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Test Report Number:	**ETRB20526**
Reference Standard:	**CFR Title 47, FCC Part 15, Class A** **ICES-003, Class A**
Date of Test:	**17 May 2012**
Date of Report:	**22 May 2012**
Product Name:	**Lithiumate Pro**
Model Number:	**2CN0000E**
Serial Number:	**D16**
Manufacturer:	**Elithion**
Representative:	**Steven Van Buskirk**
Report Type:	**Radiated and Conducted Emissions**
Test Result:	**Compliant**
Approved By:	Vincent W. Bent

FCC	BSMI	VCCI	KCC
319793 & 610588	SL2-IN-E-1134R	R-3273 C-3642 T-1756 G-233	US0168

Prepared for:

Elithion
3393 Iris Ave. Suite 110
Boulder, Colorado 80301
Phone: 720-466-7006 x2
Email: steven@elithion.com

Customer Representative:

Steven Van Buskirk
Customer Support

Tested at:

EMC Integrity, Inc.
1736 Vista View Drive
Longmont, Colorado 80504

Tested by:

Tom Wittig
Lead Technician

Report Prepared by:

Mary Burback
Office Manager

Report Approved by:

Vincent Greb
Quality Manager

Revision	Description of Revision	Date:
Rev. -	Initial Release	22 May 2012

TABLE OF CONTENTS

LIST OF APPENDICES

1.0 TEST SUMMARY

1.1 Product Description

The unit under test (UUT) was the Lithiumate Pro. The model number tested was 2CN0000E and the serial number tested was D16. It is manufactured by Elithion located in Boulder, Colorado. This product is a battery management system controller that monitors and protects lithium-ion cells in a battery pack. The product was continually exercised during testing, as documented in the "configuration" field of the test data sheet.

Additional information regarding this product may be found in the Product Data Sheet, located in Appendix B of this report.

1.2 Purpose

This report documents the test efforts performed on the Lithiumate Pro to verify compliance to the Class A limits of FCC Part 15 and ICES-003. This was a formal qualification test and was conducted on 17 May 2012.

1.3 Test Standards Used

The emission limits applied to the product tested are defined in the Code of Federal Regulations, Title 47, FCC Part 15, which is the electromagnetic emissions standard for digital devices. The UUT was set up as specified in ANSI C63.4: 2003.

The normative references of this standard define the test methods used for the emissions testing. These standards are contained in Table 1-1.

Table 1-1

CFR Title 47 FCC Part 15	ICES-003, Issue 4, February 7, 2004
ANSI C63.4: 2003	

1.4 Test Results

The UUT **complied** with the Class A emission requirements defined in Table 1-1. Test data is contained in the appropriate appendices of this report.

1.5 Modifications Required for Compliance

None.

2.0 TEST ENVIRONMENT

2.1 Radiated Emissions Test Site

Radiated emissions testing was performed at a distance of 10-meters in a semi-anechoic 10-meter chamber. This chamber is calibrated annually and meets the volumetric site attenuation requirements of ANSI C63.4: 2003. For measurements from 30 MHz to 1 GHz, a biconilog antenna is used in conjunction with a high-gain, low-noise preamplifier. This is connected to an HP 8566B spectrum analyzer with an HP 85650A Quasi-Peak (QP) Adapter, via an HP 85685 RF Preselector.

Radiated emissions testing is broken into two parts: pre-scan and QP/maximization. Pre-scanning a product from 30 MHz to 1 GHz consists of measuring peak emissions from eight radials (every 45 degrees), at four antenna heights (1 m, 2 m, 3 m and 4 m) for both antenna polarities. Data is recorded in a graph showing amplitude vs. frequency of the emissions, and frequencies for QP/maximization are chosen based on this graph. The procedure for maximizing emissions is as follows:

1. The analyzer is tuned to the frequency associated with the emissions having the least margin.
2. The turntable and antenna mast are moved to the location where the maximum emission was measured during the pre-scan.
3. Both are then oriented such that the maximum emission is obtained.
4. Cables on the UUT are manually manipulated to achieve the maximum emission.
5. The turntable and antenna mast are then re-adjusted to ensure a maximum reading.
6. If the signal in question is less than 1 GHz, quasi-peak detection is performed on the signal for a minimum of 10 seconds. For signals greater than 1 GHz, video averaging is performed.
7. Turntable/antenna mast maximization and QP detection are performed on all other signals within 6 dB of the limit. In the event that there are not six signals within 6 dB of the limit, the highest six signals are maximized. This ensures that a minimum of six signals are maximized and appear in the final data table.

2.2 Measurement Uncertainty

The measurement uncertainty for EMC Integrity's emissions test facility complies with the requirements defined in CISPR 16. The complete calculations of EMC Integrity's measurement uncertainty is contained in an EMCI memo, which is available upon request. However, a summary of EMCI's measurement uncertainty is given in Table 2-1.

Table 2-1

Test	Requirement	Actual
Conducted Emissions	3.60 dB	3.04 dB
Radiated Emissions – Horizontal Polarity	5.20 dB	4.67 dB
Radiated Emissions – Vertical Polarity	5.20 dB	5.01 dB

3.0 Radiated Emissions

3.1 Summary of Test Results

Radiated electric field emissions were measured on the UUT over the frequency range from 30 MHz to 1 GHz. The UUT was configured in its normal operating mode, and exercised continually during testing. Cables were oriented such that the maximum emission was achieved and quasi-peak detection was performed all signals (minimum of six) used in the final data table.

Test result: Compliant
Margin: 1.64 dB @ 160.018 MHz

3.2 Test Setup

The UUT was set up in accordance with ANSI C63.4: 2003 and tested to the Class A limits specified by the applicable standards.

3.3 Special Configurations

Not applicable.

3.4 Deviations from Test Procedures

Not applicable.

3.5 Test Data

See APPENDIX A for all test data sheets, test setup pictures and test equipment used.

