

NIST HANDBOOK 150-11 CHECKLIST

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

Instructions to the Assessor: This checklist addresses specific accreditation requirements prescribed in NIST Handbook 150-11, Electromagnetic Compatibility and Telecommunications (ECT). The Test Method Review Summary, which is used to review a laboratory's ability to perform ECT test methods, is to be used in conjunction with this checklist.

- All items on this checklist shall be addressed.
- Select "X" for each item that represents a nonconformity.
- Select "C" for each item on which you are commenting for other reasons.
- Select "OK" for each item you observed or verified as compliant at the laboratory.
- Record the item number and the nonconformity explanation and/or comment on the appropriate comment sheet.

Note 1: The numbering of the checklist items correlates to the numbering scheme in NIST Handbook 150-11, clauses 3, 4, and 5.

Note 2: This document is a Microsoft Word form that has been protected to allow only certain types of editing. To fill out this protected form, you may enter information into the gray-shaded areas and click on the check box drop-down menus. Use the Tab key to move from one form field to another. Enter the date and the NVLAP Lab Code on page one and this information will automatically be printed in the header of all pages that follow. For additional tips on working with Microsoft Word forms, please visit the Assessor Resources page of the NVLAP website.

3 Accreditation process

3.3 On-site assessment

3.3.3 Specific requirements for ECT on-site assessments

___ 3.3.3.1 All laboratory equipment required to perform accredited testing, including equipment that is rented to perform testing, shall be available for assessment and in compliance with testing requirements.

___ 3.3.3.2 a) The laboratory shall have normalized site attenuation (NSA) measurement reports for all OATS and semi-anechoic chambers that are used for work under the NVLAP scope of accreditation and make these reports available to the assessor.

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- ___ 3.3.3.2 b) For test sites used for conducting tests above 1 GHz, the laboratory shall make available for review the results of the Site Voltage Standing Wave Ratio (SVSWR) for each test site.
- ___ 3.3.3.3 For FCC CFR Part 68-Connection of Terminal Equipment to the Telephone Network, and other similar standards and regulations, an appropriate test artifact shall be used to demonstrate the test equipment.
- 3.3.4 Demonstrations**
- 3.3.4.2 Conducted and radiated emissions measurements**
- ___ Demonstrations shall include the use of receivers and/or spectrum analyzers in shielded enclosures, pre-scan areas, OATS, and/or fully or semi-anechoic chambers.
- 3.3.4.3 Test site validation as part of demonstration**
- ___ 3.3.4.3.1 a) As part of the demonstration of measurement, an OATS or an alternative site, for testing performed below 1 GHz, shall be validated at least at three frequencies of measure in both horizontal and vertical polarization at a single test distance.
- ___ 3.3.4.3.1 b) For laboratories using outside services to perform normalized site attenuation (NSA), the capability to perform NSA shall be available during the on-site assessment.
- ___ 3.3.4.3.2 For test sites used for conducting tests above 1 GHz, the laboratory shall make available for review the results of the Site Voltage Standing Wave Ratio (SVSWR) for each test site.

3.3.4.4 Demonstration for multiple facilities

— If the laboratory maintains more than one OATS and/or alternative site, the assessor will ask questions to determine whether all sites are operated and equipped such that the requirements of NVLAP, applicable regulatory bodies, and the test methods within the laboratory's scope of accreditation are met.

Usually one site will be examined; however, at the discretion of the assessor, more than one site may be examined.

Address of additional test location(s):

Test methods associated with additional test location:

4 Management requirements for accreditation**4.2 Management system**

— 4.2.1 The laboratory shall ensure that the requirements of NIST Handbook 150 are met so that staff are knowledgeable of the electronic or paper-based documentation system and can demonstrate, if authorized, the retrieval of needed documents and/or records.

— 4.2.2 The laboratory shall have readily available the regulation(s) and the applicable version of the standard(s) for the test methods for which accreditation has been requested.

— 4.2.3 When a test method references another test method, guide, practice, or specification, which contains the procedure for the testing process, the laboratory shall have readily available the referenced documents.

4.3 Document control

— The master list or document control procedure that identifies the current revision status and distribution of documents shall include all national and/or international standards on the requested scope of accreditation (see NIST Handbook 150, 4.3.2.1).

4.4 Review of requests, tenders and contracts

___ All requests, tenders, and contracts shall be available for selection and examination by the assessor for the period of time covered between the on-site assessments.

4.14 Internal audits

___ 4.14.1 The internal audit shall cover compliance with NVLAP accreditation requirements, the laboratory's management system, as well as regulatory, contractual, and testing requirements.

___ 4.14.2 An applicant laboratory shall conduct at least one complete internal audit prior to the first on-site assessment.

___ 4.14.3 For accredited laboratories, records of internal audits conducted since the previous on-site assessment shall be made available for review.

4.15 Management reviews

___ 4.15.1 An applicant laboratory shall perform at least one complete management review prior to the first on-site assessment.

