

**Army Regulation 5-12**

**Management**

# **Army Use of the Electromagnetic Spectrum**

**Headquarters  
Department of the Army  
Washington, DC  
15 February 2013**

**UNCLASSIFIED**

# ***SUMMARY of CHANGE***

AR 5-12

Army Use of the Electromagnetic Spectrum

This major revision, dated 15 February 2013--

- o Revises and updates Army Spectrum Management Policy in accordance with current Army, Department of Defense, United States national, host-nation, and international policies, organizational structures, and doctrinal changes (chap 1).
- o Revises the Army, Department of Defense, and national and international spectrum-related responsibilities of the Army (chap 2).
- o Delineates the scope, requirements, objectives, and timing of the elements of the Army's spectrum supportability processes, including requirements for spectrum supportability risk assessments, spectrum supportability determination, requests for equipment frequency allocation approval, and quantification of electromagnetic environmental effects (chap 3).
- o Delineates policies regarding Department of Defense, United States, host-nation, and international frequency-assignment approval processes for Army spectrum-dependent systems and provides spectrum policy for the Joint bases created by the 2005 Base Realignment and Closure Act (chap 4).
- o Incorporates new text delineating the requirements for spectrum supportability risk assessment, clarifies Army National Guard Bureau and Army North responsibilities for homeland defense and defense support of civil authorities, and defines spectrum policies for specific civil and military radio frequency systems used by Army personnel (chap 5).
- o Delineates spectrum policies and procedures for Army use of a variety of specific commercial and military spectrum-dependent systems (chap 5).
- o Delineates consequences to Army individuals and organizations that do not comply with Department of Defense, national, and international spectrum policies and regulations (chap 6).
- o Adds an appendix on requirements for spectrum supportability risk assessments throughout the life cycle of Army spectrum-dependent systems (app C).
- o Provides an internal control checklist (app D).
- o Makes administrative revisions (throughout).

## Management

### Army Use of the Electromagnetic Spectrum

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By Order of the Secretary of the Army:

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*General, United States Army*  
*Chief of Staff*

Official:

  
JOYCE E. MORROW  
*Administrative Assistant to the*  
*Secretary of the Army*

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**History.** This publication is a major revision.

**Summary.** This regulation on the Army's use of the electromagnetic spectrum has been revised to update Army policies and responsibilities across the entire range of the electromagnetic spectrum. It mandates the integration and synchronization of Army spectrum management processes with all five phases of the Defense Acquisition System and Department of Defense funding categories. It also describes the Army spectrum management functional processes necessary to achieve compliance with statutory provisions, regulations, and technical standards required by the International Telecommunication Union; the National Telecommunications and Information Administration's Manual of Regulations and Procedures for Federal

Radio Frequency Management; Part 300, Title 47, Code of Federal Regulations; and the provisions of Department of Defense Instruction 4650.01. This update delineates a range of consequences for individuals or organizations resulting from noncompliance with spectrum policies and regulations.

**Applicability.** This regulation applies to the Active Army, the Army National Guard/Army National Guard of the United States, and the United States Army Reserve, unless otherwise stated.

**Proponent and exception authority.** The proponent of this regulation is the Army Chief Information Officer/G-6. The proponent has the authority to approve exceptions to this regulation that are consistent with Army regulations. The proponent must obtain approval from United States and non-U.S. national telecommunication authorities regarding use of Army systems that are not in compliance with statutory or treaty spectrum requirements. The proponent may delegate this approval authority, in writing, to a division chief within the proponent agency in the grade of colonel or the civilian equivalent. The proponent must obtain approval from United States and non-United States telecommunication authorities regarding use of Army systems that are not in compliance with statutory or treaty spectrum requirements.

**Army internal control process.** This regulation contains internal control provisions in accordance with AR 11-2 and identifies key internal controls that must be evaluated (see appendix D).

**Supplementation.** Supplementation of this regulation and establishment of command and local forms are prohibited without prior approval from the Chief Information Officer/G-6 (SAIS-AOS), 107 Army Pentagon, Washington, DC 20310-0107.

**Suggested improvements.** Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to the Chief Information Officer/G-6 (SAIS-AOS), 107 Army Pentagon, Washington, DC 20310-0107.

**Distribution.** This regulation is available in electronic media only and is intended for command levels D and E for the Active Army, the Army National Guard/Army National Guard of the United States, and the U.S. Army Reserve.

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## **Chapter 1 Introduction**

### **1–1. Purpose**

This regulation assigns responsibilities for Army management of the electromagnetic spectrum (hereafter referred to as spectrum management) and for Army participation in Service, Joint, U.S., host-nation, and international spectrum management activities. It issues spectrum-related policies and responsibilities for Army commands, agencies, activities, installation and unit commanders, and users at installations worldwide. It issues radio frequency (RF) spectrum policy and responsibilities for combat developers (CBTDEVs) and materiel developers (MATDEVs). It delineates the elements of the Army Spectrum Supportability Program (ASSP).

### **1–2. References**

Required and related publications and prescribed and referenced forms are listed in appendix A.

### **1–3. Explanation of abbreviations and terms**

Abbreviations and special terms used in this regulation are explained in the glossary.

### **1–4. Responsibilities**

Responsibilities are listed in chapter 2.

### **1–5. Goals**

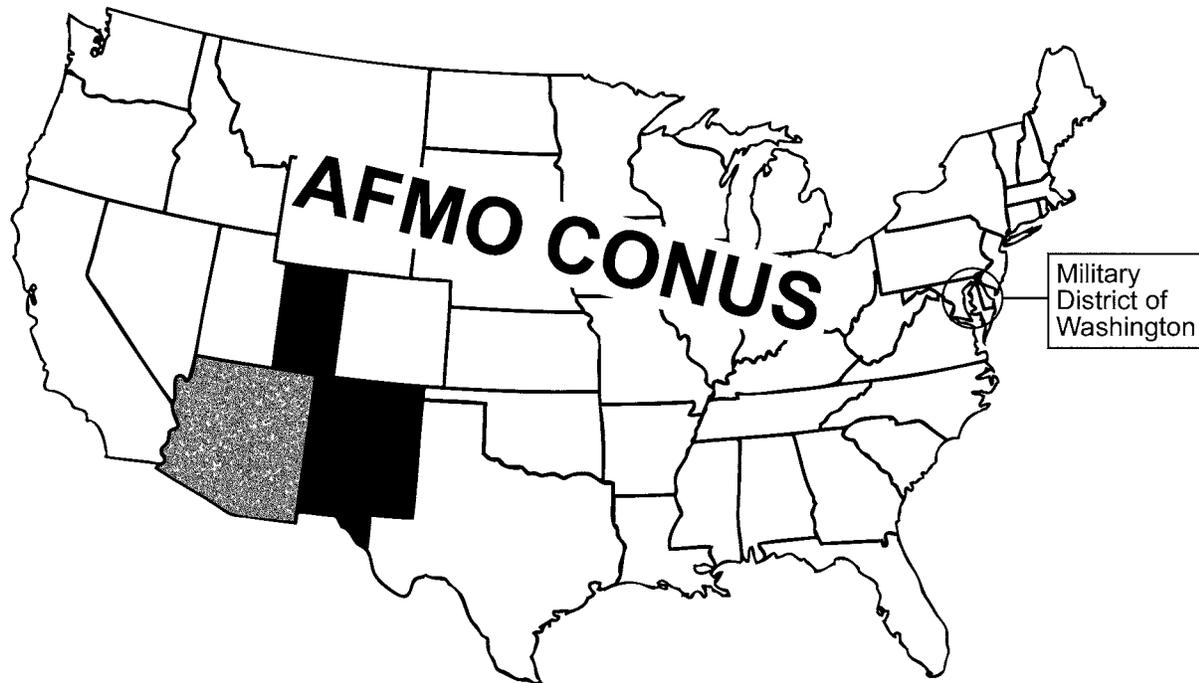
The Army's spectrum management goals are as follows:

- a.* Ensure that Army spectrum processes are an integral part of the Army's implementation of the Defense Acquisition System (DAS) and Department of Defense (DOD) funding categories.
- b.* Ensure that Army spectrum-dependent (S–D) systems effectively and efficiently use the RF spectrum in compliance with U.S., host-nation, and international telecommunication laws, rules, and regulations and are designed to minimize the potential for harmful interference.
- c.* Ensure that Army S–D systems can fully engage in net-centric operations without causing or experiencing harmful electro-magnetic interference (EMI).
- d.* Ensure that Army spectrum policy decisions and spectrum supportability risk assessments (SSRAs) are based on verifiable analyses and quantifiable, repeatable measurements.
- e.* Ensure that Army personnel are aware of the consequences and mission impacts of noncompliance with DOD, U.S., host-nation, and international spectrum laws, rules, regulations, policies, and technical standards.

### **1–6. Policies**

- a.* Army use of the RF spectrum within the United States will comply with the policies and regulations for use of the spectrum by all Federal agencies, as prescribed by the National Telecommunications and Information Administration's (NTIA's) Manual of Regulations and Procedures for Federal Radio Frequency Management (the "red book") and the provisions of Department of Defense Instruction (DODI) 4650.01. The Army will comply with these policies unless waived by the DOD Chief Information Officer (CIO). Army requests for such waivers will be provided to the DOD CIO through the CIO/G–6.
- b.* Electronic warfare (EW) equipment, to include counter radio-controlled improvised explosive device electronic warfare (CREW) technology, will be designed to maximize compatibility with other military S–D systems operating in the electromagnetic environment (EME). These S–D systems will be designed to optimize receiver selectivity and sensitivity to operate in a contested radio frequency environment. EW equipment developers must comply with the applicable requirements of the SSRA process provided in chapter 3 and appendix C of this publication.
- c.* Army spectrum use outside the United States will be coordinated with intended host nations by the Army Spectrum Management Office (ASMO) through formal combatant command (COCOM) spectrum management channels. ASMO will inform the responsible Army organization of the need for analyses or operational fixes to obtain required host-nation spectrum approvals.

(1) Many national and international entities are involved in granting or withholding of the formal approvals required for Army access to spectrum resources. Figure 1–1 provides a general orientation of major spectrum management coordination regions and organizations.



- AFMO CONUS
- DOD Army frequency coordinator for Arizona
- DOD White Sands Missile Range

Note: Alaska and Hawaii are covered by USARPAC.

Figure 1-1. Major spectrum management coordination regions

(2) Organizations, activities, and individuals are assigned responsibility for performing technical research, development engineering, allocation, allotment, and assignment missions that support Army spectrum management. Spectrum management conducted within these coordination channels is conducted within the limits of established Army policy.

(3) There is no strict hierarchy within these coordination channels. Coordination is conducted as required among one or many offices to resolve issues at the lowest possible level. Issues that cannot be resolved within these coordination channels are referred to command and staff channels for action.

*d.* No agency, employee, or member of the Army is authorized to participate in the Federal Communications Commission (FCC) implementation of the Administrative Procedures Act process for matters under the purview of Title 47, United States Code, except as authorized by the Army Spectrum Manager (ASM).

## Chapter 2 Responsibilities

### 2-1. The Assistant Secretary of the Army (Acquisition, Logistics and Technology)

The ASA (ALT) will—

*a.* Ensure that Army MATDEVs and program executive officers (PEOs) perform all spectrum-related actions during appropriate phases of the DAS to ensure system compliance with DOD, U.S., host-nation, and international spectrum

laws, regulations, policies, and technical standards compatibility as outlined in chapter 3 of this regulation and by DODI 4650.01.

*b.* Require that SSRAs receive the approval of the CIO/G-6 before an acquisition effort be allowed to proceed through any milestone when acquiring S-D systems.

*c.* Require that program offices have a spectrum coordinator for spectrum-related issues, including subordinate command (SC) frequency assignment requests.

*d.* Ensure that updated SSRAs are provided to the CIO/G-6 during all phases of the DAS for Army systems and equipment funded by the Army command (ACOM) and all SCs (see chap 3 and app C).

*e.* Coordinate the resolution of critical or specialized spectrum management requirements or issues identified during the acquisition process with the ASM.

*f.* Ensure that MATDEVs generate required SSRAs and address spectrum management, electromagnetic compatibility (EMC), and EMI issues that could affect operational system performance. It is recommended the SSRAs be a contract data requirements list item on every applicable contract.

*g.* Ensure that MATDEVs generate and implement interference-mitigation techniques that enhance EMC for all Army S-D systems.

*h.* Require that program offices resource SSRAs, EMC analyses, and electromagnetic environmental effects (E3) measurements prior to milestones A, B and C, as appropriate, and during Army's implementation of the DAS in accordance with AR 70-1 and DA Pam 70-3. (Refer to chap 3 and app C for more information.)

*i.* Identify spectrum requirements in all S-D programs and acquisitions.

## **2-2. The Army Chief Information Officer/G-6**

The Army CIO/G-6 will—

*a.* Direct and provide oversight to the ASSP.

*b.* Plan for, articulate, and defend Army spectrum requirements.

*c.* Advise the Secretary of the Army and the Chief of Staff of the Army on spectrum matters.

*d.* Support and defend resource requirements for spectrum management in the Army Planning, Programming, and Budgeting Business Operating System.

*e.* Approve and advocate the Army's spectrum interests in DOD, national, host-nation, and international spectrum regulatory processes.

*f.* Advise the ASA (ALT) regarding implementation of all elements of the ASSP in acquisition strategies for S-D sensors, weapons, mission command communication systems, intelligence, EW, and information management systems in accordance with AR 70-1.

## **2-3. The Army Spectrum Manager**

The ASM will—

*a.* Serve as the principal advisor to the Army CIO/G-6 regarding spectrum management and regulatory matters.

*b.* Direct Army spectrum management activities as well as develop and promulgate Army spectrum management policy and planning guidance.

*c.* Implement responsive spectrum management processes to meet Army needs and requirements at both the U.S. national and international levels. This regulation authorizes the ASM to review and update the Army spectrum management structure and assign specific functions within the Army as required.

*d.* Coordinate spectrum management matters within the Office of the Secretary of the Army and the Army Staff.

*e.* Coordinate Army spectrum access requirements with U.S. Government organizations and the allocation of frequency assignments in support of Army operations.

*f.* Serve as the Army spectrum certification authority for S-D systems. The ASM will authorize the submission of DD Form 1494 (Application for Equipment Frequency Allocation) to the Equipment Spectrum Guidance Permanent Working Group of the Military Communications-Electronics Board (MCEB) Frequency Panel (FP).

*g.* Provide DOD, national, host-nation, and international spectrum guidance and assistance to CBTDEVs and MATDEVs with respect to all technical and regulatory matters affecting Army S-D systems and their use of domestic and international frequencies.

*h.* Identify, budget for, and initiate Army spectrum management and EMC services, studies, and analyses as required.

*i.* Serve as the principal Army negotiator and represent Army spectrum requirements in both U.S. national and international regulatory and policy discussions; through the U.S. Department of State on a Government-to-Government level; and through status-of-forces negotiations in cases of individual host-nation relationships and for international spectrum matters on the agenda of International Telecommunication Union (ITU) Working Parties, committee, or conference meetings.

*j.* Oversee the Army spectrum management automation architecture to ensure compliance with DOD and Federal automation standardization requirements.

- k. Coordinate with the Deputy Chief of Staff, G-1 (DCS, G-1) for priority assignment of spectrum management personnel across the operating and generating force.
- l. Assist the Office Chief of Signal and commanders of ACOMs, Army service component commands (ASCCs), and direct reporting units (DRUs) in defining and justifying requirements for table of organization and equipment and table of distribution and allowance spectrum management positions at Army posts, camps, stations, and combat training centers.
- m. Review Army materiel objectives and requirements to identify potential effects on the spectrum in accordance with AR 70-1.
- n. Ensure Army spectrum management policies, plans, programs, and procedures are synchronized to the Army's implementation of the DAS in accordance with the DOD Directive (DODD) 5000-series guidelines and governing regulations.
- o. Represent spectrum management requirements in Army Systems Acquisition Review Council (ASARC).
- p. Serve as the Army representative for all Army matters involving the NTIA; articulate and defend Army spectrum matters to the Interdepartment Radio Advisory Committee (IRAC); direct and be responsible for Army participation throughout the IRAC organizational substructure.
- q. Provide Army representation and participation in the U.S. ITU working party and U.S. ITU working party preparations for technical input to the World Radiocommunication Conferences.
- r. Provide Army representation to the ITU Radiocommunication Sector, U.S. Department of State ITU National Committee, and the U.S. ITU Advisory Committee.
- s. Serve as the Army representative to the MCEB FP.
- t. Provide Army representation to the U.S. delegation to Combined Communications-Electronics Board FP meetings.
- u. Approve the Army input to the Defense Electromagnetic Spectrum Management Strategic Plan.
- v. Coordinate, when required, the assignment of the Joint Spectrum Center (JSC) commander with the U.S. Army Human Resources Command.
- w. Coordinate the resolution of serious EMI incidents with appropriate Army, COCOM, and other Service activities.
- x. Serve as the Director, ASMO, and manage the Army's spectrum management program, to:
  - (1) Serve as the focal point for the Army spectrum management program and perform assigned information management (IM) with the Army Staff, COCOMs, ACOMs, ASCCs, and DRUs along with other military Services, Government agencies, and FCC for activities in the private sector relating to spectrum management.
  - (2) Ensure that the technical and operational parameters of Army RF systems indicated on DD Form 1494 comply with DOD, national, host-nation, and international spectrum-related policies and processes.
  - (3) Exercise technical control over the area frequency coordinators (AFCs) for the Military District of Washington, Joint Base Meyer-Henderson Hall, VA; and the U.S. Army Corps of Engineers (USACE), Washington, DC.
  - (4) Coordinate specialized spectrum management requirements with USACE, the Military District of Washington, the National Training Center (NTC) at Fort Irwin, CA, the Joint Readiness Training Center (JRTC) at Fort Polk, LA, and the Joint Multinational Readiness Center at Hohenfels, Germany.
  - (5) Coordinate and obtain spectrum certifications from the NTIA and coordinate frequency allotments or assignments to support Army operational requirements in the United States and possessions (US&P).
  - (6) Ensure that required E3 measurements are conducted before submitting DD Form 1494 to ASMO.
  - (7) Ensure that SSRAs address the regulatory, technical, operational, and EMC aspects of proposed S-D system(s) in their intended EME.
  - (8) Coordinate the Army's response to the Presidential Spectrum Initiative, which includes streamlining spectrum management processes, developing test bed programs for emerging S-D systems and models, and improving the quantitative basis of spectrum management.
  - (9) Implement national, international, DOD, Joint, host-nation, and Headquarters, Department of the Army (HQDA) spectrum management policies and guidance throughout the Army.
  - (10) Provide the Army representative to the following IRAC subcommittees: Emergency Planning, Frequency Assignment, Space Systems, Spectrum Planning, Radio Conference, and Technical; and all other groups within the IRAC structure.
  - (11) Provide an alternate Army representative to the MCEB FP in the absence of the ASM.
  - (12) Provide the Army representative to MCEP FP working groups.
  - (13) Process requests to the NTIA or the FCC for spectrum resources for Army commands and activities within the US&P.
  - (14) Develop, approve, and represent Army positions presented to the Radio Technical Commission for Aeronautics and the Radio Technical Commission for Maritime Services.
  - (15) Be responsible for all U.S. submissions made on behalf of the Army to the International Telecommunication Union-Radiocommunications Sector.
  - (16) Coordinate spectrum resources to support the ASCCs of the COCOMS as required.
  - (17) Prepare the Army's input to the Defense Electromagnetic Spectrum Management Strategic Plan.

(18) Participate in the capabilities development and system acquisition process as required to advocate, advise, and ensure compliance of this regulation; provide spectrum management expertise to operational commanders, PEOs, CBTDEVs, MATDEVs, and spectrum managers.

(19) Provide technical assistance during the acquisition process, test and integration working groups, and other committees requested and approved by the ASM.

(20) Advise PEOs and program managers (PMs), CBTDEVs, and system developers on the processes and procedures for submission of the DD Form 1494 using both the Business Process Manager and the Stepstone electronic tools.

