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Job Number:	1001000175
Project Number:	08CA37069
File Number:	MC15832
Date:	25 August 2008
FCC ID:	JPZ0059
IC ID:	2851A-JPZ0059
Model:	SR1-OCRB-1-xx, SR1-VCRB-P-xx

Electromagnetic Compatibility Test Report

For

LUTRON ELECTRONICS INC

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1285 Walt Whitman Rd.
Melville, NY 11747

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Job Number: 1001000175 File Number: MC15832 Page 2 of 45
Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
Client Name: LUTRON ELECTRONICS INC

Test Report Details

Tests Performed By: **Underwriters Laboratories Inc.**
1285 Walt Whitman Rd.
Melville, NY 11747

Tests Performed For: **LUTRON ELECTRONICS INC**
7200 SUTTER ROAD
COOPERBURG, PA 18036

Applicant Contact: **Mathew Cardoni**
Phone: **(610) 282-7316**
Fax: **(610) 282-7424**
E-mail: mcardoni@lutron.com

Test Report Date: **25 August 2008**

Product Type: **Vacancy Sensor and Occupancy Sensor**

Product standards: **FCC Part 15, Subpart C, 15.231; RSS-GEN; RSS-210**

Model Number: **SR1-OCRB-1-xx, SR1-VCRB-P-xx**

Sample Serial Number: **Prototype**

EUT Category: **Periodic Low Power Transmitter**

Testing Start Date: **16 July 2008**

Date Testing Complete: **17 July 2008**

Overall Results: Compliant

Underwriters Laboratories Inc. reports apply only to the specific samples tested under stated test conditions. All samples tested were in good operating condition throughout the entire test program. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. Underwriters Laboratories Inc. shall have no liability for any deductions, inferences or generalizations drawn by the client or others from Underwriters Laboratories Inc. issued reports. This report shall not be used to claim, constitute or imply product certification, approval, or endorsement by NVLAP, NIST, A2LA, or any agency of the US government.

This report may contain test results that are not covered by the NVLAP or A2LA accreditation. The scope of accreditation is limited to the specific tests that are listed on the NVLAP and/or A2LA websites referenced at the end of this report.

Report Directory

1.0	G E N E R A L - Product Description.....	4
1.1	Equipment Description	4
1.2	Equipment Marking Plate	4
1.3	Device Configuration During Test	5
1.3.1	Equipment Used During Test:.....	5
1.3.2	Input/Output Ports:.....	5
1.3.3	EUT Internal Operating Frequencies:.....	6
1.3.4	Power Interface:.....	6
1.4	Block Diagram:.....	7
1.5	EUT Configurations	8
1.6	EUT Operation Modes.....	8
2.0	Summary	9
2.1	Deviations from standard test methods.....	9
2.2	Device Modifications Necessary for Compliance	9
2.3	Reference Standards	10
2.4	Results Summary	10
3.0	Calibration of Equipment Used for Measurement	12
4.0	EMISSIONS TEST RESULTS.....	12
4.1	Test Conditions and Results – Occupied Bandwidth.....	13
4.2	Test Conditions and Results – Cease Operation.....	17
4.3	Test Conditions and Results – Pulse Train.....	20
4.4	Test Conditions and Results – Radiated Emissions (Transmit Mode).....	23
4.5	Test Conditions and Results – Radiated Emissions (Receive Mode).....	36
5.0	IMMUNITY TEST RESULTS	43
Appendix A		44
Accreditations and Authorizations.....		44

Job Number: 1001000175 File Number: MC15832 Page 4 of 45
Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
Client Name: LUTRON ELECTRONICS INC

Report Revision History

Revision Date	Description	Revised By	Revision Reviewed By
None	Original	-	-

1.0 GENERAL - Product Description

1.1 Equipment Description

The EUT is an RF vacancy / occupancy sensor which is used to control room lighting.

1.2 Equipment Marking Plate

None

Job Number: 1001000175 File Number: MC15832 Page 5 of 45
 Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
 Client Name: LUTRON ELECTRONICS INC

1.3 Device Configuration During Test

1.3.1 Equipment Used During Test:

Use	Product Type	Manufacturer	Model	Comments
EUT	Occupancy Sensor	LUTRON ELECTRONICS INC	SR1-OCRB-1-xx, SR1-VCRB-P-xx	None
Note: EUT - Equipment Under Test, AE - Auxiliary/Associated Equipment, or SIM - Simulator (Not Subjected to Test)				

1.3.2 Input/Output Ports:

Port #	Name	Type*	Cable Max. >3m (Y/N)	Cable Shielded (Y/N)	Comments
0	Enclosure	N/E	—	—	None
Note: AC = AC Power Port DC = DC Power Port N/E = Non-Electrical I/O = Signal Input or Output Port (Not Involved in Process Control) TP = Telecommunication Ports					

Job Number: 1001000175 File Number: MC15832 Page 6 of 45
 Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
 Client Name: LUTRON ELECTRONICS INC

1.3.3 EUT Internal Operating Frequencies:

Frequency (MHz)	Description
390	Fundamental Frequency

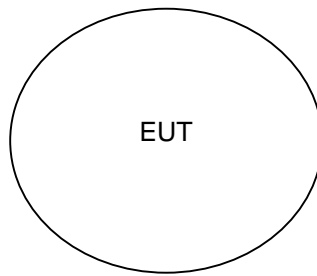
1.3.4 Power Interface:

Mode # /Rated	Voltage (V)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (#)	Comments
1	Battery Operated	-	-	DC	-	Uses two (2) 3V lithium batteries

Job Number: 1001000175 File Number: MC15832 Page 7 of 45
Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
Client Name: LUTRON ELECTRONICS INC

1.4 Block Diagram:

The diagram below illustrates the configuration of the equipment above.



Job Number: 1001000175 File Number: MC15832 Page 8 of 45
Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
Client Name: LUTRON ELECTRONICS INC

1.5 EUT Configurations

Mode #	Description
1	EUT is a battery operated, standalone device. Steps were taken to determine the worse case EUT orientation. It was in this orientation that all testing was performed.

1.6 EUT Operation Modes

Mode #	Description
1	Constant Transmit Mode
2	Standby (Receive) Mode

Job Number: 1001000175 File Number: MC15832 Page 9 of 45
Model Number: SR1-OCRB-1-xx, FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
SR1-VCRB-P-xx
Client Name: LUTRON ELECTRONICS INC

2.0 Summary

The tests listed in the Summary of Testing section of this report have been performed and the results recorded by Underwriters Laboratories Inc. in accordance with the procedures stated in each test requirement and specification. The applicant determined the list of tests performed were applicable to the Equipment Under Test. As a result, the subject product has been verified to comply or not comply as noted in the Summary of Testing with each test specification. The test results relate only to the items tested.

2.1 Deviations from standard test methods

None

2.2 Device Modifications Necessary for Compliance

None

2.3 Reference Standards

Standard Number	Standard Name	Standard Date
FCC Part 15, Subpart C, 15.231	Code of Federal Regulations, Part 15, Radio Frequency Devices	2007
FCC Part 15, Subpart B	Code of Federal Regulations, Part 15, Radio Frequency Devices	2007
RSS-GEN, Issue 2	General Requirements and Information for the Certification of Radiocommunication Equipment	2007
RSS-210, Issue 7	Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment	2007
ICES-003, Issue 4	Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard – Digital Apparatus	2004

2.4 Results Summary

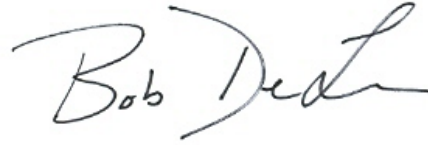
This product is considered Class B

Requirement – Test	Result (Compliant / Non-Compliant)*
Cease Operation	Compliant
Fundamental Radiated Emissions	Compliant
General Radiated Emissions	Compliant
Occupied Bandwidth (-20dB)	Compliant
Occupied Bandwidth (99%)	Compliant
Pulse Train - Averaging Factor	Compliant
Pulse Train Measurement	Compliant
Radiated Emissions - Unintentional	Compliant

Job Number: 1001000175 File Number: MC15832 Page 11 of 45
Model Number: SR1-OCRB-1-xx, FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
SR1-VCRB-P-xx
Client Name: LUTRON ELECTRONICS INC

Test Engineer:

Reviewer:



Mike Antola (Ext.23053)
Senior Project Engineer
International EMC Services
Conformity Assessment Services-

Bob DeLisi (Ext.22345)
Senior Staff Engineer
International EMC Services
Conformity Assessment Services

Any information and documentation involving UL Mark services are provided on behalf of Underwriters Laboratories Inc. (UL) or any authorized licensee of UL.

3.0 Calibration of Equipment Used for Measurement

All test equipment and test accessories are calibrated on a regular basis. The maximum time between calibrations is one year or the manufacturers' recommendation, whichever is less.

All test equipment calibrations are traceable to the National Institute of Standards and Technology (NIST); therefore, all test data recorded in this report is traceable to NIST.

4.0 EMISSIONS TEST RESULTS

The emissions tests were performed according to following regulations:

----- North America -----

Code of Federal Regulations Title 47	Part 15, Subpart B & C, Radio Frequency Devices
Industry Canada	RSS-GEN, RSS-210, ICES-003

Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be verified at the time the test is conducted.

Ambient Temperature, °C	22.5 ± 2.5	Relative Humidity, %	45 ± 15	Barometric Pressure, mBar	950 ± 150
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4.1 Test Conditions and Results – Occupied Bandwidth

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the spectrum analyzer resolution bandwidth set per the appropriate standard.
Basic Standard	CFR 47, Part 15, Subpart C, Section 15.231; RSS-GEN; RSS-210
Occupied Bandwidth Limits	
0.25% of the Fundamental Frequency	

Table 1 Occupied Bandwidth Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 2 Occupied Bandwidth Spectrum Analyzer Settings

Resolution Bandwidth (MHz)	Occupied Bandwidth Requirements	
	dBc	%
1% of the Span	-20	99
Supplementary information: None		