___ 4.15.2 For accredited laboratories, records of management reviews conducted since the previous on-site assessment shall be made available for review.

5 Technical requirements for accreditation**5.3 Accommodation and environmental conditions**

___ 5.3.1 FCC Part 15-Radio Frequency Devices: If a test site other than an OATS is used, a complete description shall be available along with documentation of equivalence.

___ 5.3.2 a) All parts of the test site shall be operational and available for inspection during the on-site visit.

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- ___ 5.3.2 b) The site attenuation shall be checked per ANSI C63.4 and complete written records shall be maintained.
- ___ 5.3.2 c) The site attenuation shall also be checked if significant changes are made in or near the OATS.
- ___ 5.3.3 a) FCC Part 68-Connection of Terminal Equipment to the Telephone Network: The laboratory shall have a procedure for checking the testing system before each use.
- ___ 5.3.3 b) The laboratory shall have at least one telephone device reserved for use in periodic checks of the test system.
- 5.4 Test methods and method validation**
- Measurement uncertainty is addressed in different ways depending on the test method standards that are employed.
- ___ 5.4 a) If measurement uncertainty can be calculated from Type A and B uncertainties, then the procedure shall follow the GUM or NIST Technical Note 1297 (see references in NIST Handbook 150, 1.4). Unless stated by the standard, the coverage factor (k) shall be equal to 2 (two) such that the confidence interval is approximately 95 %.
- ___ 5.4 b) In some instances, the standard provides a measurement uncertainty budget as part of the test method. Each measurement uncertainty budget shall be supported with calibration and computational data applicable to the test method as performed by that laboratory.
- ___ 5.4 c) In some instances, the standard provides a tolerance for the test method (and does not refer to "measurement uncertainty"). The tolerance stated in the standard shall be supported by calibration data, measurement uncertainty budgets and/or other appropriate calculations.

___ 5.4 d) In some instances, the standard provides a tolerance for the test components and/or instrumentation, but not for the test method. The tolerance shall be supported by instrument specifications, calibration and computational data, or comparison to some other appropriate measurement standard. At this time, there are no additional requirements beyond those in NIST Handbook 150, 5.4.6.2 - 5.4.6.3.

___ 5.4 e) In all other cases, the requirements in NIST Handbook 150, 5.4.6.2 - 5.4.6.3 apply.

5.5 Equipment

5.5.1 Shielded enclosure

___ 5.5.1 a) The laboratory shall specify how it monitors and records the performance of its shielded enclosure, how often, and what data shall be recorded.

___ 5.5.1 b) Requirements for checking associated critical equipment, such as power line filters, and grounding systems shall also be specified and the results documented.

5.5.2 Line impedance stabilization networks

___ Line impedance stabilization networks (LISN) shall be calibrated for insertion loss and the impedance verified at least once per year.

5.5.3 Equipment that produce transient waveforms

___ Equipment that produce transient waveforms (i.e., ESD simulators, burst generators, surge generators, automotive transient generators [per ISO 7637-2], and similar equipment) shall be verified with an oscilloscope at least once per year and photographs of the waveform verification shall be kept on file.

NOTE The waveform verification is performed in accordance with NIST Handbook 150, 5.5.10, for intermediate checks. It is not intended to replace the calibration schedule for the instrument.

5.5.4 Software

___ Software associated with automated test equipment (either stand-alone or computer-controlled) shall be validated before use. This includes validation of any software updates from the original equipment manufacturer (OEM) or other source.

5.6 Measurement traceability

___ 5.6 a) If a laboratory calibrates its own antennas, spectrum analyzers, and/or measurement receivers, procedures and instructions for those calibrations, in accordance with the manufacturer's calibration process and test method requirements, shall be maintained.

___ 5.6 b) Measurement uncertainties associated with these calibrations shall be estimated and reported in the calibration documentation.

___ 5.6 c) Antennas shall be calibrated to a recognized standard (e.g., ANSI C63.5, SAE ARP-958).

5.9 Assuring the quality of test results

___ 5.9.1 The laboratory shall have procedures for the quality control activities performed to assure the validity of the tests. These procedures shall include predefined criteria. (Refer to Notes 1 and 2 in NIST Handbook 150-11, 5.9.1.)

___ 5.9.2 The laboratory shall have a plan for monitoring the quality control activities performed. These activities are to be planned so that a minimum of one activity per year is performed, ensuring that each ECT category (reference NIST Handbook 150-11, section 1.3) of a laboratory's scope of accreditation is covered within four years.

___ 5.9.3 Laboratories shall participate in proficiency testing when NVLAP announces plans to conduct a proficiency test.

DATE:

NVLAP LAB CODE:

- 5.9.4 The laboratory shall evaluate the quality monitoring results against the predefined criteria. The laboratory shall follow NIST Handbook 150, 4.9 for the control of nonconforming work, as well as section 4.11 for corrective action (where appropriate), whenever outliers are identified.