(21) Participate in the development of suitable hardware and software suites to support Army operational requirements for spectrum management and EMC.

(22) Serve as the Army authority for assigning international and national requirements for nontactical radio station identification as outlined in paragraph 4–5.

(23) Develop and defend Army spectrum-related policies, positions, and equities within international Government-to-Government spectrum management forums, including host-nation status of forces agreements and all conferences, committees, and working parties of the United Nations ITU.

(24) Designate individuals or agencies to represent Army spectrum management interests and positions at the DOD, U.S. national, host-nation, and international spectrum levels. DA persons or agencies outside of the ASMO presenting a unilateral Army position, plan, purpose, or objective involving the electromagnetic spectrum must ensure that the position is coordinated with and approved by the ASM prior to release.

(25) Lead the development of Army positions in cases of congressional administrative actions that could result in the possible transfer, sale, auction, or removal of spectrum resources from the public to the private sector.

(26) Direct specific commands or activities to provide representation to individual Army spectrum-related working groups, ad hoc groups, committees, or panels; however, the oversight and direction are the responsibility of the ASM.

#### **2–4. Principal Officials of Headquarters, Department of the Army**

Within their respective areas of functional and process proponentcy, these officials will—

*a.* Identify, validate, and address the spectrum requirements and resources needed to accomplish the organization's assigned mission in accordance with Army policy, doctrine, and assigned responsibilities in accordance with this regulation.

*b.* Ensure that MCEB equipment frequency allocation guidance and an NTIA certification of spectrum support are received prior to contractual obligations to procure or develop equipment that radiates or receives electromagnetic energy in its intended environment.

*c.* Ensure that personnel operating S–D equipment are aware that the Army's use of spectrum allocated to non-Federal Government users on an exclusive basis will not interfere with civil sector uses of that spectrum.

*d.* In accordance with AR 11–2, implement the spectrum management-related internal controls, as necessary. An internal-control checklist for spectrum management is provided in appendix D.

#### **2–5. Army command, Army service component command, and direct reporting unit commanders**

In addition to the responsibilities listed in paragraph 2–4, ACOM, ASCC, and DRU commanders will—

*a.* Coordinate, plan, program, and fund for adequate management and supervision of all spectrum usage.

*b.* Ensure that the CIO/G–6, a principal staff officer, serves as the staff component for management and supervision of the command's spectrum resources. ACOM, ASCC, and DRU commanders will appoint a frequency-spectrum coordinator responsible for the spectrum requirements for each SC.

#### **2–6. Army command subordinate commanders and staff**

In addition to the responsibilities listed in paragraph 2–4, ACOM subordinate commanders and their staffs will coordinate, plan, program, and fund for adequate management and supervision of electromagnetic spectrum use by subordinate entities. The ACOM CIO/G–6 is responsible for management of this resource and the supporting personnel and systems to accomplish this task.

#### **2–7. Army command and direct reporting unit senior information management or G–6 official**

The ACOM and DRU senior IM or G–6 official will—

*a.* Serve as the senior staff component for spectrum management.

*b.* Identify and validate requirements for spectrum manager positions at the ACOM and SC headquarters that are adequate to discharge the functions.

*c.* Serve as the staff proponent for the spectrum supportability program which includes funding, and interfacing with HQDA and other Army agencies as required.

*d.* Conduct headquarters oversight for spectrum resourcing and other spectrum-management-related activities at installations.

*e.* Determine the complement of communications systems, spectrum resources, and computer equipment necessary

to execute the wide variety of missions assigned including training, humanitarian relief, military support to civil authorities, and warfighting.

*f.* Identify, budget, and procure approved tools for—

(1) Assigning spectrum resources.

(2) Assessing technical solutions for spectrum-related problems.

(3) Enforcing adherence to radio frequency assignments and the governance from which the command's spectrum access is derived.

*g.* Ensure and enforce adherence to international and host-nation spectrum laws, regulations, and technical standards.

*h.* Review and update operational and contingency plans, and initiate changes necessary to ensure spectrum management capabilities are sufficient to support assigned missions.

## **2-8. Army command, Army service component command, and direct reporting unit spectrum managers**

ACOM, ASCC, and DRU spectrum managers will—

*a.* Ensure that S-D systems comply with DOD, national, host-nation, and international laws, policies, regulations, technical standards, treaties, and that designated national spectrum authorities approve frequency assignments for individual systems. The spectrum managers will also provide spectrum management consulting services and guidance to SCs as required by the commander to accomplish assigned missions.

*b.* Identify and validate spectrum resource requirements for organizational missions and identify and validate spectrum requirements in support of domestic Homeland Defense (HLD) and Defense Support to Civil Authorities (DSCA) missions.

*c.* Submit validated spectrum requirements to the Army, DOD, U.S. national, host-nation, and international spectrum-approval processes, as appropriate.

*d.* Plan, program, and budget for resources to satisfy organizational spectrum management requirements and maintain the technical competence and professional development of organizational spectrum personnel.

*e.* Identify spectrum resource requirements as part of the development of information systems requirements.

*f.* Coordinate with the ASMO to identify and budget for the procurement of approved spectrum management tools for the assignment of spectrum resources.

*g.* Validate that frequency assignments are in current use, still required for the organization's mission, meet the requirements of appropriate technical standards, and are correctly reflected in DOD and national databases at least 90 days prior to the designated renewal date.

*h.* Identify to the supporting AFC those frequency assignments that are no longer required to meet the organization's mission and recommend their deletion from appropriate databases.

*i.* Identify and recommend to the organization's senior IM official or G-6 the spectrum management tools necessary for the assignment of spectrum resources, assessment of technical solutions for spectrum-related problems, enforce the adherence to appropriate technical standards, and awareness of spectrum regulations and policies.

*j.* Consolidate information for generating signal operating instructions (SOIs) for the command.

*k.* Ensure that an authorization document for each spectrum resource used is retained by the operating activity.

*l.* Ensure that the operation of communications-electronics (C-E) equipment complies with the limitations and technical tolerances contained in spectrum authorizations.

*m.* Ensure that current Army spectrum management directives and procedural publications are available and being followed.

*n.* Identify to the supporting AFC or the ASMO the unit point of contact responsible for all spectrum matters.

## **2-9. Commanding General, United States Army Forces Command**

In addition to the responsibilities in paragraph 2-4, the CG, USAFORSCOM will—

*a.* Identify the G-6, Spectrum Management Office that coordinates USAFORSCOM spectrum resource requirements with the Army Frequency Management Office-United States and possessions (AFMO-US&P) for Army contingency planning, field training exercises, and command post exercises.

*b.* Implement and integrate Army spectrum management doctrine, policy, and procedures to support contingencies, field training exercises, and command post exercises in peacetime and wartime.

*c.* Implement total force, spectrum management training, and incorporate spectrum-related training challenges at the combat training centers.

*d.* Review USAFORSCOM personnel authorization documents to identify requirements for authorized spectrum management positions at all USAFORSCOM installations and organizations. Where necessary, justify and obtain authorized spectrum management positions and the qualified personnel to fill spectrum management requirements, and coordinate critical USAFORSCOM spectrum management vacancies with the ASMO.

*e.* Maintain an updated Joint automated communications-electronics operating instructions system database for all CONUS-based forces. For those CONUS-based forces that have not completed the transition to the Joint database,

continue to maintain updated SOIs, Communications-Electronics Operating Instruction, or Joint communications-electronics operation instruction databases.

*f.* Assign and charge the USAFORSCOM CIO/G-6 and spectrum management staff with the responsibilities noted in paragraphs 2-6 and 2-7, as appropriate to the command's roles and missions.

## **2-10. Commanding General, U.S. Army Training and Doctrine Command**

In addition to the responsibilities listed in paragraph 2-4, the CG, TRADOC will—

*a.* Integrate spectrum management and or spectrum awareness training in all leadership-development courses to ensure that Army leaders understand the implications of spectrum supportability, spectrum access, and spectrum management on the ability to generate and project combat power.

*b.* Incorporate spectrum requirements in all combat-development activities to include the requirement for drafting initial SSRAs that address regulatory, technical, operational requirements capabilities, and an early EMC analysis.

*c.* Ensure that spectrum requirements are identified in all programs and coordinated with the ASM.

*d.* Review TRADOC personnel-authorization documents to ensure requirements for authorized spectrum management positions are identified for all TRADOC garrisons, installations, and organic organizations. The CG also obtains authorized spectrum management positions and the qualified personnel to fill spectrum management requirements.

*e.* Ensure that approval to use the RF spectrum is requested for S-D programs related to concept development, experimentation, and requirements determination.

*f.* Ensure that the spectrum implications of nonmateriel and materiel solutions are considered for all processes related to concept development, experimentation, and requirement determination.

*g.* Ensure that the Capabilities Based Analysis report includes a spectrum assessment where appropriate. The spectrum assessment should consider the information indicated in appendix C and ensure that the information is provided to the MATDEV.

*h.* Ensure that Army experimentation conducted under the auspices related to concept development, experimentation, and requirement determination complies with DOD, host-nation, and U.S. national spectrum laws, regulations, and policies.

*i.* Assign and charge the TRADOC, CIO/G-6 and spectrum management staff, with the responsibilities noted in paragraphs 2-7 and 2-8, as appropriate to the command's roles and missions.

## **2-11. Commanding General, U.S. Army Materiel Command**

In addition to the responsibilities listed in paragraph 2-4, the CG, USAMC will—

*a.* Direct the AMC spectrum coordinators to interface with the ASMO and the ASM, in order to ensure that spectrum management considerations affecting Army Materiel Command (AMC) initiatives are adequately addressed.

*b.* Program, budget, and provide resources to execute assigned spectrum management responsibilities.

*c.* Review AMC personnel authorization documents to identify requirements for authorized spectrum management positions at AMC installations and organizations. The CG also obtains authorized spectrum management positions and the qualified personnel to fill spectrum management requirements.

## **2-12. Commanding General, Army service component command**

In addition to the responsibilities listed in paragraph 2-4, the CGs of ASCCs will—

*a.* Ensure all S-D systems employed by the command comply with Army, DOD, U.S. national, host-nation, and international spectrum rules, regulations, policies, and technical standards.

*b.* Program, budget, and provide resources for executing spectrum management responsibilities.

*c.* Establish and maintain spectrum manager positions to fulfill mission and functional requirements. Program, plan and fund for the maintenance of the technical proficiency and professional development of assigned spectrum managers.

*d.* Review personnel authorization documents to identify requirements for authorized spectrum management positions. Obtain authorized spectrum management positions and the qualified personnel to fill spectrum management requirements.

*e.* Document and promulgate COCOM spectrum management, frequency assignment and host-nation coordination procedures to all Army units permanently or temporally assigned within the Area of Responsibility (AOR).

*f.* Assign and charge the ASCC CIO/G-6 and spectrum management staff with the responsibilities noted in paragraphs 2-6 and 2-7 as appropriate to the command's roles and missions.

## **2-13. Commanding General, U.S. Army North**

USARNORTH is the ASCC and the Joint Forces Land Component Command (JFLCC) of U.S. Northern Command (USNORTHCOM), responsible for HLD and coordinating DSCA. In addition to the responsibilities listed in paragraph 2-4 and the functions in paragraphs 2-7 and 2-8, the CG, USARNORTH will—

*a.* Establish responsibility for the accomplishment of specific HLD and DSCA spectrum management actions.

- b.* Provide guidance to Service component, functional component, and Joint task force commanders in formulation of spectrum support to HLD and DSCA C–E plans and orders.
- c.* Provide guidance on HLD and DSCA coordination with other Federal and local agencies.
- d.* Designate the USARNORTH spectrum manager. Army and other land force component DOD activities assigned to USARNORTH will submit their HLD and DSCA frequency requests to the USARNORTH spectrum manager.

#### **2–14. Commanding generals and commanders, direct reporting units**

In addition to the responsibilities listed in paragraph 2–4, the CGs and commanders of DRUs will—

- a.* Identify spectrum resource requirements to the ASM in the development of information system requirements in accordance with AR 25–1.
- b.* Program, budget, and provide resources for executing ASM and its sub-elements as well as spectrum management responsibilities.
- c.* Establish and maintain spectrum manager positions to fulfill mission and functional requirements. Program, plan, and fund for the maintenance of the technical proficiency and professional development of assigned spectrum managers.
- d.* Review personnel authorization documents to identify requirements for authorized spectrum management positions. Where necessary, justify and obtain authorization for spectrum management positions and the qualified personnel to fill the spectrum management requirements. Coordinate critical personnel requirements with the ASM.
- e.* Assign and charge the DRU CIO/G–6 and spectrum management staff with the responsibilities noted in paragraphs 2–7 and 2–8 as appropriate to the command’s roles and missions.

#### **2–15. Commanders of reserve component units**

In addition to the responsibilities listed in paragraph 2–4, commanders of reserve component (RC) units, including ARNG and United States Army Reserve (USAR), will—

- a.* Submit applications for spectrum assignments through the State Adjutant General to the AFC within whose area or jurisdiction the unit is located. A copy of the application will also be forwarded to the AFC in whose area the frequencies will be employed. The coordination channels described below are for frequency coordination purposes only. Actions which impact command policies and directives will be forwarded through normal command channels. The spectrum coordination channels are the following:
  - (1) ARNG units will forward their requests through the State Adjutant General to the supporting AFC (see app B).
  - (2) USAR units will forward their requests through the Major, USAR Command to the supporting AFC (see app B).
- b.* Normally, RC units are issued frequency assignments for training in garrison or at specified training locations. If an RC unit conducts training at a new location, it must coordinate its spectrum requirements with the appropriate installation spectrum manager. Coordination must be completed at least 90 days prior to the conduct of the training, and information copies must be sent to the supporting AFC.
- c.* Ensure that units conducting training outside the US&P obtain spectrum resources from the sponsoring unit through procedures outlined in command directives, exercise directives, or other appropriate documents.
- d.* Ensure that spectrum resources for mobilization are obtained under the provisions of USAFORSCOM policy and directives.
- e.* Assign and charge the RC unit CIO/G–6 and spectrum management staff with the responsibilities noted in paragraph 2–4c as appropriate to the command’s roles and missions.

#### **2–16. Commanding General, Theater Signal Command**

In addition to the responsibilities listed in paragraph 2–4, the CG, Theater Signal Command is responsible for managing and servicing spectrum-related requirements for installations in accordance with Army, DOD, U.S. national, host-nation, and International Telecommunication Union spectrum regulations, policies, and technical standards. Specialized requirements exist at the Combat Training Centers (CTCs); please refer to paragraph 2–18 for CTC requirements. The CG, Theater Signal Command, for each installation supported, will—

- a.* Ensure tenant and visiting force-spectrum requirements comply with DOD, U.S. national, and host-nation spectrum laws, regulations, policies, and technical standards as related to the performance of the installation mission.
- b.* Coordinate, plan, program, and fund for adequate management and supervision of spectrum use by subordinate entities.
- c.* Ensure that all devices that emit or receive electromagnetic radiations from within their installation comply with DOD, U.S. national, and host-nation spectrum laws policies, regulations, and technical standards.
- d.* Establish a program of continuing review of frequency assignments and delete or amend such assignments as appropriate within the AFC-allotted suspense date.
- e.* Appoint a director of network enterprise center (DNEC) as a principal staff officer, with spectrum management responsibilities. Where no fully resourced installation configuration exists, the owning command will establish areas or regions and will designate an installation to provide information management support.

*f.* Assign and charge the installation CIO/G-6 and spectrum management staff with the responsibilities noted in paragraph 2-4 as appropriate to the command's roles and missions.

## **2-17. Director of Network Enterprise Center**

The DNEC will—

- a.* Provide spectrum resources for operations and training which are authorized on the installation.
- b.* Educate the installation and tenant activities on spectrum management policy and procedures. DNEC will also coordinate with the installation commander, the ACOM CIO/G-6, and the AFC, to identify and forward requests for the procurement of Army-approved hardware and software to perform base-level spectrum management and technical analysis functions (for example, sustaining base information services software).
- c.* Determine peace and wartime communications equipment, spectrum resources, and computer system requirements and obtain sufficient capabilities as appropriate to the installation (for example, increased mobilization and training base requirements).
- d.* Coordinate with other installation directorates to ensure that S-D equipment being developed or procured by or for use on the installation are fully spectrum supportable. See chapter 4 of this regulation for more information.
- e.* Ensure that spectrum authorizations used within DNEC areas of responsibility are valid. Authorizations must be obtained in accordance with chapters 4 and 5 of this regulation.
- f.* Ensure that garrison spectrum emitters operate within geographical and technical parameters to promote EMC among equipment.
- g.* Serve as the point of contact for spectrum and nontactical call sign requirements and usage within the installation, including tenant activities and units conducting training on the installation.
- h.* Keep records on the types of equipment, locations of equipment, and use of the spectrum and nontactical call signs assigned to the installation.
- i.* Process and forward requests for spectrum and call sign assignment, which cannot be met from authorized resources, to the supporting AFC.
- j.* Review all spectrum assignments at least every 5 years or sooner, as required in paragraph 4-3*b*.
- k.* Coordinate, plan, and program for executing assigned spectrum management responsibilities.

## **2-18. Combat training centers information management official or G-6**

The information management office or G-6 at the CTCs will—

- a.* Perform limited technical analysis to ensure EMC between base infrastructure (for example, cell towers, trunk radio systems), training instrumentation, systems testing, and units going through a training rotation.
- b.* National Training Center only: Performs modeling and simulation for newly developed systems being introduced to the CTCs and to validate DD Form 1494 documentation on approved systems. Provide network and coverage plots in support of RF mission analysis.
- c.* Plan, coordinate, and implement spectrum management requirements in support of the Exportable Training Command.
- d.* Provide oversight of the installation of new fixed systems being integrated into the training environment to ensure proper installation and to mitigate negative spectrum impacts.
- e.* Support the Joint Improvised Explosive Device Defeat Organization's Army Center of Excellence's requirements for testing and implementing defeat systems and robotics for radio frequency improvised explosive devices.

## **2-19. U.S. Army Test and Evaluation Command**

USATECOM is responsible for providing a variety of services including EMC analyses, electromagnetic vulnerability analyses, database services, and spectrum management process support to developers of Army electromagnetic S-D equipment. These services are provided through the operation of the following subordinate elements located at the Electronic Proving Ground, Fort Huachuca, AZ: the Battlefield Electromagnetic Environments Office, Electromagnetic Environmental Test Facility (EMETF), and the EMI/TEMPEST branch. (TEMPEST stands for telecommunications electronics materiel protected from emanating spurious transmissions.)

- a.* The Director, Battlefield Electromagnetic Environments Office will—
  - (1) Support the Army Electromagnetic Compatibility Program (EMCP) through development, operation, and maintenance of databases for C-E compatibility and vulnerability analyses and concept studies.
  - (2) Develop, maintain, and operate the database element of the EMCP to provide timely scientific and technical support to the Army spectrum management program. These databases include equipment characteristics and measurements, organizational data, such as table of organization and equipment, Basis of Issue, tactical concepts and doctrine, and threat documentation.
  - (3) Develop, maintain, and operate simulated tactical deployments based on approved scenarios to include geographical locations, communications netting, frequency assignments, and spectrum use. These deployments are down to the individual equipment operator level for U.S., Allied, and threat forces.

(4) Conduct research and studies to design and develop other systems or capabilities as required to fulfill special database requirements.

*b.* The Director, EMETF will—

(1) Assess the ability of Army systems and equipment to operate compatibly in their intended operational EME. Assessments will include the activities relevant to the C–E equipment systems under consideration and doctrine of both threat and friendly forces. Provide assessment service relative to both unintentional (compatibility) and intentional (vulnerability) interference.

(2) Assess the influence of the intended operational EME on Army systems and equipment concepts and the doctrine for their implementation.

(3) Maintain its support capability through three main capabilities:

*(a)* Electronic and electromagnetic measurements of equipment parameters and performance including electro-optical equipment employed by the U.S., Allied, and threat forces.

