



Test Report #: 2415-1

Date: January 24, 2006

Issued To:

Jeffrey Samstad American Power Conversion 85 Rangeway Road North Billerica, MA 01862 USA 978-670-2440

Product Name/Description	Uninterruptible Power Supply
Model Number	SURT6000XLI
Serial Number(s)	NS0546003334
Test Description	Radiated & Conducted Emissions
Test Standard	EN55022
Test Dates	January 9, 2006
Test Engineer(s)	Mike Coye
Test Results	Pass

NKg-

Prepared By:

Mike Coye EMC Engineer

Ron Leappahi

Ron Leczynski Senior EMC Engineer

This test report shall not be reproduced, except in full, without the written approval of The Compliance Management Group.

Reviewed By:

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SECTION 1 OVERVIEW

1.1 Purpose of Test

To determine if the Uninterruptible Power Supply SURT6000XLI will meet the EN55022 Class A requirements for radiated and conducted emissions.

1.2 Date of Test

January 9, 2006

1.3 Statement of Compliance

The Uninterruptible Power Supply SURT6000XLI unit that was tested and referenced in this test report was found to comply with the requirements of:

EN55022, Class A

SECTION 2 REFERENCES

2.1 Procedures/Standards

ANSI C63.4-2003, Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz

CISPR Publication 22, 1997/A1, 2000/A2, 2002, Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment

EN55022, 1998/A1, 2000/A2, 2003, Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment

2.2 Deviations from Standards

None

SECTION 3 DETAILS

3.1 Description of Product

The Equipment Under Test (EUT) consisted of an Uninterruptible Power Supply SURT6000XLI with an external auxiliary battery pack.

The EUT was configured as given in Appendix A.

3.2 Test Software/Operating Mode

The EUT was operating under a full load charging discharged batteries.

3.3 Laboratory Test Configuration

The test setup was per the procedures and standards referenced in section 2.1. The voltage supplied to the EUT was 230 VAC, 50 Hz. Additionally, a conducted emissions test was run at 230 VAC, 50 Hz. All support equipment was powered by 115 VAC, 60 Hz.

Radiated Test

The EUT was installed on the 80 cm high wooden table on the three-meter diameter turntable, which is located in the upper level of the Free Field Site (FFS). A 10-meter distance was used for EUT to antenna separation up to 1 GHz. The free field ground plane consists of a continuous ground plane 10.5 meters wide and 13.9 meters long. The product was scanned from 1-4 meters in height and 360 degrees around it. The frequency range scanned was from 30 to 1000 MHz for all configurations. All test equipment was kept below the ground plane with the exception of the antenna and associated cables required for measurements. The cable positioning, antenna height/polarization, and turntable orientation were all chosen to maximize the emissions in order to represent a worst-case condition.

Conducted Test

The EUT was installed on the 80 cm high wooden table in the FFS conducted emissions test area. A 40 cm distance between the vertical plane and the EUT was maintained. The EUT's power cord was bundled and kept at a distance of 80 cm from the Line Impedance Stabilization Network (LISN). Measurements were made to determine the levels of RF noise induced into the AC power line. Power for the EUT was supplied via the LISN, which was electrically bonded to the ground plane. The frequency range scanned was from 150 kHz to 30 MHz. All support equipment was powered via separate LISNs.

Test Equipment	Serial #	Calibration Due
Chase model CBL6111 Biconilog Antenna 30-1000 MHz	1052	4/15/06
HP model 8566B Spectrum Analyzer (SA)	2928A06006	12/28/06
HP model 85662A Spectrum Analyzer Display	2848A18006	12/28/06
HP model 85685A RF Preselector (RFP)	3010A01074	12/28/06
HP model 85650A Quasi-Peak Adapter (QPA)	2043A00171	12/28/06
Andrew LDF2-50 radiated emissions cable	RR-RE10M-02	1/22/06
Belden 9913 conducted emissions cable	RR-CE01	1/20/06
Rohde & Schwarz 50 Ohm Line Impedance Stabilization Network (LISN), 1- Phase, 16 Amp, 50/60 Hz, model ESH3-Z5	862770/011	12/27/06
Rohde & Schwarz 50 Ohm Line Impedance Stabilization Network (LISN), 3- Phase, 32 Amp, 50/60 Hz, model ESH2-Z5	843285/002	12/28/06
Fluke model 111 Digital Multimeter	82700731	3/28/06
Extech Temp & Humid Meter, Model TH437	EXT006	1/25/06
Fisher Scientific Barometer, Model 14-648-51	41363306	10/19/06

Test Equipment List

All test equipment used is calibrated and traceable to NIST requirements.

