



SUMMARY OF INDEPENDENT ENVIRONMENTAL TESTING

Project Numbers:	A7495-MIL-STD-810F 08274-30, 07527-30 07CA60582
Equipment Tested:	Dell™ Latitude™ XFR D630
Environmental Test Dates:	August 2007 – January 2008
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Notes:	All environmental testing listed in the accompanying tables was performed by the accredited testing companies listed above. Documented MIL-STD-810F and IEC testing guidelines were followed as outlined in the enclosed test summaries.

XFR D630 (Test Summary)	DOCUMENT NUMBER	FORMAT / SIZE	PAGE
	08 3007 - 001	LTR	1/5
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1. SUMMARY TABLES

1.1 SUMMARY OF ENVIRONMENTAL TESTING PERFORMED

Characteristic	Requirement	Test Method/Standard	Description	Condition
OPERATING TEMPERATURE	-20°F (-29° C) to 140°F (+60°C)	MIL-STD-810F Methods 501.4, 502.4 Procedure II	Constant temperature exposure at high & low levels. Unit is operational. Functional tests performed and verified.	PASS
STORAGE TEMPERATURE	-60 °F (-51°C) to 160°F (+71°C)	MIL-STD-810F Methods 501.4, 502.4 Procedure I	Constant temperature exposure at high and low levels. Unit is not operating during tests. Functional tests performed at completion of tests.	PASS
THERMAL SHOCK	-60 ° F (-51°C) to 205 °F (+96°C)	MIL-STD-810F Method 503.4 Procedure I	Cyclic Temperature Exposure > 1.5° C < 5° C / min. High-Low cycling. Unit is non-operational.	PASS
RELATIVE HUMIDITY	0% to 95% - non-condensing	MIL-STD-810F Method 507.4	With all I/O doors in place. 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 during tests. Functional test each 24hour cycle.	PASS
RAIN/EXAGGERATED	Exaggerated Rain 4"/Hr, 40 psi pressure	MIL-STD-810F Method 506.4 Procedure II-Modified	With all I/O doors in place. Minimum of 4 in/hr (100mm/hr) of water pressure at 40 PSIG (275.8 Kpa-Gauge). Modified from 40 min to 10 minutes. Unit is operational.	PASS
WATER INGRESS PROTECTION	IP-x4 (Overall Ingress Protection = IP-54)	IP54 : IEC 529(EN60529) (IEC6052)	With all I/O doors in place. Splashing Water – all directions with no harmful effects. Flow rate of 10.0 l/min +/- 5%. All practical directions. Unit is not operating during tests.	PASS
BLOWING DUST EXPOSURE	Blowing Dust Conditions – 8.7m/s (19.5 mph) – up to 140F (60C)	MIL-STD-810F Method 510.4 Procedure I	With all I/O doors in place. Particle Density : 10 ± 7 g/m3 Air Flow : 1725 FPM (8.7 m/s or 19.5mph). Temperature cycles from 73F (23C) to 140F (60C). Unit is not operating during tests. Functional test after each 6hr cycle.	PASS
DUST INGRESS PROTECTION	IP-5x (Overall Ingress Protection = IP-54)	IP54 : IEC 529(EN60529) (IEC6052)	With all I/O doors in place. Ingress of dust must not interfere with satisfactory operation of equipment. Complete protection from contact. Particle Size : <75u. Dust density : 2kg/m3. Duration : 8 Hrs. Unit is not operating during tests. Functional test at test completion.	PASS
SALT FOG	5% saline for 48 hour cycles	MIL-STD-810F Method 509.4-Modified	With all I/O doors in place. 5% saline exposure for 48hrs. With 48hr dry period. Unit is not operational during tests. Functional test performed after each cycle.	PASS
ALTITUDE	15,000 ft. (Operational)- the highest equivalent altitude given for cargo pressures of military aircraft).	MIL-STD-810F Method 500.4 Procedures I & II	Chamber at 15,000ft, 77F (25C), 1 hour unit is operational, 1 hour unit is non-operational. Functional test performed after non-operating cycle.	PASS
VIBRATION (INTEGRITY)	Minimum Integrity Test 0.04g2/Hz, 20Hz – 1000Hz -6dB/octive 1000Hz – 2000Hz Figure 514.5C-17	MIL-STD-810F Method 514.5 Procedure I, Category 24	Power Spectral Density = 0.04g2/Hz, 20Hz – 1000Hz, -6dB/octive 1000Hz – 2000Hz. 60 minutes x 3 axis (Longitudinal, Transverse and Vertical). Unit is not operating during tests. Functional test after each axis.	PASS
VIBRATION (OPERATING)	Ground Vehicle Profile – simulates 1,000 miles of transportation. Figure 514.5C-1, Category 20	MIL-STD-810F Method 514.5, Procedure I, Category 20	.001g2/Hz at 12.5Hz, 0.034 g2/Hz at 20-40Hz, 5.70E-06 g2/Hz at 200Hz. 60 minutes x 3 axis (Longitudinal, Transverse and Vertical). Unit is operational.	PASS
CRASH SHOCK	40g, 11ms, Terminal Sawtooth 75g, 6ms, Terminal Sawtooth, Non-Operating	MIL-STD-810F Method 516.5	Varying Conditions : Vertical, Longitudnal and Transverse from 40g, 11ms to 75g, 6ms non-operating. Functional tests performed after non-operating cycles.	PASS
TRANSIT SHOCK/DROP	36 in drop, non-yielding surface, all surfaces, edges and corners (26 drops)	MIL-STD-810F Method 516.5, Modified Procedure IV	36 inch drop to 2 » of plywood over concrete, 26x. One drop to each face, edge and corner. Modified height from 48 » to 36 ». Unit is non-operational.	PASS
LCD IMPACT TEST	30 in drops, 1 inch ball bearing on LCD	Customized Test Based on Field Conditions	1" (2.54 cm) steel ball bearing, dropped repeatedly (20X) from 30" (76.2cm) height onto the LCD face. All quadrands on LCD surface. Unit is not operating	PASS