APPENDIX A

Radiated Emissions Test Data

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Radiated Emissions, FCC Part 15

Manufacturer:	Elithion	Project Number:	B20526
Customer Representative:	Davide Andrea	Test Area:	10 Meter #1
Model:	Lithiumate Pro (2CN0000E)	S/N:	D16
Standard Referenced:	FCC Part 15	Date:	May 17, 2012
Temperature:	22˚C Humidity: 32%	Pressure:	832 mb
Input Voltage:	Battery Powered (19Vdc)		
Configuration of Unit:	Normal operating mode		
Test Engineer:	T. Wittig		

B20526-22-RE.doc FR0100

Type	Frequency (MHz)	Level (dBuV)	Transducer (dB/m)	Gain / Loss (dB)	Final (dBuV/m)	Azm(deg)/Pol/Hgt(m)	Margin: FCC Class A QP (dB)
QP	70.008	51.7	8.2	-28.9	31.0	293/H-Pole/4.00	8.07
QP	80.008	53.0	7.7	-28.9	31.9	280/H-Pole/4.00	7.25
QP	85.008	52.7	7.4	-28.9	31.2	273/H-Pole/4.00	7.87
QP	160.018	58.1	12.3	-28.5	41.9	301/H-Pole/3.43	1.64
QP	170.017	51.1	11.9	-28.5	34.5	277/H-Pole/3.64	9.03
QP	180.019	53.8	11.4	-28.5	36.7	276/H-Pole/3.67	6.81
QP	200.024	50.0	13.0	-28.4	34.6	313/H-Pole/3.93	8.90
QP	210.024	50.7	10.4	-28.4	32.7	93/H-Pole/3.98	10.82
QP	460.052	40.3	16.7	-27.8	29.2	63/H-Pole/2.01	17.21

The highest emission measured was at **160.018 MHz,** which was **1.64 dB** below the limit.

- "Type" refers to the type of measurement performed. The type of measurement made is based on the requirements of the particular standard:
  - PK = Peak Measurement: RBW is 120kHz, VBW is 3 MHz
  - QP = Quasi-Peak Measurement: RBW is 120kHz, VBW is 3 MHz, and QP Detection is ENABLED
  - AV = Video Average Measurement: RBW is 1 MHz, VBW is 10 Hz
- The "Final" emissions level is attained by taking the "Level" and adding the "Transducer" factor and the "Gain/Loss" factor. Final measurements are made with the Azimuth, Polarity, Height, and EUT Cables positioned for maximum radiation. If applicable, cables positions are noted in the test log. (Sample Calculation: 49.6 dBuV + 11.4 dB/m – 28.8 dB = 32.2 dBuV/m. **Important Note**: This is a sample calculation only for the purpose of demonstration, and does not reflect data in this report.)
- The "Azm/Pol/Hgt" indicates the turn-table *azimuth*, the antenna *polarity*, and the antenna *height* where the maximum emissions level was measured.
- The "Margin" is with reference to the emissions limit. A positive number indicates that the emission measurement is below the limit. A negative number indicates that the emission measurement exceeds the limit.
- The PRESCAN is a peak measurement and is performed with the RBW set to 120 kHz, VBW set to 3 MHz (30 MHz to 1 GHz), and the RBW set to 1 MHz, VBW set to 100 kHz (> 1 GHz)

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Radiated Emissions, FCC Part 15

Manufacturer:	Elithion	Project Number:	B20526
Customer Representative:	Davide Andrea	Test Area:	10 Meter #1
Model:	Lithiumate Pro (2CN0000E)	S/N:	D16
Standard Referenced:	FCC Part 15	Date:	May 17, 2012

B20526-22-RE.doc FR0100

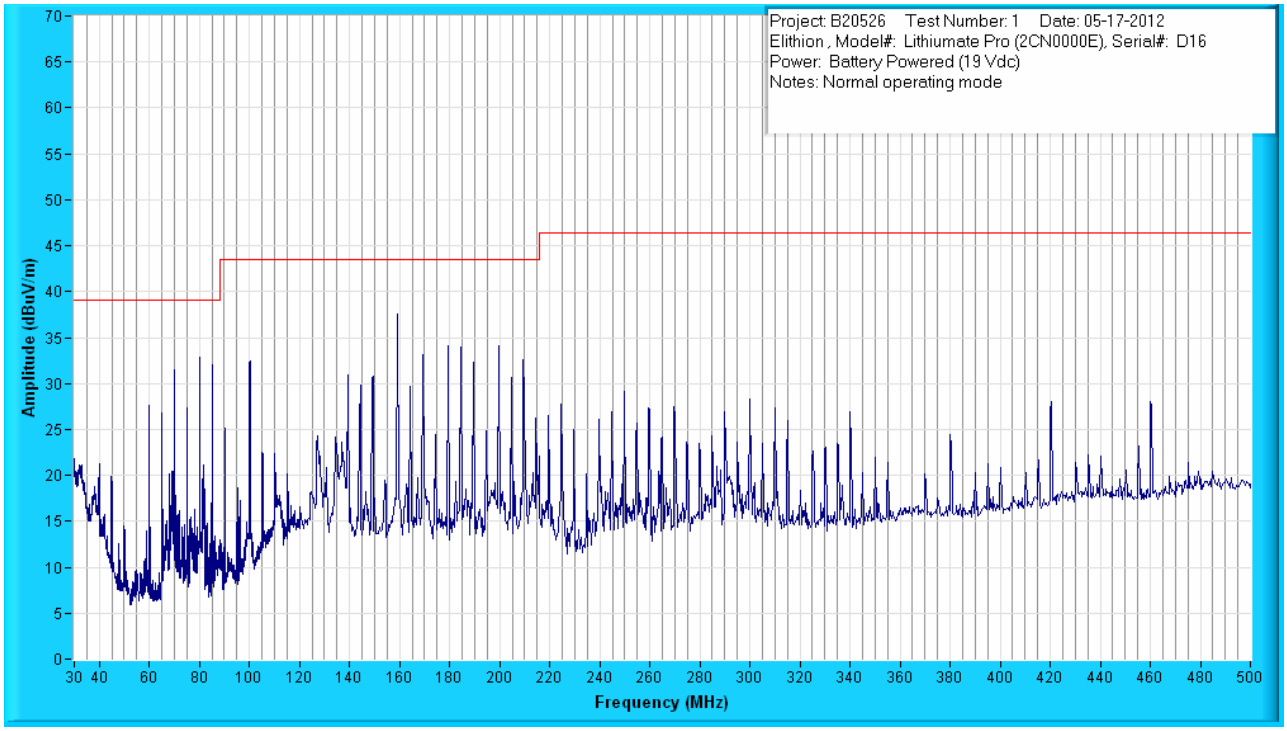

Figure A1: Radiated Emissions Prescan, 30MHz to 1000MHz, Peak Measurements at 10m Distance

