

Latitude E6420 XFR

Summary Of Independent Environmental Testing



General Information

Project Numbers

| | |
|------------------|--|
| 11707-30 | MIL-STD Testing |
| 11707-30 | IEC Ingress Testing |
| 10NK13547 | UL1604 Hazardous Location Testing |
| 10NK13547 | UL and CE Safety Testing / ESD, Emissions, Immunity Testing |
| 11706-10 | MIL-STD-461F Testing |

Equipment Tested

Dell™ Latitude™ E6420 XFR

Environmental Test Dates

February-March 2011

Independent Test Companies And Contacts

Professional Testing (EMI), Inc.

1601 FM 1460, B
Round Rock, TX 78664
Jeffery A. Lenk, President

NEMKO

802 N Kealy St
Lewisville, TX 75057
Randy Friedberg, Account Manager

Underwriters Laboratories, Inc.

333 Plingsten Road
Northbrook, IL 60062-2096
Saad Lambaz, Associate Project Engineer, Department: Hazardous Locations



Notes

All environmental testing listed in the accompanying tables was performed and reported independently by the accredited testing companies listed above.

Documented MIL-STD-810G, IEC, UL, emissions, immunity and ESD testing guidelines were followed. All tests were performed with I/O and expansion doors closed. A summary listing of tests appear in the following tables.



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MIL-STD Testing

| Test Listing | Test Method | Description | Result |
|--|---|--|--------|
| 48" Transit Drop | MIL-STD-810G Method 516.6 Procedure IV | 48" (4', 1.22m) drops to 2" of plywood over concrete. One drop to each face, edge and corner. Unit is closed and not operating. 26 total drops on a single test unit. | PASS |
| 60" Transit Drop | MIL-STD-810G Method 516.6 Procedure IV | 60" (5', 1.52m) drops to 2" of plywood over concrete. One drop to each face, edge and corner. Unit is closed and not operating. 26 total drops on a single test unit which also passed all transit drops at 48". | PASS |
| 72" Transit Drop | MIL-STD-810G Method 516.6 Procedure IV | 72" (6', 1.83m) drops to 2" of plywood over concrete. One drop to each face, edge and corner. Unit is closed and not operating. 26 total drops on a single test unit which also passed all transit drops at 48" and 60". | PASS |
| Operating Drop | MIL-STD-810G Method 516.6 Procedure IV | 36" (3', 0.914m) drop to 2" of plywood over concrete. One drop to each face, edge and corner. Unit is open and operating. 26 total drops on a single test unit. | PASS |
| Blowing Rain Aggravated | MIL-STD-810G Method 506.5 Procedure I | 5.8" (147mm) per hour of blowing rain with a 70 mph wind source for 30 minutes on each surface. Unit is operating. | PASS |
| Blowing Dust | MIL-STD-810G Method 510.5 Procedure I | Particle Density: 10 ± 7 g/m ³ . Air Velocity: 300 to 1,750 ft/min (8.9 m/s or 19.5 mph). Operating temperature of 140°F (60°C). Unit is not operating. | PASS |
| Blowing Sand | MIL-STD-810G Method 510.5 Procedure II | Sand Density: 1.2 g/m ³ . Air Velocity: 28 m/s (8.9 m/s or 19.5 mph). Operating temperature of 140°F (60°C). Unit is operating. | PASS |
| Temperature Operating | MIL-STD-810G Methods 501.5, 502.5 Procedure II | -20°F (-29°C) to 145°F (63°C) High temperature: 5 day exposure (5x 24hr cycles). Low temperature: 24hr exposure. Unit is operating. | PASS |
| Temperature Non-Operating/Storage | MIL-STD-810G Methods 501.5, 502.5 Procedure I | -60°F (-51°C) to 160°F (71°C) High temperature: 7 day exposure (7x 24hr cycles). Low temperature: 24 hour exposure. Unit is not operating. | PASS |
| High Temperature Tactical Standby To Operational | MIL-STD-810G Methods 501.5 Procedure III | 158°F (70°C) to 140°F (60°C) Unit is presoaked at 158°F (70°C) for 2 hours after temperature stabilization. Temperature is ramped to 140°F (60°C) and operational test is performed. | PASS |
| Freeze/Thaw Rapid Temperature Change | MIL-STD-810G Methods 524 Procedure III | Unit stabilized at 77°F (25°C) and relative humidity of 97% for 1 hour, then transferred rapidly to a freezing chamber at 14°F (-10°C). Unit is allowed to stabilize plus one additional hour. Unit is brought back to above-freezing test. Unit is not operating during the test. Operational test is performed at the end of cycles. | PASS |
| Thermal Shock | MIL-STD-810G Method 503.5 Procedure I | -60°F (-51°C) to 160°F (71°C) Cyclic temperature exposure. Three shocks. Unit is not operating. Functional test between cycles. | PASS |
| Humidity Aggravated | MIL-STD-810G Method 507.5 Procedure II | 0% to 95% - non-condensing humidity Temperature cycled between 86°F (30°C) and 140°F (60°C). Ten 24-hour cycles. Relative humidity maintained at 95%. Unit is not operating. | PASS |
| Vibration Composite Wheeled Vehicle | MIL-STD-810G Method 514.6 Procedure I Category 4 | Figure 514.6C-3. Unit is not operating. | PASS |
| Vibration Ground Vehicle (Common Carrier / US Highway Truck) | MIL-STD-810G Method 514.6 Procedure I Category 4 | Figure 514.6C-1. Unit is operating. | PASS |