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Characteristic	Requirement	Test Method/Standard	Description	Condition
			during tests. No cracks or breaks from impact.	

Characteristic	Specification	Requirement Limits	Test Method	Entity	Condition
ELECTROSTATIC DISCHARGE, CONDUCTED & RADIATED SUSCEPTIBILITY, IMMUNITY	EN55024	8Kv/4Kv 3Vrms 3 V/M >95%-0.5p, 30%-25[. >95%-250p	EN 6100-3-2 EN 6100-3-3 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 610004-11	PROFESSIONAL TESTING (EMI), Inc.	PASS
CONDUCTED & RADIATED EMISSIONS	EN55022	Conducted and Radiated Emissions – FCC 47 CFR Part 15, Class B	EN 55022	PROFESSIONAL TESTING(EMI), Inc.	PASS
HAZARDOUS MATERIAL CERTIFICATION	UL1604	Certified Safe operation of system in potentially hazardous environments as defined.	UL1604, Class 1, Division II, Zones A,B,C,D	UL Labs : Department of Hazardous Locations	PASS
SAFETY	UL60950	Standard Safety Certification	UL Mark	UL Labs	PASS

2. APPENDIX

Characteristic	Test Equipment/Special Notes
OPERATING & STORAGE TEMPERATURE	Thermotron Temperature Chamber, Omega over/temp protection, Watlow Temperature/Humidity Controller
THERMAL SHOCK	Thermotron Temperature Chamber, Omega over/temp protection, Watlow Temperature/Humidity Controller, Fluke Data Logger
RELATIVE HUMIDITY	Tenney Temperature/Humidity Chamber, Fluke Data Logger
RAIN EXAGGERATED	Exaggerated Rain Test Mechanism per MIL-STD
RAIN INGRESS	Rain Ingress Test Mechanism per IEC standards
DUST	PTI Dust Chamber, Thomas Vacuum Pump
ALTITUDE	Russel Temp/Altitude Chamer, Omega Altitude Probe
VIBRATION	UD Shaker System, UD Controller, PCB Signal Conditioner, PCB Accelrometer
TRANSIT DROP/SHOCK	NTS Drop Table
SALT FOG	Salt Fog Chamber, Omega Calibrator Thermometer
CRASH SHOCK	Dactron Shaker Controller, Dactron PCI DSP Card, Ling Power Amp, Ling Shaker Table, Dytran Accelerometer, Endevco Signal Conditioner, Dytran Accelerometer
ELECTROSTATIC DISCHARGE	Certificate
RADIATED SUSCEPTIBILITY	Certificate
RADIATED EMISSIONS	Certificate
CONDUCTED SUSCEPTIBILITY	Certificate
CONDUCTED EMISSIONS	Certificate

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3. SELECT TEST IMAGES

	<p>Vibration Testing</p>		<p>Humidity Test Setup</p>
	<p>Transit Shock (Drop) Test Setup</p>		<p>Post MIL-STD Dust Test</p>
	<p>Operating Post MIL-STD Dust Test</p>		<p>Exaggerated Rain Test</p>
	<p>Y Axis Shock Test Setup</p>		<p>XFR in High Temperature Test Configuration</p>
	<p>Altitude Test Setup</p>		<p>Salt Fog Test Setup</p>