

	DEPARTMENT OF COMMERCE National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program	ISSUE DATE: May 16, 2011
	LAB BULLETIN	NUMBER: LB-57-2011
		LAP: Radiation Detection Instruments
SUBJECT: Electromagnetic Compatibility testing (ECT) as required for Radiation Detection Instruments (RDI) testing		

Several of the ANSI/IEEE N42 standards are written for testing radiation detection instruments (RDI) used in homeland security applications. The various instruments to be tested include alarming personal radiation detectors, portable radiation detectors, hand-held radionuclide identifiers, portal monitors, spectroscopy-based portal monitors, mobile and transportable radiation monitors, and spectroscopic personal radiation detectors. More standards may eventually be developed for other types of radiation detection instruments.

The ANSI/IEEE N42 standards require that different types of tests – radiological, environmental, electromagnetic, and mechanical – be performed on the instruments. NVLAP recognizes that some labs that apply for accreditation in RDI will not be able perform all the tests required by the standards. Therefore, the laboratory may be accredited for only the type of testing – radiological, environmental, electromagnetic, mechanical – that it can properly perform at its facilities. In particular, some laboratories may not have the proper ECT facility to rigorously perform the testing required by the standards. Note that during the environmental, electromagnetic, and mechanical tests it is required to verify the radiological response for the items under test. Therefore, RDI laboratories accredited for environmental, electromagnetic, and mechanical testing need to show that they can properly perform the tests in combination with radioactive sources.

Though the ANSI/IEEE N42 standards do not iterate the performance criteria of the ECT laboratory, the ECT industry recognizes that certain criteria have to be met in order to avoid extraneous electromagnetic disturbances and other phenomena that may jeopardize the quality and outcome of the tests that are being performed. Therefore, NVLAP requires that laboratories that want to pursue RDI accreditation and be accredited for the ECT portion of the ANSI/IEEE N42 standards must follow the criteria established in the following list of ECT standards in order to properly perform electrostatic discharge, radio frequency, magnetic fields, conducted immunity, radiated emission, and other ECT tests required by the ANSI/IEEE N42 standards.

- IEC 61000-4-2 – Electrostatic discharge
- IEC 61000-4-3 – Radiated, radio-frequency, electromagnetic field immunity test
- IEC 61000-4-4 – Electrical fast transient/burst immunity test
- IEC 61000-4-5 – Surge immunity test
- IEC 61000-4-6 – Immunity to conducted disturbances, induced by radio-frequency fields
- IEC 61000-4-8 – Power frequency magnetic field immunity test
- IEC 61000-4-11 – Voltage dips, short interruptions and voltage variations immunity tests
- CISPR 22 – Radio disturbance characteristics – Limits and methods of measurement

Laboratories that already participate in the NVLAP ECT accreditation program do meet the minimum requirements for properly testing instruments in electromagnetic fields. However, if the accredited ECT laboratory wants to become accredited for the ECT testing required by the ANSI/IEEE N42 standards, the laboratory is required to show that it can perform the radiological response part of the tests described in the ANSI/IEEE N42 standards during ECT testing.

Although a laboratory may become accredited for the ECT portion of the ANSI/IEEE N42 standards for radiation detection instruments used in homeland security, the RDI laboratory is not an accredited ECT laboratory. NVLAP has a separate accreditation program for ECT laboratories. If an RDI laboratory wants to become accredited for ECT testing outside the scope of the ANSI/IEEE N42 standards, then the laboratory must apply for accreditation in the ECT program and follow more rigorous requirements. Likewise, if an accredited ECT laboratory wants to become accredited as an RDI laboratory, then the ECT laboratory must apply for accreditation in the RDI program.

This bulletin has been posted to the NVLAP website at (<http://www.nist.gov/nvlap>).

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