

**Army Regulation 5–12**

**Management**

# **Army Use of the Electromagnetic Spectrum**

**Headquarters  
Department of the Army  
Washington, DC  
8 February 2020**

**UNCLASSIFIED**

# ***SUMMARY of CHANGE***

AR 5-12  
Army Use of the Electromagnetic Spectrum

This major revision, dated 8 February 2020—

- o Updates policy to reflect organizational changes within the Department of the Army (chap 2).
- o Includes minor corrections to editorial oversights of the last major revision to this regulation (throughout).

Management  
Army Use of the Electromagnetic Spectrum

By Order of the Secretary of the Army:

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General, United States Army  
Chief of Staff

Official:

  
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to the Secretary of the Army

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

**Summary.** This regulation on the Army's use of the electromagnetic spectrum 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 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 DODI 4650.01. This update delineates a range of consequences for individuals or organizations, which may result from noncompliance with spectrum policies and regulations.

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

**Proponent and exception authority.** The proponent of this regulation is the Chief Information Officer/G–6. The proponent has the authority to approve exceptions or waivers to this regulation that are consistent with controlling law and regulations. The proponent may delegate this approval authority, in writing, to a division chief within the proponent agency or its direct reporting unit or field operating agency, in the grade of colonel or the civilian equivalent. Activities may request a waiver to this regulation by providing justification that includes a full analysis of the expected benefits and must include formal review by the activity's senior legal officer. All waiver requests will be endorsed by the commander or senior leader of the requesting activity and forwarded through their higher headquarters to the policy proponent. Refer to AR 25–30 for specific guidance. 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.

**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–NSR), 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–NSR), 107 Army Pentagon, Washington, DC 20310–0107.

**Committee management.** AR 15–39 requires the proponent to justify establishing/continuing committee(s), coordinate draft publications, and coordinate changes in committee status with the Office of the Administrative Assistant to the Secretary of the Army, Department of the Army, Committee Management Office (AARP–ZA), 9301 Chapek Road, Building 1458, Fort Belvoir, VA 22060–5527. Further, if it is determined that an established "group" identified within this regulation, later takes on the characteristics of a committee, as found in the AR 15–1, then the proponent will follow all AR 15–1 requirements for establishing and continuing the group as a committee.

**Distribution.** This regulation is available in electronic media only and is intended for the Regular 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 (EMS) (hereafter referred to as spectrum management) and for Army participation in Service, Joint, U.S. national, host nation, and international spectrum management activities. It issues spectrum-related policies and responsibilities for Army commands (ACOMs), agencies, activities, installation and unit commanders, and users at installations worldwide, combat developers (CBTDEVs) and materiel developers (MATDEVs). Additionally, it delineates the elements of the Army Spectrum Management Program (ASMP).

#### **1–2. References and forms**

See appendix A.

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

See the glossary.

#### **1–4. Responsibilities**

Responsibilities are listed in chapter 2.

#### **1–5. Records management (recordkeeping) requirements**

The records management requirement for all record numbers, associated forms, and reports required by this regulation are addressed in the Army Records Retention Schedule-Army (RRS–A). Detailed information for all related record numbers, forms, and reports are located in the Army Records Information Management System (ARIMS)/RRS–A at <https://www.arims.army.mil>. If any record numbers, forms, and reports are not current, addressed and/or published correctly in ARIMS/RRS–A, see DA Pam 25–403 for guidance.

#### **1–6. Objectives**

The Army's spectrum management objectives are to ensure that—

- a.* Army spectrum processes are an integral part of the Army's implementation of the Defense Acquisition System (DAS) as outlined in DODD 5000.01 and Department of Defense (DOD) funding categories.
- b.* Army Spectrum-dependent (S–D) systems effectively and efficiently use the EMS in compliance with U.S. national, host nation, and international telecommunication laws, rules, and regulations and are designed to minimize the potential for harmful interference.
- c.* Army S–D systems can fully engage in net-centric operations without causing or experiencing harmful electromagnetic interference (EMI).
- d.* Army spectrum policy decisions and Spectrum Supportability Risk Assessments (SSRAs) are based on verifiable analyses and quantifiable, repeatable measurements.
- e.* Army personnel are aware of the consequences and mission impacts of noncompliance with DOD, U.S. national, host nation, and international spectrum laws, rules, regulations, policies, and technical standards.

#### **1–7. Overview**

- a.* Army access to or use of EMS 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 (NTIA) Manual of Regulations and Procedures for Federal Radio Frequency Management and the provisions of DODI 4650.01.
- b.* Army access to the EMS in host nations other than the United States will be coordinated with intended host nations by the Army Spectrum Management Office (ASMO) through formal combatant command (CCMD) 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 for access to that host nations EMS.
  - (1) Many national and international entities are involved in granting or withholding formal approvals required for Army access to spectrum resources. (See fig 1–1 for general orientation of major spectrum management coordination regions and organizations; see app B for details regarding the Army Frequency Management Office United States and Possessions

(AFMO US&P) Army supported DOD area frequency coordinators' (AFCs') functional coordination channels, contact information, and specific areas of responsibility.)

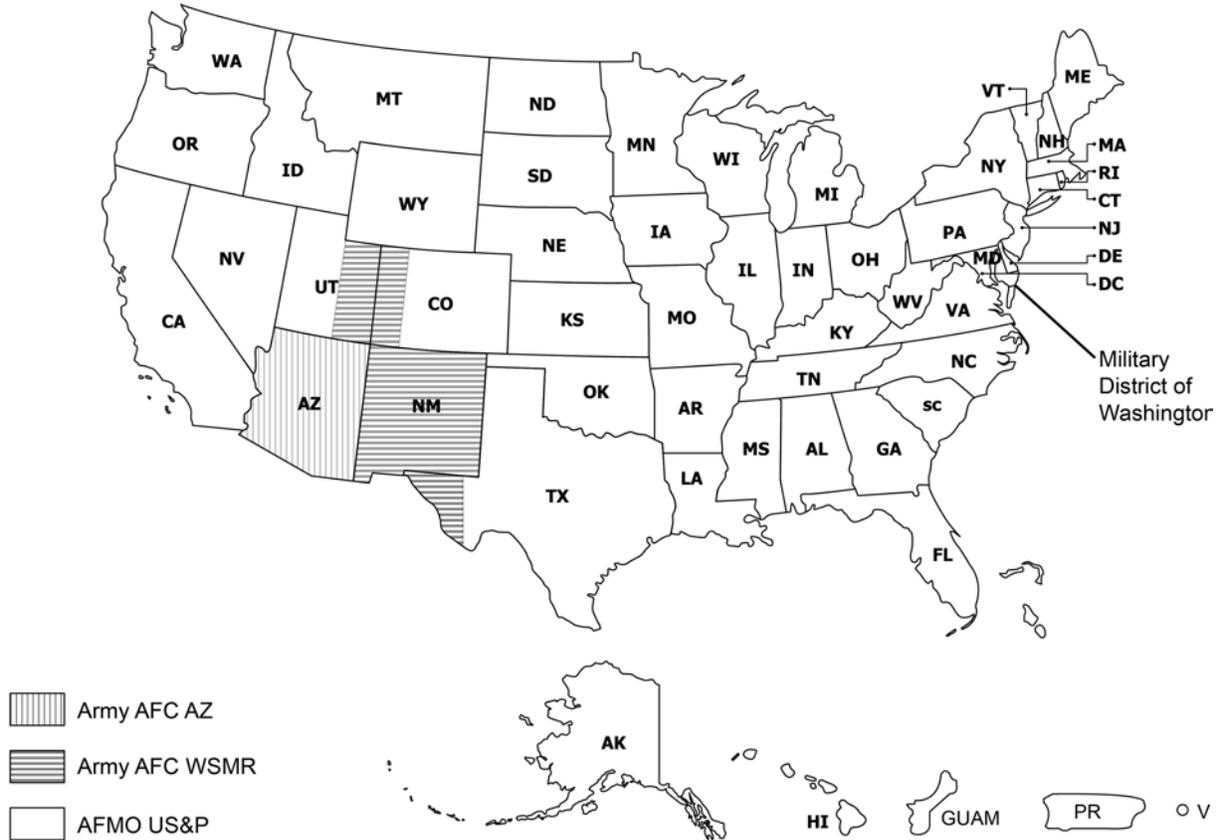


Figure 1-1. Army spectrum management coordination regions

(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 is conducted within the limits of established Army policy. 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.

c. 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 (47 USC), except as authorized by the Director, ASMO.

d. This regulation does not alter or supersede existing authorities and policies of the Director of National Intelligence (DNI) as defined in 50 USC and DNI and DOD Intelligence policies.

## Chapter 2 Responsibilities

### 2-1. 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. national, 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 all new and updated SSRAs to receive Chief Information Officer (CIO)/G-6 approval as part of the milestone review and decision process during all phases of the DAS when acquiring or developing S-D systems for equipment

funded by the ACOM or subordinate commands, in accordance with AR 70–1 and DA Pam 70–3. (See chap 3 and app C of this regulation for additional information on SSRA completion and submission.) It is required that SSRAs be a contract data requirements list item on every applicable contract.

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

*d.* Coordinate the resolution of critical or specialized spectrum management requirements or issues identified during the acquisition process with the Director, ASMO.

*e.* Coordinate with the CIO/G–6 and U.S. Army Training and Doctrine Command (TRADOC) to ensure that all requirements for the use of spectrum are identified and supportable for all S–D programs when operating within their intended operating environments.

*f.* Ensure that MATDEVs generate and implement interference-mitigation techniques that enhance electromagnetic compatibility (EMC) for all Army S–D systems.

*g.* Provide systems engineering support as required to support implementation of ASMP.

*h.* Ensure consideration is given to EMS flexibility, adaptability, agility, and efficiency as part of the acquisition process for all new spectrum dependent systems.

## **2–2. Chief Information Officer, G–6**

The CIO/G–6 will—

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

*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, Budgeting, and Execution 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 ASMP in acquisition strategies for S–D sensors, weapons, mission-command communication systems, intelligence, electronic warfare (EW), and information management (IM) systems in accordance with AR 70–1.

*g.* Provide oversight and guidance to the Director, ASMO who will—

(1) Serve as the principal advisor to the Army, CIO/G–6 regarding spectrum management and regulatory matters.

(2) Oversee the ASMP, in order to—

*(a)* Serve as the focal point for the ASMP and perform assigned IM with the Army Staff, CCMDs, ACOMs, Army service component commands (ASCCs), and direct reporting units (DRUs), along with other military Services, Government agencies, and FCC, for activities in the private sector relating to spectrum management.

*(b)* Ensure the SSRAs address the regulatory, technical, operational, and EMC aspects of proposed S–D system(s) in their intended electromagnetic environment (EME).

*(c)* 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.

*(d)* Implement national, international, DOD, Joint, host nation, and Headquarters, Department of the Army (HQDA) spectrum management policies and guidance throughout the Army.

