

DATA ITEM DESCRIPTION

Title: SPECTRUM SUPPORTABILITY RISK ASSESSMENT (SSRA)

Number: DI-EMCS- 81543A

Approval Date: 20130205

AMSC Number: 9330

Limitation:

DTIC Applicable: No

GIDEP Applicable: No

Office of Primary Responsibility: DISA (DC5)

Applicable Forms:

Use/relationship:

a. An SSRA is an assessment performed by program managers (PMs) and materiel developers (MATDEVs), which include concept developers, on all programs that are acquiring, developing, incorporating, or modifying spectrum-dependent (S-D) systems (SDS). Its purpose is to identify and assess an acquisition's potential to affect the required performance of the newly acquired SDS and other existing systems that may co-exist within the operational electromagnetic environment (EME). Each assessment will be accomplished with due consideration given to potential regulatory, technical, and operational spectrum and electromagnetic (EM) environmental effects (E3) issues. All identified risks must be included in the assessment including relevant mitigation information. Requirements for the submission of SSRAs during the Defense Acquisition System (DAS) process, as depicted in Table I, are established by the following:

(1) Department of Defense Instruction (DoDI) 4650.01 which requires the submission of an SSRA prior to each acquisition milestone (MS).

(2) Chairman of the Joint Chiefs of Staff Instruction (CJCSI) 6212.01 which requires the submission of SSRAs prior to each acquisition MS and readiness reviews.

(3) DoDI 4630.8 which requires the results of the SSRAs for information technology and national security systems be included in the Information Support Plan (ISP).

Guidance for conducting the tasks outlined in Table I can be found in Department of Defense Directive (DoDD) 3222.3, MIL-HDBK-237, and MIL-HDBK-235-1C and its supplemental parts. Copies of DoD Instructions and Directives are available online at <https://www.dtic.mil/whs/directives/>. CJCSI 6212.01 can be found at www.dau.mil. For copies of the classified and limited distribution parts of MIL-HDBK-235, see the Foreword of MIL-HDBK-235-1C.

b. This DID contains the format and content preparation instructions for data resulting from a solicitation for the preparation of an SSRA. It is intended for SDS, including commercial items (CIs) and non-developmental items (NDIs) that are S-D, employed on airborne, sea, space, and ground platforms and systems.

c. SSRAs are required throughout the acquisition process as depicted in Table I. The Military Department (MILDEP) Spectrum Management Office (SMO) and PM/MATDEV should be

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consulted regarding the application and tailoring of the SSRA, availability of data, and to ensure that all user requirements are met.

Table I Actions Required in the Defense Acquisition Phases

Milestone (MS)	<div>A</div>	<div>B</div>	<div>C</div>	<div>FRR</div>	
DAS Phase	Materiel Solution Analysis	Technology Development	Engineering & Mfg Development	Production & Deployment	Operations & Support
SSRA	SSRA Prepared	SSRA Updated	SSRA Updated	SSRA Updated	SSRA updated for specific missions, new HN deployments, system mods, etc
PMs/MATDEVs E3 Tasks	E3 Assessment for SSRA Conducted	E3 Assessment for SSRA Updated	E3 Assessment for SSRA Updated	E3 Assessment for SSRA Updated	Interference Resolution
	EME Defined	EME Updated	E3 Inputs to TEMP and ISP Updated	E3 Requirements for Production Spec and TEMP Finalized	Deployed Support
	Budget for E3	E3 Inputs to ISP Prepared	E3 IPT Established		
	E3 Rqmts Definition	E3 Requirements in TEMP and Acquisition Documents Addressed	E3 DT&E & Analyses Performed	Full E3 Testing Performed	
			Mitigation Measures Defined and Tested	E3 Assessment Report	
ESC Stages (See DoDI 4650.01)	Stage 1 Conceptual	Stage 2 Experimental	Stage 3 Developmental	Stage 4 Operational	Stage 4 Note to Holder

Legend:

