



FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

SHADE CONTROLLER

MODEL NUMBER: CSV-SYJ-B AND CSV-SYJ-PS

**FCC ID: JPZ0085
IC: 2851A-JPZ0085**

REPORT NUMBER: 1001411477

ISSUE DATE: 2011-08-24

Prepared for
**LUTRON ELECTRONICS INC
7200 SUTTER ROAD
COOPERBURG
PA 18036, USA**

Prepared by
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NVLAP LAB CODE 100255-0

Revision History

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: LUTRON ELECTRONICS INC
7200 SUTTER ROAD
COOPERBURG, PA 18036, USA

EUT DESCRIPTION: Shade Controller

MODEL: CSV-SYJ-B AND CSV-SYJ-PS

SERIAL NUMBER: Non-serialized production unit

DATE TESTED: 2011-08-11 to 2011-08-23

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Pass
INDUSTRY CANADA RSS-210 Issue 8, Annex 1	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

Underwriters Laboratories Inc. tested the above equipment in accordance with the requirements set forth in the above standards, using test results reported in the test report documents referenced below and/or documentation furnished by the applicant. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Inc. based on interpretations of these calculations. The results show that the equipment is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation, as described by the referenced documents. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL By:



Joseph Danisi
Lead Engineering Associate
UL

Tested By:



Bob DeLisi
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UL

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3:2010, and RSS-210 Issue 8:2010.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 1285 Walt Whitman Rd. Melville, NY 11747, USA.

UL Melville is accredited by NVLAP, Laboratory Code 100255-0. The full scope of accreditation can be viewed at <http://ts.nist.gov/standards/scopes/1002550.htm>.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamplifier Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	± 3.3 dB
Radiated Disturbance, 30 to 1000 MHz	± 4.00 dB

Uncertainty figures are valid to a confidence level of 95%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a shade controller intended for wireless control of Lutron Electronics Inc. shade systems.

The following models are also covered by the testing under this investigation:

CSV-YJ-B	CSV-YJ-B-N	CSV-YJ-PS	CSV-YJ-PS-N
CSV-SYJ-B	CSV-SYJ-B-N	CSV-SYJ-PS	CSV-SYJ-PS-N
CSA-YJ-B	CSA-YJ-B-N	CSA-YJ-PS	CSA-YJ-PS-N
CSA-SYJ-B	CSA-SYJ-B-N	CSA-SYJ-PS	CSA-SYJ-PS-N

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an external, permanently attached dipole antenna.

5.3. SOFTWARE AND FIRMWARE

The test utility software used during testing was developed and supplied by Lutron Electronics Inc.

5.4. WORST-CASE CONFIGURATION AND MODE

Testing was conducted at the low, mid and high channels for both battery and AC powered configurations for both field strength and conducted emissions. All other tests were tested at the mid channel. The worst case configuration was with the antenna extended away from the transmitting device.

5.5. MODIFICATIONS

Software was changed to decrease the duty cycle. Data for duty cycle can be found in section 7.2 of this report.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