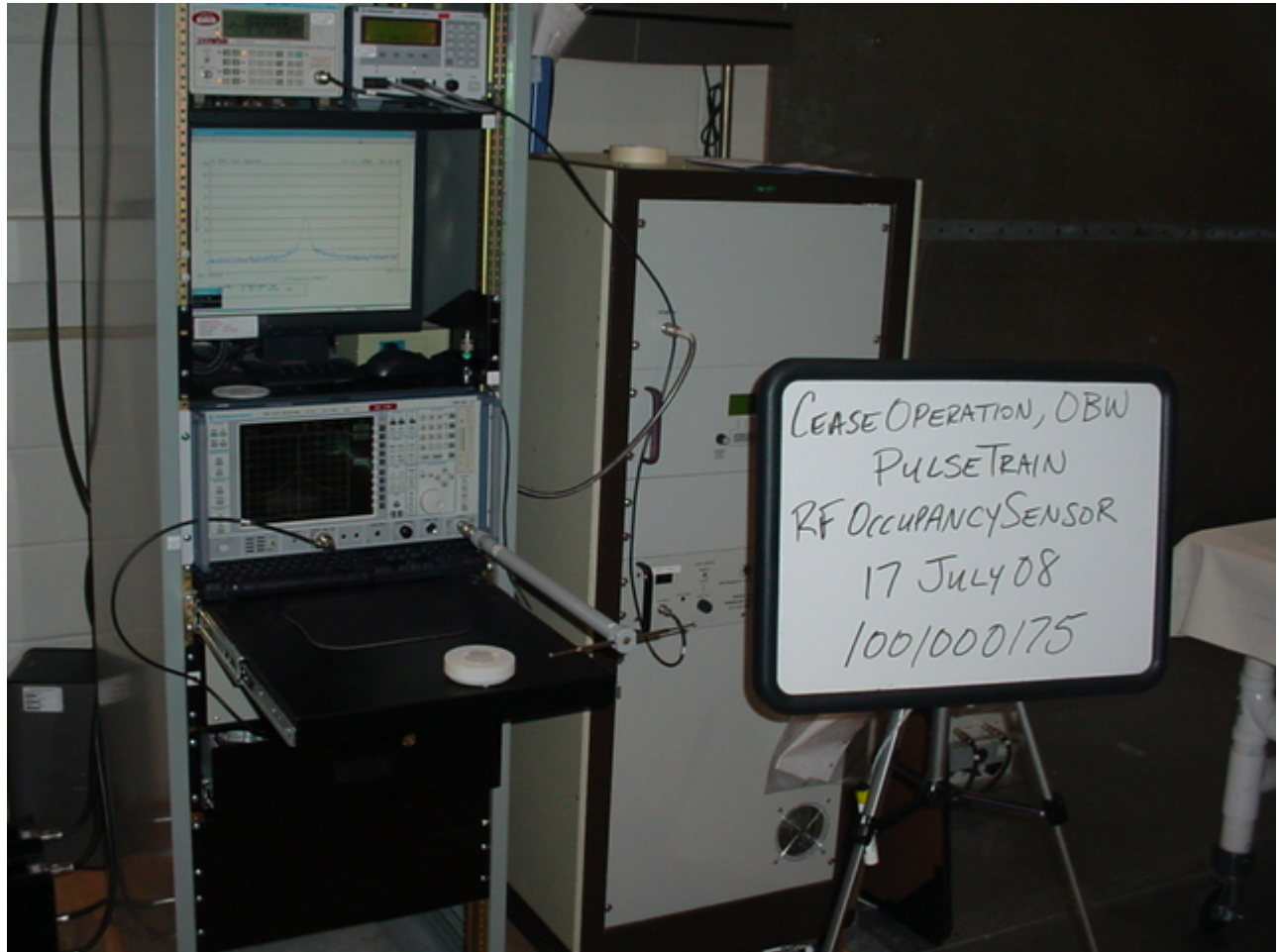
Table 3 Occupied Bandwidth Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Dipole Antenna	EMCO	3121C	3359
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740

Job Number: 1001000175
Model Number: SR1-OCRB-1-xx,
SR1-VCRB-P-xx
Client Name: LUTRON ELECTRONICS INC

File Number: MC15832 Page 14 of 45
FCC ID: JPZ0059 IC ID: 2851A-JPZ0059

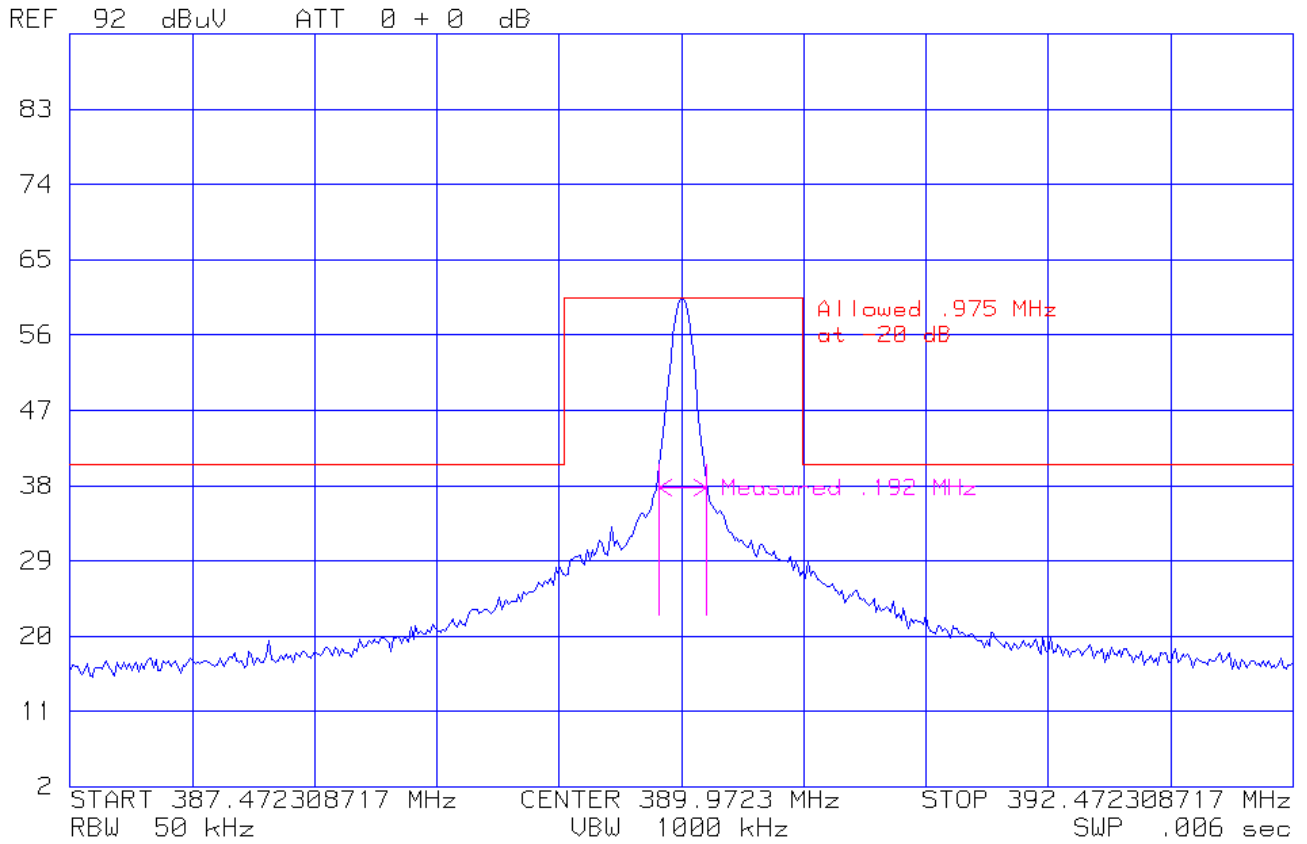
Figure 1 Test Setup for Occupied Bandwidth



Job Number: 1001000175
Model Number: SR1-OCRB-1-xx,
SR1-VCRB-P-xx
Client Name: LUTRON ELECTRONICS INC

File Number: MC15832 Page 15 of 45
FCC ID: JPZ0059 IC ID: 2851A-JPZ0059

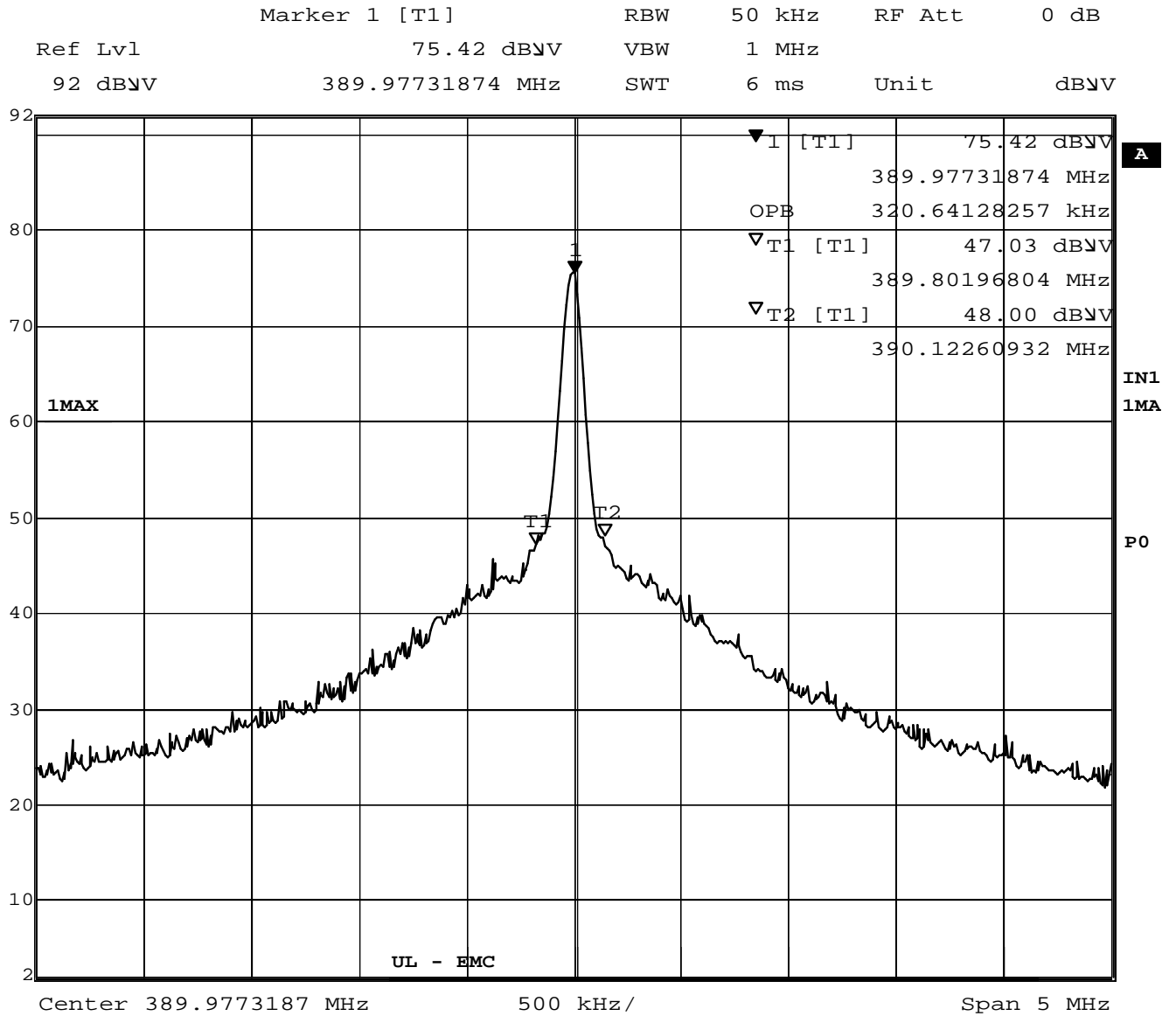
Figure 2 Occupied Bandwidth Graph (20dB Bandwidth)



Job Number: 1001000175
 Model Number: SR1-OCRB-1-xx,
 SR1-VCRB-P-xx
 Client Name: LUTRON ELECTRONICS INC

File Number: MC15832 Page 16 of 45
 FCC ID: JPZ0059 IC ID: 2851A-JPZ0059

Figure 3 Occupied Bandwidth Graph (99% Bandwidth)



Title: 99 Percent BW
 Date: 17.JUL.2008 07:39:53

4.2 Test Conditions and Results – Cease Operation

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The device was operated and the transmission time measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	CFR 47, Part 15, Subpart C, Section 15.231; RSS-GEN; RSS-210
Cease Operation Limits	
The transmissions shall stop within 5 seconds of either a button being released or if automatically controlled transmissions shall be stopped 5 seconds after transmissions begin.	