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Radiated Emissions, FCC Part 15

Manufacturer:	Elithion	Project Number:	B20526
Customer Representative:	Davide Andrea	Test Area:	10 Meter #1
Model:	Lithiumate Pro (2CN0000E)	S/N:	D16
Standard Referenced:	FCC Part 15	Date:	May 17, 2012

B20526-22-RE.doc FR0100

Figure A2: Radiated Emissions Test Setup – Front Side

Radiated Emissions, FCC Part 15

Manufacturer:	Elithion	Project Number:	B20526
Customer Representative:	Davide Andrea	Test Area:	10 Meter #1
Model:	Lithiumate Pro (2CN0000E)	S/N:	D16
Standard Referenced:	FCC Part 15	Date:	May 17, 2012

Figure A3: Radiated Emissions Test Setup – Right Side

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Radiated Emissions, FCC Part 15

Manufacturer:	Elithion	Project Number:	B20526
Customer Representative:	Davide Andrea	Test Area:	10 Meter #1
Model:	Lithiumate Pro (2CN0000E)	S/N:	D16
Standard Referenced:	FCC Part 15	Date:	May 17, 2012

Figure A4: Radiated Emissions Test Setup – Back Side

Radiated Emissions, FCC Part 15

Manufacturer:	Elithion	Project Number:	B20526
Customer Representative:	Davide Andrea	Test Area:	10 Meter #1
Model:	Lithiumate Pro (2CN0000E)	S/N:	D16
Standard Referenced:	FCC Part 15	Date:	May 17, 2012

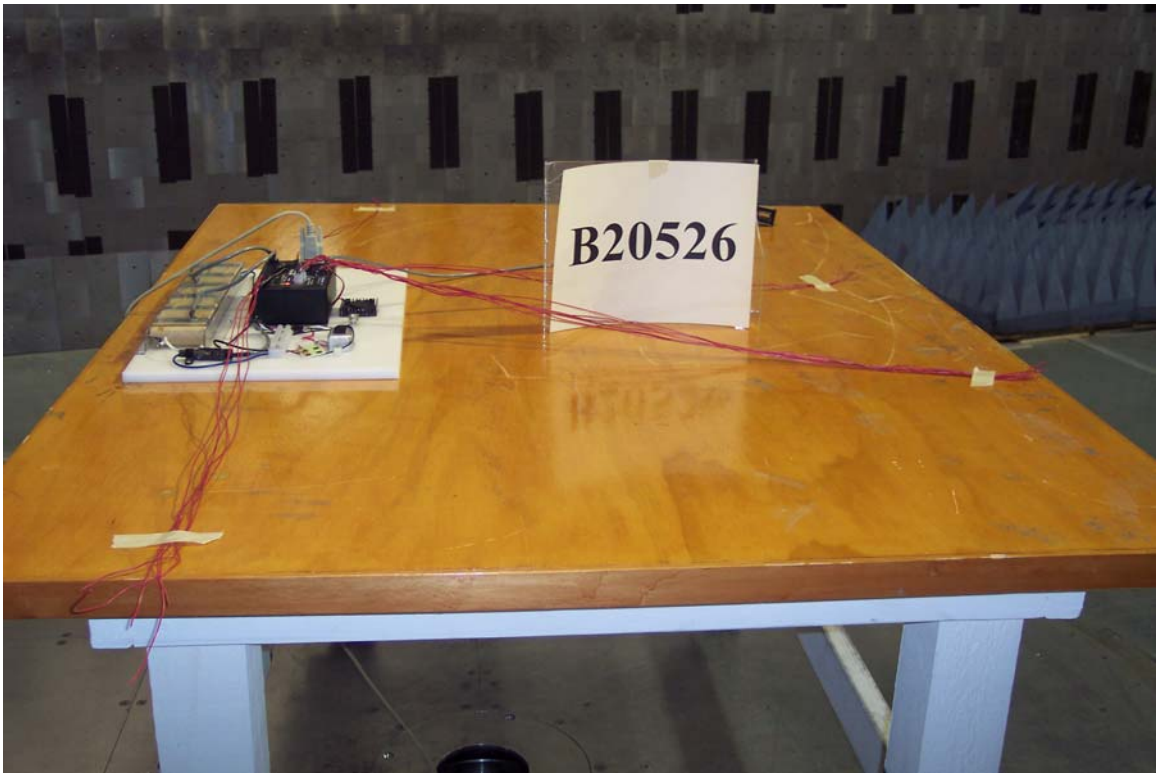

Figure A5: Radiated Emissions Test Setup – Left Side

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Radiated Emissions, FCC Part 15

Manufacturer:	Elithion	Project Number:	B20526
Customer Representative:	Davide Andrea	Test Area:	10 Meter #1
Model:	Lithiumate Pro (2CN0000E)	S/N:	D16
Standard Referenced:	FCC Part 15	Date:	May 17, 2012

