DATA ITEM DESCRIPTION

Title: SPECTRUM SUPPORTABILITY RISK ASSESSMENT (SSRA)

Number: DI-EMCS-81543
AMSC Number: 9157
DTIC Applicable: No
Office of Primary Responsibility: DISA (DC5)
Applicable Forms:
Approval Date: 20120120
Limitation:
GIDEP Applicable: No

Use/relationship: 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 S-D systems and equipment, including commercial items (CIs) and non-developmental items (NDIs) that are S-D, employed on airborne, sea, space, and ground platforms and systems.

a. An SSRA is an assessment performed by program managers (PMs) and materiel developers (MATDEVs) on all programs that are acquiring or incorporating spectrum-dependent (S-D) systems or equipment. Its purpose is to identify and assess an acquisition's potential to affect the required performance of the newly acquired system or other existing systems within the operational electromagnetic environment (EME). This assessment will be accomplished with due consideration given to potential regulatory, technical, and operational spectrum and electromagnetic (EM) environmental effects (E3) risks. 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. 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 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)		A	B	C	FRP
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** **EME Defined** **Budget for E3** **E3 Rqmts Definition**	**E3 Assessment for SSRA Updated** **EME Updated** **E3 Inputs to ISP Prepared** **E3 Requirements in TEMP and Acquisition Documents Addressed**	**E3 Assessment for SSRA Updated** **E3 Inputs to TEMP and ISP Updated** **E3 IPT Established** **E3 DT&E & Analyses Performed** **Mitigation Measures Defined and Tested** **EME Updated**	**E3 Assessment for SSRA Updated** **E3 Requirements for Production Spec and TEMP Finalized** **Full E3 Testing Performed** **E3 Assessment Report**	**Interference Resolution** **Deployed Support**
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

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

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 (see 3).

b. A standard format for reporting risk assessment findings facilitates a common 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	• 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 not 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	• 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	• 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.

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.

(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.

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. Name(s) of the principal author(s) in conventional order
e. Program office or sponsor's name and address
f. Distribution statements, as required. and
g. 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) Materiel readiness level
(3) Purpose of system and concept of operations
(4) Subsystem description and block diagrams

Table V System Description (SAMPLE)

System Component	MRL	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 of the spectrum and E3 issues, their impact on the ability to obtain SS, the potential degradation to the system's operational performance, and the recommended actions to mitigate the issues shall be provided in a table or stop light chart (see Table VI for a sample).

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**
RECOMMENDED MITIGATION MEASURES: Regulatory issue #1 (ESC status): Regulatory issue #2: (HNC status): :Technical spectrum issue: Operational spectrum issue: E3 issues				

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 S-D systems 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.

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 S-D systems 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 S-D system is being procured and point of contact information.
(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**

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 S-D systems 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 S-D systems 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 S-D systems 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 S-D systems 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/oxygen absorption)). For non-communications systems (e.g. radar, 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, diplexers, couplers, etc.).

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

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

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

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	MRL	Deployment (SA, VM, pm, Other (specify))	Training Requirements
NOTES:				

Legend:
MRL = materiel readiness level
SA = stand alone
VM = vehicle mounted
pm = personnel mounted
HN = host nation

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 S-D systems (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 S-D systems 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.

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 S-D systems used by other DoD units in the operational environment.

d. 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	Insert colors, as applicable
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 S-D system, subsystem, or equipment that is addressed by the SSRA.
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-81543.