*(b)* Databases describing the structure, activity, equipment parameters, and geographic environment of deployments up to the level of a deployed Army corps and its opposing threat force in their expected tactical situation.

*(c)* Analytical capability which incorporates the electromagnetic results of the measurements and deployment database into computer models of C–E equipment employed by the Army in opposition to a corresponding threat force. The analysis will give measures of performance for systems being evaluated in either a one-on-one or many-on-many electromagnetic emitter environment.

*c.* The EMI/TEMPEST branch will make a TEMPEST assessment of the equipment or system ability to process classified information without risking compromise. The branch has a measurement capability that detects emanations from electronic and electro-mechanical equipment conformity to requirements in this area specified by the National Security Agency. Measurement data can be analyzed to ascertain the probability of the system under test being able to complete an assigned mission without risking compromise of classified information.

*d.* The EMETF facility and the EMI/TEMPEST branch will provide support for all phases of the Lifecycle System Management Model.

*e.* EMETF services are provided to Army agencies on a cost reimbursable basis.

*f.* Address requests for EMCP services to Commander, EPG (STEW–EPG–TT), Fort Huachuca, AZ 85613–7110, DSN 879–4860 (commercial 520–538–4860).

## **Chapter 3**

### **Army Spectrum Supportability Processes**

#### **3–1. Purpose**

The purpose of Army spectrum supportability processes is to provide CBTDEV and MATDEV decision makers with information to determine whether or not the electromagnetic spectrum necessary to support the operations of an S–D system will be available. Appendix C contains further details regarding the Army SSRA process.

*a.* Army spectrum allocation process provides detailed guidance on how to navigate the mandatory Federal, U.S. national, host-nation, and international spectrum regulatory and technical processes that ensure spectrum access and frequency assignments for Army systems.

*b.* Army spectrum supportability processes provide a methodology to ensure that Army S–D systems comply with mandatory DOD, U.S. national, host-nation, and international spectrum policies during all phases of the DAS process as implemented within the Army by AR 70–1. Additional Army spectrum supportability process goals include:

(1) Assisting Army CBTDEVs and MATDEVs to determine the optimum parts of the RF spectrum where materiel solutions to Army requirements can be met from operational and regulatory perspectives.

(2) Identifying spectrum-related challenges early in the development and procurement of Army S–D systems when changes to their technical parameters architectures are least costly to implement.

(3) Ensuring that CBTDEVs and MATDEVs understand and account for mandatory regulatory processes and technical characteristics of intended RF environments during the development, acquisition, and operation of Army S–D systems.

(4) Ensuring that sufficient bandwidth within allocated frequency bands is available to support Army S–D system development, acquisition, and operations.

(5) Ensuring that Army S–D systems can operate in all of their intended EMEs without causing or receiving unacceptable interference.

(6) Aligning Army spectrum management with standard CBTDEV and MATDEV processes.

(7) Facilitating CIO/G–6 oversight of Army S–D system acquisitions.

### **3-2. Applicability**

Army spectrum supportability processes are applicable to all Army CBTDEVs and MATDEVs, as well as acquisition professionals who develop, acquire, or operate equipment that use, or require access to, the electromagnetic spectrum.

### **3-3. Spectrum supportability**

Development or acquisition of systems that meet operational requirements, but fail to obtain spectrum supportability may not be allowed to operate in the United States or in host nations. These systems create the potential for severe mutual interference between the system and other spectrum users, squander resources, and delay fielding war fighting capabilities to field units.

*a.* Successful fielding of an Army S-D system depends upon CIO/G-6 approval of a program's comprehensive assessment of the operational, regulatory, technical, and EMC aspects of the system's use of the RF spectrum.

*b.* The ASSP is the process by which S-D systems achieve the end-state of spectrum supportability. Spectrum supportability is obtained when the electromagnetic spectrum necessary to support the operation of S-D equipment or system during its expected life cycle is, or will be, available (that is, from the materiel solution analysis phase through developmental and operational testing, to actual operation in the electromagnetic environment). (See DODI 4650.01.)

*c.* The security classification or operational function of an S-D system will not exempt a system from the requirement to perform the indicated elements of the ASSP. Spectrum requirements for Special Access Programs will be coordinated directly with the Director, ASMO in the appropriate secured venues.

### **3-4. Elements of the Army Spectrum Supportability Program**

In order for a system to obtain spectrum supportability, the following must be accomplished:

*a.* An SSRA must be completed and submitted to the ASMO.

*b.* A spectrum supportability determination (SSD) for the SSRA must be received from the CIO/G-6 ASMO, approving the MATDEV's assessment of a system's potential for achieving spectrum supportability. The CIO/G-6 ASMO must also concur that the MATDEV can successfully continue to develop a candidate system.

*c.* A DD Form 1494 must be submitted to ASMO, and approved by NTIA, during each phase of the DAS (see DA Pam 25-1-1).

*d.* The availability of sufficient bandwidth and regulatory protection must be coordinated with ASMO, to perform the intended operational mission within:

(1) The US&P (through the Federal spectrum-approval process).

(2) Host nations, through the host-nation coordination process through the COCOMs.

(3) Quantified, relevant, mutual EMC, EMI, and E3 interactions.

*e.* The SSRA and the SSD:

(1) The purpose of the SSRA and SSD is to identify and assess regulatory, technical, operational, and EMC spectrum issues with the potential to affect the required operational performance of the candidate system. For example, in addition to determining that a system's bandwidth requirement complies with an individual nation's frequency allocation scheme, a new or modified system must also be evaluated with respect to:

*(a)* The system's potential to cause interference to, or suffer interference from, other military and civilian RF systems currently in use or planned for the operational environments.

*(b)* The effect of the system's proposed spectrum use on the ability of the force structure to access the RF spectrum without interference.

*(c)* How the system's spectrum use conforms to the tables of frequency allocation of intended host nations, ensuring regulatory protection from other national co-band spectrum users.

*(d)* If individual host-nation frequency allocations include enough bandwidth to fully support the system's operational mission, for example, required data rate.

(2) When CBTDEVs initiate a requirement that has an RF dependency, the CBTDEV will consider the overall spectrum implications of materiel or nonmateriel solutions and the initiating organization must generate a basic spectrum feasibility analysis. An initial SSRA is required prior to milestone (MS) "A".

(3) For example, a requirement to transmit full-motion video over distances greater than 1,500 km should not consider using the high frequency (HF) part of the RF spectrum as a materiel solution for many technical reasons, including the lack of wide bandwidth allocations below 30 megahertz (MHz). As a nonmateriel solution, the Army may consider requesting through ASMO a change in U.S. national or international spectrum regulations to obtain sufficient allocated bandwidth for specific operational applications. Although the Army has been successful in obtaining changes to U.S. national or international regulations to support nonmateriel solutions enhancing Army spectrum access, the formal approval processes for such changes involve expenditure of considerable time and fiscal resources.

(4) The MATDEV initiates the SSRA. The Army CIO/G-6 must approve the initial SSRA, before acquisition of S-D devices can be allowed. Approval by the CIO/G-6 constitutes an SSD. The CIO/G-6 will depend on the SSD, a DD Form 1494 stage approval (in accordance with the DAS stage), and other pertinent spectrum supportability-related documents, for input to the milestone decision authority during ASARC meetings. Table 3-1 shows the type of SSRA required in each phase of the DAS. The detail and scope of individual SSRAs depend upon several factors including

the system's entry point into the DAS, the complexity of the system, and the intended operational environment. In the case of a single stand-alone radio, such as the Enhanced Position Location Reporting System, a single SSRA during each acquisition phase may be sufficient to address the above components. However, a complex "system of systems" may require more than one SSRA (an SSRA for the overarching acquisition and individual SSRAs, drafted and submitted to ASMO by the respective PM, for each of the systems that are incorporated into the family-of-systems (FOS)) in any of the acquisition phases. For example, a complex sensor system consisting of an air defense radar, digital data links, and satellite Earth stations may require a separate SSRA for the radar, as well as separate SSRAs for any associated data links and Earth stations.

**Table 3-1**  
**Supportability risk assessments required in Defense Acquisition System phases**

DAS phase	Materiel solution analysis	Technology development	System development and demonstration	Production and deployment	Operations and support
SSRA type	Initial SSRA	Initial or interim SSRA	Interim SSRA	Final SSRA	Updated final SSRA(s) for specific missions, new host-nation deployments, system modifications, and so forth.

(5) A DD Form 1494, requesting allocation of the RF spectrum will be started immediately after entry into the DAS process for S-D systems. Requests for spectrum approval will identify those host nations into which deployment is planned. While global use of a capability is expected in most cases, COCOMs do not usually coordinate with every nation in their AOR. Therefore, MATDEVs must identify deployment areas on the DD Form 1494 that are important to the expected mission of the system. At the minimum, the DD Form 1494 stage 2 (in other words, "experimental," see subparagraph *f(9)(b)* below) equipment spectrum certifications must be obtained prior to a milestone B decision. (See DA Pam 25-1-1.)

(6) S-D, commercial-off-the-shelf (COTS) or other nondevelopmental item systems will not be purchased or procured without an approved SSRA, which assesses potential risks associated with gaining required U.S. national and host-nation approvals to access the RF spectrum.

(7) The SSRA process consists of documenting the S-D aspects of a system during each phase of the acquisition life cycle. An SSRA should include the following components:

(a) *Spectrum regulatory component.* The spectrum regulatory component addresses the compliance of the RF system with U.S. national and international tables of frequency allocation as well as with regulatory agreements reached at the International Telecommunication Union, and the stage and status of the spectrum certification process for all of the S-D systems that are part of the acquisition. This component is also a determination of the compliance of the system with pertinent U.S. national and international technical standards. The European Union's standard for "short range devices" is an example of an international technical standard that differs from the technical criteria in Part 15, Title 47, Code of Federal Regulations (47 CFR 15) containing the FCC's rules and regulations.

(b) *Technical component.* The technical component quantifies the mutual interactions between a candidate system and other, co-band, adjacent band and harmonically related RF systems, including the identification of suggested methods to mitigate the effects of possible mutual interference.

(c) *Operational component.* The operational component identifies and quantifies the mutual interactions among the candidate system and other Army and U.S. military RF systems in the operational environment and identifies suggested methods to mitigate possible instances of interference. Development of operational scenarios is closely coordinated with the U.S. Army Signal Center of Excellence's Frequency Spectrum Proponent Office, the TRADOC capability manager, and other Army schools and centers, as appropriate.

(d) *Electromagnetic compatibility component.* The EMC component identifies and addresses all of the EMI and EMC issues and interactions, to include all electrical and electronic equipment that are part of the acquisition, and would degrade or compromise system operational performance.

(8) SSRAs will help the MATDEV understand the spectrum related nuances for their program. One example: If the results of an initial SSRA indicate that spectrum supportability is not likely for a candidate system, in a particular frequency band, throughout a given COCOM, then alternative solutions must be identified, developed, and reported in the SSRA before it can be accepted by ASMO.

(9) MATDEVs will consult with ASMO regarding SSRA requirements for specific systems early in the DAS process. Table 3-2 shows the DD Form 1494 stages required in each phase of the DAS. As the system progresses through the DAS, the type and detail of system parametric data required transitions from calculated to measured (required for stage 4).

**Table 3–2**  
**Relationship between Defense Acquisition System phases and DD Form 1494 stages<sup>1</sup>**

<b>DAS phases:</b>	Matériel solution analysis	Technology development	System development and demonstration	Production and deployment	Operations and support
<b>Corresponding stages of allocation, on DD Form 1494:</b>	"stage 1, conceptual"	"stage 2, experimental"	"stage 3, developmental"	"stage 4, operational"	"stage 4, note-to-holder <sup>2</sup> "

Notes:

<sup>1</sup> The DD Form 1494 is submitted in stages that coincide with the phases of the DOD acquisition process.

<sup>2</sup> A "note-to-holder" document is attached to the permanent record to explain minor, administrative changes.

*f.* DD Form 1494:

(1) Permission to access the RF spectrum is an internationally recognized sovereign national privilege. Host nations have the sole prerogative to grant or deny U.S. requests to access the RF spectrum within their borders. Additionally, permission to operate can be revoked at any time.

(2) The DOD uses the DD Form 1494 to provide host-nation spectrum authorities with the technical parameters of U.S. military RF systems requesting approval to radiate within their territory. (See DA Pam 25–1–1.)

(3) For systems with worldwide missions, when requested to do so by the MATDEV, ASMO will forward the DD Forms 1494 that are in the stage-3 phase to host nations through the appropriate COCOM for spectrum supportability comments.

(4) EW systems, including CREW equipment, for example, do not receive stage-4 certification, and thus are not forwarded for host-nation coordination during the development process; but they will be provided to the applicable COCOM to help in integrating them into their AOR.

(5) MATDEVs must provide ASMO with information that is releasable at the appropriate classification level to each envisioned host nation within a COCOM AOR.

(6) The MATDEV will use a DD Form 1494 to forward the system's basic RF parameters and operating locations in each phase of the acquisition process to ASMO. Upon review, ASMO then assigns each DD Form 1494 a unique Joint Frequency 12 (J/F 12) tracking number and forwards the DD Form 1494 through a Joint process to obtain DOD and NTIA approval. Any DD Form 1494 information deemed by designated officials to be releasable is provided to host nations for comment by COCOM spectrum offices during the later phases of the acquisition cycle. The ASMO gathers and forwards the joint guidance as well as U.S. national and host-nation spectrum supportability comments to the MATDEV.

(7) The DD Form 1494 serves two functions:

(a) It provides a uniform method to capture the basic S–D and operational parameters of military S–D systems in a format that is easily provided to U.S. national and host-nation spectrum authorities.

(b) It standardizes the format of the technical data required to be added to DOD and U.S. national databases to generate frequency assignment approvals, and enables initial EMC analyses, and checks for compliance with military, U.S. national, and host-nation spectrum standards.

(8) MATDEVs will complete and obtain approval for a DD Form 1494 during each phase of the acquisition process for each newly developed S–D system. MATDEVs serving as integrators may find that S–D components of a system are already certified. In such a case, re-certification is not necessary unless the emission characteristics of a device are modified; however, it may be necessary to file a memorandum requesting that an administrative "note to holder" document be added to the permanent record. This is done to identify and document changes in usage or if different antennas have been incorporated. The system integrator must ensure that each S–D component is certified before procurement is initiated.

(9) The DD Form 1494 is submitted in stages that coincide with the phases of the DOD acquisition process. A short description of the DD Form 1494 stages follows:

(a) Stage 1 - Conceptual: The initial planning effort has been completed, including identification of proposed frequency bands and other available characteristics. Certification of spectrum support for telecommunication systems at stage 1 provides initial guidance on the feasibility of obtaining certification at subsequent stages.

(b) Stage 2 - Experimental: The preliminary design has been completed. Emission measurements from bread board equipment or preliminary models may be required. Certification for RF systems at stage 2 is a prerequisite for receiving a frequency assignment supporting, for example, proof-of-concept experimentation.

(c) Stage 3 - Developmental: The major design has been completed and emission measurements may be required from brass board models during testing. Certification of RF systems at stage 3 is a prerequisite for U.S. national authorization of radiation in support of developmental testing of systems. It also provides guidelines for assuring certification at stage 4. At this point, the intended frequency band will normally have been determined and certification at stage 3 will be required for testing of proposed operational hardware and potential equipment configurations. The

MATDEV may request that ASMO provide system parameters to host nations, through COCOM spectrum offices, for Outside Continental United States (OCONUS) spectrum supportability comments.

(d) Stage 4 - Operational: Identify the final operating constraints or restrictions required to ensure compatibility when development has been essentially completed. Certification of RF systems at stage 4 is a prerequisite for a frequency assignment for operational systems. The system parameters included on the DD Form 1494 at stage 4 are normally provided to host nations, by ASMO, through COCOM spectrum offices to obtain spectrum supportability comments.

(10) The end-to-end review process for the DD Forms 1494 submitted at stages 1 and 2 usually takes from 6 to 18 months. The DD Forms 1494 submitted at stages 3 and 4 may require more time for approval, due to the possibility of requesting spectrum supportability comments directly from the military and civil administrations of host nations in which a system will operate.

(11) Additionally, administrative updates — in the form of “notes to holders of DD Forms 1494” — provide a process to update existing DD Forms 1494 as operational systems undergo modifications that change the operating parameters of an S–D device. MATDEVs should contact ASMO when such changes to a system are contemplated or executed.

g. The MATDEV’s spectrum responsibilities: Table 3–3 shows major additional spectrum management events that developers will address in each acquisition phase.

**Table 3–3  
Additional spectrum management responsibilities for developers**

DAS phase	Material solution analysis	Technology development	System development and demonstration	Production and deployment	Operations and support
<b>Developer’s spectrum responsibilities</b>	Ensure that analyses identify operational parameters that the materiel developer can use to define spectrum parameters. Define initial spectrum requirements and frequency bands and operational areas.	Refine spectrum requirements.  Initiate preliminary spectrum discussions with ASMO, NTIA, and FCC.	Perform detailed spectrum signature, receiver degradation, and antenna tests.  Consider obtaining host-nation supportability comments, through ASMO through the COCOMs.  Request frequencies needed for US&P testing.	Obtain host-nation supportability comments, through ASMO through the COCOMs.	Stay aware of the impact of the FCC and ITU on spectrum access.  Request training frequency approvals.  Coordinate homeland defense spectrum requirements.

h. Electromagnetic and Environmental Effects (E3) Program. The Army E3 Program (see AR 70–1 and DA Pam 70–3) includes all processes used by acquisition personnel to successfully design, specify, test, evaluate, field, and maintain S–D materiel systems in all expected EMEs. The parts of the Army’s E3 program focusing on spectrum supportability include the assessment of the system’s EMC and EMI in the intended operational environment. Table 3–4 shows the type of E3 actions required in each DAS phase.

**Table 3–4  
Electromagnetic environmental effect actions required in each Defense Acquisition System phase**

DAS phase	Material solution analysis	Technology development	System development and demonstration	Production and deployment	Operations and support
<b>E3 Program</b>	E3 Program requirements definition.	Address E3 in capabilities development document, Joint Capabilities Integration and Development System (JCIDS), test and evaluation master plan (TEMP), and so forth.	Review and update E3 requirements in capabilities production document, information support plans, and TEMP.	E3 tests on production hardware.	Monitor changes to system for spectrum impacts.

## Chapter 4 Frequency Assignment

### 4-1. Introduction

The electromagnetic spectrum is a critical resource essential to the support of DOD training, operations and testing, and experimentation. One of the processes by which the electromagnetic spectrum is used and managed is through frequency assignments. Users of S-D equipment must have an approved frequency assignment from the appropriate spectrum management authority before operating the equipment. A frequency assignment is defined as the authorization of a specific frequency, group of frequencies, or frequency band to be used at a certain location under specified conditions such as bandwidth, power, azimuth, duty cycle, and modulation. Frequency assignments are also referred to as frequency authorizations or as a license to operate a piece of S-D equipment. In order to obtain authority to transmit, the appropriate local DNEC spectrum manager or the responsible AFC (see app B-1) must formally provide a frequency authorization or license. Frequency assignment policies—

- a. Ensure that all Army S-D systems comply with DOD, U.S. national, host-national, and international spectrum policies and technical standards.
- b. Accomplish effective use of the limited electromagnetic spectrum available for support of the ACOMs, agencies, and activities within the US&P and Army components of COCOMs.
- c. Promote rapid and direct action in responding to requirements submitted for spectrum approval.

