MOBILE WORLD LIVE

Why NEBS Level 3- and IP65-compliant hardware are critical to 5G and the Edge

Telecom networks have always demanded reliability and availability. With NEBS Level 3 certified and IP65 outdoor-capable hardware, service providers can be confident that their 5G and edge equipment will deliver reliable and highly available solutions.

Telecom networks in North America and worldwide must be able to tolerate harsh environments and challenging physical conditions including extreme situations such as earthquakes, wildfires and torrential rains. Many central offices and remote sites where telecom operators are deploying their new 5G radio access network (RAN) and Mobile Edge Compute (MEC) equipment are decades old and/or may not be outfitted with modern temperature and humidity controls. Because of this, operators must guarantee that the equipment they deploy will withstand a range of conditions.

To ensure that network equipment is "bulletproof" for telecom networks, many years ago Bell Labs developed the Network Equipment-Building System (NEBS) designation, whose specifications are maintained by the compliance agency Telcordia. NEBS is a set of technical requirements initially developed for central office switching equipment and these requirements are still relevant today – even more so as operators transition to 5G and leverage both existing central office and new makeshift facilities as locations to house their new 5G and MEC equipment.

The standard assures service providers that any NEBS-compliant equipment they purchase meets specific performance requirements regarding temperature and humidity, fire resistance, earthquake survivability, shock and vibration, acoustic noise and airborne contaminants.

SUPERMICRO NVIDIA

There are three levels of NEBS compliance:

- NEBS Level 1 is typically aimed at non-critical systems and therefore doesn't pertain to telecom networks.
- NEBS Level 2 is intended for failure-tolerant services, which means the equipment will work well in a very controlled environment such as a data center.
- NEBS Level 3 is considered carrier-grade and is designated for critical systems such as telecom networks. All Tier 1 telecom service providers in North America require NEBS Level 3-compliant equipment for residency in their central office or critical infrastructure facilities.

Equipment that is certified to be NEBS Level 3-compliant must undergo a series of tests that are conducted and confirmed by a certified Third Party Lab (TPL). The tests for NEBS Level 3 are based on Telcordia NEBS documents SR-3580 and GR-63, which ensure the equipment meets certain physical protection requirements, and GR-1089 which ensures the equipment meets specific requirements for electromagnetic compatibility and electrical safety.

Examples of NEBS Level 3 GR-63 tests that are conducted include:

- Shock and vibration tests
- Earthquake test of up to a 7.5 seismic event on the Richter scale
- Temperature and humidity testing from temperatures of -5°C to +55°C for 96 hours with humidity range of 5% to 95%
- Transportation and storage environment testing
- Fire resistance testing of all plastic parts, cables, labels, PCB, and connectors
- Altitude testing of up to 2,000 meters at 40°C and up to 4,000 meters at 30°C
- Temperature margin test, which increases the temperature from 5°C to 30°C every hour and increases the temperature from 30°C to 55°C every hour
- For fan-cooled equipment, the ability for the system to continue operating after a single fan failure.

While evolving from 4G/LTE to 5G, carriers may embrace open-source software and standards and use commercial off-the-shelf (COTS) servers; these servers still must meet NEBS Level 3 standards. More interesting is that as the newly enabled 5G applications leveraging AI/ML and AR/VR, and others yet to be developed, proliferate the market, there is an ever expansive workload compute requirement to support these applications. This is important because service providers must deploy equipment that is hardened to the elements in order to avoid costly truck rolls and ensure that service providers can adhere to their Service Level Agreements (SLAs).

Supermicro's commitment to telecom

Since many telecom installations have been built to support legacy equipment that is not exactly the same as found in a typical data center, Supermicro® has optimised its telecom-focused offering with features including dual redundant DC power supplies, short depth/small form factor, and front I/O access.

Supermicro has significantly and strategically invested in developing NEBS Level 3-compliant equipment to support telco customers. The first example of Supermicro's investment in NEBS is the Ultra 1U which was tested by a certified TPL for NEBS Level 3 and passed successfully. The Ultra 1U is rack-mounted and supports up to 24 dual inline memory module (DIMM) slots. It features dual Intel® Xeon® scalable processors that support up to 150W thermal design power, and is available in AC and DC power versions. Supermicro also now offers the Ultra-E, a 2U server with a shorter depth for telco racks, which is also available with NEBS Level 3 certification and support for AC or DC power.

In addition, Supermicro released a new 1U rackmount server than can support up to 4x NVIDIA® Tensor Core V100 or V100s GPUs, with a roadmap to NVIDIA Ampere GPUs in the near future – the only NEBS Level 3-certified server on the market that can do so. This system is hardened to 55°C and is compliant with GR-1089 and GR-63 tests. By supporting up to four advanced GPUs in a 1U rack height while meeting NEBS Level 3 requirements, this powerful server can handle the new 5G workloads at the Edge that are necessary for many AI, virtual reality, and gaming applications, while satisfying stringent telco operating requirements.

For environments even less controllable than the inside of operators' buildings, Supermicro has developed a line of pole-mountable Outdoor Edge Servers, which boast an IP65 rating – meaning they are resistant to extreme heat and cold (-40°C to +50°C), vibration, water jets, and even gunshots. These are complete server platforms designed for extreme environments, complying with GR-487-CORE and GR-3108-CORE specifications, and can support ruggedized outdoor telecom use for both 5G RAN and edge computing. Along with Intel Xeon processors, these systems feature three PCI-E expansion slots for GPU or FPGA accelerator cards to support AI at the extreme edge and network acceleration. These compact platforms support virtualized and containerized deployments for flexible and upgradeable networks.

Telcos that select Supermicro's NEBS Level 3- and IP65-compliant server platforms can be assured that their 5G and edge equipment will not only be optimised to support advanced 5G applications, but will also withstand all types of conditions.