



**Verizon NEBS™ Compliance: NEBS
Requirements for Customer Premises
Equipment (CPE)
Verizon Technical Purchasing Requirements
VZ.TPR.9501
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CHANGE CONTROL RECORD:

Version	Date	Action*	Reason for Revision
1	2/19/2007	Reissue	SIT.NEBS.TM.NPI.2006.042 document reissued and updated into new format. Original issue date 7/20/06.
2	3/19/2007	Change	Correction made to text in Section 12.2
3	4/4/2007	Add	Added UL-1449 Surge Protective Device testing
4	4/10/2007	Add	Added specific sections required for UL-1449 testing
5	8/16/2007	Add	Added clarification to fire spread test set-up
6	10/5/2007	Change	Corrected referenced document number for NEBS Compliance Clarification Document
7	3/1/2013	Change	Clarification to functional performance and monitoring during testing Removed Flame Spread Testing requirement
8	3/24/15	Add	Add IEC 60068-2-31
* New, Add, Delete, Change, Reissue			

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1. PURPOSE

The purpose of this Verizon Technical Purchasing Requirement document is to provide the minimum required NEBS testing for Customer Premises Equipment (CPE).

As with other products that serve the network, CPE Devices 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 NEBS team for review. In addition to NEBS testing, CPE devices shall comply with all applicable local, state and federal statutes and regulatory requirements prior to general deployment.

2. SCOPE

This document defines a subset of Verizon's NEBS requirements that address environmental, safety, lightning and AC power fault, and electromagnetic compliance for network elements located on the customer's side of the demarcation point. For this purpose, these requirements are referred to as NEBS Compliance requirements for CPE devices. A complete listing of Verizon's NEBS requirements for network equipment can be found in the Telecommunications Carrier Group NEBS Checklist at the following web page www.verizonnebs.com. The tests contained herein shall be used by equipment suppliers and the Verizon-approved Independent Test Laboratories 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. REFERENCES

GR-63-CORE	NEBS™ Requirements: Physical Protection
GR-1089-CORE	Electromagnetic Compatibility and Electrical Safety – Generic Criteria for Network Telecommunications Equipment
GR-78-CORE	Generic Requirements for the Physical Design and Manufacture of Telecommunications Products and Equipment
UL-1449 2nd Edition	Transient Voltage Surge Suppressors
UL 60950-1	Information Technology Equipment – Safety – Part 1: General Requirements
UL-60065	Audio, Video and Similar Electronic Apparatus – Safety Requirements
CFR Title 47, Part 15	Radio Frequency Devices
CFR Title 47, Part 68	Connection of Terminal Equipment to the Telephone Network
VZ.TPR.9305	NEBS Compliance Clarification Document
IEC 60068-2-31	Environmental Testing: Part 2-31:Tests; Rough Handling Shock, primarily for equipment-type specimens



4. ACRONYMS

AC	Alternating Current
BOM	Bill of Materials
CFR	Code of Federal Regulations
CPE	Customer Premises Equipment
DC	Direct Current
EMI	Electromagnetic Interference
EUT	Equipment Under Test
FCC	Federal Communications Commission
ITL	Independent Test Laboratory
OEM	Original Equipment Manufacturer
SPD	Surge Protective Device

5. DEFINITIONS

A CPE device is any equipment supplied by Verizon or its representatives to a customer, either directly connected to the network or otherwise used to deliver Verizon services. CPE devices are typically placed inside a dwelling (home or small business), and in a sheltered and environmentally controlled space. No distinction is made between AC or DC powered devices; both types of powering schemes shall comply with the requirements listed herein, and it is recommended that if a CPE device comes in both versions that each be tested separately to the NEBS requirements. Examples of CPE covered by this TPR include but are not limited to, broadband home routers, DSL modems, set top boxes, VMS and IP Clients.

6. GENERAL REQUIREMENTS

Test configuration: The Equipment Under Test (EUT) shall be fully configured and performing its designated functions during the application of NEBS testing. The EUT and all associated documentation (installation and operating manuals), mounting and grounding schemes shall be provided to the test laboratory by the vendor prior to test commencement. All equipment interfaces shall be monitored for functionality and the test plan shall include the pass/fail criteria for each interface or service type.

Verizon requires that manufacturers submit their EUT and associated documentation to a Verizon-approved ITL for testing and verification of conformance to the qualification test requirements in this document. For a list of Verizon approved laboratories and locations, consult the Verizon web page at <http://www.verizonnebs.com/tcppage.html>.



