Coded Note Number: Q4110
Revision: C011
Date: December 15, 2020
Title: EMI Test Procedure IAW MIL-STD-461

1. General

The purchase order (PO) item shall be qualified by a NAVSEA approved Electromagnetic Interference Test Procedure (EMITP).

The PO item's EMITP qualification shall be satisfied by one of the following:

1.1 Use of a Listed EMITP

When a NAVSEA approved EMITP number and revision is listed in the PO item's specification data and the Supplier's name is listed under the EMITP, no submittal is required for this coded note.

When no submittal is required, the Supplier is authorized to perform work.

1.2 Use of an Unlisted EMITP

When NNS has previously approved an EMITP and the EMITP number and revision is not listed in the PO item's specification data, the Supplier shall submit notification to Newport News Shipbuilding (NNS).

The notification to NNS for the previously approved EMITP shall be in accordance with Section 5.3 of this coded note.

The Supplier shall not resubmit an EMITP that has been previously approved.

1.3 Use of an EMITP Pending Approval

When an EMITP from a previous PO has been submitted and is pending approval and the EMITP number and revision is not listed in the PO item's specification data, the Supplier shall submit notification to NNS.

The notification to NNS for the existing EMITP pending approval shall be in accordance with Section 5.2 of this coded note.

The Supplier shall not resubmit an EMITP that has already been submitted and is pending approval.

1.4 Approval of a Newly Developed EMITP

When the PO item's specification data does not identify an EMITP number and revision and the Supplier's name for the EMITP, the EMI Test Facility used by the Supplier shall develop a new EMITP.

The newly developed EMITP shall be written and submitted in accordance with Section 2 "Format" through Section 6 "Applicable EMI Tests" of this coded note.

The Supplier shall submit a request for approval with the EMITP in accordance with Section 5.1 of this coded note.

2. Format

Contractor format is acceptable.

3. Content

The EMITP shall contain the following:

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. 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.
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.
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 software for computer-controlled instrumentation, the verification techniques used to demonstrate proper performance of the software, and the specific versions of

the software to be used. In addition, sweep times, correction factors and how are they used, how final data are determined and presented, and an audit trail that provides details on what part of the software controls each function shall be described.

e. Bandwidth (resolution and video) and scanning speeds of measurement receivers.
f. Modulation characteristics and scan rates of the susceptibility test signals.

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, including bend radius, 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.
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.
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.

4. Delivery

Shipbuilding Partners and Suppliers (SPARS) enabled suppliers shall submit one (1) electronic copy through: https://spars.huntingtoningalls.com/ngcspars/Auth.

All suppliers that are not SPARS enabled shall mail seven (7) hard copies to:

Newport News Shipbuilding
4101 Washington Ave.
Newport News, VA 23607
Attn: E68 Software Coordinator
Bldg. 902-2

5. Approval

5.1 Newly Developed EMITP

The request for approval for the newly developed EMITP shall include:

a. PO number,
b. PO item number(s),
c. NNS material number(s),
d. coded note number Q4110, and
e. the EMITP number and revision.

The Supplier should expect NAVSEA approval of the newly developed EMITP to take approximately six (6) months.

5.2 Pending Approval of Existing EMITP

The notification to NNS for the existing EMITP pending approval shall include:

a. PO number,
b. PO item number(s),
c. NNS material number(s),
d. coded note number Q4110,
e. the EMITP number and revision,
f. PO number of previous submittal, and
g. PO item number(s) of previous submittal.

5.3 Previously Approved EMITP

The notification to NNS for the previously approved EMITP shall include:

a. PO number,
b. PO item number(s),
c. NNS material number(s),
d. coded note number Q4110,
e. the EMITP number and revision,
f. PO number of previous submittal,
g. PO item number(s) of previous submittal, and
h. letter number of previous approval.