*(e)* Coordinate spectrum resources to support the ASCCs of the CCMDs, as required.

*(f)* Prepare the Army’s input to the Defense EMS Management Strategic Plan.

*(g)* Participate in the systems acquisition and capabilities development process in order to provide spectrum management expertise, advice, and technical assistance to PEOs, CBTDEVs, MATDEVs, test and integration working groups, operational commanders, spectrum managers, and other committees as necessary. Additionally, the Director, ASMO will advocate for and ensure compliance with this regulation and establish requirements for the development of suitable hardware and software suites in support of Army Department and strategic-level requirements for spectrum management and EMC requirements and processes.

*(h)* Serve as the Army authority for assigning international and national requirements for non-tactical radio station identification as outlined in paragraph 4–5.

*(i)* Designate individuals or agencies to represent Army spectrum management interests and positions at the DOD, U.S. national, host nation, and international spectrum levels to ensure, as with Congressional or other administrative actions, that Army spectrum requirements are appropriately considered and measures are taken to mitigate any risk to Army missions.

(3) Review and update the Army spectrum management structure and assign specific functions within the Army as required.

(4) Coordinate spectrum management matters within the Office of the Secretary of the Army and the Army Staff.

(5) Direct, develop, publish, and implement Army spectrum management activities, policies, and planning guidance to meet Army needs and requirements at both the U.S. national and international levels.

(6) Coordinate Army spectrum access requirements with U.S. Government organizations, and the allocation of frequency assignments in support of Army operations.

(7) Serve as the Army spectrum certification authority for S–D systems, and as Army representative to the Military Command, Control, Communications, and Computers (C4) Executive Board (MC4EB) Frequency Panel, and all other working groups as necessary, provide an alternate as required. Ensure that MC4EB 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. (See app A regarding MC4EB publications.)

(8) Serve as the approval authority for DD Form 1494 (Application for Equipment Frequency Allocation) submitted to the Equipment Spectrum Guidance Permanent Working Group of the MC4EB Frequency Panel.

(9) Review Army materiel objectives and requirements, in accordance with AR 70–1, to identify potential effects on the spectrum and to—

(a) Ensure that Army spectrum management policies, plans, programs, and procedures are synchronized with the Army’s implementation of the DAS in accordance with DODD 5000.01 guidelines and governing regulations.

(b) 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.

(10) Represent spectrum management requirements at the Army Systems Acquisition Review Council.

(11) Identify, budget for, and initiate Army spectrum management and EMC services, studies, and analyses as required.

(12) Serve as the principal Army negotiator representing Army requirements in U.S. spectrum national and international regulatory and policy discussions; through the U.S. Department of State on a Government-to-Government level; through status-of-forces negotiations in cases of individual host-nation relationships; and for international spectrum matters on the agenda of International Telecommunications Union (ITU) Working Parties, committees, or conference meetings. Assume responsibility for all U.S. submissions made on behalf of the Army to the ITU Radio communications sector.

(13) Oversee the Army spectrum management automation architecture to ensure compliance with DOD and Federal automation standardization requirements.

(14) Coordinate with the Deputy Chief of Staff (DCS), G–1 for priority assignment of spectrum management personnel across the operating and generating force.

(15) Coordinate with the TRADOC Capability Manager-Electronic Warfare Integration, Office Chief of Signal and commanders of ACOMs, ASCCs, and 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 (CTCs).

(16) Serve as the Army representative to the NTIA, the Interdepartment Radio Advisory Committee (IRAC), and provide representatives for all IRAC subcommittees in order to—

(a) Articulate and defend Army spectrum requirements.

(b) Coordinate and obtain spectrum certifications from the NTIA and coordinate frequency allotments or experimental frequency assignments to support Army operational requirements for ACOMs and activities within the United States and Possessions (US&P).

(17) Provide Army representation to the U.S. delegation to Combined Communications-Electronics (C–E) Board Frequency Panel meetings.

(18) Approve the Army input to the Defense EMS Management Strategic Plan.

(19) Coordinate, when required, the assignment of the Joint Spectrum Center commander with the U.S. Army Human Resources Command.

(20) Coordinate the resolution of all EMI incidents as appropriate with applicable ACOM, CCMD, and/or other Service activities (see Chairman of the Joint Chief of Staff Instruction (CJCSI) 3320.02F; Chairman of the Joint Chief of Staff Manual (CJCSM) 3320.02D; and chap 4 of this regulation).

### **2–3. Deputy Chief of Staff, G–2**

In addition to the responsibilities in paragraph 2–7, the DCS, G–2 will—

a. Review emerging and enduring requirements in order to identify, validate, and ensure Intelligence spectrum integration across the Army Staff and commands (see para 1–7d).

*b.* In coordination with CIO/G-6, prioritize Army S-D requirements for Intelligence programs and ensure compliance with DNI directives, Intelligence Community policies, and DOD intelligence policies (see para 3-2c).

#### **2-4. Deputy Chief of Staff, G-3/5/7**

In addition to the responsibilities in paragraph 2-7, the DCS, G-3/5/7 will—

*a.* Review emerging and enduring requirements in order to identify, validate, and ensure spectrum integration across the Army Staff and commands.

*b.* In coordination with CIO/G-6, prioritize Army S-D requirements and ensure their transmittal to the DCS, G-8 for integration into overall Program Objective Memorandum prioritization.

#### **2-5. Deputy Chief of Staff, G-8**

In addition to the responsibilities in paragraph 2-7, the DCS, G-8 will—

*a.* Assess, validate, and manage funding and budgeting, as required, to facilitate fielding and sustainment of Army spectrum management operations in support of Army tactical and operational networks and Joint electromagnetic spectrum operations across doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy, as prescribed through planning, programming, budget, and execution procedures and by the respective proponents.

*b.* Identify and resource spectrum requirements in all S-D programs and acquisitions in accordance with established DCS, G-3/5/7 priorities in support of the DAS.

*c.* Program for development and procurement of new equipment in coordination with ASA (ALT).

#### **2-6. Chief, National Guard Bureau and Chief, U. S. Army Reserve**

In addition to the responsibilities in paragraph 2-7, Commanders of Reserve Component (RC) units, including Chief, Army National Guard (ARNG) and Chief, 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 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 following are spectrum coordination channels:

(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.* Coordinate spectrum requirements with the appropriate installation spectrum manager, if an RC unit conducts training at a new location. 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. (Normally, RC units are issued frequency assignments for training in garrison or at specified training locations.)

*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 U.S. Army Forces Command (FORSCOM) policy and directives.

#### **2-7. Headquarters, Department of the Army principal officials; Commanders of Army commands, Army service component commands, direct reporting units, and subordinate commands**

Within their respective areas of functional and process proponentcy, HQDA principal officials and commanders will coordinate with the CIO/G-6, G-6, or senior information managers to ensure that spectrum requirements and resources needed to accomplish their organization's assigned mission are identified, validated, addressed, and are in keeping with Army policy, doctrine, assigned responsibilities, and this regulation.

*a.* The ACOM, ASCC, DRU, and subordinate command G-6 official or senior information manager will—

(1) Serve as the senior staff component for spectrum management.

(2) Identify and validate requirements for spectrum manager positions at the ACOM, DRU, ASCC, or subordinate command headquarters.

(3) Ensure that spectrum managers are adequately trained to discharge the functions of a spectrum manager.

(4) Serve as the staff proponent for the ASMP, which includes funding and interfacing with HQDA, and other Army agencies, as required.

(5) Ensure and enforce adherence to international and host nation spectrum laws, regulations, technical standards, and treaties.

- (6) Review and update operational and contingency plans, and initiate changes necessary to ensure spectrum management capabilities are sufficient to support assigned missions.
- (7) Coordinate, plan, program, and fund for adequate management and supervision of EMS use by subordinate entities.
- (8) Ensure compliance with regulations governing the operation of S–D equipment utilizing spectrum allocated for non-Federal Government users.
- (9) Implement spectrum management-related internal controls, as necessary, in accordance with AR 11–2 and this regulation (see app D).
- (10) Ensure that the operation of C–E equipment complies with the limitations and technical tolerances contained in spectrum authorizations.
- (11) Ensure that current ASMP directives and procedural publications are available and being followed.
- (12) Within the US&P, identify to the supporting AFC or the ASMO the unit point of contact responsible for all spectrum matters.
- (13) Document and disseminate CCMD spectrum management, frequency assignment, and host nation coordination procedures to all Army units permanently or temporarily assigned within the area of responsibility (AOR).
- (14) Ensure that requirements for spectrum management capabilities and solutions are identified to TRADOC for validation (see para 2–8).
  - b.* The ACOM, ASCC, DRU, and subordinate command will ensure that spectrum managers—
    - (1) Identify and validate spectrum resource requirements for organizational missions and identify and validate spectrum requirements in support of domestic homeland defense and defense support to civil authorities’ missions.
    - (2) Submit validated spectrum requirements to the Army, DOD, U.S. national, host nation, and international spectrum-approval processes, as appropriate. Ensure that spectrum requirements for foreign military units, training within the US&P, are submitted to the appropriate AFC.
    - (3) Validate frequency assignments to ensure that they are—
      - (a) Currently used, as originally required, for the organization’s mission.
      - (b) Meeting the requirements of appropriate technical standards.
      - (c) Correctly reflected in DOD and national databases or deleted, as necessary, at least 90 days prior to the designated renewal date.
      - (d) Prioritized according to mission requirements and commander’s intent.
    - (4) Consolidate information for generating Signal Operating Instructions for the command.
    - (5) Ensure that an authorization document for each spectrum resource used is retained by the operating activity.
    - (6) Coordinate with mission, senior, and tenant commanders to resolve spectrum scheduling conflicts due to mission overlaps between and among units vying for spectrum access within the same operating area. Issues are referred to the senior commander for adjudication in situations that are beyond the authority of the spectrum manager (see also chaps 4 and 5).

## **2–8. Commanding General, U.S. Army Forces Command**

In addition to the responsibilities in paragraph 2–7, the Commanding General (CG), FORSCOM will—

- a.* Identify the G–6, Spectrum Management Office that coordinates FORSCOM spectrum resource requirements with the AFMO US&P for Army contingency planning, field training exercises, and command post exercises.
- b.* Review FORSCOM personnel authorization documents to identify requirements for authorized spectrum management positions at all FORSCOM organizations. Where necessary, justify and obtain authorized spectrum management positions and the qualified personnel to fill spectrum management requirements, and coordinate critical FORSCOM spectrum management vacancies with the ASMO.
- c.* Maintain an updated Joint C–E operating instructions (CEOI) system database for all continental United States (CONUS) based forces as outlined in CJCSI 3320.03D. For those CONUS-based forces that have not completed the transition to the Joint database, continue to maintain updated Signal Operating Instructions, CEOIs, or Joint CEOI databases.

