mobile radios.

A5.10.6. **(Added-USAFE)** SFAF item 340 will be the nomenclature of the vehicle mounted mobile radio. Use the nomenclature of the handheld radio if you only use handhelds. When using the handheld nomenclature use the model number/nomenclature of the most prevalent handheld radio in use.

A5.10.7. **(Added-USAFE)** SFAF 400 series will reflect all parameters of repeater station in paired with record.

A5.10.8. **(Added-USAFE)** SFAF item 502 will have net designator listed.

Example: 502. MOBILE TRANSMIT BASE CE NET

A5.10.9. **(Added-USAFE)** SFAF item 506 will list paired with frequency information.

A5.10.10. **(Added-USAFE)** SFAF item 704 will be H.

**A5.11. (Added-USAFE)** TACSAT Requests for Germany. For all UHF TACSAT requests SFAF item 209 must contain the words "UHF TACSAT" and the SAA tracking number.

**A5.12. (Added-USAFE)** Common VHF/UHF Antenna Details. When using standard military type antennas for VHF/UHF assignments use **Table A5.2. (Added)** for the appropriate SFAF line item details.

**Table A5.2. (Added-USAFE) Common VHF/UHF Antenna Details.**

Antenna Name (SFAF item 354)	Antenna Nomenclature (SFAF item 355)	Antenna Gain in dBi (SFAF item 357)	Frequency Band (SFAF item 110)
DISCONE	AT-197	2	UHF (Umbrella type)
DIPOLE	AS-1097	6	UHF
DIPOLE	AS-1181	2	VHF

**A5.13. (Added-USAFE)** Control/Request Number (SFAF item 702). In the USEUCOM AOR all proposals MUST have a unique SFAF item 702. For multiple proposals, using the same SFAF item 702, use alpha character suffixes to the 702. If you carry on past "Z" start back using double alpha characters.

EXAMPLES:

Multiple 702s:

USAFE02-609A

USAFE02-609B

USAFE02-609C

Multiple 702s that carry past "Z":

USAFE02-314Z

USAFE02-314AA

USAFE02-314AB

**Attachment 6 (Added-USAFE)****PROCEDURES FOR TEMPORARY REQUIREMENTS FOR USAFE UNITS GOING TO THE CONUS**

**A6.1. (Added-USAFE)** Reference. Procedures for sending temporary frequency requests to AFFMA from the USAFE AOR as per agreement with AFFMA/DOO, AFFMA Action Officers (AO), and USAFE FMO.

A6.1.1. **(Added-USAFE)** Create one SFAF per frequency needed in accordance with MCEB PUB 7, EUCOM SMM, and **Chapter 3** of this publication. SFAF item 144 will contain “U”.

A6.1.2. **(Added-USAFE)** In SFAF item 110 enter the frequency band upper and lower limits.

A6.1.3. **(Added-USAFE)** In SFAF item 520 add all pertinent information including route that aircraft will fly, i.e., states aircraft will flyover enroute to/from training location. Include any other information that would aid in the successful coordination of the request.

A6.1.4. **(Added-USAFE)** In SFAF item 502 enter “REQUEST ONE FREQUENCY FROM BAND IN LINE 110”; or “REQUEST ACCESS TO THE ENTIRE FREQUENCY BAND SHOWN IN LINE 110.” If a band request include E039 in SFAF item 500.

A6.1.5. **(Added-USAFE)** Run compliance and fix all correctable errors before forwarding through normal USAFE channels.

A6.1.6. **(Added-USAFE)** The USAFE FMO will validate the request and forward SFAFs via SXXI to job account “AF T11.”

A6.1.7. **(Added-USAFE)** AFFMA will nominate specific frequencies and perform necessary coordination.

A6.1.8. **(Added-USAFE)** AFFMA will add discrete frequencies in SFAF item 110 and return them to “USAFE HQ OFFICIAL” job account in SXXI.

A6.1.9. **(Added-USAFE)** SFAFs will be ASSIGNED/NOTIFIED BY in SXXI by USAFE as per EUCOM procedures.