6. Applicable EMI Tests

When either MIL-STD-461 Revision E or F is invoked, the PO item shall be qualified by the following EMI tests:

Test	Name	Frequency Range
CE102	Conducted Emissions – Power Leads	10 kHz to 10 MHz
CS101	Conducted Susceptibility – Power Leads	30 Hz to 150 kHz
CS114	Conducted Susceptibility – Bulk Cable Injection	10 kHz to 200 MHz
CS116 (3)	Conducted Susceptibility – Damped Sinusoidal Transients, Cables and Power Leads	10 kHz to 100 MHz
RE101	Radiated Emissions – Magnetic Field	30 Hz to 100 kHz
RE102 (4)	Radiated Emissions – Electric Field	10 kHz to 1 GHz (1)
RS101	Radiated Susceptibility – Magnetic Field	30 Hz to 100 kHz
RS103 (5)	Radiated Susceptibility – Electric Field	2 MHz to 40 GHz (2)

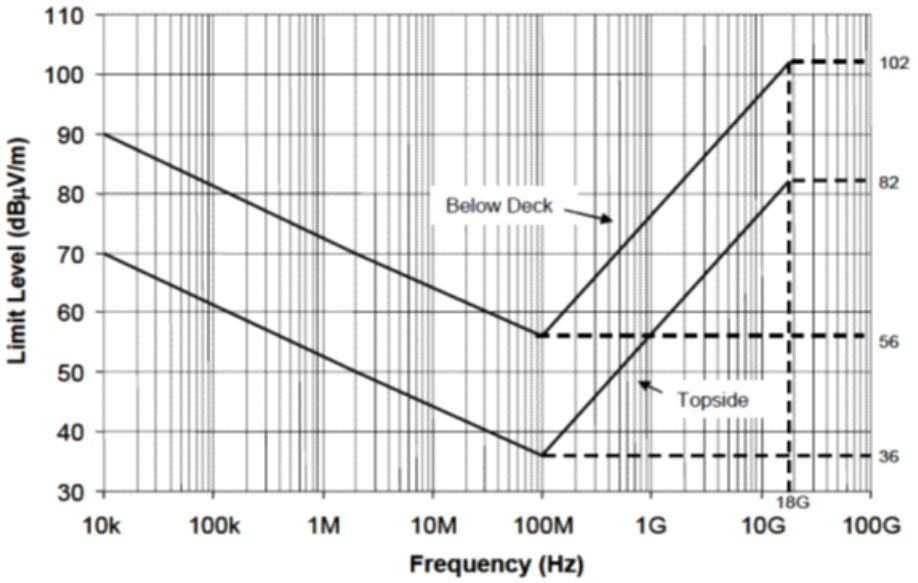
(1) For RE102, testing is required up to 1 GHz or 10 times the highest intentionally generated frequency within the Equipment Under Test (EUT), whichever is greater. Measurements beyond 18 GHz are not required.

(2) For RS103, 40 GHz is required only if specified in the procurement specification, otherwise ending frequency is 18 GHz for all applications.

When MIL-STD-461 Revision E is invoked, the following modifications apply:

(3) For CS116, in paragraph 5.14.3.4 c.(6), delete “Repeat testing in 5.14.3.4c for the power-off condition.”

(4) For RE102, replace Figure RE102-1 with the following:



(5) For RS103, use the following Table III for scan times in lieu of Table III in paragraph 4.3.10.4.1:

TABLE III. Susceptibility scanning.

Frequency Range	Analog Scans Maximum Scan Rates	Stepped Scans Maximum Step Size
30 Hz - 1 MHz	0.0333 f_o/sec	0.05 f_o
1 MHz - 30 MHz	0.00667 f_o/sec	0.01 f_o
30 MHz - 1 GHz	0.00333 f_o/sec	0.005 f_o
1 GHz - 40 GHz	0.00167 f_o/sec	0.0025 f_o

When MIL-STD-461 Revision F is invoked, the PO item shall also be qualified by the following additional EMI tests:

Test	Name	Frequency Range
CE101	Conducted Emissions – Power Leads	30 kHz to 10 kHz
CS106	Conducted Susceptibility – Transients, Power Leads	–

Revision History Table		
Rev	**Description**	**Revision Date**
C009	Removed-mail address submittal option.	07/7/16
C010	Complete rewrite of PPN and Appendix S.	12/13/18
C011	Revised: Mailing address- changed E45 to E68.	12-15-2020

This revision history is provided for convenience and does not alleviate the supplier's responsibility with understanding and complying with the full coded note.