None

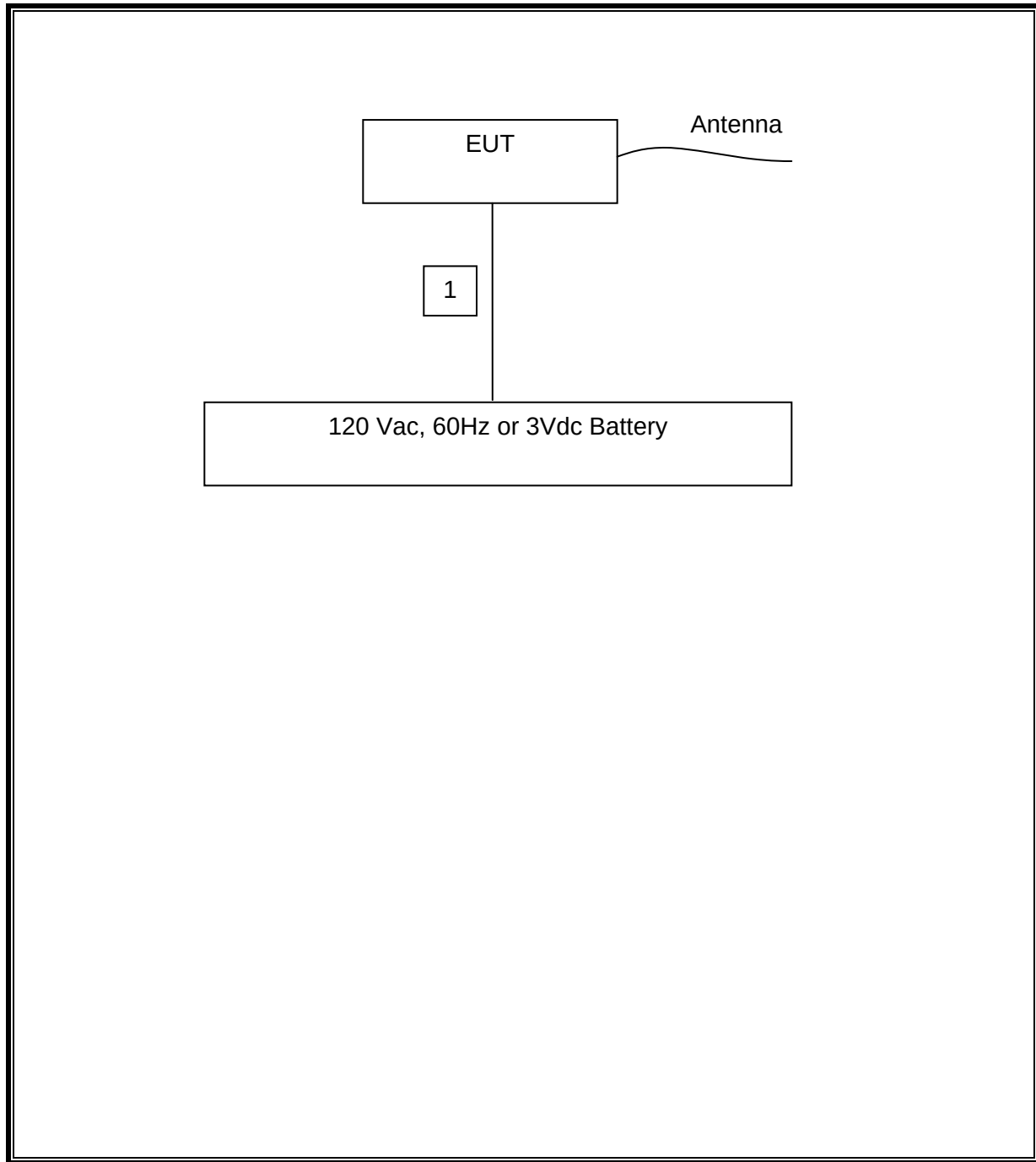
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	12	AC	Unshielded	1.8m	None

TEST SETUP

The EUT is a stand-alone device which is inserted into a plastic shade housing. Test software exercised the radio.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

Test Equipment Used – Radiated Emissions					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
30-1000MHz					
EMI Receiver	Rohde & Schwarz	ESIB40	34968	2011-03-01	2012-03-01
Bicon Antenna	Schaffner	VBA6106A	54	2011-04-05	2012-04-05
Log-P Antenna	Schaffner	UPA6109	44067	2011-04-29	2012-04-29
Switch Driver	HP	11713A	ME7A-627	N/A	N/A
System Controller	Sunol Sciences	SC99V	44396	N/A	N/A
Camera Controller	Panasonic	WV-CU254	44395	N/A	N/A
RF Switch Box	UL	1	44398	N/A	N/A
Measurement Software	UL	Version 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	87V	64386	2011-02-02	2012-02-29
Above 1GHz (Band Optimized System)					
Spectrum Analyzer	Agilent	E4446A	72823	2011-07-26	2012-07-26
Horn Antenna (1-2 GHz)	ETS	3161-01	51442	2008-03-28	See * below
Horn Antenna (2-4 GHz)	ETS	3161-02	48107	2007-09-27	See * below
Horn Antenna (4-8 GHz)	ETS	3161-03	48106	2007-09-27	See * below
Signal Path Controller	HP	11713A	50250	N/A	N/A
Gain Controller	HP	11713A	50251	N/A	N/A
RF Switch / Preamp Fixture	UL	BOMS1	50249	N/A	N/A
System Controller	UL	BOMS2	50252	N/A	N/A
Measurement Software	UL	Version 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	87V	64386	2011-02-02	2012-02-29
* - Note: As allowed by the calibration standard ANSI C63.4 Section 4.4.2, standard gain horns need only a one-time calibration. Only if physical damage occurs will the horn antenna require re-calibration. * Gain standard horn antennas (sometimes called standard gain horn antennas) need not be calibrated beyond that which is provided by the manufacturer unless they are damaged or deterioration is suspected, or they are used at a distance closer than $2D^2/\lambda$. Gain standard horn antennas have gains that are fixed by their dimensions and dimensional tolerances.					