## **2–9. Commanding General, U.S. Army Training and Doctrine Command**

In addition to the responsibilities in paragraph 2–7, the CG, TRADOC will—

- a.* Integrate Army spectrum management doctrine, policy, and procedures into field training exercises, all leadership development courses, and training challenges at the CTCs, in accordance with the Army total force policy, to ensure an understanding of the use of the EMS to generate and project combat power.
- b.* Coordinate with the CIO/G–6 and ASA (ALT) to ensure that all requirements for the use of spectrum are identified and supportable for all S–D programs when operating within their intended operating environments.
- c.* Review TRADOC personnel authorization documents to ensure requirements for authorized spectrum management positions are identified for all TRADOC garrisons, installations, and organic organizations.

d. Ensure that Army experimentation conducted under the auspices related to concept development, experimentation, and requirements determination complies with DOD, host nation, and U.S. national spectrum laws, regulations, and policies, whether materiel or non-materiel solutions are considered.

e. Identify and document requirements to develop solutions in order to execute—

- (1) Assigning spectrum resources.
- (2) Assessing technical solutions for spectrum-related problems.
- (3) Supporting ACOMs' ability to enforce adherence to RF assignments within their respective AORs.

## **2–10. Commanding General, U.S. Army Materiel Command**

In addition to the responsibilities in paragraph 2–7, the CG, AMC will—

a. Coordinate with the ASMO in order to ensure that spectrum management considerations affecting AMC initiatives are adequately addressed.

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

## **2–11. Commanding General, U.S. Army Cyber Command; Theater Signal Command; network enterprise centers; combat training centers; Army Frequency Management Office, United States and possessions; and area frequency coordinators**

In addition to the responsibilities in paragraph 2–7, the CG, USARCYBER is responsible for managing and servicing spectrum-related requirements for installations in accordance with Army, DOD, U.S. national, host nation, and ITU spectrum regulations, policies, and technical standards. Specialized requirements exist at the CTCs.

a. The Commander, Theater Signal Command, for each installation supported, will—

(1) 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.

(2) Coordinate, plan, program, and fund for adequate management and supervision of spectrum use by subordinate entities.

(3) 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.

(4) Establish a program of continuing review of frequency assignments and delete or amend such assignments as appropriate within the AFC-allotted suspense date.

(5) Appoint Director, 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 IM support.

b. DNECs will—

(1) Provide spectrum resources for operations and training which are authorized on the installation.

(2) Educate the installation and tenant activities on spectrum management policy and procedures.

(3) Coordinate with the installation commander, the ACOM 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).

(4) Determine peace and wartime communications equipment, spectrum resources, and computer system requirements and obtain sufficient capabilities as appropriate for the installation (for example, increased mobilization and training base requirements).

(5) Coordinate with other installation directorates to ensure that S–D equipment being developed or procured for use on the installation is fully spectrum supportable (see chap 4).

(6) Ensure that spectrum authorizations used within the Network Enterprise Center's AORs are valid. Authorizations must be obtained in accordance with chapters 4 and 5.

(7) Ensure that garrison spectrum emitters operate within geographical and technical parameters to promote EMC among equipment.

(8) Serve as the point of contact for spectrum and non-tactical call sign requirements and usage within the installation, including tenant activities and units conducting training on the installation.

(9) Keep records on the types and locations of equipment, and use of the spectrum and non-tactical call signs assigned to the installation.

(10) Process and forward requests for spectrum and call sign assignment, which cannot be met from authorized resources, to the supporting AFC.

(11) Review all spectrum assignments at least every 5 years, as required in paragraph 4–3c(4).

(12) Coordinate, plan, and program for executing assigned spectrum management responsibilities.

c. CTC commanders will—

- (1) Coordinate with their respective DNECs for—
  - (a) Limited technical analyses of S–D equipment utilized at the CTCs to ensure EMC with base infrastructure such as, but not limited to, cell towers or trunk radio systems.
  - (b) Oversight of new fixed S–D systems as they are integrated into the training environment to ensure proper installation and to mitigate negative spectrum impacts.
- (2) Coordinate with the Joint Improvised Explosive Device Defeat Organization’s Army Center of Excellence regarding requirements for testing and implementing defeat systems and robotics for RF improvised explosive devices to mitigate potential EMI.
  - d. AFMO US&P, DOD AFC Arizona (AZ), and DOD AFC WSMR perform operational and administrative actions required by 47 USC, the NTIA, Allied Communications Publication (ACP) 190(D), and the MC4EB to ensure compliance with applicable U.S. Federal, DOD, and Military Department EMS governance and policy in order to minimize RF interference at DOD and Service test ranges and installations. AFMO US&P, DOD AFC AZ, and DOD AFC WSMR will—
    - (1) Serve as the field-level coordinators for processing and coordination of all RF assignments within the assigned area(s) of responsibility (AORs) listed in figure 1–1.
    - (2) Support the revalidation and update of Army frequency records in the Government Master File at least once every 5 years, unless the records are designated for a different review cycle (for example, every 10 years for Aeronautical Assignment Group records). Notify Army users who need to update mission essential frequency assignments in order to avoid revocation by the NTIA or initiate actions to delete the records from the Government Master File, Frequency Resource Record System, and other appropriate databases.
    - (3) Coordinate measures and provide technical guidance between Army and non-Army frequency users in the resolution of harmful interference.
    - (4) Conduct area/installation spectrum management studies and surveys to determine sub-bands for which shared frequency use can be made by the most effective assignment of frequencies over a larger geographical area.
    - (5) Provide technical assistance to installation-level frequency managers and Army users on the Army’s processes pertaining to allocations, allotments, and assignments. Advise Army users in the proper policy and procedures, and channels to follow for each of the processes.
    - (6) Review and evaluate proposed frequency use by other Military Services and Federal agencies to ensure harmful interference is not caused to or by Army users. As required, initiate the necessary coordination and corrective actions to mitigate the potential for interference.
    - (7) Coordinate RF assignments with numerous frequency management representatives, including FCC offices, Federal Aviation Administration regional offices, and aeronautical telemetry assignments with the Aerospace and Flight Test Radio Coordinating Council and DOD test ranges.
    - (8) Maintain copies of all agreements from local FCC licensees and requesting agencies in which they provide written authorization for Army units to operate on particular frequencies that are in non-Government frequency bands.
    - (9) Receive, review, coordinate, and staff EA requests in support of Army programs, or being executed at an Army installation, in accordance with CJCSM 3212.02D.
    - (10) AFMO US&P will—
      - (a) Coordinate and manage the Army’s “tactical” and “training” frequencies, used under the policy and procedures of the DOD–FCC Field Coordination Agreement discussed in the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management. Issue Radio Frequency Authorizations (RFAs) to Army users, which will contain frequencies cleared with the FCC, under this agreement.
      - (b) Coordinate with the FCC for RFAs for Alaska, Hawaii, Guam, Virgin Islands, and Puerto Rico. RFAs for Alaska, Hawaii, and Guam will be handled under distribution guidance to be provided by the 311th Signal Command.
      - (c) In coordination with HQDA, CIO/G–6, process necessary frequency actions with NTIA.
      - (d) Maintain a copy of each RFA issued to spectrum managers in Regular Army installations, respective offices of the State Adjutant General for ARNG units, and U.S. Army Reserve (USAR) commands. Register each RFA in the Frequency Resource Record System.
    - (11) DOD AFC AZ/DOD AFC WSMR will also perform duties as described in ACP 190 U.S. Supp–1(D) that are not specifically covered in this regulation.

## **2–12. Commanding General, U.S. Army Test and Evaluation Command**

- a. The Director, Battlefield Electromagnetic Environments Office will—
  - (1) Support the Army EMC Program 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 EMC Program to provide timely scientific and technical support to the ASMP. EMC Program 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, Electromagnetic Environment Test Facility 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. Assess 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.

## **Chapter 3**

### **Army Spectrum Management Program in Support of Combat Development, Materiel Development, and Army Acquisition Programs**

#### **3–1. Purpose**

The purpose of the ASMP is to provide CBTDEVs and MATDEVs with information to determine whether the EMS necessary to support the operation of S–D systems will be available. Aligning the ASMP with standard CBTDEV and MATDEV processes, allows developers to ensure that sufficient bandwidth within allocated frequency bands is available to support Army S–D system development, acquisition, and operations in all of their intended EMEs without causing or receiving unacceptable interference (see DODI 4650.01).

#### **3–2. Applicability**

The ASMP applies to all Army CBTDEVs and MATDEVs, as well as acquisition professionals who develop, acquire, or operate equipment that uses, or requires access to, the EMS.

*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 EMS.

*b.* Development or acquisition of systems that meet operational requirements, for a specific theater, but fail to obtain spectrum supportability through ASMO, may not be allowed to operate in the United States or other host nations. To mitigate the potential these systems create for EMI with other spectrum users and to gain a spectrum supportability determination, development and procurement of S–D systems must be coordinated with ASMO.

*c.* The security classification or operational function of an S–D system will not exempt a system’s adherence to the ASMP. Spectrum requirements for Special Access Programs and intelligence systems must be coordinated with DCS, G–2 oversight, and be in accordance with Executive Orders, DNI directives, Intelligence Community policies, and DOD intelligence policies and other laws and regulations.

#### **3–3. Elements of the Army Spectrum Management Program**

In order to determine a system’s spectrum supportability, the following must be accomplished:

*a.* An SSRA must be completed and submitted to the ASMO prior to Milestone A and prior to each phase of the DAS. Commercial off-the-shelf (COTS) or other non-developmental S–D systems must not be purchased, procured, or developed without an approved SSRA, which assesses potential risks associated with gaining required U.S. national and host nation approvals to access the EMS. The SSRA submission process has two parts, the SSRA and the spectrum supportability determination, and is repeated at each phase of the DAS (see app C for details regarding the Army SSRA process).

(1) The SSRA consists of documenting the S–D aspects of a system during each phase of the acquisition life cycle and should include the following components:

*(a)* EMC component.

*(b)* Spectrum regulatory component.

*(c)* Technical component.

*(d)* Operational component.

(2) A spectrum supportability determination for the SSRA must be received from the CIO/G-6 ASMO, which approves the CBTDEV's or MATDEV's assessment of a system's potential spectrum supportability in order to continue the procurement or development of the S-D device.

b. In addition to the SSRA, a DD Form 1494 will be submitted to the ASMO during each phase of the DAS (see DA Pam 25-1-1).

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

(2) 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.

c. The CBTDEV or MATDEV must coordinate with ASMO to determine the availability of sufficient bandwidth and regulatory protection in order 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).

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

d. The Army acquisition E3 Program, as defined in DA Pam 70-3, is applicable to all materiel solutions that may have an effect upon or be affected by the EMS. It is not limited to S-D systems and involves all processes used by acquisition personnel to successfully design, specify, test, evaluate, field, and maintain materiel solution systems in all expected EMEs. The parts of the Army's acquisition E3 program focusing on spectrum supportability include the assessment of a system's EMC and EMI in the intended operational environment. Table 3-1 shows the type of E3 actions required at each DAS phase.

e. Devices used solely to activate fuses or detonators, or to provide settings and mission data to fuses and munitions inductively, are exempt from the DD Form 1494 requirement. However, these devices must conform to the DOD E3 Program as outlined in DODI 3222.03, the Army Acquisition E3 Program, and other appropriate military standards.