Table 4 Cease Operation Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

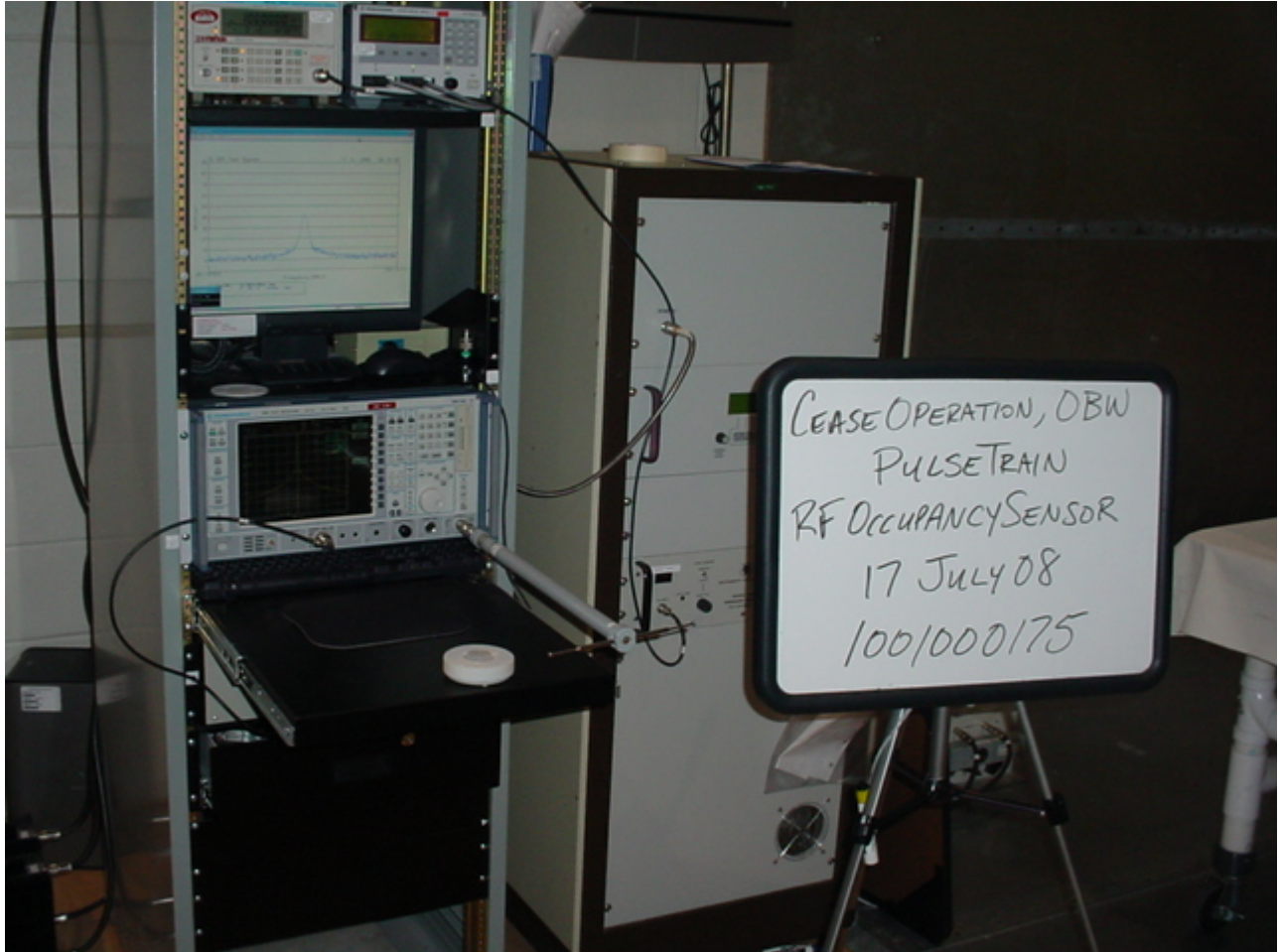
Table 5 Cease Operation Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Dipole Antenna	EMCO	3121C	3359
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740

Job Number: 1001000175
Model Number: SR1-OCRB-1-xx,
SR1-VCRB-P-xx
Client Name: LUTRON ELECTRONICS INC

File Number: MC15832 Page 18 of 45
FCC ID: JPZ0059 IC ID: 2851A-JPZ0059

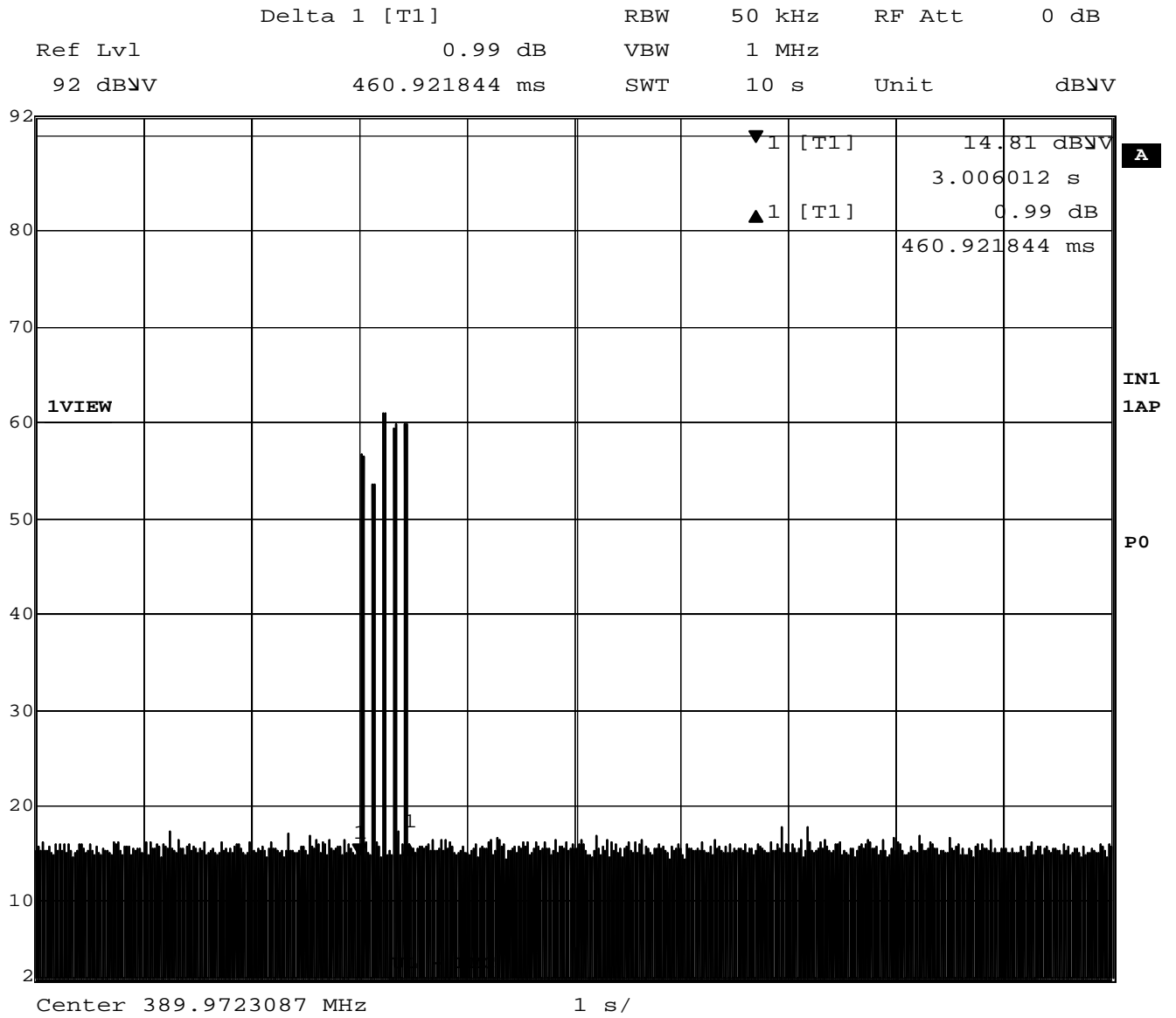
Figure 4 Test Setup for Cease Operation



Job Number: 1001000175
 Model Number: SR1-OCRB-1-xx,
 SR1-VCRB-P-xx
 Client Name: LUTRON ELECTRONICS INC

File Number: MC15832 Page 19 of 45
 FCC ID: JPZ0059 IC ID: 2851A-JPZ0059

Figure 5 Cease Operation Graph



Title: Cease Operation
 Date: 17.JUL.2008 07:36:22

4.3 Test Conditions and Results – Pulse Train

Test Description	Measurements were made in the laboratory environment. A Dipole (or equivalent) antenna tuned to the transmit frequency was attached to the input of a spectrum analyzer. The pulse train was measured with the spectrum analyzer set to zero span at the fundamental frequency.
Basic Standard	FCC Part 15 Subpart A, 15.35
Pulse Train Limits	
There are no limits for this test. This data is used to calculate the averaging correction factor that is applied to the measured peak radiated emissions results.	

Table 6 Pulse Train Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

Table 7 Pulse Train Calculation

Pulse Width (ms)	Total Transmission time or 100ms which ever is lesser	Average Correction Factor (dB) $20\log\left(\frac{PulseWidth}{TotalTransmissionTime}\right)$
9.76	100	-20.2

Table 8 Pulse Train Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081
Dipole Antenna	EMCO	3121C	3359
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Measurement Software	UL	Version 9.3	44740
Oscilloscope	Tektronix	TDS 680B	ME5A-258

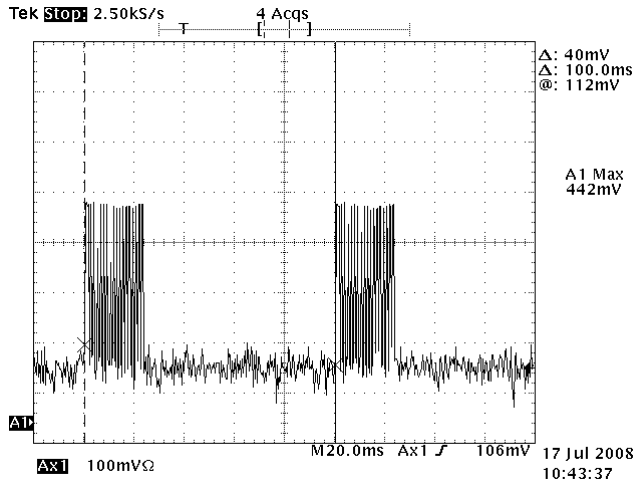
Job Number: 1001000175
Model Number: SR1-OCRB-1-xx,
SR1-VCRB-P-xx
Client Name: LUTRON ELECTRONICS INC