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| Test Listing | Test Method | Description | Result |
|--|--|--|--------|
| Vibration Minimum Integrity Test | MIL-STD-810G Method 514.6 Procedure I Category 24 | Figure 514.6E-1. Power Spectral Density = 0.04g ² /Hz at 20Hz – 1000Hz, -6dB/Octave at 1000Hz – 2000Hz. 60 minutes x 3 axes. Unit is not operating during tests. Functional test after each axis. | PASS |
| Vibration Loose Cargo | MIL-STD-810G Method 514.6, Procedure II | Figure 514.6C-4. 300 rpm for 60 minutes total. Unit is not operating during tests. Functional test after each axis. | PASS |
| Salt Fog | MIL-STD-810G Method 509.5 Procedure I | 5% saline exposure for 2 cycles x 48hrs. (24 hours wet / 24 hours dry). Unit is not operating. | PASS |
| Altitude Storage / Air Transport | MIL-STD-810G Method 500.5 Procedures I | Chamber at 30,000ft for 1 hour. Unit is not operating. | PASS |
| Altitude Operation / Air Carriage | MIL-STD-810G Method 500.5 Procedures II | Chamber at 15,000ft for 1 hour. Unit is operational. | PASS |
| Functional Shock | MIL-STD-810G Method 516.6 Procedure I | 40g, 11ms, saw-tooth, 3 shocks, +/- per axis, 3 axes. Unit is operating. | PASS |
| Explosive Atmosphere | MIL-STD-810G Method 511.5 Procedure I | Unit must be operating and perform various functions in an explosive environment without igniting the atmosphere. | PASS |
| Solar Radiation | MIL-STD-810G Method 505.5 Procedure I | Category A1, Paragraph 4.4.2, Figure 505.5-1 (Cyclic) Three 24-hour cycles of testing. Unit is not operating. | PASS |

IEC Ingress Protection Certifications

| Test Listing | Test Method | Description | Result |
|--|-------------|--|--------|
| IP-6x Dust Ingress Protection | IEC 60529 | No ingress of dust. Complete protection against contact. Unit is not operating. Operational test performed at end of test cycle. | PASS |
| IP-x5 Water Ingress Protection | IEC 60529 | Jetting Water: Water is projected in jets against the enclosure from any direction with no harmful effects. Unit is not operating. Operational test performed at end of test cycle. | PASS |

Additional Testing Procedures

| Test Listing | Test Method | Description | Result |
|--|---|--|--------|
| ASTM Vehicle Vibration Truck Highway Assurance Level II | ASTM D4169-04(99) Schedule E | 1-200Hz, 0.52 Grms in all three axis. 90 minutes per axis. Unit is operating. | PASS |
| Cold Boot | Customized test based on field conditions | Unit exposed to -10°F (-23°C) for 8 hours. Unit configured with solid state drive and not operating during test. Functional test performed with external power after conclusion of soak. | PASS |

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Environmental Certifications

| Test Listing | Test Method | Description | Result |
|---|---|---|--------|
| Electromagnetic Interference | MIL-STD-461F | CE101, CE102 ¹ , CS101, CS114, CS115, CS116, RE101, RE102 ¹ , RS101, and RS103 ¹ profiles. | PASS |
| Hazardous Locations | UL1604 Class 1, Division II, Zones A,B,C,D ² | Certified ² Safe operation of system in potentially hazardous environments as defined. Tested by UL Labs, Department of Hazardous Locations. | PASS |
| Safety | UL/IEC 60950 | Standard Safety Certification. Tested by UL Labs. | PASS |
| Conducted and Radiated Emissions | EN55022:2006 ANSI C63.4-2003 | FCC 47 CFR Part 15, Class B. Tested by NEMKO. | PASS |
| Electrostatic Discharge /Conducted And Radiated Susceptibility / Immunity | EN 61000-3-2 EN 61000-3-3 EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-4-8 EN 61000-4-11 | EN55024: 1998+A1:00+A2:03 ANSI C63.4-2003 8Kv/4Kv 3Vrms 3 V/M >95%-0.5p, 30%-25[. >95%-250p Tested by NEMKO. | PASS |

Pass Criteria and Test Scope Information

For operational tests, a PASS indicates that the unit remained operational during the entirety of the test.

For non-operational tests, a PASS indicates that a functional verification was performed immediately after the test exposure, in which the unit was powered on and booted to the primary operating system.

Sample sizes tested are not statistically significant.

Cosmetic damage does not constitute a failure unless there is a safety concern.

Important Information

- ¹ Test passed with a MIL-STD-461F approved AC power supply.
- ² UL1604 must be specified at time of order for full compliance to certification.