



**Verizon NEBS™ Compliance: FiOS Battery
NEBS Testing
Verizon Technical Purchasing Requirements
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Table of Contents

1.0	PURPOSE	5
2.0	SCOPE	5
3.0	REFERENCES	5
4.0	ACRONYMS	5
5.0	GENERAL REQUIREMENTS	6
6.0	TEST REQUIREMENTS	6
7.0	BATTERY RESERVE TESTING	7



1.0 PURPOSE

The purpose of this Verizon Technical Purchasing Requirement document is to define the minimum required NEBS and battery reserve testing for VRLA Batteries supporting FiOS services.

2.0 SCOPE

This Technical Purchasing Requirement document is intended to summarize Verizon's environmental and battery reserve time testing for VRLA FiOS batteries, which may be deployed in Verizon's network in conjunction with a UPS. For this TPR, a UPS is defined as the BBU for single family dwellings or the FMPS for multi-family dwellings. The 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

GR-63-CORE	NEBS™ Requirements: Physical Protection
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4.0 ACRONYMS

BBU	Battery Back-up Unit
EUT	Equipment Under Test
FiOS	Fiber Optic Service
FMPS	FTTP Multi-Purpose Power Supply
ITL	Independent Testing Laboratory
NEBS	Network Equipment Building Systems
OPSU	Optical Power Supply Unit
UPS	
VRLA	Valve Regulated Lead Acid



5.0 GENERAL REQUIREMENTS

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>.

In addition to the NEBS requirements, products used at a customer's premises must meet applicable UL safety standards.

6.0 TEST REQUIREMENTS

Standard	Section	Required	Notes
GR-63-CORE	Sec. 4.1.1 – Transportation and Storage Environmental Criteria	X	The batteries must execute a charge / discharge cycle following each test
GR-63-CORE	Sec. 4.1.2 – Operating Temperature Criteria	X	The batteries must execute a charge / discharge cycle during each temperature extreme as well as towards the end of the of the humidity cycle
GR-63-CORE	Sec. 4.1.3 – Altitude	X	The batteries must execute a charge / discharge cycle at each dwell point during altitude testing
GR-63-CORE	Sec. 4.2 – Fire Resistance		
GR-63-CORE	Sec. 4.3 – Equipment Handling – Packaged Drop	X	The batteries must execute a charge / discharge cycle following the test. The batteries must be tested in their final shipping container.
GR-63-CORE	Sec. 4.3 – Equipment Handling – Unpackaged Drop	X	The batteries must execute a charge / discharge cycle following the test.
GR-63-CORE	Sec. 4.4.1 – Earthquake Environment and Criteria	X	The Batteries shall be mounted directly to the test fixture. The batteries must execute a charge / discharge cycle following the test.
GR-63-CORE	Sec. 4.4.4 – Office Vibration Environment and Criteria	X	The Batteries shall be mounted directly to the test fixture. The batteries must execute charge / discharge cycles continuously during the test.
GR-63-CORE	Sec. 4.4.5 – Transportation Vibration Criteria	X	The batteries must execute a charge / discharge cycle following the test.



7.0 BATTERY RESERVE TESTING

The testing shall be performed with **new** batteries that has not been previously used for testing as defined in section 6 above and has not been recharged since shipping from the battery vendor. Testing shall be conducted on a minimum of 5 batteries. Testing will be performed with a 7 watt load to simulate the load from an OPSU and BBU. The battery voltage, current, case temperature and time to discharge shall be monitored and recorded during the testing. 7.2aH batteries or equivalent must meet the Verizon required 4 hours battery reserve time at -20°C. Alternate size batteries shall be prorated accordingly. Testing shall be conducted as follows:

1. Arrange the FiOS batteries in an environmental chamber with the support equipment located outside the chamber.
2. At a temperature of 25°C, charge the batteries to their maximum level and allow the batteries to stabilize for a minimum of 2 hours.
3. Connect the load circuit to the batteries and measure and record the voltage, current, case temperature and time for the battery to discharge to a voltage of 10.5 Vdc.
4. Repeat steps 2 and 3 for a second cycle at 25°C. Two hour stabilization is not required for the second cycle.
5. Recharge batteries to their maximum level.
6. Ramp the environmental chamber to -20°C and allow the batteries to stabilize for a minimum of 2 hours.
7. Connect the load circuit to the batteries and measure and record the voltage, current, case temperature and time for the battery to discharge to a voltage of 10.5 Vdc.
8. Recharge the batteries while maintaining the -20°C environmental set point.
9. Repeat steps 7 and 8 to complete 2 discharge cycles at -20°C.
10. Recharge the batteries while maintaining the -20°C environmental set point.
11. Once recharging has completed, increase the temperature in the environmental chamber to 25°C and allow the batteries to stabilize for a minimum of 2 hours.
12. Connect the load circuit to the batteries and measure and record the voltage, current, case temperature and time for the battery to discharge to a voltage of 10.5 Vdc.
13. Recharge the batteries while maintaining the 25°C environmental set point.
14. Repeat step 12
15. Testing complete.