### 4-2. Spectrum coordination channels

US&P and non-US&P spectrum management coordination regions are shown in figure 1-1. All systems submitted for frequency assignment approval must have an approved DD Form 1494.

a. *United States and possessions.* Commanders of Army-managed posts, camps, stations, and activities in the US&P, with the exception of Alaska, Hawaii, and Guam, must submit requests for frequency assignment approval to the supporting AFC (see app B).

b. *Alaska, Hawaii, and Guam.* Deploying units, as well as commanders of Army-managed posts, camps, stations, and activities in Alaska, Hawaii, and Guam, will submit their applications for frequency assignment through the Spectrum Manager, U.S. Army Forces Pacific (USARPAC), Fort Shafter, HI.

c. *Joint bases.* The Base Closure and Realignment Act of 2005 requires that 26 DOD installations (sharing a common boundary or in close proximity) share responsibilities for common functions to achieve greater efficiencies and economies of scale by becoming 12 Joint bases. Table 4-1 identifies and shows the lead Service for each of the Joint bases.

**Table 4-1  
Joint bases**

Lead service	Joint base
Army	Joint Base Lewis-McChord, WA Joint Base Myer-Henderson Hall, VA
Navy	Joint Base Pearl Harbor-Hickam, HI Joint Region Marianas, Guam Joint Base Anacostia-Bolling, Washington, DC Joint Base Little Creek-Story, VA
Air Force	Joint Base Charleston, SC Joint Base McGuire-Dix-Lakehurst, NJ Joint Base Andrews Naval Air Facility Washington, DC Joint Base Elmendorf-Richardson, AK Joint Base Langley-Eustis, VA Joint Base Lackland-Sam Houston-Randolph, TX

(1) Spectrum requirements for the individual Service responsible for each Joint base will continue to be processed through already established Army, Navy, Air Force, and Marine Corps channels with pre-coordination (lateral) with the supporting command. Frequency assignments and serial numbers will be assigned as they are today but processing through the U.S. national level will not be completed without coordination and approval from the supporting command.

(2) Joint spectrum requirements will be channeled through the supporting command for processing. (Serial numbers will be assigned by the supporting command.)

(3) The individual Services will retain responsibility for review of records containing their serial numbers.

(4) The supporting command will be responsible for review of Joint records.

(5) Military spectrum management publications, for example, DODI 4650.01–190, and so forth, provide additional spectrum management guidance.

*d. Non-United States and possessions' combatant command areas of responsibility.* Applicants for frequency assignments located in non-US&P COCOM AORs, not located within the United States Northern Command (US-NORTHCOM) AOR, Hawaii, or Guam will submit requirements according to the directives of the responsible ASCC, COCOM and/or applicable host-nation agreement. The commander of each geographic COCOM, with the exception of USNORTHCOM, is responsible for all military use of frequencies within the designated COCOM AOR.

*e. Army contractors.*

(1) The FCC and NTIA hold licensees legally and financially responsible in cases involving interference, so frequencies in use must be approved by the requisite authority.

(2) Army contractors in direct support of contracts for Army S–D systems, or for Joint-Service systems for which the Army is the executive agent or lead Service, will submit requests for frequency assignments at contractor facilities through the sponsoring MATDEV to the responsible AFC.

(3) The MATDEV will:

(a) Submit requests for frequency assignment for system developmental and test operations at Federal facilities to ASMO through the responsible local Frequency Management Office or AFC (see app B–1).

(b) Request frequency assignments for development or tests at Federal facilities involving Joint Service contracts for which Army is the executive agent or lead Service for that contract.

(4) Frequency support for contractor spectrum requirements that are not required to meet specifications of the contract must be obtained by the contractor through FCC channels.

#### **4–3. Frequency assignment types and actions**

National approval for Army systems to access the RF spectrum within the US&P is evidenced by NTIA's placement of a frequency assignment record in the Government Master File (GMF) database.

*a.* An Army S–D system that no longer has regulatory protection via a valid GMF record will be required to cease operation immediately.

*b.* Applicants will submit spectrum requests using the standard frequency action format (SFAF) found in Joint Chief of Staff J6 MCEB Publication 7, unless directed by Office of the Assistant Secretary of Defense (OASD) to use another DOD standard format, a COCOM or host-nation agreement. When published, the DOD standard spectrum resource format documented in MCEB Publication 8, will be used by all Army organizations.

*c.* Allied Communications Publication (ACP) 190, U.S. Supplement-1(C) describes types of spectrum actions and coordination channels, and provides guidance and procedures for processing assignment requests.

*d.* Types of US&P frequency assignments include the following:

(1) *Regular ("permanent") frequency assignment.* Regular frequency assignments are valid for an unspecified period of time and contain a review date that is 5 or 10 years from the initial date of entry or five or 10 years from the most recent modification date. ASMO will coordinate the input of these assignments into the NTIA GMF at the U.S. national level.

(2) *Temporary frequency assignment.* Temporary frequency assignments are valid for a specified period of time.

(3) *Trial frequency assignment.* This is a frequency assignment for the purpose of selecting a suitable specific operating frequency for regular assignment.

*e.* Frequency assignment actions include the following:

(1) *New assignments.* Requests for new frequency assignments must contain the information required in the SFAF (see MCEB Publication 7) and any additional information necessary to provide a clear and accurate description of the requirement. Requests for assignments must be submitted in accordance with the lead times listed below, or the applicant must provide an impact statement justifying the urgency.

(a) A minimum of 120 days of lead time is required to process a permanent assignment request.

(b) Requests to support temporary requirements (such as to test and evaluate experimental equipment) and training exercises require 45 days of lead time.

(2) *Assignment deletions.* Using activities will submit requests for deletions of authorized frequencies by letter, message, or e-mail, using the DOD standard format through spectrum management channels. Using activities will not submit deletion requests when the requirement for the spectrum ceases within 90 days of the expiration date of the authorization. Navigational aids identifiers will be deleted when no longer required.

(3) *Assignment modifications.* An applicant may request modification of any item in an assignment except for the frequency, serial number, and transmitter state or country fields. A modification is generally required when the operational, technical, or geographical data of the record will change before the indicated renewal date.

(4) *Renewing frequency assignments with expiration dates.* If the user desires to renew a frequency with an expiration date, the user must submit a request using the DOD standard format. The request must reach the supporting AFC no later than 90 days prior to the expiration date. When submitting a request for frequency renewal, the user will update the operational, technical, and geographical data that indicates how the frequency assignment is being used.

(5) Five- and 10-year reviews of regular frequency assignments. The NTIA requires that all regular (“permanent”) frequency assignments registered in the GMF be reviewed to:

(a) Ensure that frequency assignments are in current use and are correctly reflected in the GMF.

(b) Ensure that frequency assignments are required for continued operations for the purpose stated in their justification.

(c) Ensure that frequency assignments are still qualified for authorization under the provisions of the regulations contained in the NTIA Manual.

(6) The supporting AFC will provide users a listing of frequency records requiring five- and 10-year reviews with a suspense date. The suspense date will be based on:

(a) Date designated by NTIA.

(b) Adequate time for the assignment review to be processed through the spectrum management channels to NTIA.

(7) NTIA will delete frequency assignments from the GMF that are not renewed within the NTIA’s allotted suspense date. NTIA will notify the CIO/G–6, via letter, of all NTIA’s deleted frequency assignments. Users will be notified of the deletion by their supporting AFC.

#### **4–4. International and host-nation frequency approval and registration**

Non-US&P military frequency coordination is handled through international military channels that have been established for military frequency planning and coordination.

a. Army organizations and installations located outside the US&P requiring special frequency support, such as outside normal tactical and training requirements, will contact the supporting spectrum manager to request assistance for coordinating and obtaining host-nation approval to radiate. Normally, host-nation approval to radiate is signified by written notification and insertion of assignments in the national frequency assignment database. Units should expect long lead times for such coordination and plan accordingly.

b. International frequency registration for specific types of military spectrum-dependent systems requiring protection, such as satellite Earth stations and fixed-base infrastructure, is accomplished by the host nation on behalf of the United States through the ITU. The ITU International Frequency Registration Board publishes the International Frequency List, which is based on the Master International Frequency Register maintained by the Board. The coordination for such actions is managed through international military channels that have been established for military frequency planning and coordination.

#### **4–5. Radio-station identification**

ASMO is the authority for issuing the following to Army organizations:

a. International call signs under Article 19, ITU Radio Regulations; Section 6.5.2 of the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management; and implementation policy and procedures of the FCC.

b. Ship radio authorizations (SRAs) for Army vessels and watercraft in accordance with the call sign book for ships, Allied Communication Publication (ACP) 113. (Available at <http://jcs.dtic.mil/j6/cceb/acps/>.) SRAs are:

(1) Required for operation of nontactical shipboard radio stations used on any watercraft owned or operated by the Army.

(2) In effect for 3 years from the last month in which issued. ASMO must receive a request for renewal at least 30 days before the expiration date indicated on the Radio Frequency Authorization (RFA). SRAs that are not renewed in the above time periods are subject to cancellation, and may be assigned to another station.

(3) Tracked by the CIO/G–6. When C–E equipment is permanently removed from the vessel, the vessel is sold, scrapped, or otherwise disposed of, or the vessel is transferred to another agency, the Department of Army CIO/G–6’s Army Spectrum Manager Office will be notified.

(4) Requested according to the terms in table 4–2.

**Table 4–2**  
**Request for ship-radio authorization**

Item	Data required	Explanation
1.	Official watercraft name or designation	
2.	Former name(s) or designation(s) of watercraft, if any	
3.	Army authority over watercraft	a. Owned b. Operated c. Leased d. Other
4.	Description of transmitting equipment (radar, communications, position finding)	a. Equipment make or manufacturer b. Model number c. Frequency tuning range d. Specific frequencies to be used e. Frequency band required for radar f. Type(s) of emission required g. Power output h. Ship Radio Teleprinter teletype exchange ID i. Is digital selective calling ID required? j. Will vessel sail in international waters?
5.	Controlling authority	a. Army command exercising operational control b. USACE districts c. Point of contact and telephone number

c. In accordance with ITU Radio Regulation 19.30 ASMO will register Army Maritime Mobile Service Identity with the FCC and United States Coast Guard in accordance with Section 6.6, NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management.

d. To submit a request for radio station identification, see contact information under assignments branch at <https://ako.us.army.mil/suite/page/675123>.

## Chapter 5

### Use of Specific Spectrum Dependent Systems and Access to Non-Government Frequency Bands

#### 5–1. Introduction

This chapter contains policies for Army use of spectrum allocated in the United States to the private sector on an exclusive or shared basis, as well as policies for Army use of specific civil and military RF systems crucial to the Army’s missions. Refer to the NTIA Manual to obtain the latest policies regarding Federal use of the RF spectrum.

#### 5–2. Spectrum requests in non-Government bands

The Army is authorized by Chapter 7, NTIA Manual, to use frequencies in certain non-Government bands to meet peacetime tactical and training requirements, as well as certain other bands for test-range requirements. Frequencies will be assigned by the supporting AFCs only when spectrum requirements cannot be satisfied in Government bands and when operation will not cause interference to non-Government service. The Army will have to accept interference caused by authorized non-Government users. Military use of a particular frequency in these bands will not preclude new non-Government assignments on that frequency. Specific policy concerning assignments in the above bands includes:

a. *Government use of non-Government bands.* Government users may obtain agreement from the FCC for Federal systems to use frequencies allotted to non-Government operations. Such cases must meet the following minimum criteria before submitting the request through spectrum coordination channels:

(1) The assignment must be essential for communications with non-Government entities and cannot be met through use of regularly designated Government bands. For example, an Army installation provost marshal wishes to operate in a local county or municipal police network, Army medical evacuation (MEDEVAC) helicopters wish to operate in a statewide medical evacuation network, or an installation fire department wishes to operate in a local county or city fire department network.

(2) The FCC licensee and the requesting agency have concluded a mutually approved arrangement, and the licensee has provided written authorization for the Army unit to operate on the particular frequency. The requestor will forward a copy of this authorization to the supporting AFC.

(3) The intended operation will not prohibit expansion of the non-Government services for which the frequencies are allotted and will be:

- (a) Conducted in the geographical area of the licensee.
- (b) Restricted to the purpose for which the particular frequency is authorized to the non-Government stations.
- (c) Operated in accordance with FCC rules and regulations.
- (d) Terminated if it causes harmful interference to the non-Government stations.

b. *Operation and registration of FCC-licensed stations on Army installations.* Citizens band (CB), amateur, taxi company, and other radio operators that are FCC-licensed may transmit on Army installations, but will be subject to limitations imposed by the installation commander. Limitations, if any, will be an installation regulation. The regulation must not impose limitations so severe that they unnecessarily infringe on the rights of the individual to operate a radio according to FCC rules and regulations. Users must coordinate with the installation DNEC spectrum manager, or in the case of a CTC, users must also coordinate with the G-6 prior to operation of such equipment on the installation.

### **5-3. Use of specific, commercial off-the-shelf systems**

S-D COTS obtained by use of Government purchase or impact cards must be pre-approved by the installation organization spectrum manager or CIO/G-6. In addition, the S-D COTS must comply with the policies and procedures contained in this regulation, to include obtaining approval for the DD Form 1494 at stage 4, and the MATDEV must complete an SSRA, at the appropriate level. The systems include:

a. *Nonlicensed "Part 15" or short-range devices.* A nonlicensed device is a low power intentional, unintentional, or incidental radiator or device that meets the technical specifications and policies in 47 CFR 15, containing the FCC's rules and regulations. The NTIA has adopted 47 CFR 15 as Annex K of the NTIA Manual. The term "short range device" is used by non-U.S. nations to describe RF devices that meet similar host-nation-specific low power rules. Examples of nonlicensed devices are wireless local area 802.11/a/b/g/n networks, 802.16 WI-FI systems, wireless microphones, cordless telephones, and garage-door openers.

(1) The FCC rules state that nonlicensed devices will not be deemed to have any vested or recognizable right to continued use of any given frequency and are not afforded any protection from interference (under 47 CFR 15.5). If a device covered under Part 15 causes interference to an authorized civilian or Federal radio service, the nonlicensed device must immediately cease operation. See the NTIA Manual for additional details regarding Army use of Part 15 devices.

(2) A DD Form 1494 is required for Army use of nonlicensed devices within the US&P, as well as host nations. The frequencies allotted for U.S. nonlicensed device use may not be allotted for nonlicensed use in other nations. Consequently, host nations may not approve U.S. nonlicensed-device use within their borders.

(3) Army MATDEVs undertake significant mission risk when procuring and fielding nonlicensed devices for systems intended to operate in tactical operational environments. It is highly recommended that Army activities do not use nonlicensed Part 15 or short-range devices for critical mission-command applications.

b. *General Mobile Radio Service.* The GMRS is a personal two-way voice communications service that operates on 16 frequencies in the 460-470 MHz exclusive, civil-frequency band. GMRS radios are licensed by the FCC to aid the activities of an individual and his or her immediate family. GMRS cannot be used by Government agencies under any circumstances. Title 47, United States Code, Section 95 provides regulatory guidance.

c. *Family Radio Service.* FRS is a personal two-way radio service that operates in the exclusive civil 460-470 MHz frequency band on 14 frequencies that are placed between GMRS frequencies.

(1) Army entities are authorized to purchase and operate FRS radios certified by the FCC, pursuant to Part 95, Subpart B of the FCC Rules and Regulations (see 47 CFR 95.B). Army users will be accorded the same status and privileges as non-Federal users because FRS users must share each channel and no user is assured protection from interference caused by another authorized user. The Army user assumes those limitations when this equipment is purchased and operated. Army entities may not purchase or operate FRS radios for planned communications operations that safeguard human life or property. No license or frequency assignment is required or can be obtained in the US&P. Possession and use of FRS radios outside the US&P is subject to host-nation and international regulations.

(2) Army FRS users must comply with the regulations governing the use of FRS found in 47 CFR 95.191 through 95.194, which cover eligibility, responsibility, authorized locations, communications, and FRS Units.

(3) Possession of FRS devices outside the US&P is subject to host-nation and international regulations. Army members or employees are not authorized to use FRS radios outside the US&P without host-nation approval. Additionally, FRS use must be coordinated with the appropriate ASCC spectrum management office.

(4) The installation commander may prohibit or restrict FRS use when interference to mission essential electromagnetic equipment is anticipated or to resolve a suspected interference problem.

(5) Army members and employees using FRS radios must relinquish channel use for emergency communication messages concerning the immediate safety of life or the immediate protection of property.

(6) Use only FCC-certified FRS. Any modification to the equipment to boost power, add a different antenna, or to increase the gain of the current antenna, cancels the FCC certification and voids authority. Illegal FRS equipment is subject to confiscation.

(7) FRS devices are not authorized for classified, sensitive but unclassified, mission command, squadron operational, aircraft and flight line maintenance, fire crash, explosive ordnance disposal, security forces, emergency and disaster response, tactical or training operations, and/or medical communications.

(8) Under no circumstance will FRS radios be permitted for use in controlled areas without express written consent of the installation commander and compliance with all security directives.

(9) Use of FRS cannot be protected from harmful interference. FRS radios may not cause interference to any licensed device and must accept all interference from licensed devices.

(10) The FCC may restrict use of the FRS radios if the station is located within the National Radio Quiet Zone (areas of MD, VA, and WV bounded by 39°15'N 78°30'W, 39°15'N 80°30'W, 37° 30'N 78° 30'W, and 37° 30'N 80° 30'W).

(11) Army members and employees who belong to non-appropriated fund activities and some appropriated fund activities may use FRS radios, as follows: to communicate with non-Government users during Army-supported or Army-sponsored community activities, such as scouts, Special Olympics, youth activities and sporting events; civil disasters; funeral details for deceased military veterans; and so forth. In addition, FRS radios may be used for administrative purposes when communicating in warehouses, commissaries, base exchanges, billeting areas, work crews, and the like. FRS radios may also be used on Army installations where the public is permitted entrance and in family housing areas.

*d. Amateur frequencies.* The Army will not use frequencies designated for amateur radio users within the US&P during normal peacetime conditions, except as authorized by the NTIA or FCC. Frequencies and emissions shown in table 5-1 are for use in emergency areas, when required to make initial contact with Radio Amateur Civil Emergency Services (RACES) units. Activities may also use these frequencies for communications with RACES stations on matters requiring coordination.

**Table 5-1  
Radio Amateur Civil Emergency Services frequencies**

Frequency (reference frequency)	Emission
3997 kHz (kilohertz)	6K00A3E
3998.5 kHz (3997 kHz)	3K00H3E
53.3 MHz	40K00F3E

*e. Citizens band radios.* The following policies apply to Army users of CB radios:

(1) Regulations governing the use of CB radios are found in 47 CFR 95-D. Army radio stations may use frequencies in the 26.97-27.41 MHz band, provided that:

(a) Justification indicates such an assignment is necessary for intercommunications with non-Government stations.

(b) Approval for use on post, camp, or stations is subject to local requirements and restrictions of the installation commander.

(2) Possession of CB radios outside the United States is subject to host-nation and other international regulations. CB radios are not authorized for use outside the United States without host-nation approval. COCOM spectrum directives apply, so potential users must coordinate CB radio use with the appropriate ASCC Office. For more information on CB radios, see AR 25-1.

*f. Specialized Mobile Radio service.* SMR systems are established by private commercial carriers and licensed through the FCC. SMR operators typically lease land mobile communications to commercial (for profit) entities such as taxi companies, towing services, construction companies, and so forth. Government agencies, including the Army, are authorized to use the SMR service in the 806-824 MHz, 851-869 MHz, 896-901 MHz, and 935-940 MHz land mobile bands under the following conditions:

(1) The Army will not establish an SMR system or provide an SMR service in the above-listed frequency bands. Army elements will operate only as an “end user” with an FCC-licensed private carrier on a contractual basis. Since the SMR service is not considered to be in the common carrier service, spectrum authorization to Federal agencies, including the Army, will be contingent upon the continuation of the negotiated contract with the private carrier.

(2) After negotiating a contract to satisfy an Army requirement with a private carrier, Army elements will obtain spectrum authorization through NTIA to operate in the band corresponding to that in which the private carrier has been licensed, in the geographic area, by the FCC when becoming an “end user” in the SMR service. Federal agencies, including the Army, will not request SMR frequencies from the FCC.