Test Equipment Used – Conducted Emissions					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Conducted Emissions – GP 1					
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081	2011-01-27	2012-01-27
LISN	Solar	9252-50-R-24-BNC	ME5A-636	2011-02-04	2012-02-28
Switch Driver	HP	11713A	44397	N/A	N/A
RF Switch Box	UL	4	44404	N/A	N/A
Measurement Software	UL	Version 9.5	44736	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	43734	2010-03-08	2012-03-08
Multimeter	Fluke	87V	64386	2011-02-02	2012-02-29

Test Equipment Used – Occupied Bandwidth/Cease Operation/Duty Cycle					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Spectrum Analyzer	Agilent	E4446A	72822	2011-07-02	2012-07-02
Dipole Antenna	EMCO	3121C	3359	2010-12-08	2011-12-08
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	87V	64386	2011-02-02	2012-02-29

7. ANTENNA PORT TEST RESULTS

7.1. 20 dB AND 99% BW

LIMITS

FCC §15.231 (c)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

IC A1.1.3

For the purpose of Section A1.1, the 99% Bandwidth shall be no wider than 0.25% of the center frequency for devices operating between 70-900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

TEST PROCEDURE

ANSI C63.4

The transmitter output is connected to the spectrum analyzer.

20dB Bandwidth: The RBW is set to 10 KHz. The VBW is set to 300 KHz. The sweep time is coupled. Bandwidth is determined at the points 20 dB down from the modulated carrier.

99% Bandwidth: The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

No non-compliance noted:

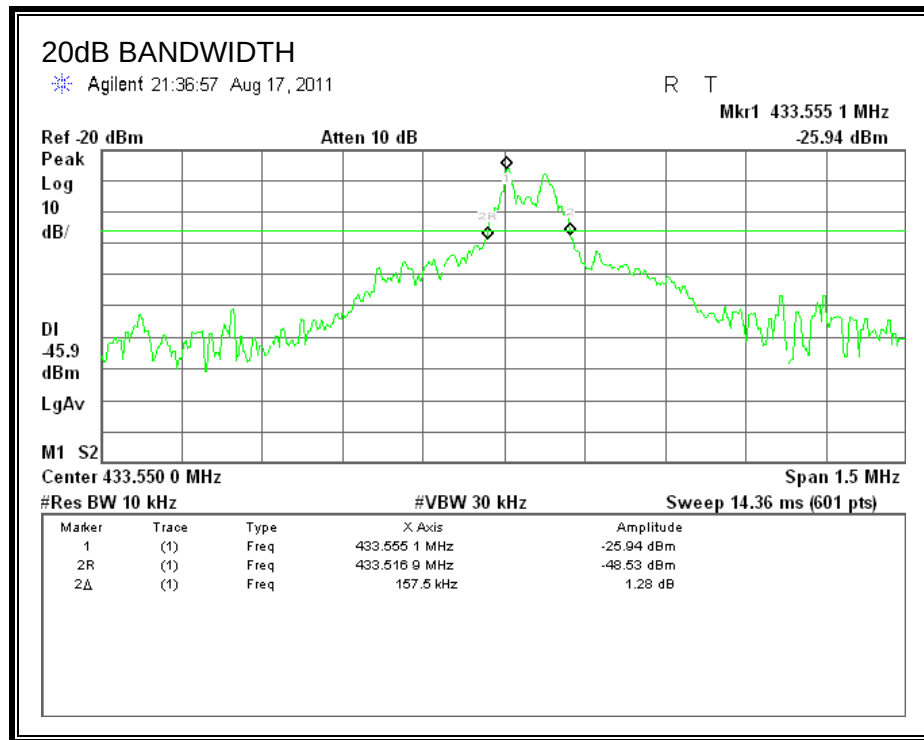
20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.55	157.5	1083.875	-926.375

