



**Verizon NEBS™ Compliance: SFU ONT Backup  
Battery Reserve Time Test Plan**  
Verizon Technical Purchasing Requirements  
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**CHANGE CONTROL RECORD:**

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## 1.0 PURPOSE

This document provides an overview of the setup and testing to be performed at a Verizon approved Independent Test Lab (ITL) on an FTTP SFU ONT Battery Backup Unit (BBU) with rechargeable lead acid battery. This test is intended to validate the BBU backup power source reserve time at the minimum operating ambient temperature of -20°C. The system must meet the Verizon required four (4) hours battery reserve time at -20°C.

## 2.0 SCOPE

This document defines the Verizon test requirements for FTTP SFU ONT Battery Backup units, which may be deployed in Verizon's network. 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.

This test plan shall be completed by the vendor and returned to Verizon SIT organization for final approval prior to conducting testing. While it is preferred that the ITL test lab prepare the final reports, test reports can be prepared by the vendor, but the test lab must review and approve the final report which shall be demonstrated by a signature page on the test report by the laboratory.

## 3.0 REFERENCES

None	
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#### 4.0 ACRONYMS

<b>BBU</b>	Battery Backup Unit
<b>EUT</b>	Equipment Under Test
<b>ITL</b>	Independent Testing Laboratory
<b>OPSU</b>	ONT Power Supply Unit
<b>SFU ONT</b>	Single Family Unit Optical Network Terminal

#### 5.0 SYSTEM OVERVIEW

The BBU shall be tested with a new battery that has not been previously used for any testing and has not been recharged since shipping from the battery vendor.

The system shall be configured with an SFU ONT running video, 15 Mbps data traffic in both upstream and downstream with two POTS lines terminated to simulate an off hook condition. The SFU ONT shall be connected to the PON card and receiving data, video and voice traffic through the PON. Voice, data, and video service shall be monitored and recorded throughout the testing. The battery voltage, current and temperature shall be monitored and recorded as the battery discharges during the test.

The vendor shall provide details of the system under test and the monitoring test equipment for review and approval by Verizon SIT prior to testing.

#### 6.0 TEST ENVIRONMENT

The SFU ONT, BBU and OPSU shall be located inside of an environmental chamber, while the rest of the support equipment will be located outside. The chamber shall be set to -20<sup>0</sup>C and the equipment will be allowed to come to thermal equilibrium prior to beginning the test.

The battery BBU shall provide backup power to the ONT after disconnecting the AC power from the OPSU. Once the AC power is disconnected, video, voice and data traffic shall be maintained for the times indicated in the system requirements section of this document. Functionality shall be monitored throughout. The test ends when the ONT issues a “Dying Gasp” alarm to the OLT.

The vendor shall provide details of the test bed environment and all diagrams/ drawings of the system under test with the specific architectural design. The vendor shall document hardware and



software components used for the testing, the pass/ fail criteria for each element (voice, data, and video), and provide details about the monitoring systems used to validate conformance to these requirements.

## **7.0 TEST PROCEDURE**

For this test, a new battery must be removed from its factory-sealed box and placed inside the BBU. The power cable between the ONT and BBU shall be the maximum length of fifty (50) feet.

Set up the equipment as described in Section 5.0. The following parameters shall be monitored and recorded throughout the testing:

- Chamber temperature
- The VRLA battery surface temperature
- Charging voltage
- Charging current
- SFU ONT internal air temperature
- BBU output voltage
- BBU output current
- SFU ONT input voltage
- Alarms
- LED Status indicator operation

Setup the OPSU, SFU ONT and the BBU inside an environmental chamber. Setup video, data traffic, and POTS service on the SFU ONT and set the chamber temperature to -20°C.

Test Cycle I:

- Disconnect the AC power to the OPSU to discharge the battery.
- Once the battery is discharged and the temperature of the battery is stabilized at -20°C, restore the AC power to the PSU, which will restore the SFU ONT and begin recharging the BBU. Maintain the chamber temperature at -20°C throughout.
- Once the SFU ONT has rebooted, restart video and data traffic, and terminate the two POTS lines with 680-ohm terminators.
- Monitor the battery charging current until it is fully charged
  - Soak the equipment and the fully charged battery at -20°C for 24 hours.

Test Cycle II:

- While maintaining the chamber temperature at -20°C, disconnect the AC power to the OPSU.
- Disable the video traffic **15 seconds** after disconnecting the AC power.
- **15 minutes** into the test, stop the data traffic and remove Ethernet cable from the test generator.



- **2 hours** into the test, remove one POTS line termination and leave the second POTS line terminated until the battery is depleted and the ONT issues a “Dying Gasp” alarm to the OLT.
  - Calculate/Measure/Record the total SFU ONT battery back up power reserve time at -20°C.