DT&E	Developmental test and evaluation	HN	Host nation
E3	Electromagnetic environmental effects	ISP	Information Support Plan
E3 IPT	E3 Integrated Product Team	SMO	Spectrum Management Office
EME	Electromagnetic environment	SSRA	Spectrum Supportability Risk Assessment
ESC	Equipment spectrum certification	TEMP	Test and Evaluation Master Plan
FRP	Full Rate Production	Δ	Acquisition Milestone

d. This DID is related to DI-EMCS-81827.

e. This DID supersedes DI-EMCS-81543

Requirements:

1. Reference Documents. The applicable issue of the documents cited herein, including their approval dates and dates of any applicable amendments, notices, or revisions, shall be as cited in the solicitation or contract.

2. Format and Content.

a. The SSRA shall be in contractor format with contents in accordance with this DID.

b. A standard format for reporting risk assessment findings facilitates a common

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understanding of program risks at all levels of an organization. Stop-light matrices based on sound engineering judgment shall be used to illustrate the level of risks identified as shown in the examples provided below.

- (1) **Red**, **yellow**, and **green** spectrum and E3 issues shall be as defined in Table II.

Table II SSRA Issues

R	<ul style="list-style-type: none"> No approved equipment spectrum certification (ESC) or J/F-12 in the Military Communications Electronics Board (MCEB) archived database Operating in the incorrect or non-allocated frequency band or significant SS issues are known to exist for this system or equipment No E3 or, as a minimum, electromagnetic compatibility (EMC) and electromagnetic interference (EMI) studies completed, planned or anticipated; known mitigation measures will impact operational deployment and/or use in EME Host Nation (HN) coordination (HNC) process not started; operational and/or developmental use may be extremely limited and/or not permitted at all System will not likely receive HN spectrum support, or may be allowed to operate after lengthy bi-lateral negotiations with individual HNs.
Y	<ul style="list-style-type: none"> No approved ESC or J/F-12 in the MCEB archived database, however similar equipment has been approved and is in the database System is operating in properly allocated frequency spectrum and ESC can be anticipated for operation in United States and Possessions (US&P) Requires minimal actions for ESC, i.e. Note-to-Holder or updated certification request E3/EMC studies funded, planned, or completed with mitigation measures identified that will not adversely impact operations Minimum spectrum issues are known to exist for this equipment Operational or developmental use is anticipated to be supportable May receive HN spectrum support, but with numerous geographic, temporal, spectrum, or operational restrictions; spectrum use in a band may be restricted to a limited number of channels.
G	<ul style="list-style-type: none"> Approved ESC J/F-12 exists in the MCEB archived database (minimum Stage 2 for MS B) Requires no actions for spectrum support E3/EMC studies completed and compatible operations confirmed or acceptable mitigation measures identified that will not impact operations No SS issues are known to exist for this equipment in the intended operational area Operational and/or developmental use is or will be supportable High likelihood of receiving HN spectrum support to operate with few, or a minimum number of, possible spectrum or operational restrictions.

- (2) The impact of a risk or consequence of the potential risk (as defined Table II) shall be reported as low, moderate, or high, as represented in Table III with the **green** for minimal or minor impact, **yellow** for moderate impact, and **red** for significant or severe impact. A sample matrix illustrating the impact of a risk is shown in Table III.

- (3) Table IV defines the likelihood of occurrence of the risk, where **green** denotes little or no likelihood of occurrence, **yellow** denotes a likely occurrence, and **red** denotes highly or near certain occurrence.

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Table III Impact of Risk (SAMPLE)

Level	Impact
1	Minimal or no consequence to technical performance.
2	Minor reduction in technical performance or supportability, can be tolerated with little or no impact on program; same approach retained.
3	Moderate reduction in technical performance or supportability with limited impact on program objectives; workarounds available.
4	Significant degradation in technical performance or major shortfall in supportability; may jeopardize program success; workarounds may not be available or may have negative consequences.
5	Severe degradation in technical performance; Cannot meet supportability threshold; will jeopardize program success; no workarounds available.