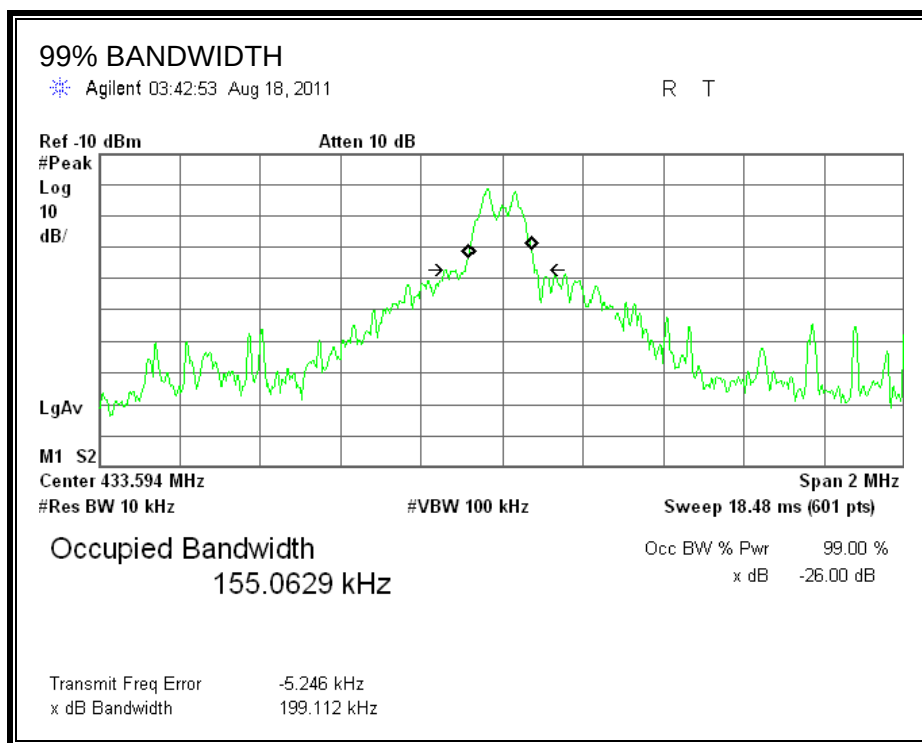
99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.55	155.1	1083.875	-928.775

20dB BANDWIDTH



99% BANDWIDTH



7.2. DUTY CYCLE

LIMITS

FCC §15.35 (c)

The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 10 kHz and the VBW is set to 300 kHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

CALCULATION

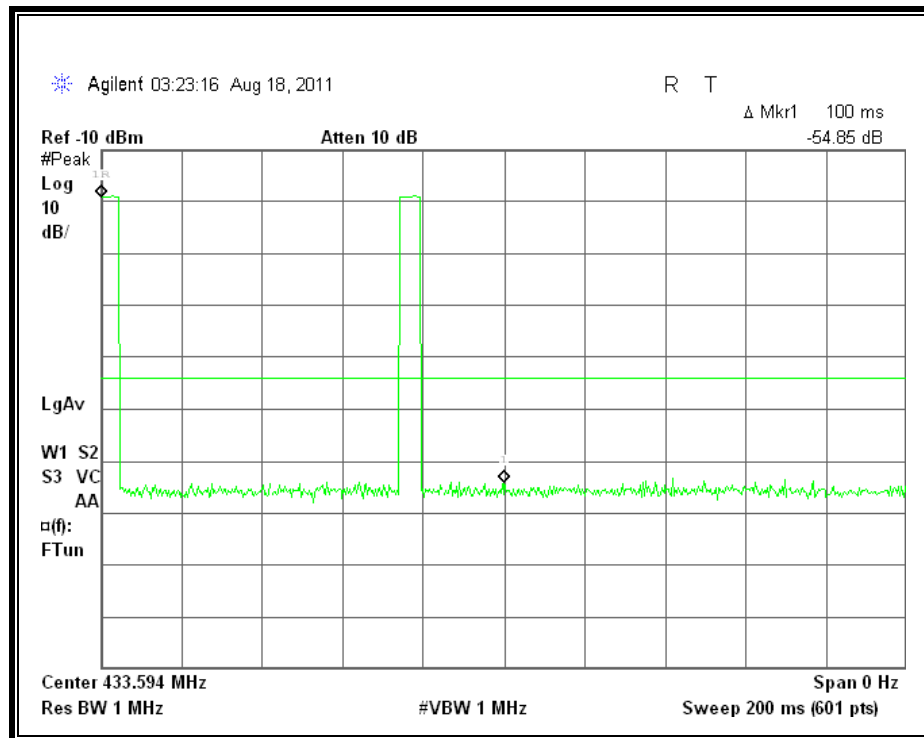
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is (# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