Test Environment: Temp.= 21.8°C, Relative Humidity = 28% Barometric Pressure = 99.9kPa



Configuration for Radiated Emissions (Front Close-up)



Configuration for Radiated Emissions (Rear Close-up)

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Configuration for Radiated Emissions (Rear)



Configuration for Conducted Emissions

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SECTION 4 CONCLUSIONS

4.1 Summary of Test Results

EN55022, Class A: Passed

4.2 Special Notes

The test results set forth in this report are expressly limited to the configuration and tests herein. Any changes in configuration may void test results. *The Compliance Management Group* agrees to quote charges for any retesting requested by the customer.

This report must not be used by the customer to claim product endorsement by any agency of the U.S. Government.

4.3 Required Compliance Modifications

None

SECTION 5 DATA

5.1 Radiated E Field Emissions Data

Test Date Product (EUT) Client	: 1/5/06: SURT6000XLI: American Power Conversion	Line Voltage : 2 Line Frequency : 5	230VAC 50Hz
Test Type Regulatory Limit	: Qualification: CISPR 22, Class A, 10 Meters	Temperature : 2 Relative Humidity : 2 Barometric Pressure : 9	21.8 ℃ 28 % RH 99.9 kPa
Test Technician	: Mike Coye		

Note :

batteries

Full load charging discharged

Equipment Used to Perform Test:

Device	Serial Number	Calibration Due
Radiated Emissions Test	Version 1.0.0	N/A - Software
Hewlett Packard 8566B	2928A06006	12/28/2006
Hewlett Packard 85662A	2848A18006	12/28/2006
Hewlett Packard 85650A	2043A00171	12/28/2006
Chase CBL6111	1052	04/15/2006
Andrew LDF2-50	RR-RE10M 02	01/22/2006

Test Data:

Frequency	Amplitude	Corr Fact	Amplitude	Limit	Margin	Ant Pol	Ant Ht	Azimuth	Comment
MHz	dBµV	dB	dBµV/m	dBµV/m	dB	H/V	cm	Deg	
48.90	22.5	9.78	32.3	40.00	-7.70	V	100	185	Q/P BROADBAND
52.00	22.9	8.37	31.3	40.00	-8.70	V	100	180	Q/P BROADBAND
109.30	9.8	12.08	21.9	40.00	-18.10	V	100	180	Q/P BROADBAND
124.00	13.6	12.67	26.3	40.00	-13.70	V	110	185	Q/P BROADBAND
134.49	9.3	12.71	22.0	40.00	-18.00	V	110	180	Q/P BROADBAND
150.00	11.0	12.50	23.5	40.00	-16.50	V	100	90	Q/P
200.00	17.4	11.55	29.0	40.00	-11.00	V	100	0	Q/P
220.00	10.5	11.60	22.1	40.00	-17.90	V	100	0	Q/P
250.00	20.3	13.93	34.2	47.00	-12.80	V	100	280	Q/P
300.00	11.7	15.00	26.7	47.00	-20.30	V	100	45	Q/P
350.00	14.4	17.05	31.5	47.00	-15.50	V	100	0	Q/P
400.00	11.6	18.75	30.4	47.00	-16.60	V	100	315	Q/P
450.00	11.2	19.65	30.9	47.00	-16.10	V	100	0	Q/P
500.00	9.4	20.70	30.1	47.00	-16.90	V	100	315	Q/P

5.2 Conducted Emissions Data

PHASE LINE (CISPR 22)

Test Date	: 1/9/06	Scan Number	:	CE002
Client	: American Power Conversion	Line Voltage	:	230VAC
Product (EUT)	: SURT6000XLI	Line Frequency	:	50Hz
Test Technician	: Mike Coye	Temperature	:	21.8 °C
Test Type	: Qualification	Relative Humidity	:	28 % RH
Regulatory Limit	: CISPR22, Class A	Barometric Pressure	:	99.9 kPa
Device Under Test	: SURT6000XLI	LISN Phase	:	L1

Note :

Full Load charging discharged batteries

Equipment Used to Perform Test:

Device	Serial Number	Calibration Due
Conducted Emissions Test	Version 1.0.0	N/A - Test Software
Hewlett Packard 8566B	2928A06006	12/28/2006
Hewlett Packard 85662A	2848A18006	12/28/2006
Hewlett Packard 85650A	2043A00171	12/28/2006
Rohde & Schwarz ESH2-Z5	843285/002	12/28/2006
Belden 9913	RR-CE01	01/04/2007

Test Data:

Frequency MHz	Corr Fact dB	Pk Ampl dBµV	QP Ampl dBµV	QP Limit dBµV	QP Margin dB	Av Ampl dBµV	Av Limit dBµV	Av Margin dB	Comment
		•		•		•	•		
.1500	.14	51.40	N/A	79.00	N/A	N/A	66.00	N/A	Pk = -14.6 dB < Av lim
.2300	.15	46.90	N/A	79.00	N/A	N/A	66.00	N/A	Pk = -19.1 dB < Av lim
.3800	.19	39.50	N/A	79.00	N/A	N/A	66.00	N/A	Pk = -26.5 dB < Av lim
.4690	.19	38.70	N/A	79.00	N/A	N/A	66.00	N/A	Pk = -27.3 dB < Av lim
1.7650	.26	42.50	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -17.5 dB < Av lim
2.0700	.28	34.30	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -25.7 dB < Av lim
3.4600	.40	39.90	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -20.1 dB < Av lim
4.5200	.47	44.30	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -15.7 dB < Av lim
7.5840	.72	50.50	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -9.5 dB < Av lim
8.8400	.82	42.80	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -17.2 dB < Av lim
12.8000	1.09	62.10	57.40	73.00	-15.60	49.90	60.00	-10.10	
13.8000	1.14	55.00	49.20	73.00	-23.80	.00	60.00	-60.00	QP = -10.8 dB < Av lim
20.5800	2.11	41.20	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -18.8 dB < Av lim
26.7220	2.80	47.00	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -13.0 dB < Av lim
29.7920	2.28	52.00	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -8.0 dB < Av lim

NEUTRAL LINE (CISPR 22)

Test Date	: 1/9/06	Scan Number : (CE001
Client	: American Power Conversion	Line Voltage : 2	230VAC
Product (EUT)	: SURT6000XLI	Line Frequency : 5	50Hz
Test Technician	: Mike Cove	Temperature : 2	21.8 ℃
Test Type	: Qualification	Relative Humidity : 2	28 % RH
Regulatory Limit	: CISPR22, Class A	Barometric Pressure : 9	9.9 kPa
Device Under Test	t: SURT6000XLI	LISN Phase : N	N

Note :

Full Load charging discharged batteries

Equipment Used to Perform Test:

Device	Serial Number	Calibration Due
Conducted Emissions Test	Version 1.0.0	N/A - Test Software
Hewlett Packard 8566B	2928A06006	12/28/2006
Hewlett Packard 85662A	2848A18006	12/28/2006
Hewlett Packard 85650A	2043A00171	12/28/2006
Rohde & Schwarz ESH2-Z5	843285/002	12/28/2006
Belden 9913	RR-CE01	01/04/2007

Test Data:

Frequency	Corr Fact	Pk Ampl	QP Ampl	QP Limit	QP Margin	Av Ampl	Av Limit	Av Margin	Comment
MHz	dB	dBµV	dBµV	dBµV	dB	dBµV	dBµV	dB	
.1500	.15	50.20	40.70	79.00	-38.30	10	66.00	-66.10	QP = -25.4 dB < Av lim
.2300	.16	45.40	N/A	79.00	N/A	N/A	66.00	N/A	Pk = -20.6 dB < Av lim
.3800	.18	33.90	N/A	79.00	N/A	N/A	66.00	N/A	Pk = -32.1 dB < Av lim
.4610	.18	33.00	.00	79.00	-79.00	.00	66.00	-66.00	Pk = -25.3 dB < Av lim
.4690	.18	40.50	N/A	79.00	N/A	N/A	66.00	N/A	Pk = -25.5 dB < Av lim
1.7660	.27	37.50	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -22.5 dB < Av lim
2.1500	.29	28.00	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -32.0 dB < Av lim
3.4550	.41	33.90	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -26.1 dB < Av lim
4.4540	.46	42.50	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -17.5 dB < Av lim
7.6720	.68	50.00	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -10.0 dB < Av lim
8.8340	.76	45.40	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -14.6 dB < Av lim
12.8160	1.09	60.60	52.00	73.00	-21.00	N/A	60.00	N/A	QP = -8.0 dB < Av lim
13.8000	1.18	57.60	50.70	73.00	-22.30	N/A	60.00	N/A	QP = -9.3 dB < Av lim
20.5870	1.77	41.30	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -18.7 dB < Av lim
26.7220	1.81	47.00	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -13.0 dB < Av lim
29.8700	2.04	52.30	N/A	73.00	N/A	N/A	60.00	N/A	Pk = -7.7 dB < Av lim

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APPENDIX A

EMI Emissions and Immunity Test Form

CLIENT INFORMATION				
Customer	Jeffrey Samstad	Contact Person	Marlon McDonald	
Telephone #	978-670-2440 x17227	Fax #	978-670-2380	
Email address				

PRODUCT INFORMATION			
Product Name	Lynx II		
Model Number	SURT6000XLI		
Serial Number	Sample		
Dimensions			
Weight	130		
Test Purpose (such	All APC products shall have a minimum of 6db of margin from the limit of the		
as qualify new or	radiated or conducted standard to which they are being tested.		
modified product)			