B20526-22-RE.doc FR0100

Test Equipment List

ID Number	Manufacturer	Model #	Serial #	Description	Cal Date	Cal Due
1219	Mini-Circuits	ZKL-2	062905	Preamp, 10 - 2000 MHz, 30 dB	02/15/2012	02/15/2013
1232	Sunol Sciences	JB1	A071605-2	Bilog Antenna, 30 MHz to 2.0 GHz	09/01/2011	09/01/2012
1233	Sunol Sciences	SC104V	110305-1	Positioning Controller	NA	NA
1234	CIR Enterprises	10m Chamber	001	10m Chamber with 2.5m turntable	04/03/2011	06/03/2012
1238	Sunol Sciences	TWR95-4	110305-3	Antenna Mast	NA	NA
1239	Sunol Sciences	FM2522VS	110305-2	Turn Table, 2.5m Diameter	NA	NA
1342	Hewlett Packard	85650A	2412A00392	Quasi-Peak Adapter	04/27/2012	04/27/2013
1343	Hewlett Packard	8566B	2403A08410	Spectrum Analyzer Display	04/24/2012	04/24/2013
1344	Hewlett Packard	8566B	2611A02676	Spectrum Analyzer with 2403A08410	04/24/2012	04/24/2013
1345	Hewlett Packard	85685A	2901A0865	RF Preselector	04/27/2012	04/27/2013
1406	EXTECH Instruments	445715	N/A	Hygro-Thermometer	08/17/2011	08/17/2012

APPENDIX B

Product Data Sheet

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1.0 Client Information

Client Information	
Manufacturer Name	Elithion
Address	3393 Iris Ave. suite 110
City	Boulder
State	CO
Zip Code	80301
Client Representative	Steven Van Buskirk
Title	Customer Support
Phone	720-466-7006 x2
Fax	---
Email	steven@elithion.com

2.0 Product Information - General

Product Information	
Product Name (as it should appear on test report)	Lithiumate Pro
Model Number	2CN0000E
Functional description of product(Detailed)	A battery management system controller that monitors and protects lithium-ion cells in a battery pack http://products.elithion.com/lithiumate-lite.php
Product type (IT, Medical, Scientific, Industrial, etc.)	IT
Is the product an intentional radiator	no
Product Dimensions	6 x 2 x 4
Product Weight	1 lb
Will fork lift be required	no
Applicable Standards, if known	FCC part 15 class A
Describe all environment(s) where product will be used	Solely in electric vehicles
Does product consist of multiple components? (If yes, please describe each system component)	Yes, master controller, current sensor, cell boards, cabling
Cycle time > 3 seconds? (If yes, How long?)	No, 1 second
Highest internally generated frequency	20 MHz
Product Set-up Time	30 minutes
Boot up time in the event of an unintentional power down	3 seconds

Identify all I/O Connections as well as maximum associated cable lengths below

Model No.	Description	Shielded?	Length	Quantity
Generic	24 AWG WI RE, Red	No	3 ft	15
Generic	Cell board Comm. cable	Yes	1.5 ft	2
Generic	RS232	Yes	25 ft	1
Generic	Current Sensor	Y	3 ft	1

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3.0 Power

Power Requirements	
Input Voltage Rating as it appears on unit, power supply, or power brick	19Vdc Battery
Input Current (specify @ 230 Vac/50 Hz)	130 ma Consumption.
Single or Multi-Phase (If multi-phase, specify delta or wye)	NA
Is input power connector two-prong (Hot & Neutral) or 3-prong (H, N, Ground)	NA
Does UUT have more than 1 power cord? (If yes, explain.)	NA

4.0 Unit Under Test (UUT) – Detailed Information

UUT Hardware	
Condition	New
Configuration During Test	Default settings. All I/O connectors connected
Input Power	19Vdc

UUT Components

Name	Model No.	Serial No.	Description
Lithiumate Pro	2CN0000E	D16	A battery management system controller that monitors and protects lithium-ion cells in a battery pack

I/O Cabling

See Section 2.0 for details

UUT Software/Firmware

Name	Version/Revision	Functionality
Controller	1.29	Standard

UUT Operating Conditions	
List all frequencies the product generates/uses	20 MHz crystal clock
How will product be exercised during test?	Cells will be monitored
How will product be monitored during test?	Via a RS232 cable to a laptop GUI
What are the product's critical parameters?	None during emissions
Specify tolerance of all critical parameters.	NA

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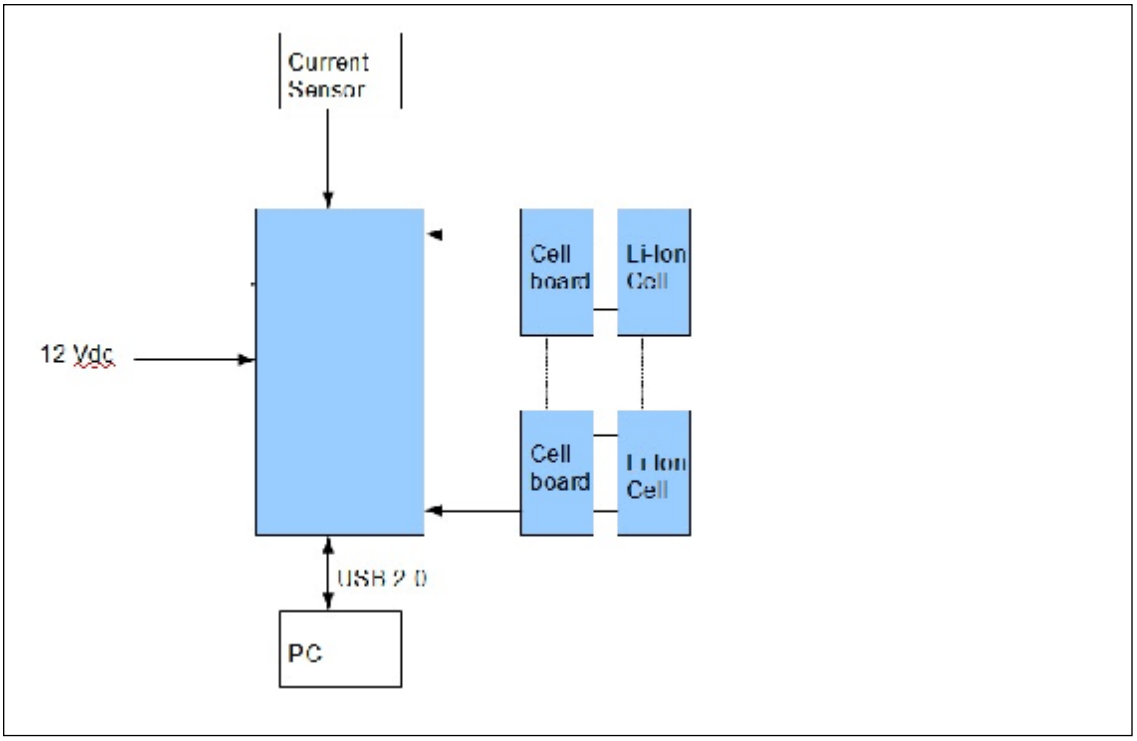
5.0 Support Equipment (SE) – Detailed Information

