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APPENDIX S - DoD CONTRACTS

ELECTROMAGNETIC INTERFERENCE REQUIREMENTS

(November 2005)

I. GENERAL

This appendix is applicable when invoked by the purchase order. This appendix sets forth requirements for the submittal of electromagnetic interference testing procedures and reports.

The Electromagnetic Interference Test Procedures (EMITP) describes the measurement procedures that will be used to demonstrate that an equipment or subsystem complies with its contractual electromagnetic interference (EMI) requirements based on MIL-STD-461, including how the general test procedures in the standard will be applied to the specific equipment or subsystem.

The Electromagnetic Interference Test Report (EMITR) provides the data and information necessary to evaluate compliance of an equipment or subsystem with its electromagnetic interference (EMI) control requirements based on MIL-STD-461, including the discussion of recommended corrective actions, if needed.

This appendix contains the format and content preparation instructions for the EMITR and EMITP required by Section 5 of MIL-STD-461.

II. ELECTROMAGNETIC INTERFERENCE TEST PROCEDURES (EMITP)

Requirements:

1. Format. A format that presents the EMITP in a clear and understandable manner with at least the required content of this appendix is acceptable.

2. Content. As a minimum, the EMITP shall contain the following:

2.1. Introduction. The introduction of the EMITP shall include the following:

a. A table describing all the tests to be performed, the applicable section within the EMITP, and the corresponding test procedure from MIL-STD-461.
b. Description of the Equipment Under Test (EUT), including its function, characteristics, intended installation, and power usage.
c. Approved exceptions or deviations from contractual test requirements, if any.

2.2. Applicable documents. Applicable documents shall be listed as follows:

a. Military (such as standards and specifications).
b. Company (such as in-house documents used for calibration or quality assurance).
c. Other Government or industry standards, specifications, and documents.

2.3. Test site. A description of the test site shall be provided covering the following:

a. Test facility and shielded enclosure or anechoic chamber, including size, characteristics, and placement of radio frequency (RF) absorbers.
b. Ground plane (size and type) and methods of grounding or bonding the EUT to the ground plane to simulate actual equipment installation.
c. Implementation of test precautions required by 4.3.7 of MIL-STD-461.

2.4. Test instrumentation. Test instrumentation to be used shall be described as follows:

a. Equipment nomenclature.

b. Characteristics of coupling transformers and band-reject filters.
c. Antenna factors of specified antennas, transfer impedances of current probes, and impedance of Line Impedance Stabilization Networks (LISN).
d. Description of the operations being directed by computer programs/software for computer-controlled receivers, the verification techniques used to demonstrate proper performance of the software, and the specific versions of the software to be used.
f. Bandwidth (resolution and video) and scanning speeds of measurement receivers.

2.5. EUT setup. A description of the EUT test setup for each test shall cover the following:

a. Physical layout of the cables and EUT.
b. Cable types, characteristics, and construction details (see 4.3.8.6 of MIL-STD-461)
c. Position of the line impedance stabilization networks on the ground plane.
d. Use of bond straps and loads.
e. Test simulation and monitoring equipment.

2.6. EUT operation. A description of the EUT operation shall cover the following:

a. Modes of operation for each test, including operating frequencies (where applicable), and rationale for selection.
b. Control settings on the EUT.
c. Control settings on any test stimulation and monitoring equipment and characteristics of input signals.
d. Operating frequencies (such as oscillator and clock frequencies) which may be expected to approach limits.
e. Performance checks initiated to designate the equipment as meeting minimal working standard requirements.
f. Enumeration of circuits, outputs, or displays to be monitored during susceptibility testing, as well as the criteria for determining degradation of performance.

2.7. Measurements. The following shall be described for each test.

a. Block diagram depicting test setup, including all pertinent dimensions.
b. Step-by-step procedures.
c. Test equipment used in performance of the test and the methods of grounding, bonding, or achieving electrical isolation of the measurement instrumentation.
d. Selection of measurement frequencies.
e. Information to be recorded during the test, including frequency and units of recorded information. Sample data sheets, test logs and graphs, including test limits, may be shown.
f. Modulation characteristics and scan rates of the susceptibility test signals, if applicable.

III. ELECTROMAGNETIC INTERFERENCE TEST REPORT (EMITR)

Requirements:

1. Format. A format that presents the EMITP in a clear and understandable manner with at least the required content of this appendix is acceptable.

2. Content. As a minimum, the EMITR shall contain the following:

2.1. Administrative data. The EMITR shall contain an administrative section covering the following:

a. Contract number.
b. Authentication and certification of performance of the tests by a qualified representative of the procuring activity.
c. Disposition of the Equipment Under Test (EUT).
d. Description of the EUT, including its function, characteristics, intended installation, actual cable types (characteristics and construction details - see 4.3.8.6 of MIL-STD-461), and

electrical current usage on each power input line.

e. List of tests performed with pass/fail indications.
f. Any approved deviations from contractual test procedures or limits previously authorized.
g. Identification of Non-Developmental Items (NDI) and Government Furnished Equipment (GFE) that may be part of the EUT.
h. Traceability of test equipment calibration.
i. A reference to the approved EMI test procedure (EMITP).

2.2. Detailed results. A separate appendix shall be prepared for each test. If deviations from an approved test procedure occurred during the test program, an additional appendix shall be provided with the as run procedures showing all red-lines and procuring activity concurrence. A separate appendix shall be provided for log sheets. Each test appendix shall contain the following factual data:

a. Test equipment nomenclature, serial numbers, version of software used (if any), and calibration due date.
b. Photographs or diagrams of the actual test set up and EUT, with identification.
c. Transfer impedance of current probes.
d. Antenna factors.
e. Impedance values of Line Impedance Stabilization Networks (LISN).
f. Identification of any suppression devices used to meet the contractual requirements, including schematics, performance data, and drawings.
g. Sample calculations, such as conversions of measured levels for comparison against the applicable limit.
h. The ambient radiated and conducted electromagnetic emission profile of the test facility, when necessary.
i. Data, and data presentation, as specified in the “data presentation” sections of the individual test procedures of MIL-STD-461.
j. Scan speeds.
k. Measurement receiver bandwidths.
l. Antenna polarization.
m. Power line voltages, frequencies, and power factor.
n. Low-noise amplifiers (LNA) compression points.
o. Any thresholds of susceptibility that were determined.

2.3. Conclusions and recommendations. Conclusions and recommendations shall be provided, including results of the tests in brief narrative form, a discussion of any remedial actions already initiated, and proposed corrective measures required (if necessary) to assure compliance of the equipment or subsystem with the contractual EMI requirements.