TEST SERVICES REQUESTED				
Top Level Standard	Description	Check (if yes)		
Emissions				
Radiated Pre-Scan	Engineering evaluation.			
FCC Part 15	Radio Frequency Devices			
FCC Part 18	Industrial, Scientific & Medical Equipment			
ICES-001	Industrial, Scientific & Medical Equipment			
ICES-003	Digital Apparatus			
EN55011	Industrial, Scientific & Medical Equipment			
EN55014	Household Appliances			
EN55022	Information Technology Equipment			
EN61000-3-2	Harmonics			
EN61000-3-3	Flicker			
Other				
Immunity				
EN55014	Household Appliances			
EN55024	Information Technology Equipment			
EN60601-1-2	Medical Equipment			
EN61000-6-1	Residential, Commercial & Light Industrial Environment			
EN61000-6-2	Industrial Environment			
EN61326-1	Laboratory/Measurement Equipment			
Other				

SETUP INFORMATION

Voltage: <u>230VAC</u> Current: <u>N/A</u> Frequency: <u>50</u>

[X] Single-Phase [] 3-Phase

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The Compliance Management Group ♦ 202 Forest Street ♦ Marlborough, MA 01752 (P) 508-281-5985 ♦ www.cmgcorp.net ♦ (F) 508-281-5972 Page 11 of 14

Populate all ports and outlets.

MAGNETIC DEVICES

Are there any magnetic devices in the EUT that may be susceptible to magnetic fields (i.e., magnetic switches or Hall effect sensors)?

PRODUCT DESCRIPTION

(Provide a detailed description of the product under test. What is its function? Describe in adequate detail that an administrator at a government agency can understand)

This product is a 6kVAUPS

TEST JUSTIFICATION

(If the EUT represents a product family, please explain why this configuration represents the operating mode that should produce the highest emissions while remaining consistent with normal operating conditions.)

PRODUCT [internal] CONFIGURATION INFORMATION				
Type of Device (such as disk drive, I/O, etc.)RevPart NumberMan				Manufacturer & Capacity of Device

OSCILLATORS & Other Internally Generated Frequencies (such as CPUs, etc.)			
Frequency Description			

NOTE: The highest frequency generated determines the test level.

EXTERNAL CABLING INFORMATION					
Cable From	able From Cable To Cable Length Part Number # of cable if multiples Description				

UNPOPULATED PORTS		
Port/Device	Description/Reason	

SUPPORT EQUIPMENT LIST				
Type of Device (workstation, keyboard, etc)	Part Number	Serial Number	Manufacturer	

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EMISSIONS EXERCISE SOFTWARE DESCRIPTION

(Describe what software is running on the product under test and how it will exercise the system during emissions testing. Include the program cycle time once, in seconds, for all devices to be exercised.)

IMMUNITY EXERCISE SOFTWARE DESCRIPTION

(If different from emissions exercise software. Include the program cycle time once, in seconds, for all devices to be exercised.)

IMMUNITY TESTING PERFORMANCE CRITERIA

(Describe the proper mode of operation of the equipment under test. Explain what the test operator should monitor during the testing to determine if the product is operating within specified parameters)



The information contained in this Appendix was provided by Jeffrey Samstad of American Power Conversion It contains specific configuration details of the system as tested.

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The Compliance Management Group Credentials



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TEST REPORT POLL

Please rate the attached test report's quality by responding to the brief questions listed in this poll. Our goal is to provide you with high quality test reports in a timely manner. Therefore, your feedback is vital in order to determine how good our test reports are, and what areas could be improved.

Please indicate beside each question what you feel is the rating. Also, feel free to make comments directly on the poll, or by attaching a separate sheet. The completed form should then be returned by either email at mryan@cmgcorp.net or FAX to Michael Ryan at 508-281-5972. Your cooperation and effort are truly appreciated.

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		YES	NO
1.	Was the information presented clearly?		
2.	Was the report complete?		
3.	Was the report timely?		
4.	Did the report satisfy your requirements?		

YOUR NAME (optional): _____

Optional Comments:

To: Michael Ryan, Program Administrator The Compliance Management Group 202 Forest Street Marlboro, MA 01752 FAX: 508-281-5972



The Compliance Management Group

Issues

A CERTIFICATE OF TEST:

То

American Power Conversion 85 Rangeway Road North Billerica, MA 01862, USA

For

Product: Uninterruptible Power Supply Model: SURT6000XLI

Date: January 24, 2006

The Compliance Management Group, a U.S. and internationally approved test laboratory, attests that compliance testing was completed satisfactorily on the aforementioned equipment as specified by the manufacturer and reported in test report number: 2415-1. *The Compliance Management Group* acknowledges that the Equipment Under Test was found to have passed the following standards:

EN55022, Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment, Class A

 The Compliance Management Group ◆ 202 Forest Street ◆ Marlborough, MA 01752

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