Support Equipment (SE)			
Name	**Model No.**	**Serial No.**	**Description**
Toshiba	Satellite series	88624794Q	Windows Computer

SE I/O Cabling				
Model No.	**Description**	**Shielded?**	**Length**	**Quantity**

SE Software/Firmware		
Name	**Version/Revision**	**Functionality**

6.0 Block Diagram



APPENDIX C

EMI Test Log

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EMI Test Log

Manufacturer:	Elithion	Project Number:	B20526
Model:	Lithiumate Pro (2CN0000E)	S/N:	D16
Customer Representative:	Davide Andrea		
Standard Referenced:	FCC Part 15		

FR0105

10m Emissions

Test	Test Code	Date	Event	O T	Time (hrs)	Result	Initials
RE	1312	May 17, 2012 0800	Performed pre-test using HP Vee, OK to proceed and client setup up UUT in 10 meter chamber		---	Pass	TW
		0830	Test #1, 8 rads, 4 heights, 3 second dwell, ref level 80 dBuV, 10 meter spacing Radiated Emissions, 30 MHz - 1 GHz UUT is battery power, not 120Vac/60Hz		---	Pass	TW
			At 160 MHz, UUT had a margin of 3.76 dB, after maximizing the 160 MHz, margin dropped to 1.67 dB		2.0	Pass	TW
			Note: Quote was for 120Vac and UUT was battery powered, therefore no need to perform conducted emissions, there will be no charge for CE, will bill client for the 2 hours only.		---	---	TW

Regular hours:	2.0
Overtime/Prem hours:	
Total hours:	2.0

APPENDIX D

Laboratory Accreditations

Nemko Laboratory Authorization

Authorization: ELA 215

EMC Laboratory: **EMC Integrity, Inc.**
1736 Vista View Drive
Longmont, Colorado 80504
USA

Scope of Authorization: **All CENELEC standards [ENs] for EMC that are listed on the accompanying page, and all of the corresponding CISPR, IEC and ISO EMC standards that are listed on the accompanying page.**

Nemko has assessed the quality assurance system, the testing facilities, qualifications and testing practices of the relevant parts of the organization. The quality assurance system of the Laboratory has been validated against ISO/IEC 17025 or equivalent. The laboratory also fulfils the conditions described in Nemko Document NLA -10. During the visit by the Nemko representative it was found that the Laboratory is capable of performing tests within the Scope of the Authorisation.

Accordingly, Nemko will normally accept test results from the laboratory on a partial or complete basis for certification of the products.

In order to maintain the Authorisation, the information given in the pertinent NLA-10 must be carefully followed. Nemko is to be promptly notified about any changes in the situation at the Laboratory, which may affect the basis for this Authorisation. The Authorisation may be withdrawn at any time if the conditions are no longer considered to be fulfilled.

The Authorisation is valid through June 30, 2012.

Dallas, Texas, USA.

For and on behalf of Nemko AS:

T.B. Ketterling,
Nemko ELA Co-ordinator
Region: North America

Nemko

Nemko Laboratory Authorization

Authorization: ELA 215

SCOPE OF AUTHORIZATION

Capability to perform a basic test implies also that any product (family) standard calling up this basic test is also within the scope if mentioned below or not.