(3) Army users submitting applications to NTIA to obtain authorization to use SMR services will include the system name and the private carrier’s name in SFAF Item 705, and the exact number of mobile receivers in SFAF Item 341 (see MCEB Publication 7).

g. *Cellular telephone systems.* These systems operate in exclusive non-Government spectrum. U.S. national spectrum policy does not permit assignment of these frequencies to Federal Government agencies, including DOD. Therefore, frequency authorization for cellular service is a FCC and local carrier function and Army activities requiring cellular service must contract through a local carrier.

#### **5-4. Use of specific Government terrestrial radio frequency systems**

a. *Air traffic control.* Air traffic control (ATC) frequencies are used to control the movement of aircraft taxiing, departing, and approaching Army airfields and en-route controlled airspace. ATC frequencies will only be approved in spectrum internationally allocated on an exclusive basis to the aeronautical radio-navigation or aeronautical mobile-radio services. As an exception, the Federal Aviation Administration provides back up ATC communication services to the military in the 225–400 MHz frequency band.

b. *Land mobile radio systems.* Within the US&P, Land Mobile Radio (LMR) frequencies in the 138–144 MHz, 148–150.8 MHz, and the 380–399.9 MHz bands are allotted primarily for DOD use. Due to congestion by other Federal agencies and the U.S.-Mexico and U.S.-Canadian coordination agreements in the 162–174 MHz and 406–420 MHz bands, units requesting LMR frequencies are encouraged to request assignments in the 138–144 MHz bands, 148–150.8 MHz bands, and 380–399.9 MHz bands unless there are operational needs that require the use of another band. Before deploying equipment overseas, users must receive assurance from the responsible COCOM that host-nation LMR frequency authorizations are available.

c. *Specific frequencies.* The following LMR policies also apply:

(1) Coordination must be made with supporting AFCs and installation spectrum personnel to determine, prior to procurement, if new LMRs can be assigned specific frequencies.

(2) All LMR frequency assignments in the 138–144 MHz bands, 148–150.8 MHz bands, and 380–399.9 MHz bands must follow the 12.5 kHz channelization plan, and the guidance contained in MCEB–M–001–07 dated 23 March 07 and the NTIA Manual.

d. *Trunked land mobile radio systems.*

(1) A trunked LMR system is a spectrum efficient method to meet nontactical LMR operational requirements. Army installations may be the lead agency for such systems, and Army units may share use of an existing or planned system sponsored by another military Service or Federal agency. AR 25–1 provides IM and acquisition policy and procedures for these systems.

(2) LMR policy:

(a) Army units and agencies managing trunked LMR systems will allow access by other Federal agencies to the trunked system where it is operationally and technically feasible.

(b) Army validation and NTIA approval is required prior to purchase of LMR systems.

(3) Requirements for acquiring LMR systems:

(a) If the Army is the lead agency for a trunked LMR system, the Army installation or activity commander will comply with the procedures outlined in the NTIA Manual, which essentially are to obtain Federal system approval from the Spectrum Planning Subcommittee and to obtain frequency assignments for the trunked system.

(b) NTIA will not issue frequency assignments for a trunked LMR system until the Spectrum Planning Subcommittee has issued a written system review approval.

(4) Army organizations are required to submit usage reports to ASMO annually. The report will be generated by the LMR system administrator. The reported information is required to justify additional channels.

e. *Special considerations for high-frequency requests within the United States and possessions.* The use of HF for domestic, point-to-point service within the US&P is limited to the following conditions:

(1) The following policy applies specifically to situations when LMR systems are to be used for transmission of emergency, command control and alerting:

(a) Circuits will be in an operational status at all times, and there will be routine on-the-air tests to assure readiness.

(b) Frequency assignments for such circuits will be protected commensurate to the importance of the communications requirement.

(2) When required in an emergency where life, public safety, or important property is in danger and other communications means are nonexistent, temporarily disrupted, or inadequate. Spectrum managers will ensure that command user training and equipment tests on frequencies in this category are conducted.

(3) When there is a need to provide a communications system manned by qualified operators who are military reservists, Army auxiliary radio system personnel, or personnel knowledgeable in tactical or training systems. These frequencies will not be used for traffic that can be routinely handled by other means.

(4) When other telecommunications facilities, such as the Defense Communications System (DCS) and Military Affiliate Radio System, do not exist, are not practical for installation, and the use of frequencies above 30 MHz is not practical.

f. *Maritime mobile frequencies.* The 156.2475–157.45 MHz band is allocated for maritime mobile communications.

In addition to the sub-band allocated to the Government, several channels are also available for Government use as outlined in the NTIA Manual.

## **5-5. Use of commercial and military satellite systems**

Overall DOD policy and guidance for obtaining military and commercial satellite system access is described in Chairman, Joint Chiefs of Staff Instruction (CJCSI) 6250.01D, Satellite Communications. Army policies and procedures for commercial satellite systems are described in AR 25-1 and the Army's satellite communications architecture book.

*a. Commercial satellite communications.* In general, the Defense Information Systems Agency (DISA) is DOD's only authorized service provider for fixed and mobile satellite communications (SATCOM) services.

(1) All satellite terminals capable of accessing commercial satellites in the Fixed Satellite Service (FSS) must comply with the SATCOM regulations in 47 CFR 25. One of two situations will apply: Either the Government owns and operates the terminal equipment, or the terminal equipment is leased or commercially owned.

(a) If the equipment is leased or commercially owned, the commercial provider is responsible for securing certifications and the frequency assignments found in 47 CFR 25.

(b) If the equipment is DOD owned, DOD must request certification under 47 CFR 25 in order to obtain spectrum certification. When processing the DD Form 1494, submit proof of compliance with 47 CFR 25, as part of the DD Form 1494 package to ASMO. Also, request required frequency assignments from ASMO once the NTIA and the FCC have granted support.

(2) Refer to MCEB-M-008-03 for procedures and guidance regarding DOD users of Earth terminals utilizing commercial FSS outside of the US&P.

(3) Users must contact the DISA for guidance on leased FSS under the Defense Information System Network's Satellite Transmission Services-Global contract. Information may be obtained at <http://www.ditco.disa.mil/HQ/contracts/dstsgchar.asp> and from Assistant Secretary of Defense (Networks and Information Integration) Memorandum: Policy for Planning, Acquisition, and Management of Commercial Satellite Fixed Satellite Communication Services, dated 19 December 2008.

(4) Mobile Satellite Service (MSS) provides communication capabilities for mobile Earth stations by means of one or more space stations. Refer to Assistant Secretary of Defense for Command, Control, Communications, and Intelligence (ASD (C3I)) Policy Letter on Managing MSS, dated 29 August 2001. (The ASD (C3I) is now the DOD CIO.)

(5) Since DOD is considered a user, the service provider is responsible for all spectrum supportability issues, including host-nation coordination.

*b. International Maritime Satellite.*

(1) The International Maritime Satellite (INMARSAT) is a commercial satellite system, operating in the MSS using geosynchronous satellites. It is subject to international law and treaty and can only be used for peaceful purposes. The Army's use of INMARSAT is allowable for emergency communications in support of disaster relief, humanitarian, and peacekeeping missions. The satellite system uses a satellite link to interface with terrestrial telephone systems or other INMARSAT terminals.

(2) Neither a spectrum certification nor frequency assignments are required for INMARSAT operations. However, the NTIA Manual provides other policies and procedures for Federal INMARSAT terminal use

*c. Iridium.* Iridium is a commercially available, satellite-based, global, wireless, personal communications network designed to permit any type of narrow-band wireless transmission, by operating in the MSS using a non-geosynchronous satellite constellation.

(1) In accordance with DOD CIO policy, Iridium is approved for use as a commercially 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.

(2) Users must contact ASMO and DISA for guidance and refer to DISA Circular 310-130-1 for Iridium provisioning procedures.

*d. Department of Defense satellite communications.* The procedures delineated in The 2008 Army Satellite Communications Architecture Book apply to Army use of military and commercial SATCOM systems such as the Defense Satellite Communications System, ground mobile force, military strategic and tactical relay (MILSTAR) system, and Global Broadcast Service.

## **5-6. Use of specific military spectrum dependent systems**

*a. Joint Tactical Information Distribution System/Multifunction Information Distribution System.* JTIDS/MIDS, a communication component of the Link 16 data-exchange network, is a secure, jam-resistant, tactical, radio navigation and communications system that uses the JTIDS/MIDS terminal as its communications component. It operates in the 960-1215 MHz band over 51 frequencies with the identification, friend or foe 1030 MHz and 1090 MHz RF frequencies notched out.

(1) Frequency assignments and operations must be in strict adherence with CJCSI 6232.01D. Units with a secure

sockets layer client certificate can access this at [http://www.dtic.mil/cjcs\\_directives/cjcs/instructions.htm#6000/](http://www.dtic.mil/cjcs_directives/cjcs/instructions.htm#6000/). Additional planning guidance may be found in the JTIDS/MIDS Spectrum Users Guide, available at <https://totn.acc.af.mil/>.

(2) Due to increased reliance on this portion of the spectrum, the DOD and the Department of Transportation entered into a memorandum of agreement to protect continued use of this vital spectrum. The full text of the agreement is contained in Section 4.3.17 of the NTIA Manual.

*b. Unmanned aerial vehicle frequencies.*

(1) The Army will comply with OASD policy mandating the Ku-Band Common Data Link. (See Under Secretary of Defense for Acquisition, Technology and Logistics Memorandum: Unmanned Aircraft Systems (UAS) Spectrum Policy Guidance, dated 14 April 2006.)

(2) A wide variety of terrestrial and airborne military RF systems share Ku-Band spectrum resources, and Ku-Band frequency allocations differ on a global basis. Therefore, Army SSRAs for RF systems using Ku-band will quantify the necessary conditions to ensure mutual electromagnetic compatibility with other military, Federal, and civil spectrum systems.

*c. Unmanned ground vehicles.*

(1) Unmanned ground vehicle (UGV) links using spectrum allocated on a primary or co-primary basis for the mobile radio service will receive regulatory protection.

(2) Legacy UGV links in frequency bands allocated to the Industrial, Scientific and Medical radio service will not receive regulatory protection and will meet the technical criteria and policies in Annex K of the NTIA Manual.

(3) UGVs will comply with the specifications of the Office of the Under Secretary of Defense (OUSD) for Acquisition, Technology and Logistics Memorandum: Joint Architecture for Unmanned Systems (JAUS), available at <http://openjaus.com/>.

*d. Performing electronic attack and counter radio-controlled improvised explosive device electronic warfare operations, in the United States and Canada for tests, training, and exercises.*

(1) All electronic attack (EA) and CREW use is on a noninterference basis to other radio services and subject to immediate shutdown if operations cause interference. Approved DD Form 1494 and frequency assignments do not constitute approval to conduct EA operations (for example, jamming or chaff drops) without prior notification, coordination, and approval.

(2) EA frequency clearances are granted as follows:

(a) US&P: The NTIA recognizes Chairman, Joint Chiefs of Staff Manual (CJCSM) 3212.02B as the official guidance for frequency clearance procedures in conducting EAs.

(b) Army testing and other use of CREW devices will follow the guidance contained in CJCSM 3212.02B.

(c) AFC Arizona, AFC White Sands Missile Range, and AFMO-US&P may provide local clearances that limit EA and CREW devices to certain frequency bands under specified conditions, such as power, orientation or time-of-day restrictions. EA or CREW clearances requiring U.S. national level coordination with the other Military Services and Federal Government agencies are issued by ASMO.

(d) Non-US&P: Overseas applicants will submit EA requirements according to directives of combatant commands and/or host-nation agreements. The combatant commander, with the exception of USNORTHCOM, is responsible for all military use of frequencies, including EA, within his or her geographic AOR.

(3) Users of EW and CREW equipment must comply with local EA frequency clearances, host-nation agreements, COCOM directives, MCEB policy and procedures, the guidance received from the DD Form 1494 process, and any other guidance provided by the ASM to the MATDEV.

## **Chapter 6 Consequences and Risks of Noncompliance**

### **6-1. Introduction**

The development and employment of spectrum-dependent systems without a determination of spectrum supportability risks denial of use by a host-nation and places combat capabilities at risk through the introduction of harmful interference into the battle space. Furthermore, the DOD, Army, U.S. national spectrum regulators, and host-nation spectrum authorities can apply a variety of punitive methods in cases of noncompliance of this regulation. It is vital from both operational and regulatory perspectives, that Army personnel are cognizant of the ramifications of developing and fielding systems that cannot be fully supported by all spectrum environments.

### **6-2. Oversight by the Chief Information Officer, Command, Control, Communications, and Computers**

AR 70-1 designates the CIO/G-6 as a member of the ASARC, and 40 USC 1401 (The Clinger-Cohen Act of 1996) gives the CIO/G-6 the responsibility to recommend the continuation, modification, or termination of Army programs having a command, control, and communications, computers and information technology impact on the Secretary of the

Army. The Army CIO/G-6 will not concur with the continuation, or modification, of Army spectrum-dependent programs unless those programs have fully complied with the provisions of chapters 1 through 5 of this regulation.

### **6-3. Withholding of funds**

*a.* The Army will not release, obligate, or expend funds for the acquisition, research, development, production, purchase, lease, or use of weapon systems, information management systems, EW systems, CREW devices, or other systems that require use of the electromagnetic spectrum until:

(1) The Army CIO/G-6 has provided a favorable SSD based upon at least one comprehensive spectrum supportability assessment.

(2) A DD Form 1494 has been approved by the NTIA.

(3) The ASMO receives an approved NTIA Certificate of Spectrum Support (excluding jamming systems).

*b.* Sources of funding that are subject to withholding for noncompliance with this regulation include those stated in DODI 5000.02, AR 70-1, and COCOM-initiative funds.

### **6-4. Notice of apparent liability**

The FCC regulations and the provisions of the NTIA Manual are found in 47 CFR 300. Therefore, FCC and NTIA provisions, rules, and technical standards are mandatory for Army civilians, military, and contractor personnel. In general, punitive measures resulting from violations of the CFR are applicable to intentional and unintentional instances of noncompliance of FCC rules and the NTIA Manual. Refer to 47 USC 503 regarding punishment of any person that willfully or repeatedly fails to comply with any of the provisions stated.

### **6-5. Host-nation denial of authorization to operate**

The United States accepts its international treaty obligation, recognizing that spectrum regulation is a sovereign national right. Failing to meet spectrum supportability standards will result in that host nation denying U.S. forces the permission to operate within their sovereign territory. Such a denial results in an inability to train and stage for combat operations. Host-nation denial of supportability also affects Army organizations that may be operating adjacent to a friendly nation, such as along a border.

*a.* Army personnel will comply with international and host-nation spectrum-related laws, regulations, and technical standards.

*b.* Army personnel will fully assist host-nation authorities in identifying possible U.S. sources of interference to host-nation S-D systems. Army personnel will comply with host-nation requests to cease operation of any S-D device suspected, or found to be causing interference to host-nation S-D devices.

*c.* Incidents involving mutual interference between Army and host-nation S-D devices will be reported as a matter of priority through Army components to the COCOM spectrum manager and the ASM.

## **Appendix A References**

### **Section I**

#### **Required Publications**

Unless otherwise stated, all publications are available at <http://www.apd.army.mil/>. Department of Defense regulations are available at <http://www.dtic.mil/>. Chairman of the Joint Chief of Staff Instructions are available at <http://www.dtic.mil/doctrine/cjcs.htm/>. Defense Information Systems Agency circulars are available at <https://ca.intranet.disa.mil/pubs/circulars/circular.html/>. The Code of Federal Regulations and the U.S. Code are available at <http://www.gpo.gov/fdsys/>. All other publications are available at <https://acc.dau.mil/communitybrowser.aspx/>.

#### **AR 10–87**

Army Commands, Army Service Component Commands, and Direct Reporting Units (Cited in paras 2–12, 2–14.)

#### **AR 25–1**

Army Knowledge Management and Information Technology (Cited in paras 2–14*a*, 5–3*e*(2), 5–4*d*(1), and 5–5.)

#### **AR 70–1**

Army Acquisition Policy (Cited in paras 2–2*f*, 2–3*l*, 3–1*b*, 3–4*h*, 6–2, and 6–3*b*.)

#### **DA Pam 25–1–1**

Information Technology Support and Services (Cited in paras 3–4*c*, 3–4*d*(5), 3–4*f*(2).)

#### **DA Pam 70–3**

Army Acquisition Procedures (Cited in paras 2–1*h*, 3–4*h*, and C–4*b*(2).)

#### **CJCSI 6232.01D**

LINK–16 Spectrum Deconfliction (Cited in para 5–6*a*(1).) Accessible from .mil or .gov sites only, at [https://ca.dtic.mil/cjcs\\_directives/index.htm/](https://ca.dtic.mil/cjcs_directives/index.htm/)

#### **CJCSI 6250.01D**

Satellite Communications (Cited in para 2–8*j* and 5–5.) Accessible from .mil or .gov sites only, at [https://ca.dtic.mil/cjcs\\_directives/index.htm/](https://ca.dtic.mil/cjcs_directives/index.htm/)

#### **CJCSM 3212.02B**

Performing Electronic Attack in the United States and Canada for Tests, Training, and Exercises (Cited in para 5–6*b*.)

#### **DISA Circular 310–130–1**

Submission of Telecommunications Service Requests (Cited in para para 5–5*c*.)

#### **DODI 4650.01**

Policy and Procedures for the Management and Use of the Electromagnetic Spectrum (Cited in paras 1–6*a*, 2–1*a*, 3–3*b*, 4–2*c*(5), and C–1.)

#### **DODI 5000.02**

Operation of the Defense Acquisition System (Cited in para 6–3*b*.)

#### **Allied Communications Publication (ACP) 190, U.S. Supplement–1(C)**

Guide to Frequency Planning (Cited in para 4–3*c* and 4–5*b*.)

#### **NTIA Manual**

Manual of Regulations and Procedures for Federal Radio Frequency Management (Cited in paras 1–6*a*, 4–3*e*, 4–5*a* and *c*, 5–1, 5–2, 5–3*a*, 5–4*c*, *d*, and *f*, 5–5*b*, 5–6*a* and *c*, 6–4, and C–1*b*.) (Available at: <http://jcs.dtic.mil/j6/cceb/acps/>)

#### **47 USC**

Telegraphs, Telephones and Radiotelegraphs (Cited in para 1–6*d* and 5–3*b*.)

## **Section II Related Publications**

### **AR 1-1**

Planning, Programming, Budgeting, and Execution System

### **AR 5-12**

Army Management of the Electromagnetic Spectrum

### **AR 11-2**

Manager's Internal Control Program

### **AR 11-7**

Army Internal Review Program

### **AR 25-6**

Military Affiliate Radio System (MARS) and Amateur Radio Program

### **AR 71-9**

Warfighting Capabilities Determination

### **AR 95-2**

Airspace, Airfields/Heliports, Flight Activities, Air Traffic Control, and Navigational Aids

### **AR 385-10**

The Army Safety Program

### **FM 6-02.70**

Army Electromagnetic Spectrum Operations

### **TRADOC Regulation 71-20**

Concept Development, Capabilities Determination, and Capabilities Integration (Available at <http://www.tradoc.army.mil/tpubs/regs/tr71-20.pdf/>.)

### **The 2008 Army Satellite Communications Architecture Book**

Explaining requirements and capabilities from present to foreseeable future

### **ASD (NII) Memo**

Policy for Planning, Acquisition, and Management of Commercial Satellite Fixed Satellite Communication Services, dated 19 December 2008

### **ASD (C3I) Memo**

Policy Letter on Managing MSS, dated 29 August 2001

### **OUUSD (AT&L) Memo**

Joint Architecture for Unmanned Systems (JAUS) (Available at <http://openjaus.com/index.php/>.)

### **USD (AT&L) Memo**

Unmanned Aircraft Systems (UAS) Spectrum Policy Guidance, dated 14 April 2006

### **CJCSI 6212.01**

Interoperability and Supportability of Information Technology and National Security Systems

### **Defense Acquisition Guidebook**

Chapter 7.6.3

### **E3 and Spectrum Management**

Assessment Guide for Operational Testing

**Findings and Recommendations of the Study**

Early Consideration of Spectrum Supportability in Spectrum Dependent System Acquisitions (Available at <https://acc.dau.mil/>.)