Table IV Likelihood of Risk Occurrence (SAMPLE)

Level	Likelihood of Occurrence	Probability of Occurrence
1	Not Likely	<20%
2	Low Likelihood	20-40%
3	Likely	40-70%
4	Highly Likely	70-90%
5	Near Certainty	>90%

3. Content of SSRA.

3.1 Front Cover. The front cover of the report shall include the following information:

- a. Title of the document
- b. Month and year of publication
- c. Milestone or readiness review it supports
- d. Program ACAT category
- e. Name(s) of the principal author(s) in conventional order
- f. Program office or sponsor's name and address
- g. Distribution statements, as required. and
- h. Security classification markings, as required.

3.2 Introduction. The introduction of the SSRA shall contain the following:

- a. A description of the purpose of the report and programmatic decision and/or readiness review it supports.
- b. A detailed system description including the following in a table format (see Table V for sample format):

- (1) Physical components (vehicle or platform mounted, stand alone, etc.)
- (2) Purpose of system and concept of operations
- (3) Subsystem description and block diagrams

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Table V System Description (SAMPLE)	
System Component	System Description (SA, VM, pm, Other (specify))
#1	
#2	
etc	

Legend:

MRL = materiel readiness level
SA = stand alone

VM = vehicle mounted
pm = personnel mounted

3.3 Executive Summary. An executive summary that is meant to be an abridged version of the SSRA Report, shall document the spectrum and E3 issues, their impact on the ability to obtain SS and the potential degradation to the system's operational performance. The recommended actions to mitigate the issues shall be provided in a table or stop light chart (see Table VI for a sample). The Executive Summary shall contain the following:

- a. A cover page (see 3.1 above); however, the name and logo should apply to the PM/MATDEV required to submit the SSRA.
- b. Introduction (see 3.2 above).
- c. A summary of spectrum and E3 issues. This should be a summation of 3.4 through 3.7, which follows below. The summarized conclusions should be presented in a Stop-Light chart format.
- d. The impact of the risks on the ability to obtain SS including a brief summarization of the important aspects from 3.8 below. The summarized conclusions should be here and presented in a Stop-Light chart format (see sample Table VI) using the guidance in Tables II, III, and IV of this DID.
- e. Recommendation: If all risks can be mitigated, the suggested recommendation should read as follows: "The (**insert PM/MATDEV**) recommends that the (**insert Program name**) receive a Spectrum Supportability Determination to support (**insert review**).

3.4 Regulatory Component of the SSRA. The Regulatory component of the SSRA shall include the following:

- a. A list of countries for likely operational deployment within each Combatant Command (CCMD) area of responsibility.
- b. A list of internationally recognized radio services of all SDS being developed or integrated by the acquisition.
- c. A list of the system's tuning ranges supported by each HN's Table of Allocation (TOA).
- d. The regulatory status (for example, co-primary or secondary) assigned to the radio service by the HN's TOA.

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Table VI Summary of Relative Ratings of Spectrum and E3 Issues (SAMPLE)				
Issue	Likelihood of Occurrence (See Table IV)	Impact of Risk (See Table III)		
Regulatory issue # 1 - ESC status				
Regulatory issue #.2 - HNC status		Insert colors, as applicable		
Technical spectrum issue				
Operational spectrum issues				
E3 issues				
		NONE/MINIMAL	MODERATE	SIGNIFICANT/SEVERE
<u>RECOMMENDED MITIGATION MEASURES:</u>				
Regulatory issue #1 (ESC status):				
Regulatory issue #2: (HNC status):				
:Technical spectrum issue:				
Operational spectrum issue:				
E3 issues				

e. International comments on U.S. military systems of the same radio service and with similar technical characteristics previously submitted for HNC.

f. A list of the other U.S. military, U.S. civilian, and non-U.S. in-band, adjacent-band and harmonically-related systems likely to be co-site or in close proximity.

g. Comments (including footnotes) from the ESC and HNC processes and how they are being addressed.

h. The impact of changes to U.S. Federal, DoD, or civil telecommunication regulations, on the system's spectral characteristics.

i. The impact of changes to applicable military, national, and international spectrum standards on system's radiated bandwidth, transmitter, and other spectral characteristics.

j. The impact of changes to HN spectrum regulations on the system's spectral characteristics.

k. ESC stage and status for all S-D systems being developed or integrated by the acquisition.

l. Spectrum issues and recommendations for mitigation of regulatory issues.