**Table 3-1  
Required Army Spectrum Management Program actions at each Defense Acquisition System phase**

| <b>DAS phase</b>    | Materiel solution analysis         | Technology development  | Engineering and manufacturing development<br><br>(System development and demonstration)                     | Production and deployment       | Operations and support  |
|---------------------|------------------------------------|---|---|---------------------------------|---|
| <b>SSRA Type</b>    | 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. |
| <b>DD Form 1494</b> | Stage 1, Conceptual                | Stage 2, Experimental   | Stage 3, Developmental  | Stage 4, Operational            | Stage 4, Revision   |
| <b>E3 Program</b>   | E3 Program requirements definition | Address E3 in Capabilities development document, Joint Capabilities Integration and Development System (JCIDS), test and evaluation | 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.   |

**Table 3–1  
Required Army Spectrum Management Program actions at each Defense Acquisition System phase—Continued**

|  |   |  |  |   |  |
|--|---|--|--|---|--|
|  |   | master plan (TEMP), and so forth.  |  |   |  |
| <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.<br><br>Initiate preliminary spectrum discussions with ASMO, NTIA, and FCC. | Perform detailed spectrum signature, receiver degradation, and antenna tests.<br><br>Consider obtaining host nation supportability comments, through ASMO.<br><br>Request frequencies needed for US&P testing. | Obtain host nation supportability comments, through ASMO. | Stay aware of the impact of the FCC and ITU on spectrum access.<br><br>Request training frequency approvals.<br><br>Coordinate homeland defense spectrum requirements. |

Note. The end-to-end review process for the DD Forms 1494 submitted at stages 1 and 2 usually takes from 6 to 18 months. 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.

## Chapter 4 Frequency Assignment Types, Radio Station Identification, and Electromagnetic Interference Resolution

### 4–1. Introduction

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 Network Enterprise Center spectrum manager, responsible AFC (see fig B–1), or designated authority must formally provide a frequency authorization or license. For information specific to commercial and military Satellite Communications (SATCOM) systems, see paragraph 5–5. 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 EMS available for support of the ACOMs, agencies, and activities within the US&P and Army components of CCMDs.
- c. Promote rapid and direct action in responding to requirements submitted for spectrum approval.

### 4–2. Spectrum coordination channels

US&P spectrum management coordination regions are shown in figure 1–1. All systems submitted for frequency assignment approval must have a verified and ASMO-accepted DD Form 1494. A spectrum planning subcommittee number for Stage 2 DD Form 1494 submission is the minimum requirement for NTIA approval of experimental noninterference basis frequency assignments. Final approved Stage 4 is required to obtain permanent assignments in the Government Master File.

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

b. *Joint bases.*

(1) Spectrum requirements supporting Joint Base functions will be processed through the Lead Service Joint Base Spectrum Management Office (JBSMO). Functions not supporting Joint Base Operations will be coordinated with the JBSMO but processed through already established Army, Navy, Air Force, and Marine Corps channels. 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 JBSMO.

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

(3) Table 4–1 lists Joint bases and lead Service for each in accordance with the Base Closure and Realignment Act of 2005. Refer to DODI 4650.01 for additional guidance.

| <b>Table 4–1<br/>Joint Bases</b> |   |
|----------------------------------|---|
| <b>Lead service</b>              | <b>Joint base</b>   |
| <b>Army</b>                      | Joint Base Lewis-McChord, WA<br>Joint Base Myer-Henderson Hall, VA  |
| <b>Navy</b>                      | Joint Base Pearl Harbor-Hickam, HI<br>Joint Region Marianas, Guam<br>Joint Base Anacostia-Bolling, Washington, DC<br>Joint Base Little Creek-Story, VA  |
| <b>Air Force</b>                 | Joint Base Charleston, SC<br>Joint Base McGuire-Dix-Lakehurst, NJ<br>Joint Base Andrews Naval Air Facility Washington, DC<br>Joint Base Elmendorf-Richardson, AK<br>Joint Base Langley-Eustis, VA<br>Joint Base Lackland-Sam Houston-Randolph, TX |

c. *Combatant command areas of responsibility.* With the exception of the U.S. Army Northern Command (US-NORTHCOM), applicants for frequency assignments will submit requirements according to the directives of the responsible ASCC, CCMD, and/or applicable host nation agreement. The commander of each geographic CCMD, with the exception of USNORTHCOM, is responsible for all military use of frequencies within the designated CCMD AOR.

d. *Army contractors.*

(1) 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.

(2) 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.

e. *MATDEVs.*

(1) 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 para B–1).

(2) 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.

### **4–3. United States and possessions frequency assignment types and actions**

National approval for Army systems to access the EMS within the US&P is evidenced by NTIA’s placement of a frequency assignment record in the Government Master File database. An Army S–D system that no longer has regulatory protection through a valid assignment is required to cease operation immediately.

a. Unless otherwise directed by the Office of the Assistant Secretary of Defense, applicants will submit spectrum requests using the standard frequency action format (SFAF) as found in MCEB Pub 7 (see app A for availability.)

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

(1) Regular (“permanent”) frequency assignments are valid for an unspecified period of time and contain a review date that is 5 to 10 years from the initial date of approval.

(2) Temporary frequency assignments are valid for a specified period of time with an expiration date not to exceed five years.

(3) Trial frequency assignments are made for the purpose of selecting a suitable, specific operating frequency for regular assignment with an expiration date not to exceed 2 years.

c. ACP 190, U.S. Supplement-1(D) describes the types of spectrum actions and coordination channels and provides guidance and procedures for processing assignment requests. Frequency assignment actions include the following:

(1) *New assignments.* Requests for new frequency assignments must contain the information required in the SFAF 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 noncompliance.

(a) Regular assignments require a minimum of 120 days' lead time.

(b) Temporary assignments require a lead time of 45 days. This includes testing and evaluating experimental equipment, training exercises, and trial assignments.

(2) *Assignment modifications.* A modification request may be granted for 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 changes. Additionally, assignments with expiration dates may be renewed. Requests for renewal must be submitted in DOD standard format and received by the supporting AFC no later than 90 days prior to the expiration date. These assignments automatically expire, if no action is taken, and operation must cease immediately.

(3) *Assignment deletions.* Using activities will submit requests for assignment deletion (to include navigational aid identifiers) by letter, message, or e-mail, using the DOD standard format, through spectrum management channels when assignments are no longer required.

(4) *Five and ten-year reviews of regular frequency assignments.* The supporting Army AFC will provide users a listing of frequency records requiring 5- and 10-year reviews with a suspense date. Suspense dates are based on the NTIA designation date and will provide adequate time for the assignment review to be processed. In accordance with NTIA Manual, all regular assignments registered in the Government Master File require review to ensure that:

(a) Frequency assignments are in current use and are correctly reflected in the Government Master File.

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

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

d. NTIA will delete frequency assignments from the Government Master File that are not reviewed by the NTIA's allotted suspense date and will notify the CIO/G-6, by way of a letter, of all deleted 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, must 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 (in excess of the 120-day minimum for regular assignments) for such coordination and plan accordingly.

b. International frequency registration for specific types of military S-D 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.

#### **4-5. Ship radio station identification**

To submit a request for ship radio station identification, contact ASMO, National Regulatory Branch, frequency assignment team.

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

(1) International call signs under ITU Radio Regulations; the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management; and implementation policy and procedures of the FCC.

(2) Ship Radio Authorization (SRA) for Army vessels and watercraft in accordance with the call sign book for ships, ACP 113 (AI).

(a) SRAs are required for operation of non-tactical shipboard radio stations used on any watercraft owned or operated by the Army.

(b) SRAs are 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 RFA. SRAs that are not renewed in the above time periods are subject to cancellation, and may be assigned to another station.

(c) SRAs are documented by the CIO/G-6, so that ASMO may delete from the National Registry as required. The Owning unit must notify ASMO when C-E equipment is permanently removed from a vessel, a vessel is sold, scrapped, or otherwise disposed of, or if a vessel is transferred to another agency.

b. ASMO will register Army Maritime Mobile Service Identity with the FCC and U.S. Coast Guard, in accordance with ITU Radio Regulation 19.30 and the NTIA Manual of Regulations and Procedures for Federal Radio Frequency Management.

#### **4-6. Tactical radio call signs and call words**

Call signs associate radio stations with command authorities, activities, facilities, units, elements, or individual positions. In Army usage, a call sign is a combination of letters and digits and is used to establish and maintain communications. Call signs are not to be used to identify people; however, call words, such as “RED DOG 6” or “SPEEDY TULIP 3,” are authorized for communications only when operating in a secure mode. This applies to aeronautical, maritime, and ground stations. If operating as a part of a Joint Task Force, refer to the Joint CEOI, master net list, in accordance with Joint Publication (JP) 6-01.

#### **4-7. Electromagnetic interference resolution**

In accordance with CJCSM 3320.02D, incidents of EMI will be resolved at the local unit level, when possible, and all incidents are reported in the Joint Spectrum Interference Resolution Online at the following Secret Internet Protocol Network (SIPRNET) site: <https://intelshare.intelink.sgov.gov>.

### **Chapter 5**

## **Access to Non-Government Frequency Bands, Use of Spectrum-Dependent Commercial Off-the-Shelf Systems, Terrestrial Radio, Satellite Systems, Unmanned Vehicles, and Electronic Attack Operations**

### **5-1. Introduction**

This chapter contains policies for Army use of spectrum allocated in the United States to non-Federal users, including the private sector and state and local authorities 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 of Regulations and Procedures for Federal Radio Frequency Management to obtain the latest policies regarding Federal use of the EMS.

### **5-2. Access to non-Government bands**

The Army may request and gain authorization by the FCC, as outlined in chapter 7 of the NTIA Manual and Title 47 Code of Federal Regulations (CFR) Part 15 (47 CFR 15), to use frequencies in certain non-Government bands in order 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 must 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 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 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 Federal Communications Commission—licensed station on Army installations.* Citizens band, amateur radio, taxi companies, 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 published in 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 installation G-6 prior to operation of such equipment on the installation.

### **5-3. Use of spectrum-dependent, 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. The systems include the following:

a. *Non-licensed “Part 15” or short-range devices.* A non-licensed device is a low-power intentional, unintentional, or incidental radiator or device that meets the technical specifications and policies in Title 47 Code of Federal Regulations (CFR) 15 (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 non-licensed devices are wireless local area networks, WI-FI systems, wireless microphones, cordless telephones, and garage-door openers.

(1) *Federal Communications Commission rules.* FCC rules state that non-licensed 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 non-licensed device must immediately cease operation. (See the NTIA Manual for additional details regarding Army use of Part 15 devices.)