File Number: MC15832
FCC ID: JPZ0059
Page 21 of 45
IC ID: 2851A-JPZ0059

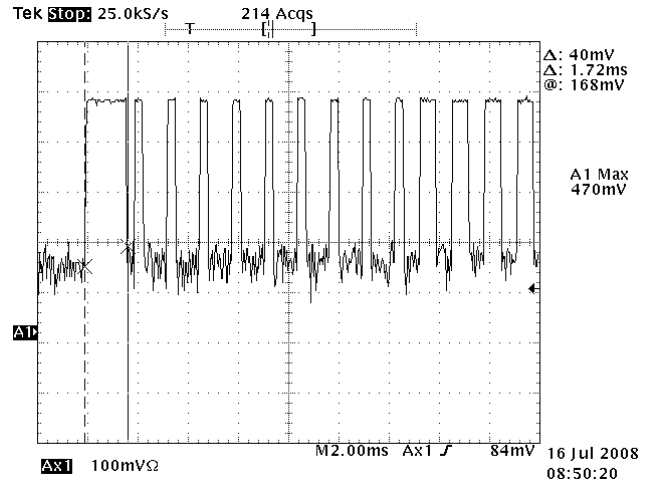
Figure 6 Test Setup for Pulse Train



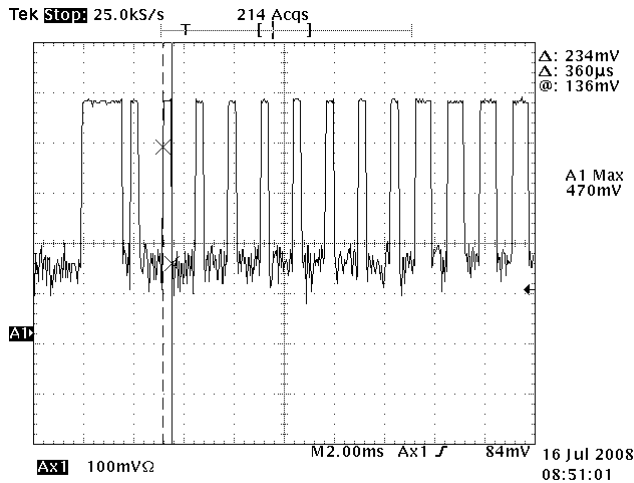
Figure 7 Pulse Train Graph



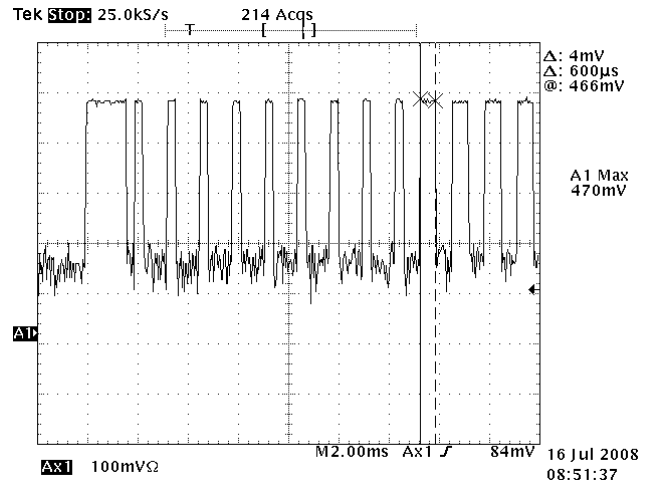
Complete Pulse



First Packet



Second Packet



Third Packet

Calculation

First Packet: 1.72ms * 1 = 1.72ms
 Second Packet: 360μs * 9 = 3.24ms
 Third Packet: 600μs * 8 = 4.8ms
 Total Pulse Width = 1.72 + 3.24 + 4.8 = 9.76ms

4.4 Test Conditions and Results – Radiated Emissions (Transmit Mode)

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.		
Basic Standard	FCC Part 15, Subpart C, 15.231, 15.209, RSS-GEN, RSS-210		
UL LPG	80-EM-S0029		
	Frequency range	Measurement Point	
Fully configured sample scanned over the following frequency range	0.009MHz – 1GHz	(3 meter measurement distance)	
	1GHz – 5GHz	(3 meter measurement distance)	
Limits			
Frequency (MHz)	Limit (dB μ V/m)		
	Quasi-Peak	Average	
	General Emissions	Fundamental	Spurious
0.009 – 0.490	128.5 – 93.8	-	-
0.490 – 1.705	73.8 – 63	-	-
1.705 – 30	69.5	-	-
30 – 88	40	-	-
88 – 216	43.5	-	-
216-960	46	-	-
960-1000	54	-	-
1000-5000	-	-	54
390	-	79.24	-
All Harmonics	-	-	59.24
Supplementary information: Spurious limits are only applied against products of the transmitter. All other emissions must meet the general limits.			

Table 9 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	1
Supplementary information: None		

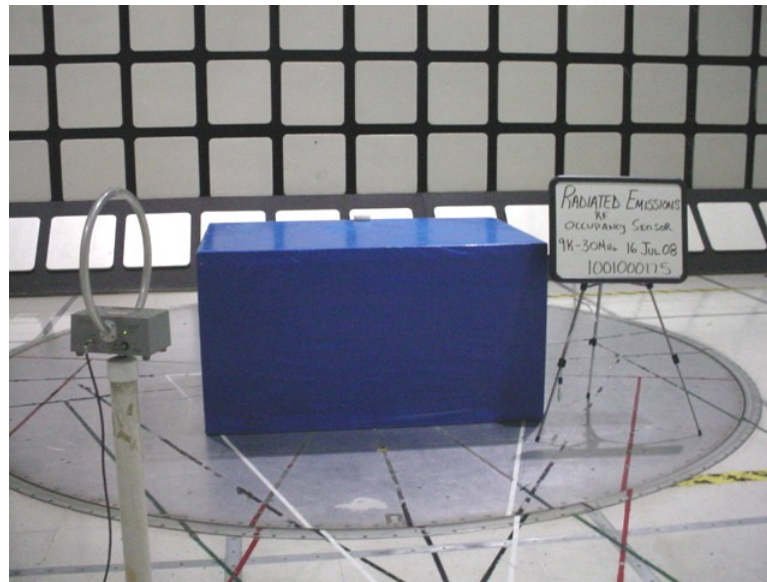
Table 10 Radiated Emissions Test Equipment

Test Equipment Used			
Description	Manufacturer	Model	Identifier
9kHz-30MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Active Loop Antenna	EMCO	6507	ME5A-288
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
30-1000MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Bicon Antenna	Schaffner	VBA6106A	54
Log-P Antenna	Schaffner	UPA6109	44067
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Above 1GHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Horn Antenna	EMCO	3115	ME5A-766
Preamp (1 - 26GHz)	HP	8449B	ME5-914
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268

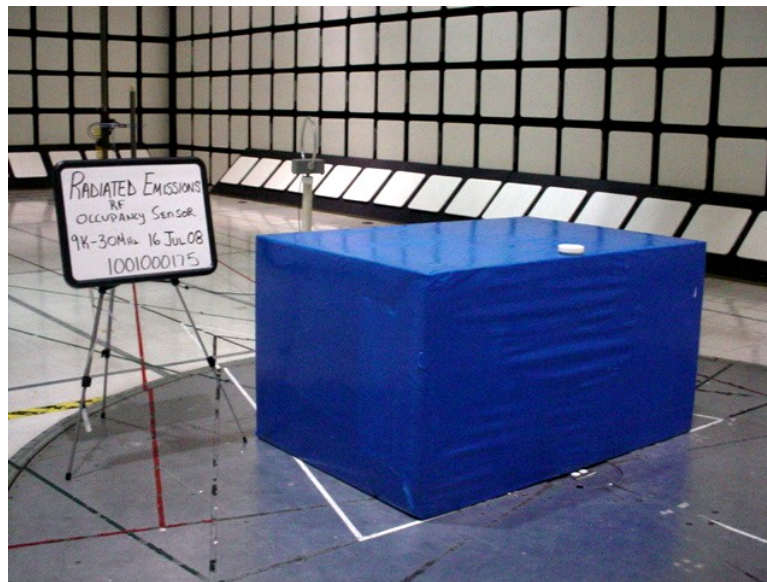
Job Number: 1001000175
Model Number: SR1-OCRB-1-xx,
SR1-VCRB-P-xx
Client Name: LUTRON ELECTRONICS INC

File Number: MC15832
FCC ID: JPZ0059
Page 25 of 45
IC ID: 2851A-JPZ0059

Figure 8 Test setup for Radiated Emissions



9kHz-30MHz Front

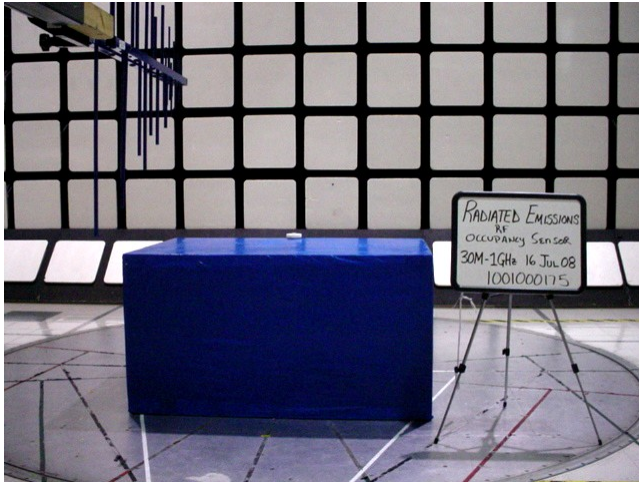


9kHz-30MHz Rear

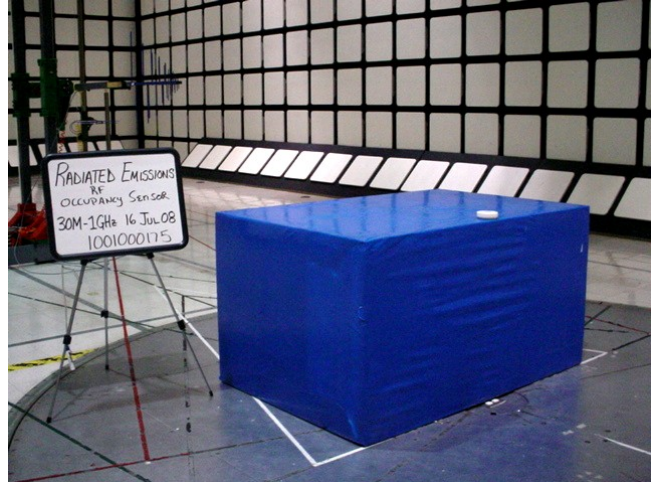
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Model Number: SR1-OCRB-1-xx,
SR1-VCRB-P-xx
Client Name: LUTRON ELECTRONICS INC

File Number: MC15832 Page 26 of 45
FCC ID: JPZ0059 IC ID: 2851A-JPZ0059

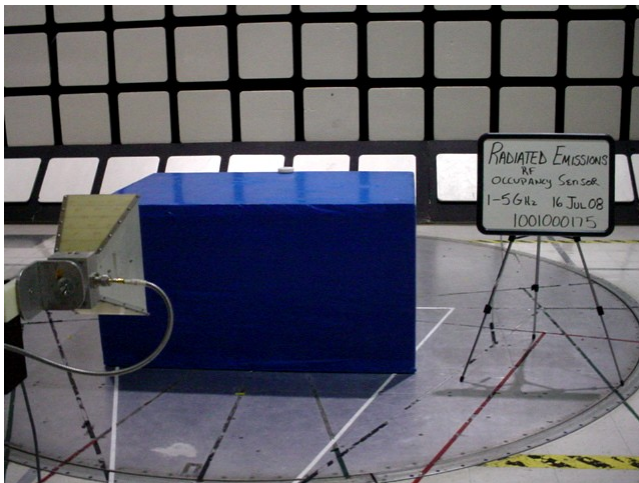
Figure 9 Test setup for Radiated Emissions