Generic & Product –Family Standards		
EN 55011 :1998+A1 :1999 +A2 :2002 EN 55011:2007 +A2:2007 CISPR 11:1997 (Modified) + A1:1999 + A2:2002 CISPR 11 Ed. 4.1	EN 55014-1:2006 EN 55014-1:2000 + A1:2001 + A2:2002 CISPR 14-1:2000 + A1:2001 + A2:2002 CISPR 14-1 Ed. 5.0	EN 55014-2:1997 + A1:2001 CISPR 14-2:1997 + A1:2001 CISPR 14-2 Ed. 1.2
EN 55022: 1998+ A1:2000, +A2:2003 CISPR 22: 2003+ A1:2004 CISPR 22:2005 (Modified) EN55022:2006 CISPR 22 Ed. 5.2 EN 55022 +A1: 2007	EN 55024: 1998 +A1:2001, +A2:2003 CISPR 24: 1997 +A1:2001, +A2:2002 CISPR 24 Ed. 1.0	EN 61000-6-1 :2007 IEC 61000-6-1 Ed. 2.0 EN 61000-6-1: 2001
EN 61000-6-2:2005 IEC 61000-6-2 Ed. 2.0	EN 61000-6-3 :2007 IEC 61000-6-3 Ed. 2.0 EN 61000-6-3: 2001 + A1 :2004	IEC 61000-6-2 Ed. 2.0 EN 61000-6-2: 2005 IEC 61000-6-2: 2005 EN 61000-6-2: 2001
EN 61326:1997 +A1:1998 + A2:2001 +A3:2003 IEC 61326:1997 + A1:1998 + A2:2000 EN 61326-1 Ed. 1.0 IEC 61326:2006	EN 60601-1-2:2001 + A1:2006 IEC 60601-1-2:2001 EN 60601-1-2:2006 IEC 60601-1-2 Ed. 3.0	EN 55103-1:1996 EN 55103-2 :1996 EN 55103-1:2005 EN 55103-2:2005
EN 300 386 V.1.3.1 EN 300 386 V.1.3.3 EN 300 386 V.1.4.1	EN 61000-3-3: 1995, +A1:2001 +A2:2005 IEC 61000-3-3: 1994, +A1:2001 +A2:2005 EN 61000-3-3:2008	EN 61000-3-2: 2000 +A2 :2005 IEC 61000-3-2: 2000 (Modified) +A1:2001 +A2:2004 EN 61000-3-2:2006
EN 50130-4: 1995 + A1:1998 + A2:2002	ETSI EN 301 489 V1.8.1	ETSI EN 300 339 Ed. 1
Basic Standards		
EN 61000-4-2:1995, +A1:1998, +A2:2000 IEC 61000-4-2:1995, +A1:1998, +A2:2000 IEC 61000-4-2 : 2009	EN 61000-4-3:2002, +A1:2002 IEC 61000-4-3:2002, +A1:2002 EN 61000-4-3 :2006 +A1 :2006 +A2 :2006 IEC 61000-4-3 Ed. 3.0	EN 61000-4-4:1995, +A1:2002, +A2:2002 IEC 61000-4-4:1995, +A1:2000, +A2:2001 EN 61000-4-4:2004 IEC 61000-4-4 Ed. 2.0
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EN 61000-4-11:2004 IEC 61000-4-11 Ed. 2.0 EN 61000-4-11:1994, +A1:2000 IEC 61000-4-11:1994, +A1:2000	BLANK	BLANK

May 1, 2009

T.B. Ketterling, Nemko ELA Co-ordinator

2(2) NLA 3 ED3

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200737-0

EMC Integrity, Inc.
Longmont, CO

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2011-07-01 through 2012-06-30
Effective dates

Sally S. Bruce
For the National Institute of Standards and Technology

NVLAP-01C (REV. 2009-01-28)

NVLAP® National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

EMC Integrity, Inc.
1736 Vista View Drive
Longmont, CO 80504
Mr. Vincent W. Greb
Phone: 303-776-7249 Fax: 303-776-7314
E-Mail: vinceg@emcintegrity.com
URL: http://www.emcintegrity.com

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2012-03-16

NVLAP Code	*Designation / Description*
Emissions Test Methods	
12/100063c	IEC 61000-6-3 (1996), EN 61000-6-3 (2001), A1 (2004): Electromagnetic Compatibility (EMC) - Part 6: Generic standards - Section 3: Emission standard for residential, commercial, and light-industrial environments.
12/CIS11f	AS/NZS CISPR 11 (2002): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11g	IEC/CISPR 11, Ed. 4.1 (2004-06): Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurements
12/CIS11h	AS/NZS CISPR 11 (2004): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11i	IEC/CISPR 11, Ed. 4.1 (2004-06) + A1(2004): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement

2011-07-01 through 2012-06-30
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

[redacted]

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2012-03-16

NVLAP Code	*Designation / Description*
12/CIS11j	EN 55011 (1998) + A1(1999), A2(2002): Industrial, scientific and medical (ISM) radio frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11k	IEC/CISPR 11 (2003), EN 55011 (1998), A2(2002): Limits and Methods of Measurement of Electromagnetic Disturbance Characteristics of Industrial, Scientific, and Medical Radio-Frequency Equipment
12/CIS11m2	EN 55011 (2009) + A1 (2010): Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
12/CIS11p	IEC/CISPR 11 Ed. 5 (2009-05): Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
12/CIS14b1	AS/NZS CISPR 14-1 (2003): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
12/CIS14x	IEC/CISPR 14-1, Ed. 4 (2003): Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
12/CIS22	IEC/CISPR 22 (1997) & EN 55022 (1998) + A1(2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993) and EN 55022 (1994): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)
12/CIS22a4	IEC/CISPR 22 (1993) & EN 55022 (1994)+A1(1995), A2(1997): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22b	CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment

2011-07-01 through 2012-06-30
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2012-03-16

NVLAP Code	*Designation / Description*
12/CIS22e	IEC/CISPR 22, Fourth Edition (2003-04) & EN 55022 (1998): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22e1	IEC/CISPR 22, Edition 5 (2005) and EN 55022 (1998): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22e3	IEC/CISPR 22, Edition 5 (2005) + A1(2005): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22e4	EN 55022 (1998) + A1(2000) + A2(2003): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22f	CNS 13438 (2006): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/CIS22j	EN 55022 (2006): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22j1	EN 55022 (2006) + A1 (2007): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/CIS22j2	EN 55022 :2010: Information technology equipment. Radio disturbance characteristics. Limits and methods of measurement
12/EM02d	IEC 61000-3-2, Edition 2.2 (2004-11): Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)
12/EM03b	IEC 61000-3-3, Edition 1.1(2002-03) & EN 61000-3-3, A1(2001): EMC - Part 3-3: Limits - Limitations of voltage changes, voltage flucuations and flicker, in public low-voltage supply-systems, for equipment with rated current <=16 A per phase and not subject to conditional connections
12/EM03g	IEC 61000-3-3, Edition 1.1 (2003) +A2 (2005): EMC Part 3-3: Limits - Limitations of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connections

2011-07-01 through 2012-06-30
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

[redacted]

