

Verizon NEBSTM Compliance: HVAC Systems
NEBS Requirements
Verizon Technical Purchasing Requirements
VZ.TPR.9808
Issue 2, April 2017

CHANGE CONTROL RECORD:

Version	Date	Action*	Reason for Revision
1	4/14/2014	New	New document.
2	4/18/2017	Change	Correct Table in Section 6 to show ESD
* New, Add, Delete, Change, Reissue			

Trademark Acknowledgement – NEBS is a trademark of Telcordia Technologies, Inc.

PREPARED BY:

Name, Title, Organization	Date
Todd Talbot DMTS – Maintenance Engineering - NEBS 320 St. Paul Place, Floor 14 Baltimore, MD 21202 Phone: 410-736-5945 E-mail: todd.f.talbot@verizon.com	4/18/2017

APPROVED BY:

Name, Title, Organization	Date
David Hampton Manager – Maintenance Engineering 1201 E Arapaho Road Richardson, TX 75081 Phone: 214-416-3894 E-mail: david.hampton@verizon.com	4/18/2017

Table of Contents

1.0	PURPOSE.....	5
2.0	SCOPE.....	5
3.0	REFERENCES	5
4.0	ACRONYMS.....	6
5.0	DEFINITIONS	6
6.0	GENERAL REQUIREMENTS.....	6
7.0	PASS/FAIL REQUIREMENTS.....	8

1.0 PURPOSE

The purpose of this document is to establish requirements for HVAC systems containing electronic controls that may be installed in Verizon network space. As with other products that serve the network, HVAC Systems shall be tested to determine their safety, performance, and reliability characteristics. The supplier shall provide a production sample to a Verizon-approved Independent Testing Laboratory (ITL) for testing and shall furnish the test results to Verizon’s Maintenance Engineering NEBS group for review. In addition to NEBS testing, HVAC systems shall comply with all applicable local, state and federal statutes and regulatory requirements prior to general deployment.

2.0 SCOPE

This document defines the NEBS test requirements for HVAC systems, which may be deployed inside Verizon’s network facility. The “punchlist” of tests contained herein shall be used by equipment suppliers and the Verizon-approved Independent Test Laboratory as the baseline of tests to create the NEBS test plan. In all instances of test planning and test execution, the most recent and accepted versions of the GR standards shall be used.

3.0 REFERENCES

The following documents and publications were used as sources of information and test guidelines for this policy. Note: Refer to www.verizonebs.com for the latest versions of the TCG Checklist and Verizon’s TPRs.

GR-63-CORE	NEBS Requirements: Physical Protection
GR-78-CORE	Generic Requirements for the Physical Design and Manufacture of Telecommunications Products and Equipment
GR-1089-CORE	Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment
VZ.NEBS.TE.NPI.2004.015	Telecommunications Carrier Group Network Equipment-Building Systems (NEBS) Compliance Checklist
VZ.TPR.9305	NEBS Compliance Clarification Document

4.0 ACRONYMS

CO	Central Office
EMI	Electromagnetic Interference
EUT	Equipment Under Test
GR	Generic Requirement
HVAC	Heating, Ventilation and Air Conditioning
ITL	Independent Test Laboratory
NEBS	Network Equipment Building Systems
TPR	Technical Purchasing Requirements

5.0 DEFINITIONS

This Section Left Intentionally Blank.

6.0 GENERAL REQUIREMENTS

- a) **Flame Spread:** Tested products shall comply with all applicable requirements and objectives of GR-63-CORE, section 4.2. Additionally, products shall meet the pass/fail criteria defined in the Verizon NEBS Compliance Clarification Document (VZ.TPR.9305) (i.e., flame and smoke cessation within 15 minutes).

Telecommunications service providers require that network equipment be tested to and meet the minimum fire resistance requirements of GR-63-CORE. The requirements apply to the primary supplier and Original Equipment Manufacturer (OEM) of subassemblies that constitute an equipment system when interconnected. The following criteria apply for Equipment Assemblies and Material Selection:

- **Equipment Assemblies:** Testing is required to demonstrate that an equipment assembly fire does not spread beyond the structural elements (horizontal and vertical confines) of the equipment, and to ensure that all smoke emitting from the equipment when under test ceases within 15 minutes after the start of test.
- **Material Selection:** Polymeric materials used in construction of electrical components, equipment cables and wires have differing degrees of flammability and shall be tested by the equipment manufacturer in accordance with GR-63-CORE Section 4.2.3 to help minimize ignition of fires in equipment.