**JAUS**

Joint Architecture for Unmanned Systems (Available at <http://openjaus.com/support/jaus-documents/>.)

**JTIDS/MIDS**

Spectrum Users Guide Available at <https://totn.acc.af.mil/>

**Military Communications–Electronics Board (MCEB)**

Administrative Procedures Manual Available from the MCEB, Room 1E833, Pentagon, Washington, DC 20310

**MCEB Publication 7**

Standard Frequency Action Format (SFAF)

**MCEB Publication 8**

Standard Spectrum Resource Format (SSRF)

**MCEB–M–008–03**

DOD Spectrum Procedures for the Use of Commercial Satellite Earth Terminals Outside the United States and Possessions

**MIL–STD–188–100**

Common Long Haul and Tactical Communications System Technical Standards

**MIL–STD–461F**

Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment

**MIL–STD–464A**

Electromagnetic Environmental Effects Requirements for Systems

**MIL–STD–469B**

Radar Engineering Interface Requirements, Electromagnetic Compatibility

**MIL–STD–2169B**

High Altitude Electromagnetic Pulse (HEMP) Environment

**OMB Circular A–11**

Preparation, Submission, and Execution of the Budget

**47 CFR 300**

Manual of Regulations and Procedures for Federal Radio Frequency Management

**47 CFR 25**

Satellite Communications

**47 CFR 95**

Personal Radio Services

**47 CFR 95.B**

Family Radio Service

**47 USC 503**

Forfeitures

**40 USC 1401**

The Clinger-Cohen Act of 1996

**ITU Radio Regulations**

ITU, Geneva, Switzerland Available at <http://www.itu.int/>

### **Section III**

#### **Prescribed Forms**

Unless otherwise indicated, DD forms are available on the Office of the Secretary of Defense Web site (<http://www.dtic.mil/whs/directives/infomgt/forms/index.htm>).

#### **DD Form 1494**

Application for Equipment Frequency Allocation (Prescribed in paras 2-3, 2-18, 3-4, 4-2, 5-3, 5-5, 5-6, 6-3, C-3, C-4, D-4, and table 3-2.)

### **Section IV**

#### **Referenced Forms**

Unless otherwise indicated, DA forms are available on the Army Publishing Directorate (APD) Web site (<http://www.apd.army.mil>).

#### **DA Form 11-2**

Internal Control Evaluation Certification

#### **DA Form 2028**

Recommended Changes to Publications and Blank Forms

## Appendix B Area Frequency Coordinators

### B-1. Area frequency coordinators' areas of responsibility

Areas of responsibility for area frequency coordinators and Army Frequency Management Offices are shown in figure B-1.

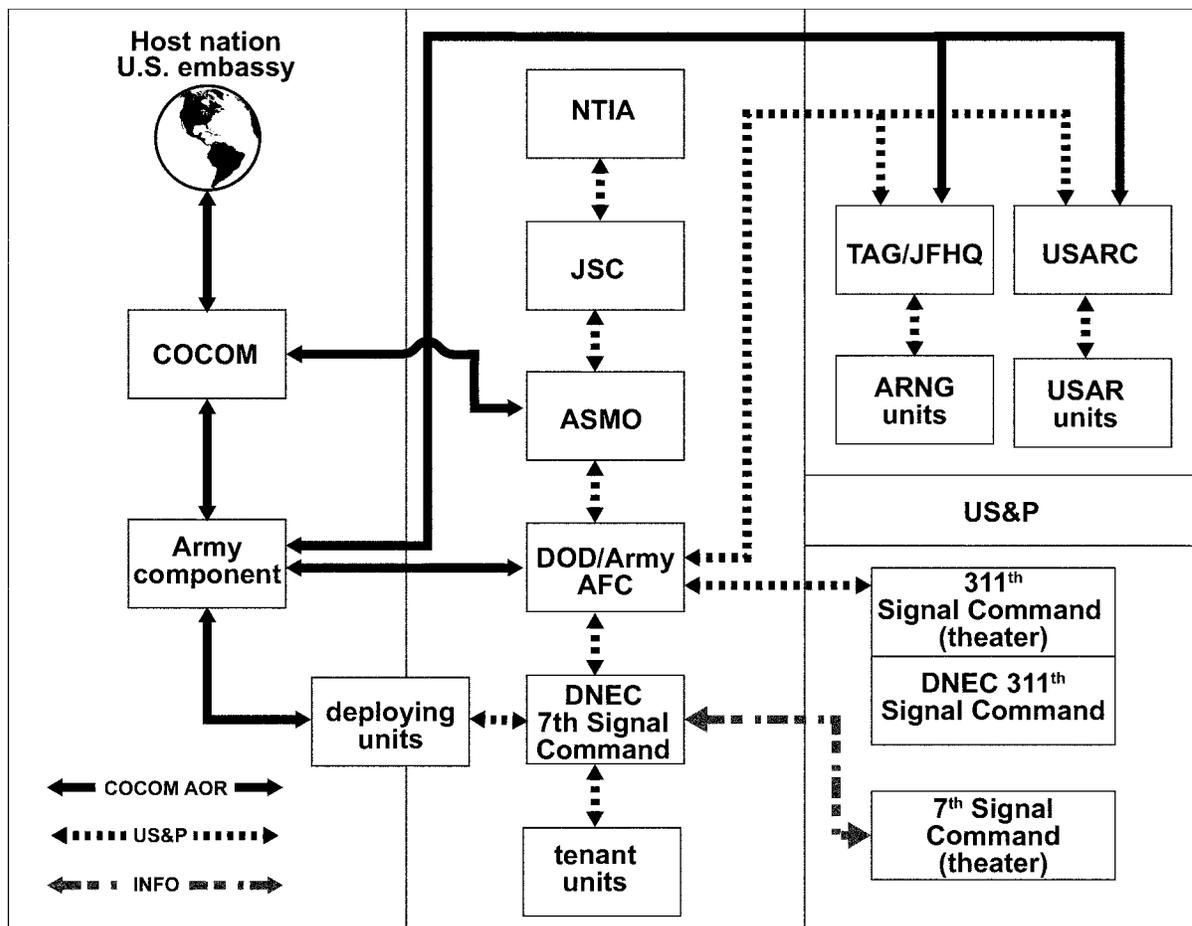


Figure B-1. Areas of responsibility for area frequency coordinators

### B-2. Addresses and areas of responsibility for area frequency coordinators

Here is a list of contact information and AORs:

*a.* Army Frequency Management Office, Continental United States Fort Sam Houston, TX 78234-5032. Telephone: (210) 221-2820, DSN: 471-2820/FAX:-2844. AOR: Alabama, Arkansas, California (less units located on or conducting training of the Army National Training Center, Fort Irwin, CA), Colorado (less the area west of 108<sup>0</sup>W), Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland (less certain areas which are included in the Military District of Washington), Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas (less Fort Bliss and U.S. Territory within 240-kilometer radius of White Sands Missile Range), Utah (less the area east of 111<sup>0</sup>W), Vermont, Virginia (less certain areas which are included in the Military District of Washington), Washington, West Virginia, Wisconsin, Wyoming, Puerto Rico, and the Virgin Islands.

*b.* Area Frequency Coordinator, Entire State of Arizona, Fort Huachuca, AZ 85613–6000. Telephone: (520) 538–6423 or -6424, DSN: 879–6423 or 6424, FAX: 879–8525.

*c.* Area Frequency Coordinator, White Sands Missile Range, New Mexico 88002–5526. Telephone: (505) 678–5417, DSN: 258–5417, FAX: 258–5281. AOR: State of New Mexico, Texas west of 104W, and areas of Utah and Colorado between 108N and 111N West.

*d.* Deputy Chief of Staff for Information Management, Military District of Washington, ANMY–IMO–O, Fort Lesley J. McNair, Washington, DC 20319–5050. Telephone: (202) 475–2799, DSN: 335–2799/FAX:-2767. AOR: Army installations and activities within the District of Columbia; Arlington and Fairfax Counties in Virginia; Montgomery and Prince George’s counties in Maryland; Fort Ritchie, MD; Fort Meade, MD; and Fort A.P. Hill, Fort Belvoir, and Vint Hill Farms, VA.

*e.* Commander, U.S. Army, Pacific (USARPAC), APIM–OEO Fort Shafter, HI 96858–5410. Telephone: (808) 477–1054, DSN: 477–1054/FAX:-0691. AOR: Alaska and Hawaii.

*f.* Assistant Chief of Staff/CIO G–6 National Training Center Building, 287 Barstow Road, Fort Irwin, CA 92310. Telephone: (760) 380–3035/3872, DSN: 460–3035/3872. AOR: 175-mile radius, geographical extent of Fort Irwin, CA.

*g.* Assistant Chief of Staff/CIO G–6, Joint Readiness Training Center Building, 330 Fort Polk, LA 71459. Telephone: (337) 531–2701, DSN: 863–2701. AOR: Geographical extent of Fort Polk, LA.

## Appendix C Army Spectrum Supportability Risk Assessment Writing Guide

### C-1. Introduction

For all S-D systems, DOD components will determine if there will be sufficient spectrum to support operation of the S-D system during its life cycle.

- a. In order to effect design and procurement decisions, DOD components will, in accordance with DODI 4650.01:
  - (1) Identify spectrum-related risks as early as possible via an SSRA.
  - (2) Review these assessments at acquisition milestones.
  - (3) Manage the risks throughout the system's life cycle.
- b. The security classification or operational function of an S-D system will not exempt a system from completing the required elements of the ASSP. Spectrum requirements for Special Access Programs and rapid fielding initiatives (RFI) will be coordinated directly with the Director, ASMO, in the appropriate secure venues.
- c. This guide is written for all Army CBTDEVs and MATDEVs, as well as acquisition professionals, who develop, acquire, integrate, or operate equipment dependent on the use of, or requiring access to, the EMS. The intent is to provide detailed guidance on how to assure spectrum access for Army developed S-D systems. The SSRA outline should be tailored for the acquisition, whether it is a singular S-D system, or a "family of systems" (FoS) or "system-of-systems" (SoS). Only one integrated SSRA will be prepared and submitted to the ASMO, in support of the upcoming MS or applicable decision (such as an in-process review (IPR), when required). In addition to a "title page" and table of contents, a typical SSRA should include the sections described in the format below.

### C-2. Section 1: Introduction

The SSRA Introduction should include:

- a. A detailed system description.
- b. The intended operational employment.
- c. A description of one or two sentences, addressing why this SSRA is being submitted and explaining what MS or acquisition decision point is being supported.
- d. A summarizing table, when applicable, shown below in table C-1, where "YY" is a place holder.

**Table C-1**

**Table YY: System description and deployment**

System component	Materiel readiness level	S-D (Y/N)	Stationary deployment	Vehicle-mounted deployment	Personnel-mounted deployment	Other deployment	Training requirement

Notes:

<sup>1</sup> Add any notes here.

### C-3. Section 2: Spectrum considerations

SSRA spectrum considerations should include:

- a. Section 2.1 of the SSRA: Program spectrum requirements and availability—
  - (1) Address the system spectrum requirements and the anticipated availability for all S-D equipment that makes up the system. Determine the following technical parameters of the system, based largely on recommended technology: Application: operation only at fixed sites, during motion, transportable; host platform (for example, dismounted Soldier, airborne, TOC, and so forth); frequency range of operation; required throughput; required radiated bandwidth; receiver selectivity; receiver criteria required for desired operation; transmitter power output; antenna gain and characteristics; anticipated host nations in each COCOM (for example, United States only, and envisioned host nations in all COCOM AORs).
  - (2) For a FoS or SoS, identify the number and types of radios, channel requirements, and so forth, that are needed to provide for undegraded operation. Table C-2, below, provides an example of how to summarize the system spectrum requirements.

**Table C-2**  
**Summary of system-spectrum requirements**

<b>System</b>	<b>Radio</b>	<b>Waveform</b>	<b>Frequency band(s)</b>
The system may be a composite of multiple sub S-D equipments.	Identify the specific radio or S-D equipments and channel requirements.	Identify all the waveforms intended, necessary to support the operating requirements.	Identify the frequency bands intended, necessary to support the operating requirements.

*b.* Section 2.2 of the SSRA: Regulatory requirements—

(1) In seeking spectrum access, the MATDEVs and the PMs must address compliance of the S-D system with U.S. national and international tables of frequency allocation, as well as, agreements reached at the International Telecommunication Union and a determination of the compliance of the system with pertinent national and international technical standards.

(2) Permission to access the RF spectrum is an internationally recognized sovereign national privilege that must be granted by the host nation and can be denied or revoked. The DOD uses the DD Form 1494 to provide host-nation spectrum authorities the technical parameters of U.S. military RF systems for approval to radiate within their borders. Note that the DD Form 1494 is submitted for each individual S-D system and not for a hosting platform, such as an Abrams tank.

(3) EW systems, including CREW equipment, for example, do not receive stage-4 certification, and thus are not forwarded for host-nation coordination during the development process.

(4) The MATDEV or PM will use a DD Form 1494 to forward the system's basic radio frequency parameters and operating locations in each phase of the acquisition process to ASMO. After review, ASMO assigns a unique "J/F 12" tracking number to each DD Form 1494, and then forwards the DD Form 1494 to a Joint process to obtain DOD, national, and international spectrum approvals. DD Form 1494 information, deemed releasable by designated officials during the later phases of the acquisition cycle, is provided to host nations for comment by COCOM spectrum offices. ASMO will collect, and forward to the MATDEV, the Joint guidance, as well as U.S. national and host-nation spectrum supportability comments.

(5) For systems under development without completed DD Form 1494 spectrum approval, MATDEVs will:

(a) Provide ASMO with separate DD Forms 1494 for each S-D system that is part of the acquisition, containing information that is releasable at the appropriate classification level to each envisioned host nation within a COCOM AOR.

(b) Determine countries for likely operational deployment within each COCOM AOR.

(c) Determine the internationally recognized radio service of all pertinent spectrum-dependent systems. (See Chap 6, NTIA Manual, the "red book.")

(d) Obtain the table of frequency allocations for each intended deployment host nation and determine if the allocations table of each host nation allows the radio system service access across its tuning range. If the table of frequency allocations for a particular host nation is not available in English, determine the allocations and relevant host-nation footnotes for the relevant ITU region as indicated in "International Table" column of Chapter 4 of the NTIA Manual.

(e) Determine the relative regulatory status, for example, co-primary or secondary, assigned to the radio service by the host nation's table of frequency allocations.

(f) Identify portions of the equipment's tuning range supported by each host nation's table of frequency allocation.

(g) Obtain national comments on U.S. military systems of the same radio service and with similar technical characteristics submitted for host-nation spectrum approval by accessing the DOD's Host Nation Spectrum Worldwide Database Online (HNSWDO), or reviewing other co-band approved DD Forms 1494. (If the PM does not have ready access to HNSWDO, contact the ASMO.)

(h) Identify other U.S. military, U.S. civil and non-U.S. co-band, adjacent-band, and harmonically related systems likely to be co-site or in close proximity by querying, for example, DOD equipment databases (such as the Joint Spectrum Center Data Access Web Server or the appropriate NTIA database).

(i) Ensure that the functional solution analysis identifies operational parameters that the MATDEVs can use to define spectrum parameters.

(j) Define initial spectrum requirements, frequency bands, and operational areas.

(k) Define the operational EME and include in the EMC consideration section.

(6) For systems with existing spectrum approval to operate, such as with a current, approved DD Form 1494 for stage 4, MATDEVs will:

(a) Obtain from ASMO copies of the approved DD Forms 1494 containing the system's technical parameters, as well as U.S. and host-nation spectrum supportability comments.

(b) Identify additional host nations of interest that are not included on any existing DD Form 1494.

(c) Determine if there have been changes to the U.S. national or host-nation tables of frequency allocation in the system's frequency bands.

(d) Identify new, major, DOD or civil telecommunication systems allowed to operate in the same frequency band, or adjacent frequency bands.

(e) Determine if there have been changes to any of the system's technical parameters and if these changes are included in the existing DD Forms 1494.

(f) Compare the S-D technical parameters of the system with any newly adopted national or international technical standards.

(7) Table C-3, below, provides an example of a typical format for use in the SSRA to summarize the regulatory information. In the case where the system is, in fact, a FoS or a SoS, include ALL of the S-D systems that are, or will be, integrated into the FoS or SoS. For a FoS or SoS, include, as noted for the "stage or status" column, the acquisition program under which the S-D system is being procured and POC information.

**Table C-3**  
**Summary of regulatory information**

J/F-12#	Nomenclature	Stage or status	CONUS	OCONUS
Provide the Joint Forces number here.	Provide the system nomenclature here.	Provide the stage as 1, 2, 3, or 4. For the status, use either "approved date," or "in-process at the ESG, awaiting MCEB guidance."	Provide a yes, no, or probability (high, medium, low) of obtaining necessary frequencies for nondegraded operation. Provide full MCEB guidance, operating conditions, and/or restrictions as a referenced file or report.	Provide a yes, no, or probability (high, medium, low) of obtaining necessary frequencies for nondegraded operation regarding OCONUS, host-nation approval status. Provide expanded status (which COCOM(s) have it) and guidance where the system or similar system has host-nation approval, for what countries, and the guidance or restrictions as a referenced file or report. Information may be obtained with ASMO support and from HNSWDO.

c. Section 2.3 of the SSRA: Operational requirements—

(1) Identify and quantify the mutual interactions among the candidate system, within itself, and other Army and U.S. military RF systems in the operational environment. Identify suggested mitigations for possible instances of EMI. Combat developers will ensure that the following data that drives spectrum requirements is provided to the materiel developer:

(a) The intended radio frequency propagation environment; for example, urban, jungle, desert, Earth-to-space, space-to-space relays, or ground-to air.

(b) The kind and quality of data or information transmitted; for example, voice-recognition speech, wideband digital data, and high-quality imagery.

(c) The range of distances over which the transmission will be sent; for example, single-digit, km, 10s of km, and 1,000s of km.

(d) The echelons involved; for example, corps-to-brigade, intra-company, and platoon-to-division.

(e) Developed operational scenarios, closely coordinated with the Signal Center, Frequency Spectrum Proponent Office, the TRADOC capability manager, and other Army schools and centers, as appropriate.

(2) The materiel developer can use the above information, as well as knowledge of technological trends, envisioned operational areas and the intended operational mission, to better define the initial spectrum requirements, such as the desired frequency bands, required transmitted bandwidths, and antenna type.

(3) Additionally, the CBTDEV, MATDEV, or PM should:

(a) Review the baseline mission for the concept of operations, focusing on deployment of the mission's assets and to identify the mission-deployment plans (such as COCOM, CONUS, test and training sites).

(b) Determine the spectrum requirements of each operational mission in coordination with mission planners, including technical parameters and operational information, such as: Operational Frequency Range (bandwidth, power, and so forth; and radio service (fixed or mobile); location and operating radius; route, and so forth).

(c) Examine spectrum supportability of each system or equipment in use individually on the basis of host-nation spectrum policy and supportability comments for similar U.S. RF systems; identify the intended area of operation and the host-nation spectrum allocation and regulatory status. Host-nation comments can be obtained from the COCOM in coordination with ASMO and the Joint Staff or from pertinent DOD databases, such as HNSWDO.

(d) Examine spectrum supportability of each system or equipment in use individually on the basis of spectrum availability; review existing DD Forms 1494 for similar systems in the required frequency range and operating locations.

(e) Examine spectrum supportability of the aggregate mission assets in theater by taking into account spectrum availability.

(f) Quantify the regulatory and technical impacts of incremental, evolutionary, or spiral development changes to the

system’s RF parameters; contact ASMO for guidance regarding the necessity of forwarding a “note to holders” to document and request approval for the new RF parameters.