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2012-03-16

NVLAP Code	*Designation / Description*
12/F18	FCC OST/MP-5 (1986): FCC Methods of Measurement of Radio Noise Emissions for ISM Equipment (cited in FCC Method 47 CFR Part 18 - Industrial, Scientific, and Medical Equipment)
12/FCC15b	ANSI C63.4 (2003) with FCC Method 47 CFR Part 15, Subpart B: Unintentional Radiators
12/KN11d1	KN11 (Annex 3) with RRA Announce 2008-11 (Dec. 16, 2008): Conformity Assessment Procedure for Electromagnetic Interference; With KN 11 (Annex 3)
12/KN16	Korea RRA Notice No. 2008-11 (Dec. 16, 2008): Conformity Assessment Procedures for Electromagnetic Interference using KN 16-1-1, KN 16-1-2, KN 16-1-3, KN 16-1-4, KN 16-1-5, KN 16-2-1, KN 16-2-2, KN 16-2-3, KN 16-2-4 (2008-05)
12/KN22	KN22 with RRL Notice No. 2005-82 (Sept. 29, 2005): RRL Notice No. 2005-82: Technical Requirements for Electromagnetic Interference Annex 8 (KN-22), RRL Notice No. 2005-131: Conformity Assessment Procedures for Electromagnetic Interference
12/KN22e	KN22 (2008-5) with RRL Notice No. 2008-3 (May 20, 2008): Conformity Assessment Procedure for Electromagnetic Interference; With KN 22
12/KN22f	KN22 (Annex 5) with RRA Announce 2010-5 (Dec 24, 2010): Conformity Assessment Procedure for Electromagnetic Interference; With KN 22 (Annex 5)
12/RRA105	RRA Announce 2010-5, K only (December 24, 2010): Conformity Assessment Procedure for Electromagnetic Interference (K only)
12/RRA1118	RRA Public Notification 2011-18, K only (July 5, 2011): Technical Requirements for Electromagnetic Interference (K only)
12/T51	AS/NZS CISPR 22 (2002) and AS/NZS 3548 (1997): Electromagnetic Interference - Limits and Methods of Measurement of Information Technology Equipment
12/VCCIa	VCCI: Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/2005.04

2011-07-01 through 2012-06-30
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2012-03-16

NVLAP Code	*Designation / Description*
12/VCCIb	Agreement of VCCI V-3 (2006.04): Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/2006.04
12/VCCIc	Agreement of VCCI V-3 (2007.04): Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/2007.04
12/VCCId	Agreement of VCCI V-3 (2008.04): Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/2008.04
12/VCCIe	Agreement of VCCI V-3 (2009.04): Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/2009.04 (radiated disturbance above 1 GHz)
12/VCCIg	Agreement of VCCI V-3 (2011.04): Agreement of VCCI Council - Technical Requirements: V-3/2011.04 (including radiated disturbance above 1 GHz)

Immunity Test Methods

12/610006h	IEC 61000-6-1, 2nd edition (2005-03): Electromagnetic compatibility (EMC) - Part 6: Generic standards - Section 1: Immunity for residential, commercial and light-industrial environments
12/610006i	IEC 61000-6-2, Edition 2.0 (2005-01): Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
12/CIS24g	CISPR 24 ed2.0 (2010-08): Information technology equipment - Immunity characteristics - Limits and methods of measurement
12/CIS24h	EN 55024 (2010): Information technology equipment. Immunity characteristics. Limits and methods of measurement
12/I01b	IEC 61000-4-2 (2001); EN 61000-4-2 (2001), A2 (2001): Electrostatic Discharge Immunity Test

2011-07-01 through 2012-06-30
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2012-03-16

NVLAP Code	*Designation / Description*
12/l01c	EN 61000-4-2 +A1(1998) +A2(2001): Electrostatic Discharge Immunity Test
12/l01d	IEC 61000-4-2, Ed. 2.0 (2008-12): Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test
12/l01f	EN 61000-4-2 (2009-05): Electromagnetic compatibility (EMC) — Part 4-2 : Testing and measurement techniques — Electrostatic discharge immunity test
12/l02b	IEC/EN 61000-4-3, Ed. 2.1 (2002), A1 (2002): EN 61000-4-3: Radiated, radio-frequency, electromagnetic field immunity test
12/l02e	EN 61000-4-3 (2002) + A1(2002) + IS1(2004): Radiated, radio-frequency, electromagnetic field immunity test
12/l02f	EN 61000-4-3 (2002) + A1(2002): Radiated, radio-frequency, electromagnetic field immunity test
12/l02ggg	IEC 61000-4-3, Ed. 3.0 (2006-02) + A1 (2007) + A2 (2010): Electromagnetic compatibility (EMC) - Part 4-3: Testing measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test
12/l02hhh	EN 61000-4-3 (2006) +A1 (2008) + A2 (2010): Electromagnetic compatibility (EMC). Testing and measurement techniques. Radiated, radio- Frequency, electromagnetic field immunity test
12/l03c	IEC 61000-4-4, Ed. 2.0 (2004-07): Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
12/l03e	EN 61000-4-4 (2004): Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test
12/l04aa	IEC 61000-4-5, Ed. 2.0 (2005-11); EN 61000-4-5: Electromagnetic Compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test

2011-07-01 through 2012-06-30
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

[redacted]

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2012-03-16

NVLAP Code	***Designation / Description***
12/l04b	IEC 61000-4-5 (2001), A1(2000); EN 61000-4-5(2001), A1(2000): Surge Immunity Test
12/l04d	BS EN 61000-4-5 (2006): Electromagnetic compatibility (EMC). Testing and measurement techniques. Surge immunity test
12/l05d	IEC 61000-4-6, Ed. 2.1 (2004); EN 61000-4-6: Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/l05e	EN 61000-4-6 (1996) + A1 (2001): Immunity to Conducted Disturbances, Induced by Radio Frequency Fields
12/l05f1	IEC 61000-4-6 Ed. 3.0 (2008): Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/l05j	EN 61000-4-6 (2009): Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/l06b	IEC 61000-4-8 (2001), A1(2000); EN 61000-4-8 (2001),A1(2000): Power Frequency Magnetic Field Immunity Test
12/l06e	EN 61000-4-8 (1993) + A1 (2001): Power Frequency Magnetic Field Immunity Test
12/l06e	IEC 61000-4-8 (2009): Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test
12/l06f	EN 61000-4-8:2010: Electromagnetic compatibility (EMC). Testing and measurement techniques. Power frequency magnetic field immunity test
12/l07c	IEC 61000-4-11, Ed. 2 (2004-03) & EN 61000-4-11: Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests

2011-07-01 through 2012-06-30
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

[redacted]

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2012-03-16

NVLAP Code	***Designation / Description***
12/I07e	EN 61000-4-11 (1994), A1 (2001): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/I07f	EN 61000-4-11 (2004): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/KN11a	KN 61000-4-11 with RRL Notice No. 2005-130 (Dec 27, 2005): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/KN11f	KN 61000-4-11 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
12/KN11h	KN 61000-4-11 (Annex 1-7) RRA Announce 2010-6 (Dec.24, 2010): Conformity Assessment Procedure for EMS (Voltage Dips, Short Interruptions and Voltage Variations Immunity tests)
12/KN24	KN24 (December 2005) with RRL Notice No. 2005-83: Information Technology Equipment - immunity charateristics - limits and methods of measurements
12/KN24d	KN 24 (2008-5) with RRL Notice No. 2008-4 (May 20, 2008): Information Technology Equipment - immunity charateristics - limits and methods of measurements
12/KN24e	KN 24 (Annex 5) with RRA Announce 2010-6 (Dec. 24, 2010): Conformity Assessment Procedure for EMS (Information technology equipment – Immunity characteristics – Limits and methods of measurement)
12/KN2a	KN 61000-4-2 with RRL Notice No. 2005-130 (Dec. 27, 2005): Electrostatic Discharge Immunity Test
12/KN2c	KN 61000-4-2 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Electrostatic Discharge Immunity Test
12/KN2e	KN 61000-4-2 (Annex 1-1) RRA Announce 2010-6 (Dec. 24, 2010): Conformity Assessment Procedure for EMS (Electrostatic Discharge Immunity Test)

2011-07-01 through 2012-06-30
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

Page 8 of 10

NVLAP-01S (REV. 2005-05-19)

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2012-03-16

NVLAP Code	*Designation / Description*
12/KN3a	KN 61000-4-3 with RRL Notice No. 2005-130 (Dec. 27, 2005): Radiated, radio-frequency, electromagnetic field immunity test
12/KN3c	KN 61000-4-3 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Radiated, radio-frequency, electromagnetic field immunity test
12/KN3e	KN 61000-4-3 (Annex 1-2) RRA Announce 2010-6 (Dec. 24, 2010): Radiated, radio-frequency, electromagnetic field immunity test
12/KN4a	KN 61000-4-4 with RRL Notice No. 2005-130 (Dec. 27, 2005): Electromagnetic compatibility (EMC): Testing and measurement techniques - Electrical Fast Transient/Burst Immun
12/KN4c	KN 61000-4-4 (2008-5); RRL Notice No. 2008-5 (May 20, 2008): Electromagnetic compatibility (EMC): Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test
12/KN4e	KN 61000-4-4 (Annex 1-3) RRA Announce 2010-6 (Dec. 24, 2010): Electromagnetic compatibility (EMC): Testing and measurement techniques - Electrical Fast Transient/Burst Immunity Test
12/KN5a	KN 61000-4-5 with RRL Notice No. 2005-130 (Dec. 27, 2005): Surge Immunity Test
12/KN5c	KN 61000-4-5 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Surge Immunity Test
12/KN5e	KN 61000-4-5 (Annex 1-4) RRA Announce 2010-6 (Dec. 24, 2010): Conformity Assessment Procedure for EMS (Surge Immunity Test)
12/KN6a	KN 61000-4-6 with RRL Notice No. 2005-130 (Dec. 27, 2005): Electromagnetic compatibility (EMC): Testing and measurement techniques - Immunity to conducted disturbances,
12/KN6c	KN 61000-4-6 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Electromagnetic compatibility (EMC): Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields

2011-07-01 through 2012-06-30
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

NVLAP-01S (REV. 2005-05-19)

[redacted]

NVLAP® National Voluntary Laboratory Accreditation Program

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 200737-0
Scope Revised: 2012-03-16

NVLAP Code	*Designation / Description*
12/KN6e	KN 61000-4-6 (Annex 1-5) RRA Announce 2010-6 (Dec. 24, 2010): Electromagnetic compatibility (EMC): Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/KN8a	KN 61000-4-8 with RRL Notice No. 2005-130 (Dec. 27, 2005): Power Frequency Magnetic Field Immunity Test
12/KN8c	KN 61000-4-8 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Power Frequency Magnetic Field Immunity Test
12/KN8e	KN 61000-4-8 (Annex 1-6) RRA Announce 2010-6 (Dec. 24, 2010): Conformity Assessment Procedure for EMS (Power Frequency Magnetic Field Immunity Test)
12/RRA106	RRA Public Notification 2010-6, December 24, 2010 (K only): Conformity Assessment Procedure for Electromagneitc Susceptibility (K only)
12/RRA1117	RRA Public Notification 2011-17, K only (July 5, 2011): Technical Requirements for Electromagnetic Susceptibility, K only

Product Safety Test Methods

12/60601ab	IEC 60601-1-2, Ed. 3.0 (2007): Medical electrical equipment - Part 1-2: General requirements for safety - Collateral standard: Electromagnetic compatibility - Requirements and tests
12/60601ac	KN 60601-1-2 (2008-5); RRL Notice No. 2008-4 (May 20, 2008): Medical electrical equipment - Part 1-2: general requirements for safety - collateral standard: electromagnetic compatibility - requirements and tests
12/60601h1	EN 60601-1-2 (2007): Medical electrical equipment - Part 1-2: General requirements for safety - Collateral standard: EMC - Requirements and tests

2011-07-01 through 2012-06-30
Effective dates

David F. Alderman
For the National Institute of Standards and Technology

Page 10 of 10

NVLAP-01S (REV. 2005-05-19)

[redacted]

END OF REPORT