The flame spread test methodology defined in ANSI T1.319 as well as Verizon's clarification document shall be used during testing.

- b) **Electrostatic Discharge (ESD):** Tested products shall comply with all applicable requirements and objectives of GR-1089-CORE, section 2.1.

Discharges of electrostatic voltages on or near equipment assemblies can be a significant cause of failures or malfunctions. Equipment is susceptible to ESD effects at all stages of storage, installation, testing, operation, adjustment and maintenance. Failures or malfunctions occur when the effects of ESD

- Extend to the device level and cause device damage
- Alter the system software or firmware, affecting equipment functional performance
- Interfere with stored or transmitted information or data, resulting in malfunction and system errors.

- c) **Electromagnetic and Radio Frequency Interference:** Tested products shall comply with all applicable requirements and objectives of GR-1089-CORE, section 3.

Electro-mechanical devices cause EMI emissions that may interfere with nearby equipment or licensed transmitters. To minimize these emissions, products shall be designed, manufactured and tested to pass the FCC's Part 15 emissions criteria which address operating frequencies between 9 kHz to 1 GHz. In addition to the FCC criteria, Verizon requires that products deployed in the network shall meet the EMI criteria defined in Telcordia's GR-1089-CORE. This standard addresses frequencies beyond the FCC's frequency limit (up to 10 GHz). Products shall be tested for radiated and conducted emissions by a Verizon approved test laboratory.

Electronic equipment is also susceptible to excessive radiated and conducted emissions. To increase EMI immunity, Verizon requires products be designed, manufactured and tested to validate susceptibility thresholds. Metallic interfaces – power, and signal leads – are tested for radiated and conducted susceptibility in a shielded anechoic chamber. Immunity requirements are not addressed by the FCC but are required by Verizon and other telecommunications service providers.

- d) **Electrical Safety:** Tested products shall comply with all applicable requirements and objectives of GR-1089-CORE, section 7.

Electrical safety criteria are intended to protect persons from harm by limiting the voltages and currents that are intentionally applied to energized parts of equipment. Energy sources are categorized on the basis of classifications of voltages. Based on the voltage classification, power sources are further categorized as exposed, restricted or inaccessible to finger contact through the use of an accessibility test finger probe. Listing requirements for AC-powered devices and control of leakage currents that may be conducted from exposed ungrounded surfaces of the equipment are also addressed.

- e) **Bonding and Grounding:** Tested products shall comply with all applicable requirements and objectives of GR-1089-CORE, section 9.

Network equipment shall comply with the test requirements of GR-1089-CORE, section 9, which address bonding and grounding of network equipment and guidance for their usage. The main goals of bonding and grounding are as follows:

- Provide potential equalization to reduce voltage differences that might harm people or damage equipment or the facility,
- Provide a reliable low-impedance return-path for fault currents to enable rapid operation of over-current devices,
- Help avert equipment damage from unwanted energy resulting from lightning stroke, lightning-caused surges on metallic communications conductors, or surges on metallic communications conductors caused by commercial AC power, and
- Help avoid interference and malfunction of equipment.

HVAC equipment installed and operating in Verizon’s facilities, shall meet all applicable requirements of the following safety, performance, and reliability requirements:

GR-63-CORE: Network Equipment Building System (NEBS) Requirements: Physical Protection
Section 4.2, Fire Resistance
GR-1089-CORE: Electromagnetic Compatibility and Electrical Safety – Generic Criteria for Network Telecommunications Equipment
Section 2.1, ESD
Section 3.0, EMI
Section 7.0, Electrical Safety
Section 9.0, Bonding and Grounding

7.0 **PASS/FAIL REQUIREMENTS**

The EUT shall be configurable as documented in the manufacturer’s installation procedures and shall operate reliably over its intended life cycle. The product shall operate as intended during immunity and susceptibility testing (EMI) and the test report shall include failure thresholds, if any, for the purpose of risk assessment. The product shall meet all defined limits in the NEBS standards and the references listed above. All products shall be tested by a Verizon-approved Independent Testing Laboratory (ITL) using the latest acceptable version of the NEBS test standard.