1. Update any previous, detailed SSRAs to quantify interactions with co-band and adjacent band RF systems.
2. For systems located on platforms, quantify the potential effects of the new RF parameters on other co-sited RF systems.

3. Identify and implement techniques to mitigate potential interference cause by the new RF parameters.

(g) Forward to ASMO a “note to holders” document identifying the new host nations that are not included in the DD Form 1494. Determine if the system may be required to support USARNORTH, the Army element of US-NORTHCOM, HLD, or DSCA incidents; coordinate spectrum requirements through USARNORTH.

d. Section 2.4 of the SSRA: Technical component—

(1) The technical component quantifies the mutual interactions between a candidate system and other, co-band, adjacent band and harmonically related RF systems, including the identification of suggested methods to mitigate the effects of possible mutual interference.

(2) For the initial and pre MS B, this may be accomplished through analysis; as the acquisition progresses through the DAS phases, this should also progress through modeling and simulation and finally be performed with the acquisition operating in the defined operational EME.

(3) Identify any proposed frequencies that overlap, or are in an adjacent band to, other systems in deployment or mission areas; determine if these frequencies need to be used in the same location at the same time in accordance with the concept of operations.

(4) Determine the RF parameters of other S–D systems that can operate simultaneously within the AOR-based, current, concept of operations and “Army-allocated” resources and quantify the mutual interactions between all S–D systems.

(5) Construct and evaluate plausible interference scenarios that involve identified frequencies in the case of overlapping frequency usage and potential interference to a system with primary use.

(6) Obtain detailed information about the mission profile as well as detailed information of in-theater RF equipment, such as power output, antenna gain, bit rate, emission requirements, modulation (Waveforms), receiver selectivity, and frequency dependent rejections.

(7) Determine through technical analysis if spectrum sharing is plausible using techniques such as operational frequency reuse, spatial separation, directional antennas, time sharing, and etc.

(8) Consider options if spectrum supportability cannot be obtained and all readily implementable regulatory, technical, operational interference mitigation techniques have been used without success; options may include changing equipment parameters reducing emissions bandwidth requirements, time share the environment, and changing operating locations.

e. Section 2.5 of the SSRA: Issues, Ramifications, and Mitigation Measures. Identify action(s) necessary should the required spectrum be unavailable and/or, when the system is a FoS, there is an unavailability of the desired spectrum dependent equipment to be integrated. Summarize current risk assessment in a table or stoplight chart. Table C–4 shows a chart template.

**Table C–4**  
**Template for the spectrum supportability risk-assessment stoplight chart**  
**Relative rating of E3 issues<sup>1</sup>**

Issue	Green	Yellow	Red
1.			
2.			
3.			
4.			
5.			
6.			

Notes:

<sup>1</sup> Additionally, raters must provide a brief summary of, and rationale for, the rating of each issue.

**C–4. Section 3: Electromagnetic compatibility considerations**

a. Section 3.1 of the SSRA: The E3 Program. DA Pam 70–3 defines the requirement that each Army acquisition must establish an Army E3 Program. The Army E3 Program includes all processes used by acquisition personnel to successfully design, specify, test, evaluate, field, and maintain spectrum-dependent materiel systems in all expected electromagnetic environments. The parts of the E3 program focusing on spectrum supportability include the assessment of the system’s EMC and EMI in the intended operational environment. The program includes:

- (1) Identification through E3 tests and analysis that the system will operate, without affecting or being affected by, the intended operational EME, as required.
  - (2) Development of supporting documentation, as applicable: E3 Test reports, TEMPEST report, JTIC certification, similar system lessons learned reports.
  - (3) An impact report on the fielding or integration of EA systems within the system or the AOR.
- b.* Section 3.2 of the SSRA: E3 Analyses and Tests Performed, Summarized.
- (1) Table C-5 shows the type of E3 actions required in each DAS phase.

**Table C-5**  
**Electromagnetic and environmental effects actions that are required in Defense Acquisition System phases**

DAS phase	Materiel solution analysis	Technology development	System development and demonstration	Production and deployment	Operations and support
<b>E3 program</b>	Define operational EME, address in SSRA	Address E3 in JCIDS documents, TEMP, SSRA	Review and update EME and E3 test requirements, address in JCIDS documents, TEMP, and SSRA	Review and update EME and E3 test requirements, address in JCIDS documents, TEMP, and SSRA	Monitor changes to system or AOR for spectrum impacts

- (2) Further details regarding the Army's E3 program may be found in DA Pam 70-3.
- (3) As early as practical in the DAS, the MATDEV should:
  - (a) Perform an initial EMC analysis to identify major anticipated electromagnetic interactions that require further detailed study. The analysis should use, as a minimum, the technical parameters for the candidate system and the technical parameters of systems expected to be in the candidate's operational RF environment. The technical parameters of these systems may be taken from appropriate system characteristics or from frequency assignment databases.
  - (b) Evaluate the initial system RF parameters with respect to U.S. national and appropriate international spectrum standards and develop plans to bring noncompliant systems into conformance.
  - (c) Determine the expected complement of radio frequency dependent systems for other Army and DOD units anticipated to be in the system's operating environments. Consider that the system may have to operate without experiencing or causing interference as part of the Army's response to domestic disaster relief and public protection scenarios in support of State and local civil authorities in the United States.
- (4) Perform a more detailed EMC analysis quantifying the mutual interference between the candidate system and the RF systems used by other Army and DOD units in the operational environment, for example within a Brigade Combat Team (BCT) or during convoy missions. Inputs to this EMC analysis include the free-space path loss model and system parameters obtained from databases. The results will be expressed in operational terms; for example, the frequency-distance separation requirements between a transmitter and a receiver that must be maintained in order to achieve mutual compatibility.
- (5) The above data, analysis, and information should be reported in the SSRA and refined as the SSRA progresses through the initial to the final SSRA. Data should likewise progress from calculated to measured, as with the data required in the DD Form 1494 stages. The goal of these analyses are to quantify the mutual, operational degradation caused by interactions between the system (or SoS) being acquired and other co-frequency and adjacent frequency S-D systems typically found in the operational environment. Detailed EMC analyses, based on measured system technical data and the technical parameters of other systems found in the target operational environment taken from appropriate data bases, must be performed. These analyses should:
  - (a) Determine the ratio of the received interference level to a given threshold, such as noise level or desired signal power.
  - (b) Account for factors such as the frequency-dependent rejection (FDR) based on the frequency offset between the system being analyzed and other S-D systems.
  - (c) Use detailed antenna pattern data, as well as terrain-dependent propagation models.
  - (d) For mobile RF systems, compute the desired and undesired received signal levels using propagation models developed specifically for mobile communications systems to determine any potential link degradation and blockage due to atmospheric conditions or terrain and building obstructions within intended deployments areas.
  - (e) Use the appropriate detailed propagation model and the FDR data to generate frequency-distance curves that express the requirements for compatibility during operations as, for example, the minimum frequency-distance separation requirements required to achieve mutual compatibility.
  - (f) Determine the required availability of link or outage percentage for reliability during a specified period of time,

typically a year. Calculate the detailed availability and outage time with—and without— interference by considering path loss, rain attenuation, humidity, climate, temperature, and water and oxygen absorption.

(g) Consider how forward error correction (FEC) techniques combat fading and interference to improve a given measure of quality, for example, Eb/No (ratio of the energy per bit (Eb) to the spectral noise density (No)) for more reliable transfer rates in a digital communication system.

(h) Determine the appropriate measure of operational degradation and how that measure degrades as a function of the level of received environmental and co-site interference, for noncommunications systems, for example, radar, passive sensors, and so forth.

(i) Quantify intra-platform EMC among co-sited emitters and receivers for complex SoS platforms in terms of the possibility and influence of: intermodulation, transmitter harmonic interference, transmitter spurious output interference, transmitter noise interference, receiver desensitization interference, and a comparison of the measured system RF parameters with U.S. national and appropriate international spectrum standards.

(j) Generate technical recommendations regarding mitigating potential interference by implementing, for example, channelization plans, advanced narrow-beam antennas (such as active, spot, and contoured-beam), as well as passive RF components (filters, diplexers, couplers, and so forth).

(k) Review and address the MCEB and national spectrum guidance resulting from the spectrum certification process.

(l) Determine if the system meets appropriate military, national, and international spectrum standards for radiated bandwidth, transmitter stability, and so forth.

c. Section 3.3 of the SSRA: Impact of EW on E3—

d. To combat the effects of IEDs, the Army initiated an extensive effort to provide EW equipment to the operational forces. The initial impact on communications and data transfers was extensive. For a SoS or FoS, provide a summary of the EW equipment and their effects on each other.

#### **C–5. Section 4: Conclusions**

Provide a summary of the issues and related risks identified when drafting sections 2 and 3 of the SSRA and an assessment, conclusion of the impact, or potential degradation, to the systems operational requirements capabilities as they are related to spectrum and/or EMC.

#### **C–6. Section 5: Recommendations**

Describe the outcome that the acquisition PM is striving to achieve.

## Appendix D Internal Control Evaluation Certification and Checklist

### D-1. Function

The functions covered by this checklist are the administration of Army Spectrum Management Program and the Army's use of the electromagnetic spectrum. The checklist is designed to assist Army organizations such that they properly acquire and employ S-D systems. The checklist includes key controls for CIO management of how the Army acquires and uses systems that employ capabilities that make use of the electromagnetic spectrum.

### D-2. Purpose

The purpose of this checklist is to assist HQDA, field operating agencies (FOAs), ACOMs, ASCCs, DRUs, RDT&E centers, and other organizations and installations in evaluating the key internal controls outlined below; it is not intended to cover all controls.

### D-3. Instructions

Answers must be based on the actual testing of internal controls (such as document analysis, direct observation, sampling, simulation). Answers that indicate deficiencies must be explained and corrective action indicated in supporting documentation. These key internal controls must be formally evaluated at least once every 5 years. Certification that this evaluation has been conducted must be accomplished on DA Form 11-2 (Internal Control Evaluation Certification).

### D-4. Test questions

*a. Responsibilities.* See also chapter 2.

(1) Is the MCEB equipment frequency allocation guidance and an NTIA Certification of Spectrum Support complete prior to entering into contractual obligations to procure or develop equipment that radiates or receives electromagnetic spectrum. (This applies to the command and staff of ASA (ALT) and AMC, installation commanders, DNECs, and CIO/G-6s.)

(2) Are operators of S-D equipment using non-Federal, Government spectrum aware that such use is on a noninterference basis and that there are not protections for Army users when experiencing interference? (This applies to the command and staff of ASA (ALT) and AMC, installation commanders, DNECs, and CIO/G-6s.)

(3) Are materiel developers and other acquisition professionals involved in efforts related to development and procurement of S-D systems required to include spectrum supportability governance as rated objectives in officer, noncommissioned officer (NCO) and civilian performance. (This applies to ASA (ALT) and AMC.)

(4) Are materiel developers and other acquisition professionals involved in efforts related to development and/or procurement of S-D systems required to complete SSRAs during all phases of the DAS? See chapter 3 and appendix C. (This applies to ASA (ALT) and AMC.)

(5) Does the command or organization ensure and enforce adherence to international and host-nation spectrum laws, regulations, and technical standards? (This applies to ACOMs, ASCCs, and DRUs.)

(6) Does the command or organization have a process to ensure that S-D systems comply with DOD, U.S. national, host-nation, and international laws, policies, regulations, technical standards, treaties, and that frequency assignments to individual systems are approved by designated national spectrum authorities? (This applies to ACOMs, ASCCs, DRUs, installation commanders, DNECs, and CIO/G-6s.)

(7) Has the command's integrated spectrum management and/or spectrum-awareness training in all leadership development courses ensured that Army leaders understand the implications of spectrum supportability, spectrum access, and spectrum management on the ability to generate and project combat power? (This applies to TRADOC.)

(8) Is the initiation of an SSRA incorporated in all combat development activities that have spectrum requirements? (This applies to TRADOC.)

(9) Do combat developers consider the spectrum implications of nonmateriel and materiel solutions during the execution of combat development processes? (This applies to TRADOC.)

(10) Is a spectrum assessment, where appropriate, incorporated as part of the capabilities-based analysis? (This applies to TRADOC.)

(11) Are SSRAs provided to the Army CIO/G-6 during all phases of the DAS (see chap 3 and app C)? (This applies to ASA (ALT) and AMC.)

(12) Is there a spectrum coordinator appointed to oversee issues relating to acquisition of S-D systems? (This applies to ASA (ALT) and AMC.)

(13) Have program managers and/or spectrum coordinators established a link with the ASMO and the ASM, as to ensure that spectrum management considerations affecting S-D initiatives are adequately addressed? (This applies to ASA (ALT) and AMC.)

(14) Is the organization properly and adequately resourcing the execution of SSRAs, EMC analyses, and E3

measurements prior to milestones A, B and C, as appropriate, during Army's implementation of the DAS (see chap 3 and app C)? (This applies to ASA (ALT) and AMC.)

(15) Have materiel developers generated required SSRAs to address spectrum management and EMC or EMI issues that could affect operational system performance? (This applies to ASA (ALT) and AMC.)

(16) Does the command ensure that all S-D systems employed by the command comply with Army, DOD, U.S. national, host-nation, and international spectrum rules, regulations, policies, and technical standards? (This applies to ASCCs.)

(17) Has the command established and maintained spectrum-manager positions to fulfill mission and functional requirements? (This applies to ASCCs.)

(18) Has the command programmed, planned, and funded for maintenance of the technical proficiency and professional development of assigned spectrum managers? (This applies to ASCCs, installation commanders, DNECs, and CIO/G-6s.)

(19) Does the command ensure tenant and visiting organizations' force-spectrum requirements comply with DOD, U.S. national, and host-nation spectrum laws, regulations, policies, and technical standards as related to the performance of the installation mission? (This applies to installation commanders and DNECs.)

(20) Has the command ensured that all devices that emit or receive electromagnetic radiations from within their installation comply with DOD, U.S. national, and host-nation spectrum laws policies, regulations, and technical standards? (This applies to installation commanders and DNECs.)

(21) Has a program been established to conduct continuous review of frequency assignments, and are assignments deleted or amended as appropriate within the AFC-allotted suspense date? (This applies to installation commanders and DNECs.)

(22) Has a DNEC been appointed as a principal staff officer, with spectrum management responsibilities? Where no fully resourced installation configuration, exists, has the owning command established areas or regions and designated an installation to provide information management support? (This applies to installation commanders.)

(23) Have the installation's CIO/G-6 and spectrum management staff been assigned and charged the with the responsibilities noted in paragraphs 2-8 and 2-9, as appropriate to the command's roles and missions? (This applies to installation commanders.)

(24) Is there an established program of continuing review of frequency assignments in which reviewed assignments are also deleted or amended as appropriate within the AFC allotted suspense date? (This applies to installation commanders and DNECs.)

(25) Has the command appointed a DNEC as the principal staff officer, with spectrum management responsibilities? Where no fully resourced installation configuration exists, has the owning command established areas or regions and designated an installation to provide information management support? (This applies to ACOMs and installation commanders.)

(26) Has the DNEC coordinated with other installation directorates to ensure that S-D equipment being developed or procured by, or for use on, the installation is fully spectrum supportable? (This applies to installation commanders and DNECs.)

(27) Has the command ensured that garrison spectrum emitters operate within geographical and technical parameters to promote electromagnetic compatibility among equipment? (This applies to installation commanders and DNECs.)

(28) Does the command keep records on the types of equipment, locations of equipment, and use of the spectrum and nontactical call signs assigned to the installation? (This applies to installation commanders and DNECs.)

*b. Army Spectrum Supportability Program.* See also chapter 3. Note: This also applies to COTS, discretionary funding, and Government Purchase Card Request purchases.

(1) Are the requirements for submission of DD Forms 1494 known? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(2) Are records of DD Form 1494 and supporting documentation being maintained so information can be retrieved as needed? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(3) Are contractual obligations made for equipment that transmits or receives RF energy, before efforts are made to assure that it is frequency supportable? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(4) Is equipment procured or leased off-the-shelf licensed by the Federal Communications Commission (FCC) for operation in the non-Government frequency bands? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(5) Are local spectrum managers and supporting AFCs allowed to participate in all phases of information systems planning, including plans to modify equipment? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(6) Are all radio frequencies within the commander's area of responsibility authorized for use?

(7) Has an installation or activity spectrum manager been appointed for management of radio frequency and

- nontactical call sign assignments? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (8) Are procedures established to obtain frequency and call sign assignments from the supporting AFC? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (9) Have appropriate technical considerations been given to mitigating electromagnetic interactions, such as increasing the tuning range of the transmitter, filtering the receiver, or using high-gain narrow beamwidth antennas? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (10) Have “safe zones” been calculated to eliminate electromagnetic radiation effects on personnel, explosives, and fuel? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (11) Have plans been approved to address the spectrum management and EMC implications of Army use of COTS equipment in tactical operations? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (12) Have alternate means of communication been identified and approved if severe degradation of COTS equipment in tactical environments is expected and, therefore, places operations in jeopardy? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (13) Based only on technical factors, such as available bandwidth and propagation characteristics, have idealized frequency bands or ranges been identified which could best support the telecommunications requirements? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (14) Do existing U.S. national, host-nation, and international frequency allocations provide sufficient regulatory protection for the radio services required by the system in the idealized frequency bands? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (15) If appropriate allocations do not exist in the idealized bands, are there any appropriately allocated bands that could satisfy the telecommunications requirements?
- (16) Have penalties (in terms of time, cost, and performance) been associated with the available frequency allocation alternatives? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (17) Have areas or locations been identified in which the proposed system will be deployed?
- (18) Has adequate consideration been given to mutual interactions with the intended electromagnetic environment including: idealized versus available frequencies; and tradeoffs of time, cost, and performance? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (19) Have SSRAs and EMC analysis been published which support the rationale for band selection and quantifies mutual co-band and other electromagnetic interactions? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (20) Are there any system limitations that may be imposed by mutual interactions with all intended EMEs? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (21) Have frequency supportability changes been identified from previously submitted planning data? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (22) Has consideration been given to the EMC potential of alternative telecommunications designs? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (23) Has appropriate EMC consideration been given to whether the proposed equipment or hardware can be tuned to the necessary frequency? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (24) Has adequate consideration been given to intrasystem implications on flexibility and EMC, and the side effects on personnel and explosives? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (25) Are spectrum considerations included in any request for procurement (RFP) preparation? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, any other purchasing officials.)
- (26) Have proper adjustments been made to overall system configuration based on the experimental stage? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (27) Do EMC specifications comply with prevailing standards and criteria? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (28) Can deviations from prevailing standards and criteria for EMC be justified? Is such deviation approved by the Army CIO/G-6? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (29) Have areas of current design been identified in which system performance is degraded due to EM environment, and will EMI problems be created in other systems? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (30) Have plans for special tests, measurement techniques, and simulation efforts been defined that will help validate design? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (31) Are SSRAs provided to the Army CIO/G-6 during all phases of the DAS? See also chapter 3 and appendix C. (This applies to ASA (ALT) and AMC.)

(32) Were specific frequency requirements identified for development systems-integration testing? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(33) Have changes in all previous stages been identified and submitted for consideration? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(34) Have basic technical characteristics been clearly defined, such as transmitted power, emission characteristics (bandwidth, modulation, and data rate); antenna orientation and directivity; and receiver characteristics (sensitivity, selectivity, and so forth)? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(35) Have all special technical characteristics peculiar to the proposed system and having potential EMC problems been adequately identified and described (such as complex modulation schemes, filters, special receiver circuitry, signal processing, and so forth)? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(36) Has all data developed during previous phases of the system's life cycle been considered and evaluated in completing the telecommunications requirements and/or characteristics? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(37) Have previous EMC analyses been reviewed and updated? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(38) Are additional studies required to assess changes to system design, deployment, and other factors? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)

(39) Have equipment tests been specified to identify and validate performance aspects and susceptibility features of the total system to EMI identified in previous and updated analyses? (This applies to ASA (ALT), AMC, PEOs, PMs, and PdMs.)