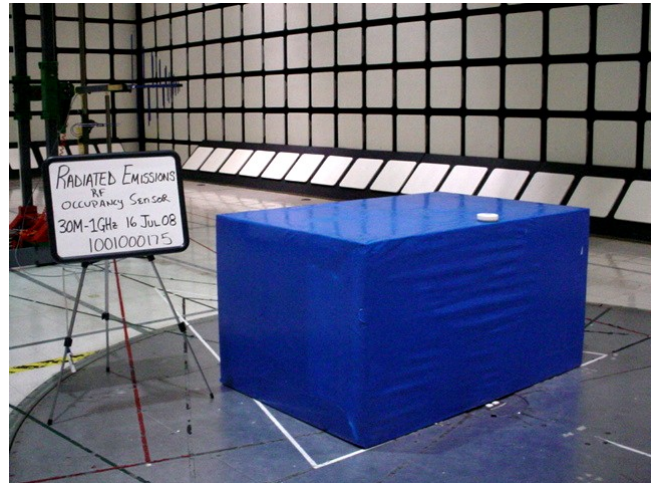
30-1000MHz Front



30-1000MHz Rear

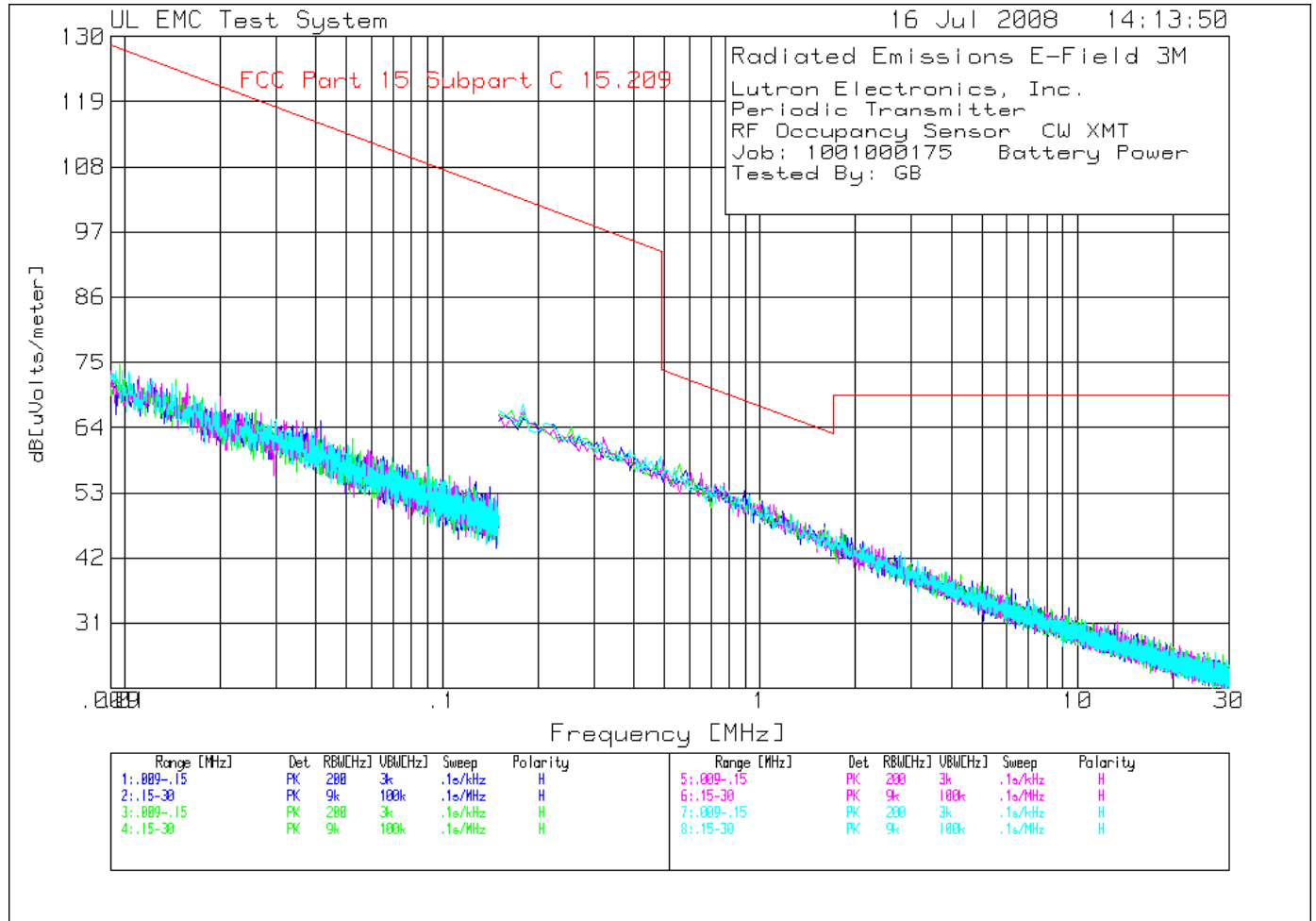


1-5GHz Front



1-5GHz Rear

Figure 10 Radiated Emissions Graph



Job Number: 1001000175 File Number: MC15832 Page 28 of 45
 Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
 Client Name: LUTRON ELECTRONICS INC

Table 11 Radiated Emissions Data Points

Lutron Electronics, Inc.
 Periodic Transmitter
 RF Occupancy Sensor CW XMT
 Job: 1001000175 Battery Power
 Tested By: GB

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
=====											
45° .009 - .15MHz -----											
1	.00968	45.07 pk	0	29.5	74.57	127.9	-	-	-	-	-
	Azimuth:302	Height:120	Horz	Margin [dB]		-53.33	-	-	-	-	-
2	.01447	45.39 pk	0	26.6	71.99	124.4	-	-	-	-	-
	Azimuth:227	Height:120	Horz	Margin [dB]		-52.41	-	-	-	-	-
3	.02576	44.68 pk	0	22.3	66.98	119.4	-	-	-	-	-
	Azimuth:302	Height:120	Horz	Margin [dB]		-52.42	-	-	-	-	-
4	.05211	44.43 pk	0	17.8	62.23	113.3	-	-	-	-	-
	Azimuth:284	Height:120	Horz	Margin [dB]		-51.07	-	-	-	-	-

135° .15 - 30MHz -----											
5	.17986	52.34 pk	0	15.7	68.04	102.5	-	-	-	-	-
	Azimuth:45	Height:160	Horz	Margin [dB]		-34.46	-	-	-	-	-
6	.38886	44.72 pk	0	15.5	60.22	95.8	-	-	-	-	-
	Azimuth:134	Height:160	Horz	Margin [dB]		-35.58	-	-	-	-	-

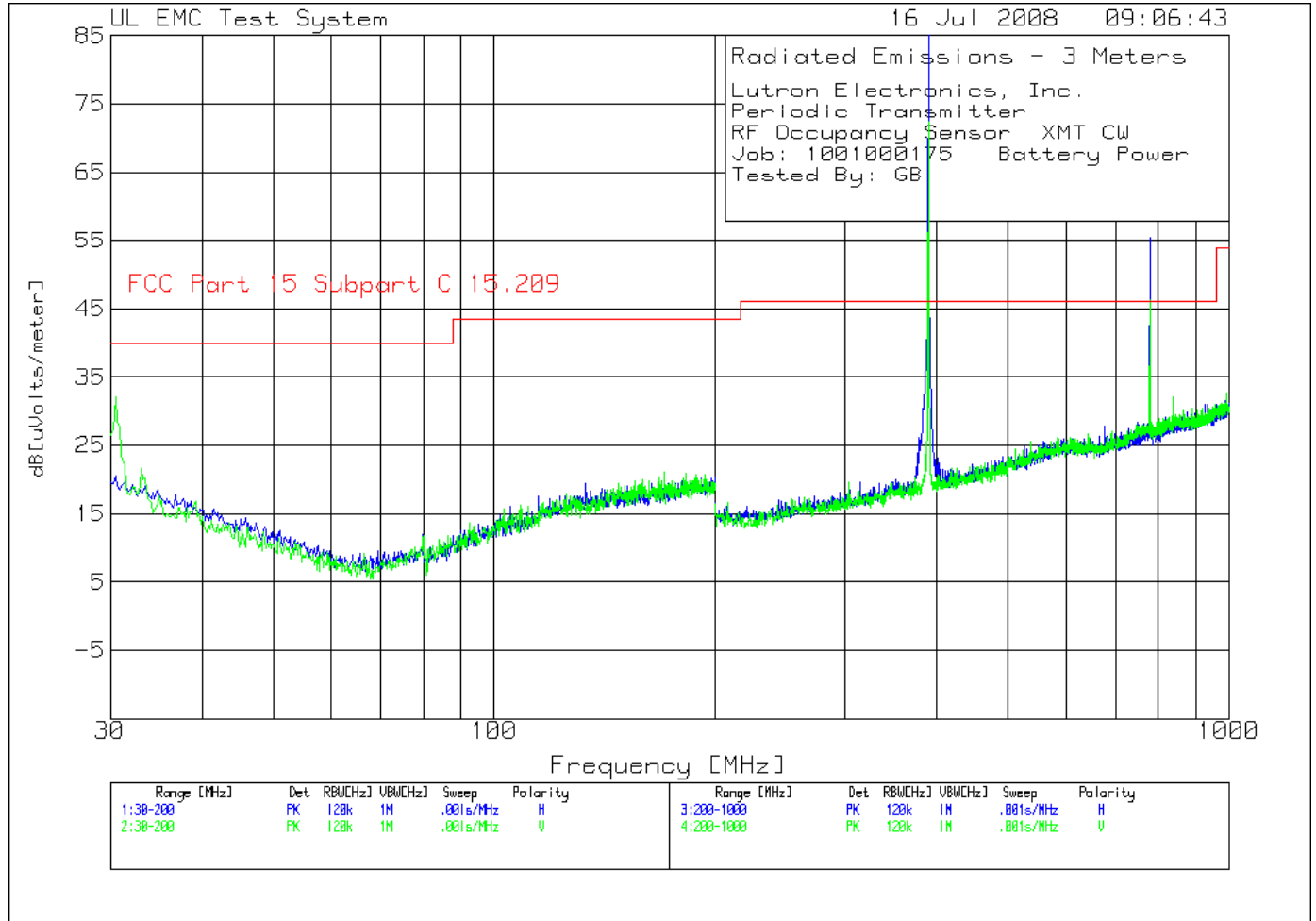
LIMIT 1: FCC Part 15 Subpart C 15.209
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE
 LIMIT 5: NONE
 LIMIT 6: NONE

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - denotes average log detection

Job Number: 1001000175
 Model Number: SR1-OCRB-1-xx,
 SR1-VCRB-P-xx
 Client Name: LUTRON ELECTRONICS INC

File Number: MC15832 Page 29 of 45
 FCC ID: JPZ0059 IC ID: 2851A-JPZ0059

Figure 11 Radiated Emissions Graph



Job Number: 1001000175 File Number: MC15832 Page 30 of 45
 Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
 Client Name: LUTRON ELECTRONICS INC

Table 12 Radiated Emissions Data Points

Lutron Electronics, Inc.
 Periodic Transmitter
 RF Occupancy Sensor XMT CW
 Job: 1001000175 Battery Power
 Tested By: GB

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Vertical 30 - 200MHz -----											
1	30.5105	15.09 pk	.4	16.7	32.19	40	-	-	-	-	-
	Azimuth:344	Height:100	Vert	Margin [dB]		-7.81	-	-	-	-	-
Horizontal 200 - 1000MHz -----											
2	389.6948	69.52 pk	1.2	15.8	86.52	46	-	-	-	-	-
	Azimuth:16	Height:100	Horz	Margin [dB]		40.52	-	-	-	-	-
3	779.8899	31.82 pk	1.7	21.8	55.32	46	-	-	-	-	-
	Azimuth:258	Height:100	Horz	Margin [dB]		9.32	-	-	-	-	-
Vertical 200 - 1000MHz -----											
4	389.6948	55.44 pk	1.2	15.7	72.34	46	-	-	-	-	-
	Azimuth:17	Height:300	Vert	Margin [dB]		26.34	-	-	-	-	-
5	779.8899	22.43 pk	1.7	22.2	46.33	46	-	-	-	-	-
	Azimuth:2	Height:300	Vert	Margin [dB]		.33	-	-	-	-	-
6	840.3202	7.12 pk	1.8	23.2	32.12	46	-	-	-	-	-
	Azimuth:150	Height:200	Vert	Margin [dB]		-13.88	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE
 LIMIT 5: NONE
 LIMIT 6: NONE

pk - Peak detector
 qp - Quasi-Peak detector

Job Number: 1001000175 File Number: MC15832 Page 31 of 45
 Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
 Client Name: LUTRON ELECTRONICS INC

Lutron Electronics, Inc.
 Periodic Transmitter
 RF Occupancy Sensor XMT CW
 Job: 1001000175 Battery Power
 Tested By: GB

Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Correction Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5
Horizontal 200 - 1000MHz										
389.971	69.18 pk	1.2	15.8	-20.2	65.98	-	79.24	-	-	-
Azimuth: 46 Height:101 Horz						Margin [dB]: -13.26 - - -				
779.9522	32.3 pk	1.7	21.8	-	55.8	-	-	59.24	-	-
Azimuth: 264 Height:109 Horz						Margin [dB]: -3.44 - -				
Vertical 200 - 1000MHz										
389.971	56.77 pk	1.2	15.7	-	73.67	-	79.24	-	-	-
Azimuth: 129 Height:332 Vert						Margin [dB]: -5.57 - -				
779.9553	24.44 pk	1.7	22.2	-	48.34	-	-	59.24	-	-
Azimuth: 19 Height:257 Vert						Margin [dB]: -10.9 - -				

LIMIT 1: FCC Part 15 Subpart C 15.209
 LIMIT 2: FCC Part 15 Subpart C 15.231 Fundamental
 LIMIT 3: FCC Part 15 Subpart C 15.231 Harmonics
 LIMIT 4: NONE
 LIMIT 5: NONE
 LIMIT 6: NONE

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - Average log detector
 ave - Average detector

Figure 12 Radiated Emissions Graph

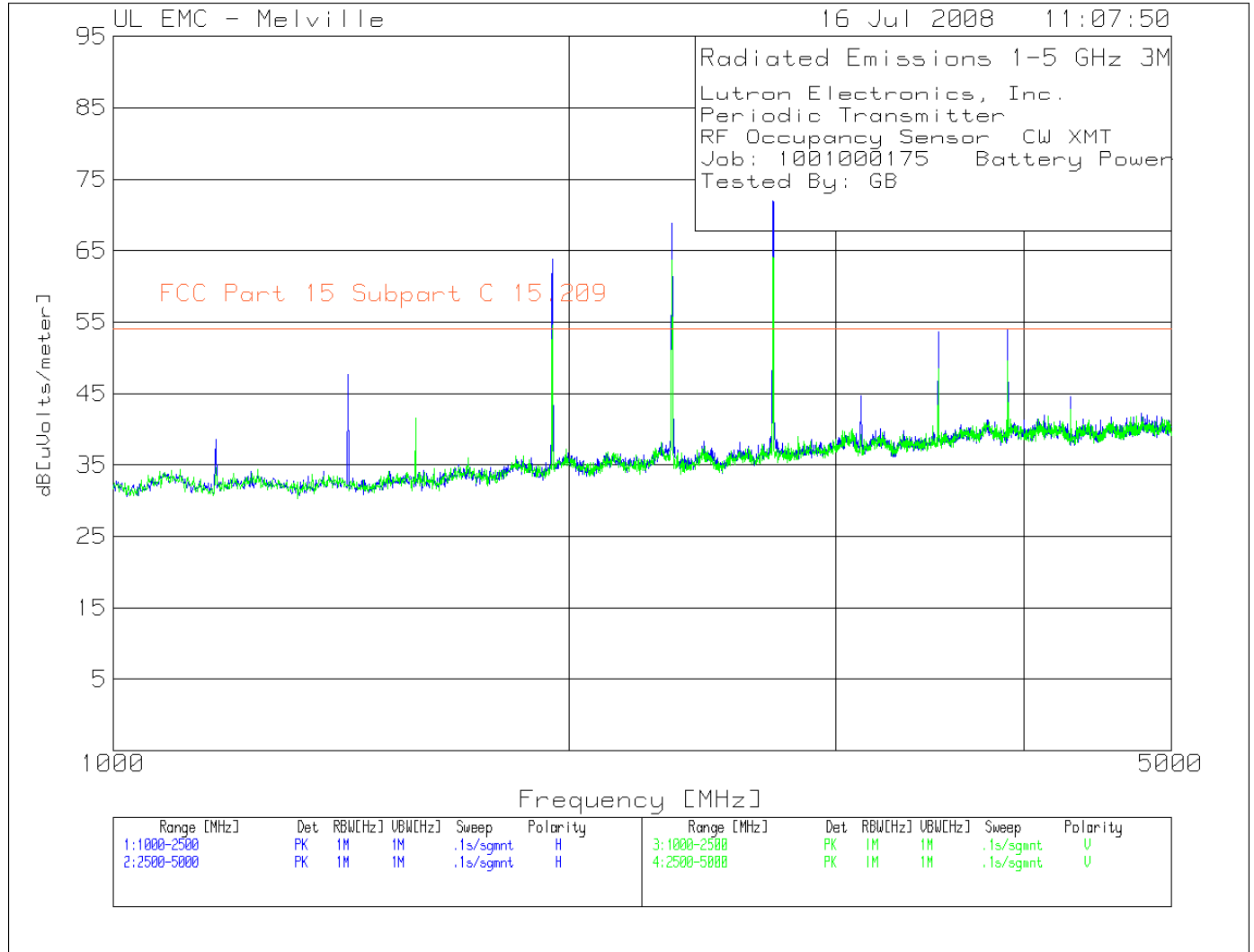


Table 13 Radiated Emissions Data Points

Lutron Electronics, Inc.
 Periodic Transmitter
 RF Occupancy Sensor CW XMT
 Job: 1001000175 Battery Power
 Tested By: GB

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 1000 - 2500MHz -----											
1	1169.67	45.45 pk	-31.9	25.1	38.65	54	-	-	-	-	-
	Azimuth:33	Height:200	Horz	Margin [dB]		-15.35	-	-	-	-	-
2	1429.429	53.93 pk	-31.3	25	47.63	54	-	-	-	-	-
	Azimuth:181	Height:200	Horz	Margin [dB]		-6.37	-	-	-	-	-
3	1950.45	66.31 pk	-30	27.5	63.81	54	-	-	-	-	-
	Azimuth:216	Height:100	Horz	Margin [dB]		9.81	-	-	-	-	-
4	2340.841	69.49 pk	-29.1	28.5	68.89	54	-	-	-	-	-
	Azimuth:244	Height:200	Horz	Margin [dB]		14.89	-	-	-	-	-
Horizontal 2500 - 5000MHz -----											
5	2728.486	70.97 pk	-28.5	29.5	71.97	54	-	-	-	-	-
	Azimuth:6	Height:200	Horz	Margin [dB]		17.97	-	-	-	-	-
6	3120.414	41.98 pk	-27.8	30.5	44.68	54	-	-	-	-	-
	Azimuth:293	Height:200	Horz	Margin [dB]		-9.32	-	-	-	-	-
7	3509.006	49.38 pk	-26.9	31.2	53.68	54	-	-	-	-	-
	Azimuth:112	Height:200	Horz	Margin [dB]		-.32	-	-	-	-	-
8	3899.266	47.6 pk	-25.8	32.2	54	54	-	-	-	-	-
	Azimuth:112	Height:100	Horz	Margin [dB]		0	-	-	-	-	-
9	4289.526	37.62 pk	-25.5	32.5	44.62	54	-	-	-	-	-
	Azimuth:293	Height:100	Horz	Margin [dB]		-9.38	-	-	-	-	-
Vertical 1000 - 2500MHz -----											
10	1584.084	46.85 pk	-30.9	25.6	41.55	54	-	-	-	-	-
	Azimuth:304	Height:200	Vert	Margin [dB]		-12.45	-	-	-	-	-
11	1950.45	57.06 pk	-30	27.5	54.56	54	-	-	-	-	-
	Azimuth:83	Height:100	Vert	Margin [dB]		.56	-	-	-	-	-
12	2340.841	64.45 pk	-29.1	28.3	63.65	54	-	-	-	-	-
	Azimuth:194	Height:200	Vert	Margin [dB]		9.65	-	-	-	-	-
Vertical 2500 - 5000MHz -----											
13	2728.486	63.31 pk	-28.5	29.3	64.11	54	-	-	-	-	-
	Azimuth:332	Height:200	Vert	Margin [dB]		10.11	-	-	-	-	-
14	3509.006	44.26 pk	-26.9	31.2	48.56	54	-	-	-	-	-
	Azimuth:140	Height:200	Vert	Margin [dB]		-5.44	-	-	-	-	-
15	3899.266	43.15 pk	-25.8	32.2	49.55	54	-	-	-	-	-
	Azimuth:140	Height:200	Vert	Margin [dB]		-4.45	-	-	-	-	-
16	4289.526	35.95 pk	-25.5	32.4	42.85	54	-	-	-	-	-
	Azimuth:83	Height:200	Vert	Margin [dB]		-11.15	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart C 15.209
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE
 LIMIT 5: NONE
 LIMIT 6: NONE

Job Number: 1001000175 File Number: MC15832 Page 34 of 45
 Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
 Client Name: LUTRON ELECTRONICS INC

Lutron Electronics, Inc.
 Periodic Transmitter
 RF Occupancy Sensor CW XMT
 Job: 1001000175 Battery Power
 Tested By: GB

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4	5	6
Frequency	Reading	Factor	Factor	dB[uVolts/meter]						
[MHz]	[dB(uV)]	[dB]	[dB]							
=====										
Horizontal 1000 - 2500MHz										
1169.9018	48.69 pk	-31.9	25.1	41.89	54	-	-	-	-	-
Azimuth: 278 Height:178 Horz					Margin [dB]:	-12.11	-	-	-	-
1429	35.32 pk	-31.3	25	29.02	54	-	-	-	-	-
Azimuth: 137 Height:140 Horz					Margin [dB]:	-24.98	-	-	-	-
1429	28.65 ave	-31.3	25	22.35	54	-	-	-	-	-
Azimuth: 137 Height:140 Horz					Margin [dB]:	-31.65	-	-	-	-
1949.8998	62.51 pk	-29.9	27.5	39.91*	-	59.24	-	-	-	-
Azimuth: 200 Height:120 Horz					Margin [dB]:	-19.33	-	-	-	-
2340	70.29 pk	-29.1	28.5	49.49*	54	-	-	-	-	-
Azimuth: 310 Height:123 Horz					Margin [dB]:	-4.51	-	-	-	-
Horizontal 2500 - 5000MHz										
2729.8337	72.5 pk	-28.5	29.5	53.3*	54	-	-	-	-	-
Azimuth: 105 Height:142 Horz					Margin [dB]:	-0.7	-	-	-	-
3119.8547	44.01 pk	-27.8	30.5	46.71	-	59.24	-	-	-	-
Azimuth: 215 Height:153 Horz					Margin [dB]:	-12.53	-	-	-	-
3509.7816	49.3 pk	-26.9	31.2	53.6	-	59.24	-	-	-	-
Azimuth: 117 Height:160 Horz					Margin [dB]:	-5.64	-	-	-	-
3899.9043	48.56 pk	-25.8	32.2	34.76*	54	-	-	-	-	-
Azimuth: 113 Height:162 Horz					Margin [dB]:	-19.24	-	-	-	-
4289.7916	37.66 pk	-25.5	32.5	44.66	54	-	-	-	-	-
Azimuth: 335 Height:193 Horz					Margin [dB]:	-9.34	-	-	-	-
Vertical 1000 - 2500MHz										
1584	35.35 pk	-30.9	25.6	30.05	54	-	-	-	-	-
Azimuth: 94 Height:153 Vert					Margin [dB]:	-23.95	-	-	-	-
1584	28.89 ave	-30.9	25.6	23.59	54	-	-	-	-	-
Azimuth: 94 Height:153 Vert					Margin [dB]:	-30.41	-	-	-	-
1949.8948	59.66 pk	-29.9	27.5	57.26	-	59.24	-	-	-	-
Azimuth: 53 Height:176 Vert					Margin [dB]:	-1.98	-	-	-	-
2339.8998	63.68 pk	-29.1	28.3	42.68*	54	-	-	-	-	-
Azimuth: 2 Height:185 Vert					Margin [dB]:	-11.32	-	-	-	-
Vertical 2500 - 5000MHz										
2729.8838	63.44 pk	-28.5	29.3	44.04*	54	-	-	-	-	-
Azimuth: 141 Height:200 Vert					Margin [dB]:	-9.96	-	-	-	-
3509.8517	44.6 pk	-26.9	31.2	48.9	-	59.24	-	-	-	-
Azimuth: 119 Height:160 Vert					Margin [dB]:	-10.34	-	-	-	-
3899.8267	42.31 pk	-25.8	32.2	48.71	54	-	-	-	-	-
Azimuth: 136 Height:131 Vert					Margin [dB]:	-5.29	-	-	-	-