A suggested format for summarizing the ESC and HNC information is shown in Table VII.

Table VII Summary of Regulatory Information (SAMPLE)⁽¹⁾				
Nomenclature	J/F 12 #	Stage/Status⁽²⁾⁽³⁾	US&P⁽⁴⁾	OCONUS⁽⁵⁾
NOTES:				
(1) For a family of systems (FoS) or system of system (SoS), include all SDS that are or will be integrated into the FoS or SoS.				
(2) Provide the Stage as 1, 2, 3, or 4; indicate status as Approved, (with date) or In-Process (at Equipment Spectrum Guidance Permanent Working Group awaiting MCEB guidance, etc).				
(3) For a FoS or SoS, include, as a note, the acquisition program under which the SDS is being procured and point of contact information.				

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- (4) Provide a YES/NO or Probability (High, Medium, Low) of obtaining necessary frequencies for non-degraded operation. Provide MCEB guidance, operating conditions and/or restrictions. Include in table as notes.
- (5) Provide a YES/NO or Probability (High, Medium, Low) of obtaining necessary frequencies for non-degraded operation regarding OCONUS, HN approval status. Provide expanded status (which CCMDs have it) and guidance where the system or similar system has HN approval. Identify countries and the guidance, or restrictions. Information may be obtained from the MILDEP SMO as a result of the ESC/HNC processes.

3.5 Technical Component of the SSRA.

a. The Technical component of the SSRA shall contain a description of the technical parameters of system's components (e.g. receivers, transmitters, antennas). A suggested format for this information is shown in Table VIII.

Table VIII System Spectrum Requirements vs. Availability ⁽¹⁾⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾ (SAMPLE)					
System Nomenclature and/or J/F 12#	Freq Range	Throughput Required/ Available	BW Required/ Available	Power Output	Antenna Gain Factor & Nomenclature

NOTES:

(1) Availability may be a known quantity or an estimated quantity based on previous operation of the same or similar systems performing the same type or similar functions.

(2) Where table input may require lengthy or long explanation, use Note and include the information following the table as a note.

(3) For a FoS or SoS, include all SDS that are, or will be, integrated into the FoS or SoS.

(4) Cite source document for requirement.

(5) Cite security classification of data, where applicable.

b. The Technical component of the SSRA shall also include the following:

(1) A list of other U.S. military, U.S. civil, and non-U.S. in-band and adjacent-band and harmonically-related systems likely to be co-site or in close proximity.

(2) The undesired interactions of SDS expected to be in the candidate's operational environment including plans to address non-compliant systems.

(3) The expected system performance and effect on other SDS that may operate co-frequency or adjacent frequency expected to be found in the intended operational environment.

(4) The acceptable received EM levels between the subject system and other SDS to ensure neither is significantly degraded and that coexistence is feasible.

(5) Potential link degradation and blockage due to atmospheric conditions or terrain and building obstructions within intended deployments areas. (Note: The overall system performance includes link availability, with and without EMI, while taking into account the effects of the environment (e.g. considering path loss, rain attenuation, humidity, climate, temperature, and water and oxygen absorption)). For non-communications systems (e.g. radar,

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passive sensors, etc.), the operational degradation shall be presented as a function of the level of received environmental and co-site EMI.

(6) Recommendations to mitigate potential technical issues (e.g. implementation of channelization plans, advanced narrow-beam antennas, (active, spot and contoured-beam, etc.), as well as passive radio frequency components (filters, duplexers, couplers, etc.).

(7) Recommended electronic protection measures and, where applicable, electronic attack capabilities being considered in the design of the system.