(40) Have both static and dynamic electromagnetic environments for testing been considered? (This applies to ASA (ALT), AMC, PEOs, PMs, and PdMs.)

(41) Have in-field EMC assessment techniques (frequency assignment aids, equipment usage aids, grading for performance, measurement programs, EMC maintenance procedures) been considered to support procurement and deployment planning for the system? (This applies to ASA (ALT), AMC, PEOs, PMs, and PdMs.)

(42) Has the number of frequencies required, within a specified band or bands, been identified? (This applies to ASA (ALT), AMC, PEOs, PMs, and PdMs.)

(43) Have channeling limitations, transmit/receive separation, and other pertinent limitations and system peculiarities been identified? (This applies to ASA (ALT), AMC, PEOs, PMs, and PdMs.)

(44) Have locations been identified for testing and operation? (This applies to ASA (ALT), AMC, PEOs, PMs, and PdMs.)

*c. Frequency assignment policy and procedure.* See also chapter 4.

(1) Has an installation or activity spectrum manager been appointed for management of radio frequency and nontactical call sign assignments? (This applies to DNECs.)

(2) Is there a program in place for continuing review of frequency assignments and for deleting or amending same? (This applies to DNECs.)

(3) Are the spectrum emitters operating within the geographical and technical parameters assigned? (This applies to DNECs.)

(4) Are records kept on the types of equipment, locations of equipment, and use of the spectrum and nontactical call signs assigned to the installation? (This applies to DNECs.)

(5) Are frequency assignments being reviewed, and do they meet suspense dates set by the respective AFC? (This applies to DNECs.)

(6) Have all emitters within the commander's area of responsibility received spectrum certification, and are they authorized for use? (This applies to DNECs.)

(7) Are procedures established to obtain frequency and call-sign assignments from the supporting AFC? (This applies to DNECs.)

(8) Has the installation spectrum manager received formal training and equipped with the appropriate tools? (This applies to DNECs.)

(9) Are frequency assignments records registered in the Government master file (GMF) database up-to-date? (This applies to DNECs.)

(10) Does the spectrum manager have a POC listing for activities on the installation using spectrum dependant equipment? (This applies to DNECs.)

*d. Use of specific spectrum-dependent systems and access to non-Government frequency bands.* See also chapter 5.

(1) Are non-Government frequency bands being used? (This applies to all.)

(2) Does the user, installation, or organization have FCC agreements for the Federal systems to use frequencies allotted to non-Government operations? (This applies to all.)

- (3) Is the assignment essential for communications with non-Government entities, and is it true that the needs cannot be met through use of regularly designated Government bands? (This applies to all.)
  - (4) Have the local FCC licensee and the requesting agency concluded a mutually approved arrangement, with the licensee providing written authorization for the Army unit to operate on the particular frequency? (This applies to all.)
  - (5) Are copies of all agreements referred to above on file with the supporting AFC? (This applies to all.)
  - (6) Are there FCC-licensed stations, amateur radio, taxi companies, and other radio operators operating on an Army installation? (This applies to all.)
  - (7) Are the FCC-licensed stations operating under written agreements, approved by the installation commander, and coordinated with the installation DNEC spectrum manager or in the case of a CTC, also with the G-6 prior to operating such equipment on the installation?
  - (8) Are S-D COTS devices in use? (This applies to all.)
  - (9) Are S-D COTS devices pre-approved by the installation organization spectrum manager or CIO/G-6 prior to purchase? (This applies to all.)
  - (10) Is there a DD Form 1494 on file for the S-D COTS devices authorizing Army use of nonlicensed devices within the US&P, or subject host nation? (This applies to all.)
  - (11) Are GMRS devices (personal two-way voice communications service) in use on military installations? Uses of these systems, which operate in the 460–470 MHz exclusive civil frequency band, are forbidden. (This applies to all.)
  - (12) Are Family Radio Service radios in use? (This applies to all.)
  - (13) Has use of Family Radio Service radios been approved by the host nation? (This applies to all.)
  - (14) Are Army organizations using amateur frequencies for its operations? (This applies to all.)
  - (15) Are Specialized Mobile Radio (SMR) services in use? (This applies to all.)
  - (16) Are SMR systems used as a leased or end-user service? (This applies to all.)
  - (17) Is the use of SMR services approved by the NTIA? (This applies to all.)
  - (18) Is there an LMR system in use? (This applies to all.)
  - (19) Has access to the system been opened to other Federal agencies? (This applies to all.)
  - (20) Are UGVs in use? Does use of the UGVs comply with the specifications of the Joint Architecture for Unmanned Systems (JAUS)? (This applies to all.)
- e. Consequences and risks of noncompliance.* See also chapter 6.

#### **D-5. Supersession**

This checklist replaces all checklists and test questions for Army Management of the Electromagnetic Spectrum, previously published in AR 5-12, dated 1 October 1997.

#### **D-6. Comments**

Help make this a better tool for evaluating internal controls. Submit comments to HQDA (SAIS-AO-AOS) (The Army Spectrum Manager), 2461 Eisenhower Avenue, Alexandria, VA 22331.

## **Glossary**

### **Section I Abbreviations**

**ACOM**

Army command

**ACP**

allied communication publication

**AFC**

area frequency coordinator

**AFMO-US&P**

Army Frequency Management Office-United States and possessions

**AMC**

Army Materiel Command

**AOR**

area of responsibility

**AR**

Army Regulation

**ARNG**

Army National Guard

**ASA (ALT)**

Assistant Secretary of the Army for Acquisition, Logistics and Technology

**ASARC**

Army Systems Acquisition Review Council

**ASCC**

Army service component command

**ASM**

Army Spectrum Manager

**ASMO**

Army Spectrum Management Office

**ASSP**

Army Spectrum Supportability Program

**ATC**

air traffic control

**ASD (C3I)**

Assistant Secretary of Defense for Command, Control, Communications, and Intelligence

**CB**

Citizens Band

**CBTDEV**

combat developer

**CDL**

Common Data Link

**C-E**

communications-electronics

**CFR**

Code of Federal Regulations

**CG**

commanding general

**CIO**

chief information officer

**CJCSI**

Chairman of the Joint Chiefs of Staff Instruction

**CJCSM**

Chairman of the Joint Chiefs of Staff Manual

**COCOM**

combatant command

**CONUS**

continental United States

**COTS**

commercial off-the-shelf

**CREW**

counter radio-controlled improvised explosive device electronic warfare

**CTC**

Combat Training Center

**DA**

Department of the Army

**DAS**

Defense Acquisition System

**DCS**

Defense Communications System

**DD**

Department of Defense (form)

**DISA**

Defense Information Systems Agency

**DNEC**

Director of Network Enterprise Center

**DOD**

Department of Defense

**DOD CIO**

Department of Defense Chief Information Office

**DODD**

Department of Defense Directive

**DODI**

Department of Defense Instruction

**DRU**

direct reporting unit

**DSCA**

Defense Support to Civil Authorities

**E3**

electromagnetic environmental effects

**EA**

electronic attack

**EMC**

electromagnetic compatibility

**EMCP**

Electromagnetic Compatibility Program

**EME**

electromagnetic environment

**EMETF**

electromagnetic environmental test facility

**EMI**

electro-magnetic interference

**EW**

electronic warfare

**FCC**

Federal Communications Commission

**FOS**

family of systems

**FP**

frequency panel

**FRS**

Family Radio Service

**FSS**

Fixed Satellite Service

**GMF**

Government Master File

**GMRS**

General Mobile Radio Service

**HF**

high frequency

**HNSWDO**

Host Nation Spectrum Worldwide Database Online

**HLD**

Homeland Defense

**HQDA**

Headquarters, Department of the Army

**Hz**

hertz

**IED**

improvised explosive device

**IM**

information management

**INFO**

information

**INMARSAT**

International Maritime Satellite

**IRAC**

Interdepartment Radio Advisory Committee

**ISM**

Industrial, Scientific, and Medical

**ITU**

International Telecommunication Union

**ITU-R**

International Telecommunication Union-Radiocommunications

**J/F 12**

Joint Frequency 12

**JAUS**

Joint Architecture for Unmanned Systems

**JCIDS**

Joint Capabilities Integration System

**JFHQ**

Joint Forces Headquarters

**JFLCC**

Joint Forces Land Component Commander

**JRTC**

Joint Readiness Training Center

**JSC**

Joint Spectrum Center

**JTIDS**

Joint Tactical Information Distribution System

**kHz**

kilohertz

**LMR**

Land Mobile Radio

**MATDEV**

materiel developer

**MCEB**

Military Communications-Electronics Board

**MEDEVAC**

medical evacuation

**MHz**

megahertz

**MIDS**

Multifunctional Information Distribution System

**MILSTAR**

Military Strategic and Tactical Relay

**MS**

milestone

**MSS**

Mobile Satellite Service

**NII**

Networks and Information Integration

**NTC**

National Training Center

**NTIA**

National Telecommunications and Information Administration

**OASD**

Office of the Assistant Secretary of Defense

**OCONUS**

Outside Continental United States

**OUSD**

Office of the Under Secretary of Defense

**Pam**

Pamphlet

**PEO**

Program Executive Office

**PM**

program manager

**RACES**

Radio Amateur Civil Emergency Services

**RC**

reserve component

**RF**

radio frequency

**RFA**

radio frequency authorization

**SATCOM**

satellite communications

**SC**

subordinate command

**S-D**

spectrum-dependent

**SFAF**

standard frequency action format

**SMR**

Specialized Mobile Radio

**SOI**

Signal Operating Instruction

**SRA**

ship radio authorization

**SSD**

spectrum supportability determination

**SSRA**

Spectrum Supportability Risk Assessment

**TAG**

The Adjutant General

**TEMP**

test and evaluation master plan

**TEMPEST**

telecommunications electronics materiel protected from emanating spurious transmissions

**TRADOC**

Training and Doctrine Command

**UGV**

Unmanned Ground Vehicle

**US&P**

United States and possessions

**USACE**

United States Army Corps of Engineers

**USAFORSCOM**

U.S. Army Forces Command

**USAR**

United States Army Reserve

**USARC**

U.S. Army Reserve Command

**USARNORTH**

United States Army North

**USARPAC**

United States Army Pacific

**USATECOM**

U.S. Army Test and Evaluation Command

**USNORTHCOM**

United States Northern Command

**Section II****Terms****Allocation**

An allocation is the designation of frequency bands for use in performing specific functions or services. Allocations are made to communications services such as fixed, mobile, broadcast, and amateur.

**Allotment**

An allotment is the designation of specific frequency bands or frequencies within a prescribed allocation. Within the Federal Government, allotments are made to specific Government agencies.

**Army Frequency Coordinator**

The AFC serves as the focal point for radio frequency and call sign requests within the US&P which required registration and clearance at the national level. The AFC coordinates with counterparts of other Military Services and Government agencies prior to making frequency and call sign assignments.

**Assignment**

An assignment is the designation of a specific frequency or frequencies for use by a radio station under specified conditions.

**Deconfliction**

An integral part of spectrum management, deconfliction is a process of optimizing the usage of the spectrum incorporating both the requirements of the battlefield spectrum managers and the EW operations.

**Department of Defense Area Frequency Coordinator**

An office empowered by the MCEB to provide overall management and use of the spectrum in areas on or near a National Test Range or other designated complex. The Terms of Reference for the DOD AFCs is contained in ACP 190 US SUPP-1, Annex B and in Chapter 8.3.26 of the NTIA Manual.

**Electromagnetic compatibility**

The ability of systems, equipment, and devices that use 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. (See JCS Pub 1.)

**Electromagnetic compatibility analysis**

An objective investigation in to the potential frequency-spectrum-resource requirements of Army frequency spectrum-dependent systems or equipment. EMC analysis should be conducted prior to entering the phases of the DAS as a cost-saving measure and to determine if a proposed system or equipment is frequency supportable in its proposed environment. EMC analysis will present the trade-offs regarding use of the electromagnetic spectrum in various technical concepts for fulfilling Army materiel requirements.

**Electromagnetic environment**

All electromagnetic radiation, manmade and natural, emanating from emitters at the lowest alternating current to the highest RF in the environment is included.

**Electromagnetic environmental effects**

The effect of the electromagnetic environment upon the operational capability of military forces, equipment, systems, and platforms. It encompasses all electromagnetic disciplines, including electromagnetic compatibility and electromagnetic interference; electromagnetic vulnerability; electromagnetic pulse; electronic protection, hazards of electromagnetic radiation to personnel, ordnance, and volatile materiel; and natural phenomena effects of lightning and precipitation static. (See JCS Pub 1.)

**Electromagnetic interference**

Any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics or electrical equipment. It can be induced intentionally, as in some forms of EW warfare, or unintentionally, as a result of spurious emissions and responses, intermodulation products, or the like. (See JCS Pub 1.)

**Electromagnetic pulse**

The electromagnetic radiation from a nuclear explosion caused by Compton-recoil electrons and photo electrons from photons scattered in the materiel of the nuclear device or in a surrounding medium. The resulting electric and magnetic fields may be coupled with electrical or electronic systems to produce damaging current and voltage surges. The electromagnetic pulse may also be caused by nonnuclear means.

**Electromagnetic radiation**

Radiation made up of oscillating electric and magnetic fields and propagated with the speed of light. This radiation includes gamma radiation; x-rays; ultraviolet, visible, and infrared radiation; and radar and radio waves.

**Electromagnetic radiation hazards**

Those electromagnetic radiations that are a source of direct danger to the human body or those that could possibly detonate or ignite explosives, flammable gases or vapors, dust, or easily ignitable particles or fibers.

**Electromagnetic spectrum**

The range of frequencies of electromagnetic radiation, from zero to infinity. For convenience, the DOD divides into 26 alphabetically designated bands. (See JCS Pub 1.)

**Electromagnetic vulnerability**

The characteristics of a system that cause it to suffer a definite degradation (incapability to perform the designated mission) after being subjected to a certain level of effects in an unnatural (manmade), hostile environment. Electromagnetic vulnerability measures the system's incapacity to perform in the presence of hostile EA. Electromagnetic vulnerability is measured only in its own operational environment (actual or simulated) and under conditions which take into account: how susceptible the system is, how easily it can be intercepted by hostile intercept and direction-finding activities, and the nature and extent of the hostile EW threat.

**Electronic attack**

The division of electronic warfare involving the use of electromagnetic energy, directed energy, or anti-radiation weapons to attack personnel, facilities, or equipment with the intent of degrading, neutralizing, or destroying enemy combat capability and is considered a form of fires.

**Electronic attack clearance**

An approval or authorization to conduct EA (for example, jamming, chaff drops) in a given geographical area under specified conditions and controls to mitigate harmful interference to other authorized spectrum users. The provisions of CJCSM 3212.02B apply in the US&P; for non-US&P areas appropriate COCOM directives apply.

**Electronic protection**

The division of EW that involves actions taken to protect personnel, facilities, and equipment from any effects of friendly or enemy use of the electromagnetic spectrum that degrade, neutralize, or destroy friendly combat capability.

**Electronic warfare**

Military action involving the use of electromagnetic energy to determine, exploit, reduce, or prevent hostile use of the electromagnetic spectrum, and action which retains friendly use of the electromagnetic spectrum. There are three divisions of electronic warfare: EA, EP, and ES measures.

**Enforcement**

Enforcement is the process of identifying and eliminating unauthorized use of the electromagnetic spectrum with potentially punitive measures.

**Frequency allocation-to-equipment process**

The process is a spectrum requirement and is used to determine that Army spectrum-dependent equipment operates in frequency bands according to national and international frequency allocation tables and conforms to all other applicable spectrum management regulations, directives, standards, and specifications. The process is started as early as possible in the research, development, production, and procurement cycle. This early start is to efficiently assure future spectrum assignments and EMC. (See chap 3 and app C of this publication.)

**Information resources management**

The planning, budgeting, organizing, directing, training, promoting, controlling, and management activities associated with the burden, collection, creation, maintenance, use, dissemination, and disposition of information regardless of media. IRM includes the management of information and information-related resources and systems, whether manual or automated, such as records management activities, privacy and security of records, agency sharing and dissemination of information, and acquisition and use of automatic data processing, telecommunications, and other information technology.

**Interference**

See electromagnetic interference.

**Joint base**

For purposes of base defense operations, a Joint base is a locality from which operations of two or more of the Military Departments are projected or supported and which is manned by significant elements of two or more Military Departments, or in which significant elements of two or more Military Departments are located.

**Occupied bandwidth**

The bandwidth within which 99 percent of the total emitted energy is contained. The occupied bandwidth must encompass the necessary bandwidth. If not, the transmitter will not emit a signal wide enough to successfully convey all the information.

**Part 15 radio**

A type of radio that meets the low-power specifications of Part 15, Title 47, Code of Federal Regulations contains the FCC's rules and regulations.

**Radio wave propagation**

The transfer of energy by electromagnetic radiation at radio frequencies.

**Spectrum-dependent equipment**

Army telecommunications and command and control systems (including weapon systems), subsystems, or equipment which either depends on or affects the use of the electromagnetic spectrum.

**Spectrum management**

The management of how electromagnetic-spectrum resources are used. The goal of Army spectrum management is to support telecommunications, weapons systems, and electronic warfare requirements. This goal will be accomplished through the acquisition of spectrum resources, the efficient use of those resources, and the attainment of electromagnetic compatibility.

**Spectrum management doctrine**

Fundamental principles that guide Army use of the electromagnetic spectrum for operation of Army telecommunications and command and control systems (including weapons systems), subsystems, and equipment. These principles are official and require sound military and technical judgment in application. Principles may be based on: basic physical phenomena associated with radio wave propagation and radiation; national or international regulatory constraints on the use of the frequency spectrum; the need for coordination and cooperation among users of the frequency spectrum; and EW implications.

**Spectrum plan**

An organized and documented scheme that identifies the specific spectrum resources required for a military operation (such as a contingency operation or field training exercise) or to operate a telecommunications system (such as a

satellite communications system). Spectrum plans will be engineered to ensure communicability and to reduce interference among the frequencies in the plan. Spectrum plans will also reduce interference between the frequencies in the plan and frequencies that are in use, or planned, in the coexistent electromagnetic environment.

### **Spectrum resources**

Allocations, allotments, or assignments of portions of the electromagnetic spectrum that aim to accomplish a specific function or telecommunications service. In an operational environment, spectrum resources are the specific number and types of frequency assignments needed to operate items of spectrum-dependent materiel.

### **Spectrum support**

The potential availability of operating frequencies (frequency assignments) to meet specific type-of-service and operational requirements.

### **Spectrum supportability**

The assessment as to whether the electromagnetic spectrum necessary to support the operation of a spectrum-dependent equipment or system during its expected life cycle is, or will be, available. (That is, from the materiel solution-analysis phase through developmental and operational testing, to actual operation in the electromagnetic environment. See DODI 4650.01.)

### **Spectrum supportability risk assessment**

The assessment as to whether the electromagnetic spectrum necessary to support the operation of a spectrum-dependent equipment or system during its expected life cycle is, or will be, available. (That is, from the materiel solution analysis phase through developmental and operational testing, to actual operation in the electromagnetic environment.)

### **Spectrum supportability determination**

A spectrum supportability determination requires four documents: An equipment spectrum certification (within the US&P) or an equipment spectrum certification (outside the US&P and in the host nation); an SSRA; an E3 assessment; and an operational frequency assignment. (See DODI 4650.01.)

### **Telecommunications**

Any transmission, emission, or reception of signs, signals, writing, images, and sound or information of any nature by wire, radio, or other electromagnetic or optical systems.

### **Telecommunications service**

A specific function performed by a system, subsystem, or equipment such as fixed, mobile, broadcasting, or mobile satellite.

### **Waiver**

A written authorization to accept a system, subsystem, or equipment which, having been submitted for inspection, does not meet specified requirements but is considered suitable for use “as is” or after rework by an approved method.

## **Section III**

### **Special Abbreviations and Terms**

#### **Eb/No**

This is the ratio of the energy per bit (Eb) to the spectral noise density (No).

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