Job Number: 1001000175 File Number: MC15832 Page 35 of 45
 Model Number: SR1-OCRB-1-xx, FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
 SR1-VCRB-P-xx
 Client Name: LUTRON ELECTRONICS INC

Test	Meter	Gain/Loss	Transducer	Level	Limit:1	2	3	4	5	6
Frequency	Reading	Factor	Factor	dB[uVolts/meter]						
[MHz]	[dB(uV)]	[dB]	[dB]							
4289.7966	36.28 pk	-25.5	32.4	43.18	54	-	-	-	-	-
Azimuth: 277		Height:169	Vert	Margin [dB]:	-10.82	-	-	-	-	-

* = Average Correction Factor applied to measurement

LIMIT 1: FCC Part 15 Subpart C 15.209
 LIMIT 2: FCC Part 15 Subpart C 15.231 Harmonics
 LIMIT 3: NONE
 LIMIT 4: NONE
 LIMIT 5: NONE
 LIMIT 6: NONE

pk - Maximized Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - Average log detector
 ave - Average detector

4.5 Test Conditions and Results – Radiated Emissions (Receive Mode)

Test Description	Measurements were made in a 10-meter semi-anechoic chamber that complies to CISPR 16/ANSI C63.4. Preliminary (peak) measurements were performed at an antenna to EUT separation distance of 3-meter. The EUT was rotated 360° about its azimuth with the receive antenna located at various heights in both horizontal and vertical polarities. Final measurements (quasi-peak or average as noted) were then performed by rotating the EUT 360° and adjusting the receive antenna height from 1 to 4-meters. All frequencies were investigated in both horizontal and vertical antenna polarity, where applicable.	
Basic Standard	FCC Part 15, Subpart B	
UL LPG	80-EM-S0029	
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30MHz – 1GHz	(3 meter measurement distance)
	1GHz – 2GHz	(3 meter measurement distance)
Limits - Class B		
Frequency (MHz)	Limit (dB μ V/m)	
	Quasi-Peak	Average
30 – 88	40	-
88 – 216	43.5	-
216-960	46	-
960-1000	54	-
1000-2000	-	54
Supplementary information: None		

Table 14 Radiated Emissions EUT Configuration Settings

Power Interface Mode #	EUT Configurations Mode #	EUT Operation Mode #
1	1	2
Supplementary information: None		

Table 15 Radiated Emissions Test Equipment

Test Equipment Used			
30-1000MHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Bicon Antenna	Schaffner	VBA6106A	43441

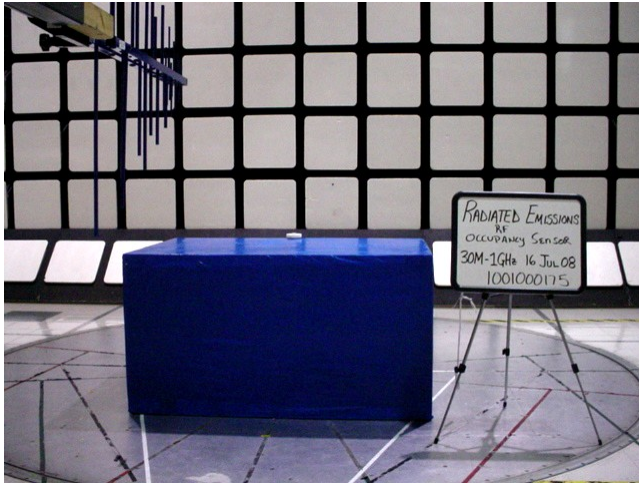
Job Number: 1001000175 File Number: MC15832 Page 37 of 45
 Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
 Client Name: LUTRON ELECTRONICS INC

Test Equipment Used			
Log-P Antenna	Schaffner	UPA6109	44068
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268
Above 1GHz			
EMI Receiver	Rohde & Schwarz	ESIB40	34968
Horn Antenna	EMCO	3115	ME5A-766
Preamp (1 - 26GHz)	HP	8449B	ME5-914
Switch Driver	HP	11713A	ME7A-627
System Controller	Sunol Sciences	SC99V	44396
Camera Controller	Panasonic	WV-CU254	44395
RF Switch Box	UL	1	44398
Measurement Software	UL	Version 9.3	44740
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268

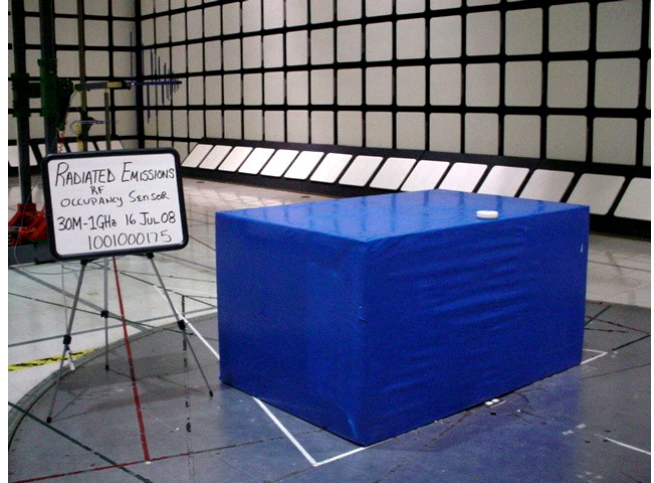
Job Number: 1001000175
Model Number: SR1-OCRB-1-xx,
SR1-VCRB-P-xx
Client Name: LUTRON ELECTRONICS INC

File Number: MC15832 Page 38 of 45
FCC ID: JPZ0059 IC ID: 2851A-JPZ0059

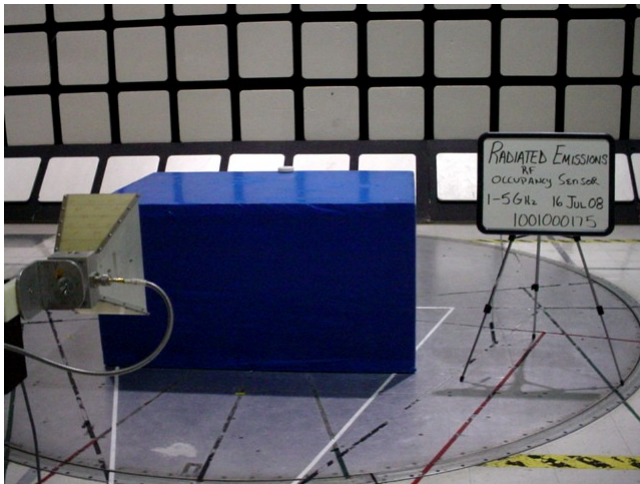
Figure 13 Test setup for Radiated Emissions



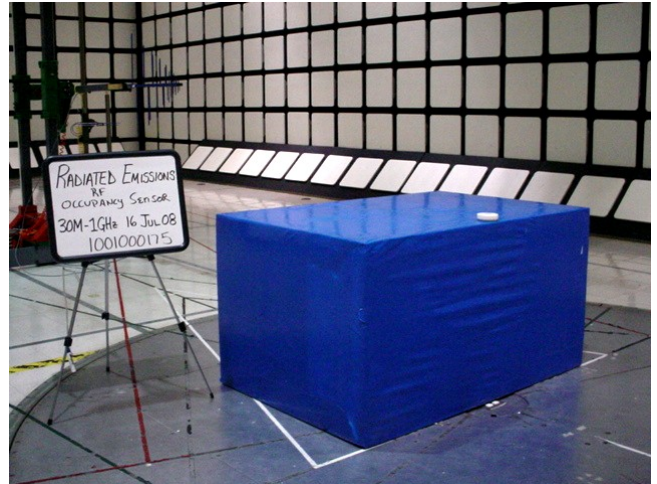
30-1000MHz Front



30-1000MHz Rear

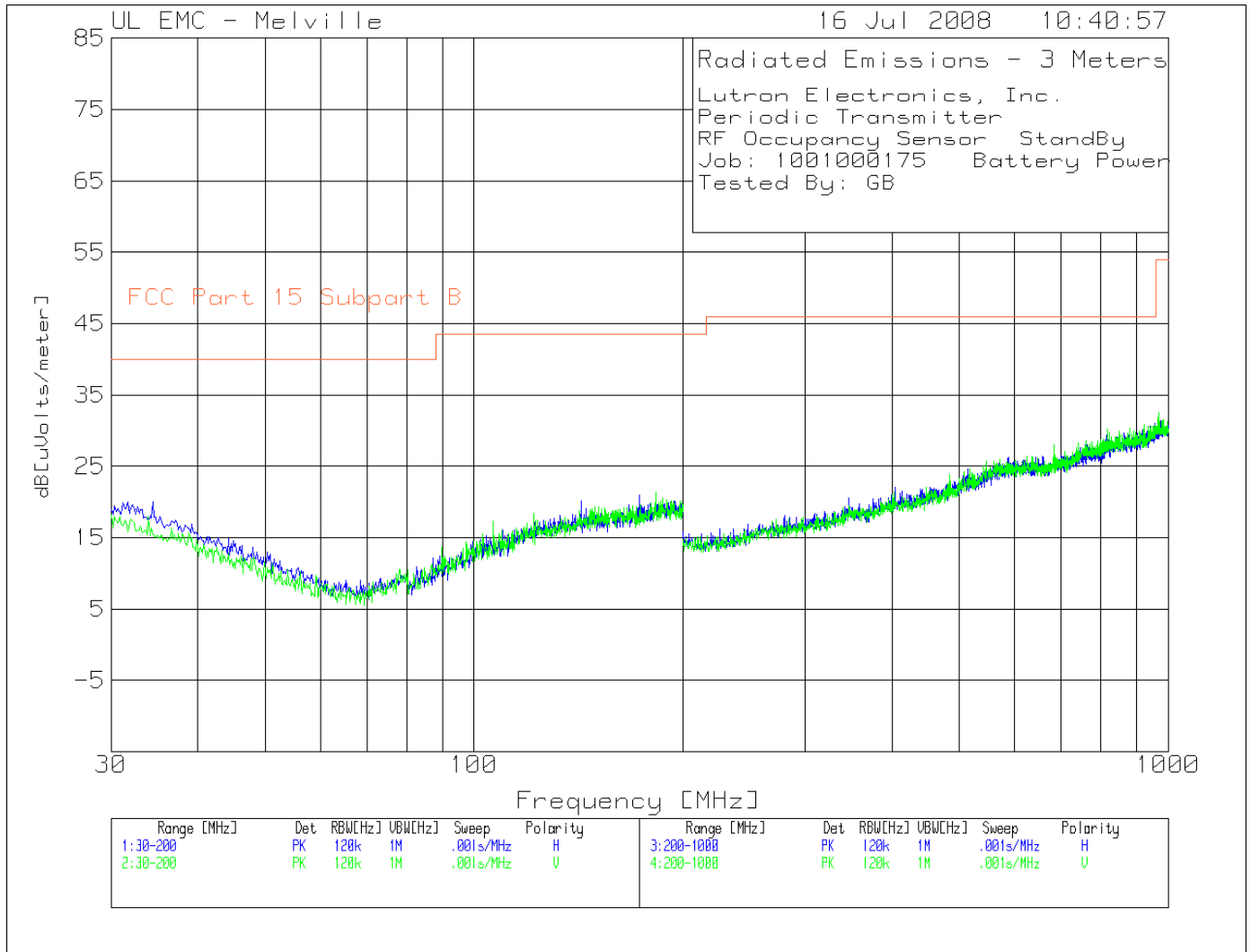


1-2GHz Front



1-2GHz Rear

Figure 14 Radiated Emissions Graph



Job Number: 1001000175 File Number: MC15832 Page 40 of 45
 Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
 Client Name: LUTRON ELECTRONICS INC