(2) *United States and possessions operations.* Non-licensed devices operating within the US&P supporting garrison operations do not require a DD Form 1494 and may be operated officially without a NTIA approved frequency assignment; however, DOD requires a frequency assignment registered in the Frequency Resource Record System database and Army users must obtain frequency authorization from the supported AFC.

(3) *Outside United States and possessions operations.* Theater commanders and host nations decide if frequency support is available and the requirements for frequency assignments. Users must submit a DD Form 1494 through the supporting spectrum manager for equipment that intentionally radiates and will be deployed outside the US&P.

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

b. *Installation commanders.* Installation commanders should strongly consider limiting the use of Part-15 devices to the installation cantonment area, and should work with the range/base installation spectrum manager, to develop an installation-level policy statement for the use of Part-15 devices.

c. *General Mobile Radio Service.* The General Mobile Radio Service (GMRS) is a personal two-way voice communications service that operates on 16 frequencies in the 460–470 megahertz (MHz) exclusive, civil frequency band. GMRS will not be used by Army units for tactical or combat operations (47 USC 95 provides regulatory guidance).

d. *Family Radio Service.* The 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 granted 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 in the US&P. Possession and use of FRS radios outside the US&P is subject to host nation and international regulations.

(2) 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. Likewise, the installation commander is under no obligation to protect FRS from interference.

(3) Use only FCC-certified FRS. Any modifications to the equipment such as, but not limited to, boosting power, using non-stock antennas, or altering the antenna to increase gain, cancels the FCC certification and voids authority. Illegal FRS equipment is subject to confiscation.

(4) The FCC may restrict use of the FRS radios if the station is located within the National Radio Quiet Zone (areas of Maryland, Virginia, and West Virginia 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).

*e. 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.

*f. Citizen band radios.* The following policies apply to Army users of citizen's band radios:

(1) Regulations governing the use of citizen's band 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 station is subject to local requirements and restrictions of the installation commander.

(2) Possession of citizen's band radios outside the United States is subject to host nation and other international regulations.

*g. Specialized Mobile Radio service.* Government agencies, including the Army, are authorized to use the Specialized Mobile Radio (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) Army elements must 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 Pub 7).

*h. 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, on a primary basis. Army use of these frequencies, on a non-interference basis, will require coordination with the incumbent license holder and the FCC. Army activities must contract through an appropriate contract vehicle for access through FCC licensed holders.

#### **5–4. Use of government terrestrial radio systems**

*a. Air traffic control.* Air traffic control frequencies are used to control the movement of aircraft and 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 air traffic control 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 and 148–150.8 MHz bands have been allotted for primary use; the 380–399.9 MHz range has been allotted for exclusive use. Units requesting LMR frequencies are encouraged to request assignments in the 138–144 MHz, 148–149.9 MHz, 150.05–150.8 MHz, 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 CCMD that host nation LMR frequency authorizations are available.

(1) *Specific frequencies.* The following LMR policies also apply:

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

(b) 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-kilohertz channelization plan and the guidance contained in Deputy Secretary of Defense Memorandum, dated 1 August 2001, subject: Policy for Land Mobile Radio Systems, and section 2.3.10.1 (LMR Systems) of the NTIA Manual.

(2) *Trunked land mobile radio systems.*

(a) A trunked LMR system is a spectrum efficient method to meet 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. DA Pam 25–1–1 provides IM and acquisition policy and procedures for these systems. 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. 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 section 9, chapter 10 of the NTIA Manual.

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

c. *Special considerations for high frequency requests within the United States and possessions.* The use of high frequency 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 high frequency 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 with 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.

(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 and Military Auxiliary Radio System, do not exist, are not practical for installation, and the use of frequencies above 30 MHz is not practical.

d. *Maritime use and others.* 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 chapters 5 and 8 of 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 CJCSI 6250.01E. Army policies and procedures for commercial satellite systems are described in DA Pam 25–1–1.

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

(1) All satellite terminals capable of accessing commercial satellites in the Fixed Satellite Service 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 (see app A) for procedures and guidance regarding DOD users of Earth terminals utilizing commercial Fixed Satellite Service outside of the US&P.

(3) Users should contact DISA for guidance on leased Fixed Satellite Service under the Future Commercial Satellite Communications Services Acquisition, which consists of a comprehensive set of acquisition activities that replace expired and expiring DISA and General Services Administration contracts, including the Defense Information Systems Network Satellite Transmission Services - Global and International Maritime Satellite (INMARSAT) Bridges contract. Information may be obtained by accessing <http://www.disa.mil/network-services/satellite> or <https://www.gsa.gov/technology/technology-purchasing-programs/telecommunications-and-network-services/satellite-communications-satcom-products-and-services>.

(4) Mobile Satellite Service provides communication capabilities for mobile Earth stations by means of one or more space stations.

(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.* The Army's use of INMARSAT is allowable for filling voids in primary Army communications networks. Neither spectrum certification nor frequency assignment is required for INMARSAT operations. Refer to AR 25–13, the NTIA Manual, and DA Pam 25–1–1 for guidance. For further assistance, contact ASMO or DISA.

c. *Iridium.* In accordance with DOD CIO policy, as outlined on the DISA Web site regarding enhanced mobile satellite services (<http://disa.mil/network-services/satellite/emss>), Iridium is approved for use as a commercially-leased service.

Neither a spectrum certification nor frequency assignment is required; however, special procedures exist for the purchase and use of Iridium service and equipment (see AR 25–13). Users should contact ASMO and DISA for guidance.

## 5–6. Unmanned vehicles

*a. Joint Tactical Information Distribution System/Multifunction Information Distribution System.* The Joint Tactical Information Distribution System/Multifunction Information Distribution System 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. Frequency assignments and operations must be in strict adherence with CJCSI 6232.01E. Units with a secure sockets layer client certificate can access this at <http://www.dtic.mil>. Additional planning guidance may be found in the Joint Tactical Information Distribution System/Multifunction Information Distribution System Spectrum Users Guide, available at <https://www.my.af.mil>.

*b. Unmanned aerial vehicle frequencies.*

(1) The Army will comply with Office of the Assistant Secretary of Defense 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, on the SIPRNET.) However, due to the latency of the memorandum, spectrum managers should verify with current spectrum allocations before making frequency assignments.

(2) Army SSRAs for RF systems using Ku-band will quantify the necessary conditions to ensure mutual EMC with other military, Federal, and civil spectrum systems.

*c. Unmanned ground vehicles.*

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

(2) Legacy unmanned ground vehicle 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.

## 5–7. Electronic attack operations

An approved DD Form 1494 or frequency assignment does not constitute approval to conduct EA training or testing of EW systems. The testing and training of EA systems, such as the employment of counter remote control improvised explosive device electronic warfare (CREW) devices, or the exercise of Global Positioning System EA, will be conducted on a noninterference basis with other spectrum dependent systems, or services, and are subject to immediate shutdown if operations cause unintended interference. In the US&P, the NTIA recognizes CJCSM 3212.02D as the official guidance for frequency clearance procedures when conducting EAs.

*a. EA frequency clearances are granted as follows:*

(1) Users of EW equipment must comply with local EA frequency clearances, host nation agreements, CCMD directives, MC4EB policy and procedures, the guidance received from the DD Form 1494 process, and any other guidance provided by the Director, ASMO to the MATDEV.

(2) EA testing, training, and exercises involving the Global Positioning Systems will be conducted in accordance with CJCSM 3212.03A.

*b. Non-US&P and overseas applicants will submit EA requirements in accordance with the directives of CCMDs or host nation agreements. Combatant commanders, with the exception of USNORTHCOM, are responsible for all military use of frequencies, including EA, within their AORs.*

## Chapter 6

### Consequences and Risks of Noncompliance

#### 6–1. Introduction

The development and employment of S–D 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, punitive action may be taken against violators due to noncompliance with the policies referenced and outlined in 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/G–6, Command, Control, Communications, and Computers**

*a.* In accordance with AR 70–1 and 40 USC 1401 (The Clinger-Cohen Act of 1996), the CIO/G–6 will not concur with the continuation or modification of Army S–D programs unless those programs are in compliance with the provisions of chapters 1 through 5.

*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 CCMD initiative funds.

## **6–3. Notice of apparent liability**

Adherence to FCC regulations as found in 47 CFR and the NTIA Manual and Procedures for Federal Radio Frequency Management is mandatory for Army civilians, military, and contract personnel. Punitive measures may result from violations of the CFR. Refer to 47 USC 503 regarding punishment of any person that willfully or repeatedly fails to comply with any of the provisions stated.

## **6–4. Host nation denial of authorization to operate**

The United States accepts its international treaty obligations, 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.

*c.* Incidents involving mutual interference between Army and host nation S–D devices must be reported as a matter of priority through Army components to the CCMD spectrum manager and the ASMO.

*Note.* In accordance with CJCSI 5116.05, the organization previously known as the Military Communications-Electronics Board (MCEB) has changed its name to the Military Command, Control, Communications, and Computer (C4) Executive Board (MC4EB). MCEB Publication 7 and MCEB Publication 8 will be renamed to reflect changes made to the organization's name (MC4EB) during their next scheduled revision. To alleviate confusion to the reader of this regulation, references to these documents will reflect their names as currently listed (for example, MCEB and vice MC4EB).

## Appendix A

### References

#### Section I

##### Required Publications

**ACP 113 (AI)**

Allied Communications Publications, Call Sign Book for Ships (Cited in para 4–5a(2).) (Available on the Army Spectrum Management Office (ASMO) SharePoint Site at <https://go.usa.gov/xe4xz>, upon request.)

**ACP 190 (D)**

Allied Communications Publications, Guide to EMS Management in Military Operations (Cited in para 2–11d.) (Available on the Army Spectrum Management Office (ASMO) SharePoint Site at <https://go.usa.gov/xe4xz>, upon request.)

**ACP 190 U.S. Supp–1(D)**

Allied Communications Publications, Guide to Frequency Planning, U.S. Supplement-1(D) (Cited in para 2–11d(11) .) (Available on the Army Spectrum Management Office (ASMO) SharePoint Site at <https://go.usa.gov/xe4xz>, upon request.)

**AR 25–13**

Army Telecommunications and Unified Capabilities (Cited in para 5–5b.)

**AR 70–1**

Army Acquisition Policy (Cited in para 2–1b.)

**Base Closure and Realignment Act of 2005**

Base Closure and Realignment Act of 2005 (Cited in para 4–2b(3).) (Available at <http://www.defense.gov>.)

**CJCSI 3320.02F**

Joint Spectrum Interference Resolution (Cited in para 2–2g(20).) (Available at <http://www.jcs.mil/library/>.)

**CJCSI 3320.03D**

Joint Communications Electronics Operating Instructions (Cited in para 2–8c.) (Available at <http://www.jcs.mil/library/>.)

**CJCSI 6232.01E**

LINK–16 Spectrum Deconfliction (Cited in para 5–6a.) (Available at <http://www.jcs.mil/library/>.)