7. 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, Operational Temperature and Relative Humidity, Altitude, etc.,) and the test report shall include failure thresholds, if any, so that proper risk analysis can be made. The product shall meet all defined requirement limits contained herein.

For all operational testing (Immunity, EMI, etc.), the EUT shall be configured as would be in real world applications. The EUT shall be fully operational with all services enabled. Data traffic shall be maximized in order to create a worst case test scenario. Monitoring, of the functionality, of the EUT shall be such that any degradation of performance is noted by the support equipment.

8. OPERATING TEMPERATURE, HUMIDITY AND ALTITUDE REQUIRMENTS

- 8.1** All CPE devices shall operate in the temperature and humidity environment described in GR-63-CORE – *NEBS Physical Protection*, section 4.1.2. The operating temperature ranges described in GR-63-CORE are:

Long Term Operation: 5⁰C to 40⁰C
Short Term Operation: -5⁰C to 50⁰C

- 8.2** All CPE devices shall operate within the altitude requirements specified in GR-63-CORE, Section 4.1.3.

9. SURFACE TEMPERATURE REQUIREMENTS

- 9.1** All CPE devices shall utilize materials (metallic and polymeric) that meet the surface temperature contact exposure requirements defined in GR-63-CORE section 4.1.7 - Temperature Limits of Touchable Surfaces - when the equipment is operating in a room with an ambient air temperature of 23°C (73°F).

10. FIRE RESISTANCE REQUIREMENTS

- 10.1** All CPE devices shall be manufactured using fire resistant materials and components as described in GR-63-CORE section 4.2.3. All items listed in the product's Bill of Materials (BOM) shall be tested to and comply with the aforementioned standards.



10.2 All CPE devices made with a plastic enclosure shall be constructed using 94-V0 material or better.

10.3 Needle Flame Testing

10.3.1 All CPE devices shall comply with the needle flame testing as defined in GR-63-CORE.

11. ELECTROMAGNETIC COMPATIBILITY REQUIREMENTS

11.1 All CPE devices shall comply with the FCC requirements CFR Title 47 Part 15 - *Radio Frequency Devices* and CFR Title 47 Part 68 - *Connection of Terminal Equipment to The Telephone Network* (if they are connected to the network) and the Immunity requirements defined in GR-1089-CORE, section 3.3.

12. LIGHTNING SURGE AND AC POWER FAULT REQUIREMENTS

12.1 All CPE devices shall comply with the Lightning Surge and AC Power Fault requirements defined in GR-1089-CORE, Section 4.

12.2 CPE devices require additional levels of lightning protection. The CPE device shall be designed to withstand first-level lightning surges up to $\pm 5000V$ amplitude on the telecom POTS type ports. The test level defined for telecom POTS ports under Table 4-2 Test 8 & 9 shall be increased to a minimum peak voltage of $\pm 5000V$. First-level acceptance criterion that the equipment is capable of operating properly after a $\pm 5000V$ simulated lightning strike without manual intervention or power cycling following the application of the ± 5000 lightning surge shall be applied. Ethernet and coaxial ports shall be tested at the levels as defined in Table 4-2 of GR-1089.



13. ELECTRICAL SAFETY REQUIREMENTS

13.1 All CPE devices shall comply with the listing requirements of UL-60950 or UL-60065 and shall comply with the Electrical Safety requirements defined in GR-1089-CORE, Section 7.

14. GR-78-CORE REQUIREMENTS

14.1 All CPE devices shall meet the intent of the design and manufacturing requirements described in GR-78-CORE – Physical Design and Manufacture of Telecommunications Products and Equipment.

15. GENERAL SAFETY REQUIREMENTS

15.1. CPE products that contain surge protective devices shall be tested to and comply with the UL-1449 sections listed below. Testing is to be performed on the fully assembled product and the test reports shall be provided to Verizon.

- Section 31 – Leakage Current Test
- Section 32 – Dielectric Voltage-Withstand Test
- Section 34 – Measured Limiting Voltage Test
- Section 35 – Surge Current Test
- Section 36 – Overvoltage Test
- Section 37 – Abnormal Overvoltage Test

16. DROP TESTING REQUIREMENTS

16.1 All CPE devices shall be tested to IEC 60068-2-31 Free Fall – Procedure 1 and pass functionality testing at the conclusion of testing. The equipment shall be subjected to 2 free-fall drops from a height of 750mm on each of 6 surfaces, 12 edges and 8 corners. Multiple samples are allowed to be used.