Table 16 Radiated Emissions Data Points

Lutron Electronics, Inc.
 Periodic Transmitter
 RF Occupancy Sensor StandBy
 Job: 1001000175 Battery Power
 Tested By: GB

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
Horizontal 30 - 200MHz -----											
1	34.4244	3.11 pk	.4	16.5	20.01	40	-	-	-	-	-
	Azimuth:17	Height:250	Horz	Margin [dB]		-19.99	-	-	-	-	-
3	142.4825	5.11 pk	.8	14.2	20.11	43.5	-	-	-	-	-
	Azimuth:358	Height:100	Horz	Margin [dB]		-23.39	-	-	-	-	-
4	172.7728	5.12 pk	.8	15	20.92	43.5	-	-	-	-	-
	Azimuth:59	Height:250	Horz	Margin [dB]		-22.58	-	-	-	-	-
Vertical 30 - 200MHz -----											
2	106.5766	4.17 pk	.7	12.4	17.27	43.5	-	-	-	-	-
	Azimuth:322	Height:100	Vert	Margin [dB]		-26.23	-	-	-	-	-
Vertical 200 - 1000MHz -----											
5	817.1086	5.56 pk	1.8	22.9	30.26	46	-	-	-	-	-
	Azimuth:347	Height:100	Vert	Margin [dB]		-15.74	-	-	-	-	-
6	968.3842	6.16 pk	1.9	24.5	32.56	54	-	-	-	-	-
	Azimuth:347	Height:400	Vert	Margin [dB]		-21.44	-	-	-	-	-

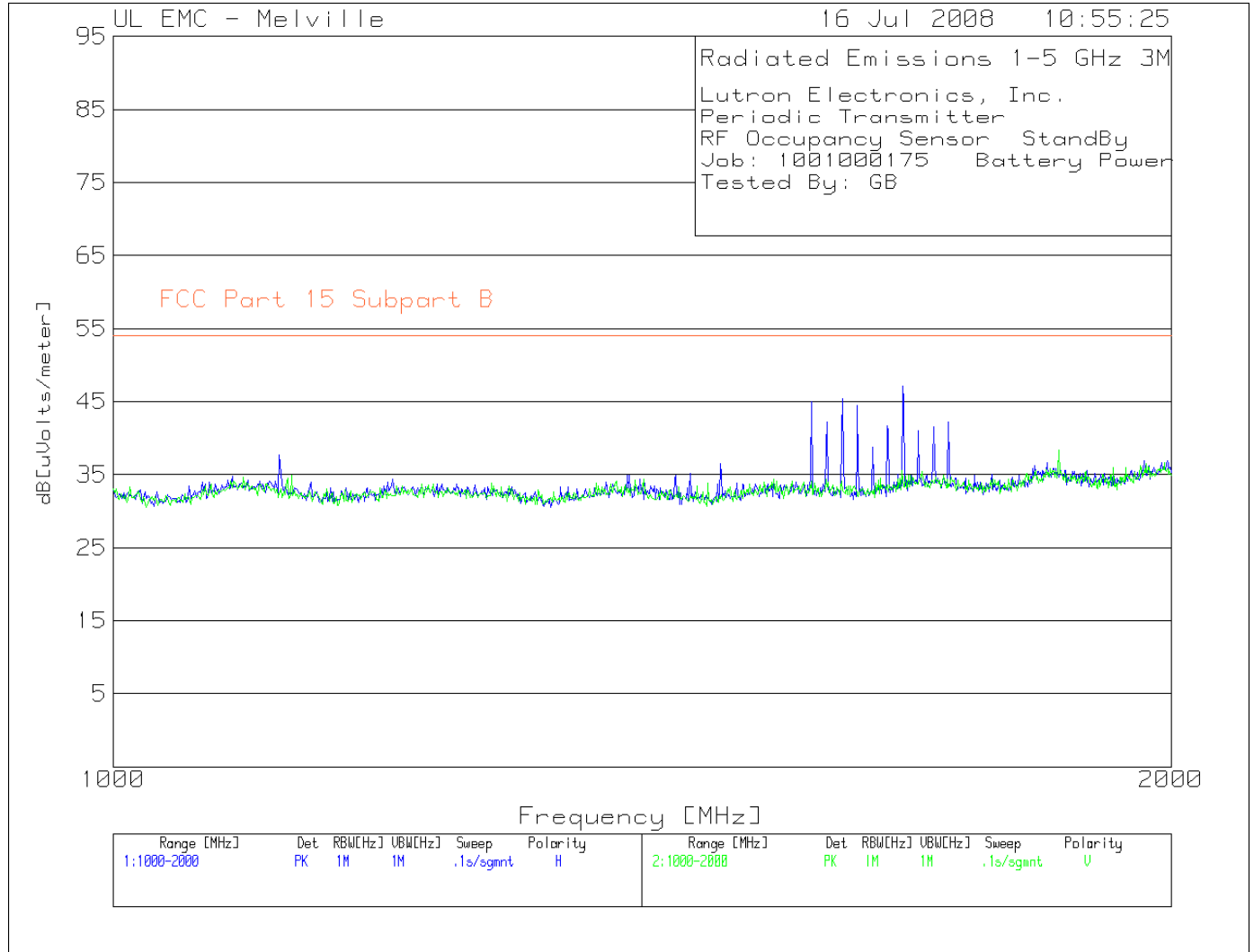
LIMIT 1: FCC Part 15 Subpart B
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE
 LIMIT 5: NONE
 LIMIT 6: NONE

pk - Peak detector
 qp - Quasi-Peak detector

Job Number: 1001000175
 Model Number: SR1-OCRB-1-xx,
 SR1-VCRB-P-xx
 Client Name: LUTRON ELECTRONICS INC

File Number: MC15832 Page 41 of 45
 FCC ID: JPZ0059 IC ID: 2851A-JPZ0059

Figure 15 Radiated Emissions Graph



Job Number: 1001000175 File Number: MC15832 Page 42 of 45
 Model Number: SR1-OCRB-1-xx, FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
 SR1-VCRB-P-xx
 Client Name: LUTRON ELECTRONICS INC

Table 17 Radiated Emissions Data Points

Lutron Electronics, Inc.
 Periodic Transmitter
 RF Occupancy Sensor StandBy
 Job: 1001000175 Battery Power
 Tested By: GB

No.	Test Frequency [MHz]	Meter Reading [dB(uV)]	Gain/Loss Factor [dB]	Transducer Factor [dB]	Level dB[uVolts/meter]	Limit:1	2	3	4	5	6
=====											
Horizontal 1000 - 2000MHz -----											
1	1580.581	50.39 pk	-30.9	25.5	44.99	54	-	-	-	-	-
	Azimuth:6	Height:200	Horz	Margin [dB]		-9.01	-	-	-	-	-
2	1596.597	47.54 pk	-30.8	25.5	42.24	54	-	-	-	-	-
	Azimuth:331	Height:200	Horz	Margin [dB]		-11.76	-	-	-	-	-
3	1612.613	50.62 pk	-30.8	25.6	45.42	54	-	-	-	-	-
	Azimuth:303	Height:200	Horz	Margin [dB]		-8.58	-	-	-	-	-
4	1628.629	49.63 pk	-30.8	25.7	44.53	54	-	-	-	-	-
	Azimuth:248	Height:200	Horz	Margin [dB]		-9.47	-	-	-	-	-
5	1677.678	51.75 pk	-30.6	26	47.15	54	-	-	-	-	-
	Azimuth:81	Height:200	Horz	Margin [dB]		-6.85	-	-	-	-	-
6	1728.729	46.49 pk	-30.5	26.3	42.29	54	-	-	-	-	-
	Azimuth:354	Height:200	Horz	Margin [dB]		-11.71	-	-	-	-	-

LIMIT 1: FCC Part 15 Subpart B
 LIMIT 2: NONE
 LIMIT 3: NONE
 LIMIT 4: NONE
 LIMIT 5: NONE
 LIMIT 6: NONE

pk - Peak detector
 qp - Quasi-Peak detector
 av - Average detector
 avlg - denotes average log detection
 ave - denotes average detection
 tm - Trace Math Result

Job Number: 1001000175 File Number: MC15832 Page 43 of 45
Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
Client Name: LUTRON ELECTRONICS INC

5.0 IMMUNITY TEST RESULTS

Not Applicable

Job Number: 1001000175 File Number: MC15832 Page 44 of 45
Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
Client Name: LUTRON ELECTRONICS INC

Appendix A

Accreditations and Authorizations



NVLAP Lab code: 100255-0

NVLAP: The National Institute of Standards and Technology (NIST) administers the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP is comprised of laboratory accreditation programs (LAPs) which are established on the basis of requests and demonstrated need. Each LAP includes specific calibration and/or test standards and related methods and protocols assembled to satisfy the unique needs for accreditation in a field of testing or calibration. NVLAP accredits public and private laboratories based on evaluation of their technical qualifications and competence to carry out specific calibrations or tests. Accreditation criteria are established in accordance with the U.S. Code of Federal Regulations (CFR, Title 15, Part 285), NVLAP Procedures and General Requirements, and encompass the requirements of ISO/IEC 17025. For a full scope listing see <http://ts.nist.gov/ts/htdocs/210/214/scopes/1002550.htm>



FCC: Details of the measurement facilities used for these tests have been filed with the Federal Communications Commission's Laboratory in Columbia, Maryland (Ref. No. 91040).



Industry Canada Industrie Canada

Industry of Canada: Accredited by Industry Canada for performance of radiated measurements. Our test site complies with RSP 100, Issue 7, Section 3.3. File #: IC 2181



VCCI: Accepted as an Associate Member to the VCCI. The measurement facilities detailed in this test report have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. Registration Nos.: (Radiated Emissions) R-797, (Conducted Emissions) C-832, C-833, C-834 and (Conducted Emissions - Telecommunications Ports) T-267.

Job Number: 1001000175 File Number: MC15832 Page 45 of 45
Model Number: SR1-OCRB-1-xx, SR1-VCRB-P-xx FCC ID: JPZ0059 IC ID: 2851A-JPZ0059
Client Name: LUTRON ELECTRONICS INC



ICASA: ICASA (Independent Communications Authority of South Africa) has appointed UL as a Designated Test Laboratory to test Telecommunications equipment for type approval in compliance with CISPR 22 to assist in fulfilling its mandate under section 54(1) of the Telecommunications Act, 1996 (Act 103 of 1996).



NIST/CAB: Validated by the European Commission as a U.S. Conformity Assessment Body (CAB) of the U.S.-EU Mutual Recognition Agreement (MRA) for the Electromagnetic Compatibility - Council Directive 89/336/EEC, Article 10 (2). Also validated for the Telecommunication Equipment-Council Directive 99/5/EC, Annex III and IV, Identification Number: 0983.

NIST/CAB: Provisioned to act as a U.S. Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the Asia Pacific Economic Cooperation (APEC) MRA between the American Institute in Taiwan (AIT) and the United States. Our laboratory is considered qualified to test equipment subject to the applicable EMC regulations of the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) which require testing to CNS 13438 (CISPR 22).

NIST/CAB: Recognized by the Infocomm Development Authority of Singapore (IDA) under the Asia Pacific Economic Cooperation Mutual Recognition Agreement (APEC MRA). Our laboratory is provisionally designated to act as a Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA. Our scope of designation includes IDA TS EMC (CISPR 22), IEC 61000-4-2, -4-3, -4-4, -4-5, and -4-6