**CJCSI 6250.01E**

Satellite Communications (Cited in para 5–5.) (Available on the SIPRNET by the Army Spectrum Management Office (ASMO), upon request.)

**CJCSM 3212.02D**

Performing EA in the United States and Canada for Tests, Training, and Exercises (Cited in para 2–11d(9) .) (Available on the SIPRNET by the Army Spectrum Management Office (ASMO), upon request.)

**CJCSM 3212.03A**

Performing Tests, Training, and Exercises Impacting the Global Positioning System (GPS) (Cited in para 5–7a(2).) (Available on the SIPRNET by the Army Spectrum Management Office (ASMO), upon request.)

**CJCSM 3320.02D**

Joint Spectrum Interference Resolution (JSIR) Procedures ( (Cited in para 2–2g(20).) (Available at <http://www.jcs.mil/library/>.)

**DA Pam 25–1–1**

Army Information Technology Implementation Instructions (Cited in para 3–3b.)

**DA Pam 70–3**

Army Acquisition Procedures (Cited in para 2–1b.)

**DA Pam 611–21**

Military Occupational Classification and Structure (Cited in para D–4a(17).)

**Deputy Secretary of Defense Memorandum**

Policy for Land Mobile Radio Systems (Cited in para 5–4b(1)(b).) (Available on the Army Spectrum Management Office (ASMO) SharePoint Site at <https://go.usa.gov/xe4xz>, upon request.)

**DODD 5000.01**

The Defense Acquisition System (Cited in para 1–6a .) (Available at [https://www.esd.whs.mil/dd/.](https://www.esd.whs.mil/dd/))

**DODI 3222.03**

DOD Electromagnetic Environmental Effects (E3) Program (Cited in para 3–3e.) (Available at [https://www.esd.whs.mil/dd/.](https://www.esd.whs.mil/dd/))

**DODI 4650.01**

Policy and Procedures for Management and Use of the Electromagnetic Spectrum (Cited on the title page.) (Available at [https://www.esd.whs.mil/dd/.](https://www.esd.whs.mil/dd/))

**DODI 5000.02**

Operation of the Defense Acquisition System (Cited in para 6–2b.) (Available at [https://www.esd.whs.mil/dd/.](https://www.esd.whs.mil/dd/))

**ITU Radio Regulation 19.30**

International Telecommunications Union Radio Regulation (cited in para 4–5b.) (Available at <https://www.itu.int>.)

**JP 6–01**

Joint Electromagnetic Spectrum Management Operations (Cited in para 4–6.) (Available at <http://www.jcs.mil/doctrine>.)

**MCEB Pub 7**

Frequency Resource Record System (FRRS) Standard Frequency Action Format (SFAF) (Cited in para 4–3a.) (Available at <https://acc.dau.mil>.)

**National Telecommunications and Information Administration**

Manual of Regulations and Procedures for Federal Radio Frequency Management (Redbook) (Cited on the title page .) (Available at <http://www.ntia.doc.gov/>)

**Under Secretary of Defense for Acquisition, Technology and Logistics Memorandum**

Unmanned Aircraft Systems (UAS) Spectrum Policy Guidance (Cited in para 5–6b(1).) (Available on the SIPRNET at <https://portal.nonrel.centcom.smil.mil>.) (APD was unable to access this site; however the proponent requires this reference.)

**World Radiocommunication Conference**

Radio Regulations (Cited in para 4–5a(1).) (Available at <http://www.itu.int/pub/r-reg-rr>.) (*Note.* Will require the requester to create an account.)

**47 CFR**

Telecommunication (Cited on the title page.) (Available at <https://www.govinfo.gov>.)

**40 USC 1401**

The Clinger-Cohen Act of 1996 (Cited in para 6–2a.) (Available at <http://www.gpo.gov>.)

**47 USC**

Telecommunications (Cited in para 1–7c.) (Available at <http://uscode.house.gov/>.)

**Section II****Related Publications**

A related publication is a source of additional information. The user does not have to read it to understand this regulation.

**AR 1–1**

Planning, Programming, Budgeting, and Execution

**AR 10–87**

Army Commands, Army Service Component Commands, and Direct Reporting Units

**AR 11–2**

Managers' Internal Control Program

**AR 11–7**

Internal Review Program

**AR 25–1**

Army Information Technology

**AR 25–6**

Military Auxiliary Radio System and Amateur Radio Program

**AR 71–9**

Warfighting Capabilities Determination

**AR 95–2**

Air Traffic Control, Airfield/Heliport, and Airspace Operations

**AR 385–10**

The Army Safety Program

**CJCSI 5116.05**

Military Command, Control, Communications, and Computers Executive Board (Available at <http://www.jcs.mil/library/>.)

**Defense Acquisition Guidebook**

Chapter 7.6.3, Spectrum Management and E3 in the Acquisition Life Cycle (Available at <https://www.dau.mil/tools/dag>.)

**DODD 6055.9E**

Explosives Safety Management (ESM) (Available at <https://www.esd.whs.mil/dd/>.)

**DODI 6055.11**

Protecting Personnel from Electromagnetic Fields (Available at <https://www.esd.whs.mil/dd/>.)

**DODI 8410.02**

NetOps for the Global Information Grid (GIG) (Available at <https://www.esd.whs.mil/dd/>.)

**E3 and SM Assessment Guide for Operational Testing**

Findings and Recommendations of the Study on Early Consideration of Spectrum Supportability in Spectrum Dependent System Acquisitions (A copy of the document can be found on the Army Spectrum Management Office (ASMO) SharePoint Site at <https://go.usa.gov/xe4xz> upon request.)

**JANAP 119**

Joint Call Sign Book (A copy of the document can be found on the Army Spectrum Management Office (ASMO) SharePoint Site at <https://go.usa.gov/xe4xz> upon request.)

**Joint Tactical Information Distribution System**

Multifunction Information Distribution System Spectrum Users Guide (A copy of the document can be found on the Army Spectrum Management Office (ASMO) SharePoint Site at <https://go.usa.gov/xe4xz> upon request.)

**MCEB Pub 8**

Standard Spectrum Resource Format (SSRF) (A copy of the document can be found on the Army Spectrum Management Office (ASMO) SharePoint Site at <https://go.usa.gov/xe4xz> upon request.)

**MCEB–M–008–03**

DOD Spectrum Procedures for the Use of Commercial Satellite Earth Terminals Outside United States and Possessions (A copy of the document can be found on the Army Spectrum Management Office (ASMO) SharePoint Site at <https://go.usa.gov/xe4xz> upon request.)

**MIL–HDBK–240A**

Hazards of Electromagnetic Radiation to Ordnance Test Guide (Available at <https://quicksearch.dla.mil/>.)

**MIL–STD–188–124B**

Grounding, Bonding and Shielding for Common Long Haul/Tactical communications Systems Including Ground Base Communications-Electronics Facilities and Equipment (Available at <https://quicksearch.dla.mil/>.)

**MIL–STD–461G**

Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment (Available at <https://quicksearch.dla.mil/>.)

**MIL–STD–464C**

Electromagnetic Environmental Effects Requirements for Systems (Available at <https://quicksearch.dla.mil/>.)

**MIL–STD–469B**

Radar Engineering Interface Requirements, Electromagnetic Compatibility (Available at <https://quicksearch.dla.mil/>.)

**MIL–STD–2169B**

High-Altitude Electromagnetic Pulse (HEMP) Environment (Available at <https://quicksearch.dla.mil/>.)

**OMB Circular A–11**

Preparation, Submission and Execution of the Budget (Available at <https://www.whitehouse.gov/>.)

**Telecommunications Series TS–94**

Handbook of Occupational Groups and Families (A copy of the document can be found on the Army Spectrum Management Office (ASMO) SharePoint Site at <https://go.usa.gov/xe4xz> upon request.)

**50 USC**

War and National Defense (Available at <http://uscode.house.gov/>.)

**Section III****Prescribed Forms**

Unless otherwise indicated, DD forms are available on the Executive Services Directorate (ESD) website: <http://www.esd.whs.mil/directives/forms/>.

**DD Form 1494**

Application for Equipment Frequency Allocation (Prescribed in paras 2–2g(8).)

**Section IV****Referenced Forms**

Unless otherwise indicated, DA forms are available on the Army Publishing Directorate (APD) website: <https://armypubs.army.mil/>.

**DA Form 11–2**

Internal Control Evaluation Certification

**DA Form 2028**

Recommended Changes to Publications and Blank Forms

## Appendix B

### Frequency Coordination

#### B-1. Frequency coordination channels

Functional coordination channels for ASMO, AFCs, and AFMO US&P are shown in figure B-1.

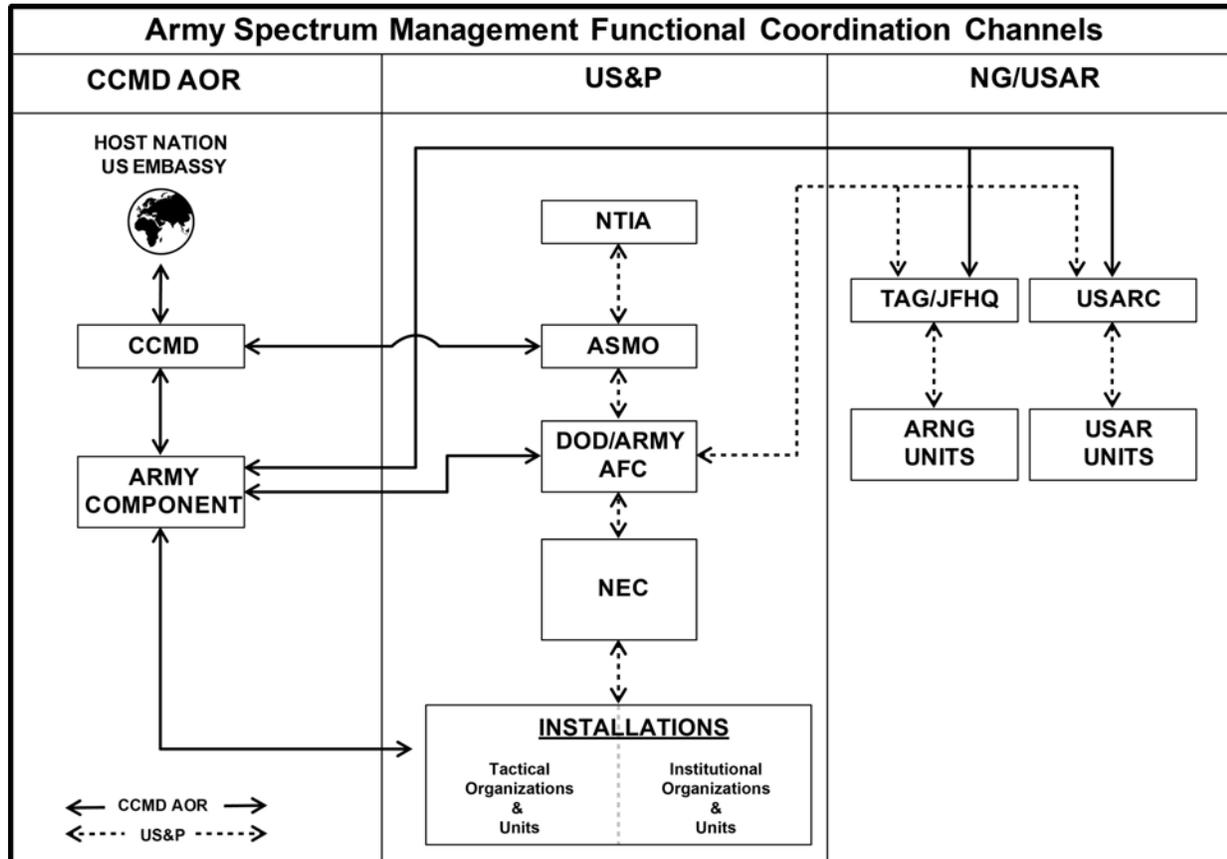


Figure B-1. Functional coordination channels

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

The following is a list of contact information and AORs:

a. Army Frequency Management Office, United States and possessions located at Fort Sam Houston, TX 78234-2720. Telephone: (210) 221-2820, DSN: 471-2820/FAX:-2844. AOR: Alabama, Alaska, Arkansas, California, Colorado (less the area west of 108oW), Connecticut, Delaware, District of Columbia, Florida, Georgia, Guam, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, 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 (km) radius of WSMR), Utah (less the area east of 111oW), Vermont, Virginia, Washington, West Virginia, Wisconsin, Wyoming, Puerto Rico, and the Virgin Islands.

b. Area frequency coordinator, AZ (entire state), located at Fort Huachuca, AZ 85613-6000. Telephone: (520) 538-6423 or -6424, DSN: 879-6423 or 6424, FAX: 879-8525.

c. Area frequency coordinator (SFIS-FAC-SS), 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 111 N. West.

## Appendix C

### Army Spectrum Supportability Risk Assessment Writing Guide

#### C–1. Introduction

This guide is written for all Army CBTDEVs, MATDEVs, and acquisition professionals, who develop, acquire, integrate, or operate equipment that is dependent upon the use of, requires access to, is affected by, or has an effect upon the EMS. The intent is to provide detailed guidance on how to assure spectrum access or compatibility for all Army developed systems. The SSRA outline must be tailored for the type of acquisition, whether it is a singular system, “family of systems” (FoS), or “system of systems” (SOS). Only one integrated SSRA will be prepared and submitted to ASMO in support of the upcoming milestone or applicable decision (such as an in-process review, when required). In addition to a title page and table of contents, a typical SSRA will include the sections described below, and in the following format.

#### C–2. Section 1: Spectrum supportability risk assessment introduction

The SSRA Introduction will include the following:

- 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 milestone or acquisition decision point is being supported.
- d. A summarizing table, when applicable, shown below in table C–1, where “YY” is a placeholder.
- e. In the cells below column heading, enter appropriate text.

**Table C–1**  
**YY: System description and deployment**

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

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

SSRA spectrum considerations will 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 make up the system. Determine the following technical parameters of the system, based largely on recommended technology:
    - (a) Application: Operation only at fixed sites, during motion, transportable.
    - (b) Host platform (for example, dismounted Soldier, airborne, tactical operation center, and so forth).
    - (c) Frequency range of operation.
    - (d) Required throughput.
    - (e) Required radiated bandwidth.
    - (f) Receiver selectivity.
    - (g) Receiver criteria required for desired operation.
    - (h) Transmitter power output.
    - (i) Antenna gain and characteristics.
    - (j) Anticipated host nations (for example, United States only, and envisioned host nations).
  - (2) For a FoS or SOS, identify the number and types of radios, channel requirements, and so forth, that are needed to provide for intended operation. Table C–2, below, provides an example of how to summarize the system spectrum requirements.

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

| System | Radio | Waveform | Frequency band(s) |
|--------|-------|----------|-------------------|
|        |       |          |                   |

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

|  |  |   |   |
|--|--|---|---|
| The system may be a composite of multiple sub S-D equipment's. | Identify the specific radio or S-D equipment's 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 program managers (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 ITU, and a determination of the compliance of the system with pertinent national and international technical standards.

(2) Permission to access the EMS is an internationally recognized sovereign national privilege that must be granted by the host nation and can be denied or revoked. The DOD uses 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, such as CREW equipment, do not receive DD Form 1494, stage-4 certification and thus, are not forwarded for host nation coordination during the development process.

(4) The CBTDEV, MATDEV, or PM will use the DD Form 1494 to forward a system's basic RF parameters and operating locations in each phase of the acquisition process to ASMO. After review, ASMO assigns a unique "Joint Frequency 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. ASMO will collect, and forward to the CBTDEV and MATDEV, the Joint guidance, as well as U.S. national and host nation spectrum supportability comments.

(5) For systems under development without a completed DD Form 1494 showing spectrum approval, CBTDEVs, MATDEVs, and PMs—

(a) Provide ASMO with a separate DD Form 1494 for each system that is part of the acquisition, containing information that is releasable at the appropriate classification level to each envisioned host nation.

(b) Determine countries for likely operational deployment.

(c) Determine the internationally recognized radio service of all pertinent S-D systems. (See chap 6, NTIA Manual, the "Red Book.")

(d) Identify portions of the equipment's tuning range supported by each host nation's table of frequency allocation. 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 the "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) 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) available at <https://hnswdo.disa.mil> and on the SIPRNET at <https://gemsis.disa.smil.mil/>, or by reviewing other co-band approved DD Form 1494s. (If the PM does not have ready access to HNSWDO, contact the ASMO.)

(g) Identify other U.S. military, U.S. civil, and non-U.S. co-band, adjacent band, and harmonically related systems likely to be collocated or in close proximity with one another, which may result in co-site interference, by querying DOD equipment databases (such as the Joint Spectrum Center Data Access Web Server or the appropriate NTIA database).

(h) Ensure that the functional solution analysis identifies operational parameters that the developers may use to define spectrum parameters.

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

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

(6) For systems with existing spectrum approval to operate (in other words, systems with current, approved DD Forms 1494 for stage 4), developers—

(a) Obtain from ASMO copies of the approved DD Form 1494(s) 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 Form 1494s.

(f) Compare the S–D technical parameters of the system with 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 in the “stage or status” column, the acquisition program under which the system is being procured and point of contact information.

| <b>J/F–12 #</b>                       | <b>Nomenclature</b>                   | <b>Stage or status</b>   | <b>CONUS</b>   | <b>Outside CONUS</b>   |
|---------------------------------------|---------------------------------------|--|--|--|
| 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 “inprocess at the equipment spectrum guidance awaiting MC4EB guidance.” | Provide a yes, no, or probability (high, medium, low) of obtaining necessary frequencies for non-degraded operation. Provide full MC4EB guidance, operating conditions, and/or restrictions as reference file or report. | Provide a yes, no, or probability (high, medium, low) of obtaining necessary frequencies for non-degraded operation regarding outside CONUS, host nation approved status. Provide expanded status (which CCMD(s) have it) and guidance where the system or similar system has host nation approval, for which countries, and the guidance or restrictions as a referenced file or report. Information may be obtained from ASMO and from HNSWDO. |

*c.* Section 2.3 of the SSRA: Operational requirements—

(1) U.S. Identify and quantify the mutual interactions among the candidate systems within Army RF systems and other 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 RF 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, or high-quality imagery).

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

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

(e) The developed operational scenarios, closely coordinated with the Cyber Center of Excellence, Frequency Spectrum Proponent Office, the TRADOC capability manager, and other Army schools and centers, as appropriate.

(2) The developer may 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, CBTDEVs, MATDEVs, or PMs will—

(a) Review the baseline mission for the concept of operations, focusing on deployment of the mission’s assets and identify the mission-deployment plans (such as CCMD, 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; radio service (fixed or mobile); and location, 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 may be obtained from the CCMD 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 Form 1494s 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. (If necessary, contact ASMO for guidance regarding the necessity of revising the existing documents and/or requesting 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.
4. Forward to ASMO a request identifying the new host nations that are not included in the DD Form 1494.

(4) Determine if the system may be required to support United States Army North, the Army element of USNORTHCOM, Department of Homeland Defense, or defense support to civil authorities’ incidents; coordinate spectrum requirements through United States Army North.

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 Milestone B, the technical component 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; 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 in theater RF equipment such as power output, antenna gain, bit rate, emission requirements, modulation (Waveforms), receiver selectivity, and frequency dependent rejections (FDR).

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

(8) Consider options if spectrum supportability cannot be obtained and if 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-sharing 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, if the system is a FoS, or if there is an unavailability of the desired spectrum dependent equipment to be integrated. Summarize the current risk assessment in a table or stoplight chart, such as the chart depicted in table C–4.

**Table C–4**  
**Template for the spectrum supportability risk assessment stoplight chart relative rating of electromagnetic and environmental effects issues<sup>1</sup>**

| Issue   | Green | Yellow | Red |
|---|-------|--------|-----|
| 1. (Out of band)  |       | X      |     |
| 2. (Emissions could potentially cause interference to system or other military systems) |       |        | X   |
| 3. (Potential hazard for electromagnetic radiation to personnel (HERP))                 | X     |        |     |
| 4. (Potential hazard for electromagnetic radiation to ordnance (HERO))                  |       | X      |     |

**Table C-4**  
**Template for the spectrum supportability risk assessment stoplight chart relative rating of electromagnetic and environmental effects issues<sup>1</sup>—Continued**

|  |   |  |   |
|--|---|--|---|
| 5. (Potential for electromagnetic pulse (EMP))   | X |  |   |
| 6. (Potential for electrostatic discharge (ESD)) |   |  | X |

Note. 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 will establish an Army E3 Program. 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, telecommunications electronics material protected from emanating spurious transmissions report, Joint Interoperability Test Command certification, and 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                    | Engineering and manufacturing development<br><br>(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) During the materiel solution analysis phase of the DAS, MATDEVs—

(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 RF 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.

(3) 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 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.

(4) The above data, analysis, and information will be reported in the SSRA and refined as the SSRA progresses through the initial to the final SSRA. Data shall likewise progress from calculated to measured, as with the data required in the DD Form 1494 stages. The goal of these analyses is to quantify the mutual, operational degradation caused by interactions between the system (or SOS) being acquired and other systems (affected by or dependent upon the spectrum), or adjacent 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 databases, must be performed. These analyses will—

(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 FDR based on the frequency offset between the system being analyzed and other 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 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 techniques combat fading and interference to improve a given measure of quality; for example, Eb/No (ratio of the energy in accordance with 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 non-communications 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: Inter-modulation, 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 channelization plans and advanced narrow-beam antennas (such as active spot and contoured-beam) as well as passive RF components (for example, filters, diplexers, couplers, and so forth).