(8) Identification and quantification of interactions with non-DoD, other Federal and commercial users in the environment.

(9) Identification of spectrum risks and recommendations for mitigating issues.

(10) Address how limitations or restrictions identified in the MCEB J/F-12 recommendations are being mitigated and/or resolved for each SDS.

3.6 Operational Component of the SSRA.

a. The Operational component of the SSRA shall contain a description of the intended operational deployment of the system. A suggested table format to present this data is shown in Table IX.

Table IX System Description and Deployment (SAMPLE)			
System Component	Anticipated HNs	Deployment (SA, VM, pm, Other (specify))	Training Requirements
NOTES			

Legend:

VM = vehicle mounted
SA = stand alone

HN = host nation
pm = personnel mounted

b. The Operational component shall also include the following where the likelihood of being able to perform the operational mission is at risk:

(1) The operational performance requirements, as specified in the acquisition documents (e.g. initial capabilities document, capability development document, capability production document, or ISP) or operational needs statements and whether the requirements will be met or exceeded.

(2) A list of the expected complement of SDS (DoD, non-DoD, Federal and commercial) anticipated to be in the system's operating environment.

(3) Quantification in operational terms (e.g. frequency-distance separation between transmitter and receiver that must be maintained to achieve EMC) of the performance of the candidate system and other SDS used by other DoD units in the operational environment.

(4) Operational spectrum risks and recommendations, including tactics, techniques, and procedures for mitigation of operational risks.

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3.7 E3 Component of the SSRA. The E3 component of the SSRA shall include the following along with recommendations for mitigation of the E3 risks.

a. Identification of EMC and EMI interactions between the candidate system, other systems, and its anticipated operational EME including the possible effect on overall system operational performance as a result of any EM interaction.

b. Quantification of intra-platform EMI among co-site emitters and receivers for complex SoS and platforms in terms of the possibility and influence of:

- (1) Inter-modulation
- (2) Transmitter Harmonic Interference
- (3) Transmitter Spurious Output Interference
- (4) Transmitter Noise Interference
- (5) Receiver Desensitization Interference

c. Quantification of the mutual EMI between the candidate system and SDS used by other DoD units in the operational environment.

d. Identification of potential EMI from own force or hostile EW emitters as well as protection measures to be employed to minimize the EMI or counter the threat.

Quantification of potential E3 (including hazards of electromagnetic radiation to personnel (HERP), volatile materials (HERF), and ordnance (HERO), electromagnetic pulse (EMP), lightning, electrostatic discharge (ESD), etc) as may be contractually required by the MILDEP SMO or E3 authority.

A table or stop-light chart similar to that shown in Table X may be used to illustrate or summarize results.

Table X Relative Rating of E3 Issues	
Issue	Green/ Yellow / Red (see Categories in Table II)
E3 Issue #1	
E3 Issue #2	
E3 Issue #3	
NOTES:	

3.8 Conclusion. The conclusion shall contain a summary of the spectrum and E3 risks identified and the impact on SS and potential degradation to the system's operational performance. The results may be summarized in a table or stop light chart (see Table VI). The conclusion shall also indicate whether the system meets all user requirements.

3.9 Recommendations. Provide a recommendation as to whether the SSRA should be sent by the MILDEP SMO to their Service Chief Information Officer for approval and forwarded to the milestone decision authority.

3.10 References. Identify the following:

a. The DoD Information page or DD Form 1494 for each SDS, subsystem, or equipment that is addressed by the SSRA.

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- b. Copies of E3 Assessment Reports, when requested.
 - c. DoDI 4650.01 (latest version)
 - d. DoDD 3222.3 (latest version)
 - e. MILDEP Spectrum and E3 policy regulations
 - f. Source documents for performance requirements
4. Other Information Sources. When other information sources contain data required by this DID, these sources shall be referenced and the data incorporated into the SSRA, as applicable. State how copies of the referenced documents can be obtained.
5. End of DI-EMCS-81543A.