

DELL LATITUDE E6400 XFR

SUMMARY OF INDEPENDENT ENVIRONMENTAL TESTING

PROJECT NUMBERS: 09314 MIL-STD-810F
19049 IEC Ingress Testing
08CA46457 UL1604 Hazardous Location Testing
15529 UL and CE Safety Testing
15529 ESD, Emissions, Immunity Testing

EQUIPMENT TESTED: Dell™ Latitude™ E6400 XFR

ENVIRONMENTAL TEST DATES: December 2008

INDEPENDENT TEST COMPANIES AND CONTACTS: Professional Testing (EMI), Inc.
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NOTES: All environmental testing listed in the accompanying tables was performed and reported independently by the accredited testing companies listed above.
Documented MIL-STD-810, IEC, UL, emissions, immunity and ESD testing guidelines were followed. A summary listing of tests appear in the following tables.



1. SUMMARY TABLES

1.1 MIL-STD-810F TESTING

TEST LISTING	TEST METHOD	DESCRIPTION/PARAMETERS ¹	RESULT ^{2,3}
TRANSIT DROP	MIL-STD-810F Method 516.5 Procedure IV	48"(4', 1.22m) drop to 2" of plywood over a non-yielding surface, 26 total drops on a single test unit. One drop to each face, edge and corner. Unit is closed and not operating.	PASS
OPERATING DROP	MIL-STD-810F Method 516.5 Procedure IV	36"(3', 0.914m) drop to 2" of plywood over a non-yielding surface, 26 total drops on a single test unit. One drop to each face, edge and corner. Unit is open, operating and configured with SSD.	PASS
BLOWING RAIN ⁴	MIL-STD-810F Method 506.4 Procedure I, Aggravated	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 ⁴	MIL-STD-810F Method 510.4 Procedure I	Particle Density: 10 ± 7 g/m ³ . Air Velocity: up to 1,750 ft/min (8.9 m/s or 19.5mph). Temperature exposure at 73°F (23°C) and 140°F (60°C). Unit is operating.	PASS
OPERATING TEMPERATURE	MIL-STD-810F Methods 501.4, 502.4 Procedure II	-20°F (-29°C) to 145°F (63°C) High temperature: 5 day exposure (5x24 cycles) at 145°F (63°C). Low temperature: 24hr exposure at -20°F (-29°C). Unit is operating.	PASS
STORAGE TEMPERATURE	MIL-STD-810F Methods 501.4, 502.4 Procedure I	-58°F (-50°C) to 160°F (71°C) High temperature: 7 day exposure (7x24 cycles) at 160°F (71°C). Low temperature: 24 hour exposure at -58°F (-50°C). Unit is not operating.	PASS
THERMAL SHOCK	MIL-STD-810F Method 503.4 Procedure II	-60°F (-51°C) to 160°F (71°C) Cyclic temperature exposure. Three shocks. Unit is not operating. Functional test between cycles.	PASS
HUMIDITY ⁴	MIL-STD-810F Method 507.4	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 (INTEGRITY)	MIL-STD-810F Method 514.5 Procedure I Category 24 Figure 514.5C-17	Minimum Integrity Test Power Spectral Density = 0.04g ² /Hz at 20Hz - 1000Hz, -6dB/Octive at 1000Hz - 2000Hz. 60 minutes x 3 axes. Unit is not operating during tests. Functional test after each axis.	PASS
VEHICLE VIBRATION	MIL-STD-810F Method 514.5, Procedure I Category 4 & 20	Composite Wheeled Vehicle: Figure 514.5C-3, Cat 4 Unit is not operating. Ground Vehicle (US Highway truck): Figure 514.5C-1, Cat 20 Unit is operating. Simulates 1,000 miles of transportation.	PASS
SALT FOG ⁴	MIL-STD-810F Method 509.4 Procedure I	5% saline exposure for 2 cycles x 48hrs. (24hrs wet/24hrs dry). Unit is not operating.	PASS
ALTITUDE	MIL-STD-810F Method 500.4 Procedures I & II	Chamber at 15,000ft for 1 hour. Unit is operational. Chamber at 30,000ft for 1 hour. Unit is not operating.	PASS
FUNCTIONAL SHOCK	MIL-STD-810F Method 516.5 Procedure I	40g, 11ms, saw-tooth, 3 shocks, +/- per axis, 3 axes. Unit is operating.	PASS
EXPLOSIVE ATMOSPHERE ⁴	MIL-STD-810F Method 511.4, Procedure I	Unit must be operating and perform various functions in an explosive environment without igniting the atmosphere. 131°F (55°C), 2067.5ml N-Hexane solvent.	PASS

¹ Full details provided in test reports as indicated at the end of the summary report.

² PASS for operational tests indicates that the unit remained operational during the entirety of the test.

³ PASS for non-operational tests indicates that the unit powered on and booted to Microsoft® Windows® following each test.

⁴ Tests performed with I/O and expansion doors in place.



1.2 IEC INGRESS

TEST LISTING	TEST METHOD	DESCRIPTION/PARAMETERS ¹	RESULT ^{2,3}
WATER INGRESS PROTECTION ⁴	IEC 60529	IP-x5 (Overall Ingress Protection = IP-65) Jetting Water - Water is projected in jets against the enclosure from any direction with no harmful effects. Unit is not operating.	PASS
DUST INGRESS PROTECTION ⁴	IEC 60529	IP-6x (Overall Ingress Protection = IP-65) No ingress of dust. Complete protection against contact. Unit is not operating.	PASS

1.3 OTHER TESTING PROCEDURES

TEST LISTING	TEST METHOD	DESCRIPTION/PARAMETERS ¹	RESULT ^{2,3}
VEHICLE VIBRATION (ASTM)	ASTM D4169-04(99) Schedule E	Truck Highway Assurance Level II, Vehicle Vibration 1-200Hz, 0.52 Grms in all three axis. 90 minutes per axis. Unit is operating.	PASS
LCD IMPACT TEST	Customized Test Based on Field Conditions	1" (2.54 cm) steel ball bearing, dropped repeatedly (20X) from 36" (91.44cm) height onto the LCD face. All quadrants on LCD surface. Unit is not operating during tests. No cosmetic or functional damage from impact.	PASS

1.4 ADDITIONAL TESTING

TEST LISTING	TEST METHOD	SPECIFICATION	REQUIREMENT LIMITS	ENTITY	RESULT ^{2,3}
ELECTROSTATIC DISCHARGE, VARIOUS CONDUCTED & RADIATED SUSCEPTIBILITY TESTS, VARIOUS IMMUNITY TESTS	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	NEMKO	PASS
CONDUCTED & RADIATED EMISSIONS	EN 55022:2006	EN55022:2006 ANSI C63.4-2003	Conducted and Radiated Emissions - FCC 47 CFR Part 15, Class B	NEMKO	PASS
HAZARDOUS MATERIAL CERTIFICATION	UL1604, Class 1, Division II, Zones A,B,C,D	UL1604	Certified Safe operation of system in potentially hazardous environments as defined.	UL Labs: Department of Hazardous Locations	PASS
SAFETY	UL/IEC Mark	UL/IEC 60950	Standard Safety Certification	UL Labs	PASS

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