(k) Review and address the MC4EB 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. For an SOS or FoS, provide a summary of the EW equipment and their effects upon 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 system’s operational requirements capabilities as they are related to spectrum or EMC.

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

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

## Appendix D

### Internal Control Evaluation

#### D-1. Function

The functions covered by this evaluation are the administration of ASMP and the Army's use of the EMS. The evaluation is designed to assist Army organizations such that they properly acquire and employ S-D systems. The evaluation includes key controls for CIO/G-6 management of how the Army acquires and uses systems that employ capabilities that make use of the EMS.

#### D-2. Purpose

The purpose of this evaluation is to assist HQDA, field operating agencies; ACOMs; ASCCs; DRUs; Research, Development, Test & Evaluation 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 MC4EB 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 EMS? (This applies to the command and staff of ASA (ALT) and AMC, installation commanders, DNECs, and 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 G-6s.)

(3) Are MATDEVs, CBTDEVs, and other acquisition professionals involved in efforts related to development or procurement of S-D systems or S-D activities required to complete SSRAs for each phase of the DAS or S-D activity? (See chap 3 and app C.) (This applies to ASA (ALT), AMC, and TRADOC.)

(4) Are MATDEVs and other acquisition professionals involved in efforts related to development and or procurement of S-D systems required to include spectrum supportability governance as rated objectives in officer, non-commissioned officer, and civilian performance? (This applies to ASA (ALT) and AMC.)

(5) Does the command or organization have a process to ensure that S-D systems comply with DOD, U.S. Army, 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 G-6s.)

(6) Has the command programmed, planned, and funded for integrated spectrum management and awareness training in all leadership development courses as well as for maintenance training and professional development of assigned spectrum managers to ensure the Army's ability to generate and project combat power through the efficient management of the EMS? (This applies to TRADOC, ASCCs, installation commanders, DNECs, and G-6s.)

(7) Where appropriate, do CBTDEVs consider spectrum implications as part of the capabilities-based analysis and as part of the development of materiel or non-materiel solutions during the execution of combat development processes? (This applies to TRADOC.)

(8) 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.)

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

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

(11) 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 the Army's implementation of the DAS (see chap 3 and app C)? (This applies to ASA (ALT) and AMC.)

(12) Have MATDEVs 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.)

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

(14) 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.)

(15) 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.)

(16) 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 IM support? (This applies to installation commanders.)

(17) Do personnel filling spectrum management positions have the requisite training as reflected in their position descriptions (civilian personnel - 0391) or military occupational specialties (Military Occupational Speciality-25E, military personnel)? (This applies to all. See Handbook of Occupational Groups and Families, Telecommunications Series TS-94. See also, DA Pam 611-21.

(18) Have the installation's G-6 and spectrum management staff been assigned and charged 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.)

(19) 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.)

(20) 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.)

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

(22) Are records maintained on the types of equipment, locations of equipment, and use of the spectrum and non-tactical call signs assigned to the installation? (This applies to installation commanders and DNECs.)

*b. Army spectrum management 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 Form 1494s known? (This applies to ASA (ALT), AMC, PEOs, PMs, product managers (PdMs), DNECs, and other purchasing officials.)

(2) Are DD Form 1494 records, with supporting documentation, maintained on file authorizing Army use of non-licensed S-D COTS devices or other S-D devices, as required, for use within the US&P, or host nation? (This applies to all. Electronic copies preferred.)

(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 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 AOR authorized for use?

(7) Has an installation or activity spectrum manager been appointed for management of RF and non-tactical 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 beam-width 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 EME, including Idealized versus available frequencies, and trade-offs 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 changes, such as frequency supportability, been identified from previously submitted planning data for consideration? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (22) 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.)
- (23) 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.)
- (24) 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.)
- (25) Has adequate consideration been given to intra-system 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.)
- (26) 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.)
- (27) 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.)
- (28) Do EMC specifications comply with prevailing standards and criteria? (This applies to ASA (ALT), AMC, PEOs, PMs, PdMs, DNECs, and other purchasing officials.)
- (29) 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.)
- (30) 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.)
- (31) 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.)
- (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 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.)

(34) 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.)

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

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

(37) 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.)

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

(39) 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.)

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

(41) 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.)

(42) 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 2 (section 2–4), chapter 4, and chapter 5.

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

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

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

(4) Is there policy or a process in place to resolve scheduling conflicts due to mission overlaps between or among units vying for spectrum access within the same operating area? (Refer to chapter 2 (section 2–4), chapter 4, and chapter 5. This applies to ACOMs, ASCCs, DRUs, and subordinate commands.)

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

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

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

(8) Are frequency assignments records registered in the Government Master File database up-to-date? (This applies to DNECs.)

(9) Does the spectrum manager have a point of contact listing for activities on the installation using S–D 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 prior to purchase? (This applies to all.)
  - (10) 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.)
  - (11) Are FRS radios in use? (This applies to all.)
  - (12) Has use of FRS radios been approved by the host nation? (This applies to all.)
  - (13) Are Army organizations using amateur frequencies for its operations? (This applies to all.)
  - (14) Are SMR services in use? (This applies to all.)
  - (15) Are SMR systems used as a leased or end-user service? (This applies to all.)
  - (16) Is the use of SMR services approved by the NTIA? (This applies to all.)
  - (17) Is there an LMR system in use? (This applies to all.)
  - (18) Has access to the system been opened to other Federal agencies? (This applies to all.)
  - (19) Are unmanned ground vehicles in use? (This applies to all.)
  - (20) Are there procedures in place to ensure that the procurement of all S–D equipment must be coordinated and approved by the DNEC or installation spectrum manager? (Refer to para 5–3. This applies to all.)
- e. What are the consequences and risks of noncompliance? See chapter 6.*

#### **D–5. Supersession**

This evaluation replaces all evaluations and test questions for Army Management of the EMS, previously published in AR 5–12.

#### **D–6. Comment**

Help make this a better tool for evaluation of internal controls. Submit comments to the Chief Information Officer/G–6 (SAIS–NSR), 107 Army Pentagon, Washington, DC 20310–0107.

## **Glossary**

### **Section I**

#### **Abbreviations**

**ACOM**

Army command

**ACP**

Allied Communications Publication

**AFC**

area frequency coordinator

**AFMO US&P**

Army Frequency Management Office United States and Possessions

**AMC**

U.S. Army Materiel Command

**AOR**

area of responsibility

**AR**

Army regulation

**ARIMS**

Army Records Information Management System

**ARNG**

Army National Guard

**ASA (ALT)**

Assistant Secretary of the Army (Acquisition, Logistics and Technology)

**ASCC**

Army service component command

**ASMO**

Army Spectrum Management Office

**ASMP**

Army Spectrum Management Program

**AZ**

Arizona

**CBTDEV**

combat developer

**CCMD**

combatant command

**C-E**

communications-electronics

**CEOI**

communications-electronics operating instructions

**CFR**

Code of Federal Regulations

**CG**

Commanding General

**CIO/G-6**

Chief Information Officer, G-6

**CJCSI**  
Chairman of the Joint Chief of Staff Instruction

**CJCSM**  
Chairman of the Joint Chief of Staff Manual

**CONUS**  
continental United States

**COTS**  
commercial off-the-shelf

**CREW**  
counter remote control improvised explosive device electronic warfare

**CTC**  
combat training center

**DA**  
Department of the Army

**DA Pam**  
Department of the Army Pamphlet

**DAS**  
Defense Acquisition System

**DCS**  
Deputy Chief of Staff

**DD**  
Department of Defense (forms)

**DISA**  
Defense Information Systems Agency

**DNEC**  
Director, Network Enterprise Center

**DNI**  
Director of National Intelligence

**DOD**  
Department of Defense

**DODI**  
Department of Defense Instruction

**DRU**  
direct reporting unit

**E3**  
electromagnetic and environmental effects

**EA**  
Electronic Attack

**EMC**  
electromagnetic compatibility

**EME**  
electromagnetic environment

**EMI**  
electromagnetic interference

**EW**  
electronic warfare

**FCC**  
Federal Communications Commission

**FDR**  
frequency dependent rejection

**FORSCOM**  
U.S. Army Forces Command

**FoS**  
family of systems

**FRS**  
Family Radio Service

**GMRS**  
General Mobile Radio Service

**HNSWDO**  
Host Nation Spectrum Worldwide Database Online

**HQDA**  
Headquarters, Department of the Army

**IM**  
information management

**INMARSAT**  
International Maritime Satellite

**IRAC**  
Interdepartment Radio Advisory Committee

**ITU**  
International Telecommunications Union

**JBSMO**  
Joint Base Spectrum Management Office

**JCIDS**  
Joint Capabilities Integration and Development System

**Km**  
kilometer

**LMR**  
Land Mobile Radio

**MATDEV**  
materiel developer

**MC4EB**  
Military Command, Control, Communications, and Computers (C4) Executive Board (MC4EB)

**MHz**  
megahertz

**NTIA**  
National Telecommunications and Information Agency

**PdM**  
Product manager

**PEO**  
program executive officer

**PM**  
program manager

**RC**  
Reserve Component

**RF**  
radio frequency

**RFA**  
Radio Frequency Authorization

**SATCOM**  
Satellite Communications

**S–D**  
Spectrum-dependent

**SFAF**  
standard frequency action format

**SIPRNET**  
Secret Internet Protocol Network

**SMR**  
Specialized Mobile Radio

**SOS**  
system of systems

**SRA**  
Ship Radio Authorization

**SSRA**  
Spectrum Supportability Risk Assessment

**TEMP**  
test and evaluation master plan

**TRADOC**  
U.S. Army Training and Doctrine Command

**USAR**  
U.S. Army Reserve

**USC**  
United States Code

**USNORTHCOM**  
U.S. Army Northern Command

**WSMR**  
White Sands Missile Range

## **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.

#### **Area Frequency Coordinator**

The AFC serves as the focal point for RF and call sign requests within the US&P that require 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 MC4EB 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(D) U.S. 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 EMS 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 EMS 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 into the potential frequency-spectrum-resource requirements of Army Frequency S-D 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 EMS 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 EMC 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, or unintentionally, as a result of spurious emissions and responses, inter-modulation 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 vulner-

ability 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 EW 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 3212.02D apply in the US&P; for non-US&P areas, appropriate CCMD 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 electronic warfare support 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 S-D 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).

### **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. Information resources management 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 convey all the information successfully.

### **Part 15 radio**

A type of radio that meets the low-power specifications of 47 CFR 15 (contains the FCC's rules and regulations).

### **Radio wave propagation**

The transfer of energy by electromagnetic radiation at radio frequencies.

**Spectrum management**

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

**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 S–D 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 an 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).

**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).

**Spectrum supportability risk assessment**

The assessment as to whether the electromagnetic spectrum necessary to support the operation of an 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.)

**Spectrum-dependent equipment**

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

**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.

**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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