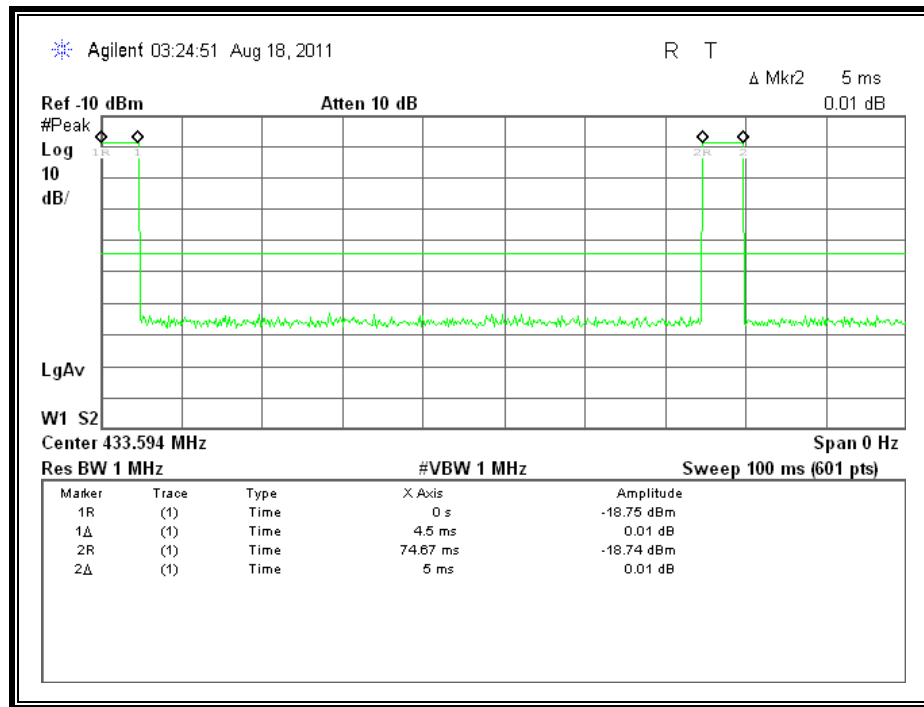
No non-compliance noted:

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	4.5	1	5.00	1	0.095	-20.45

PULSES IN A 100MS WINDOW



PULSE WIDTHS



8. RADIATED EMISSION TEST RESULTS

8.1. TX RADIATED SPURIOUS EMISSION

LIMITS

FCC §15.231 (b)

IC A1.1.2

In addition to the provisions of § 15.205, the field strength of emissions from Intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental Frequency (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,7501	125 to 3751
174 - 260	3,750	375
260 - 470	3,750 to 12,5001	375 to 1,2501
Above 470	12,500	1,250

1 Linear interpolation

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 -	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.52525	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	156.7 - 156.9	3260 - 3267	23.6 - 24.0
12.29 - 12.293	162.0125 - 167.17	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	167.72 - 173.2	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	240 - 285	3600 - 4400	(²)
13.36 - 13.41	322 - 335.4		

1 Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
2 Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 88	100 **	3
88 216	150 **	3
216 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54 72 MHz, 76 88 MHz, 174 216 MHz or 470 806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

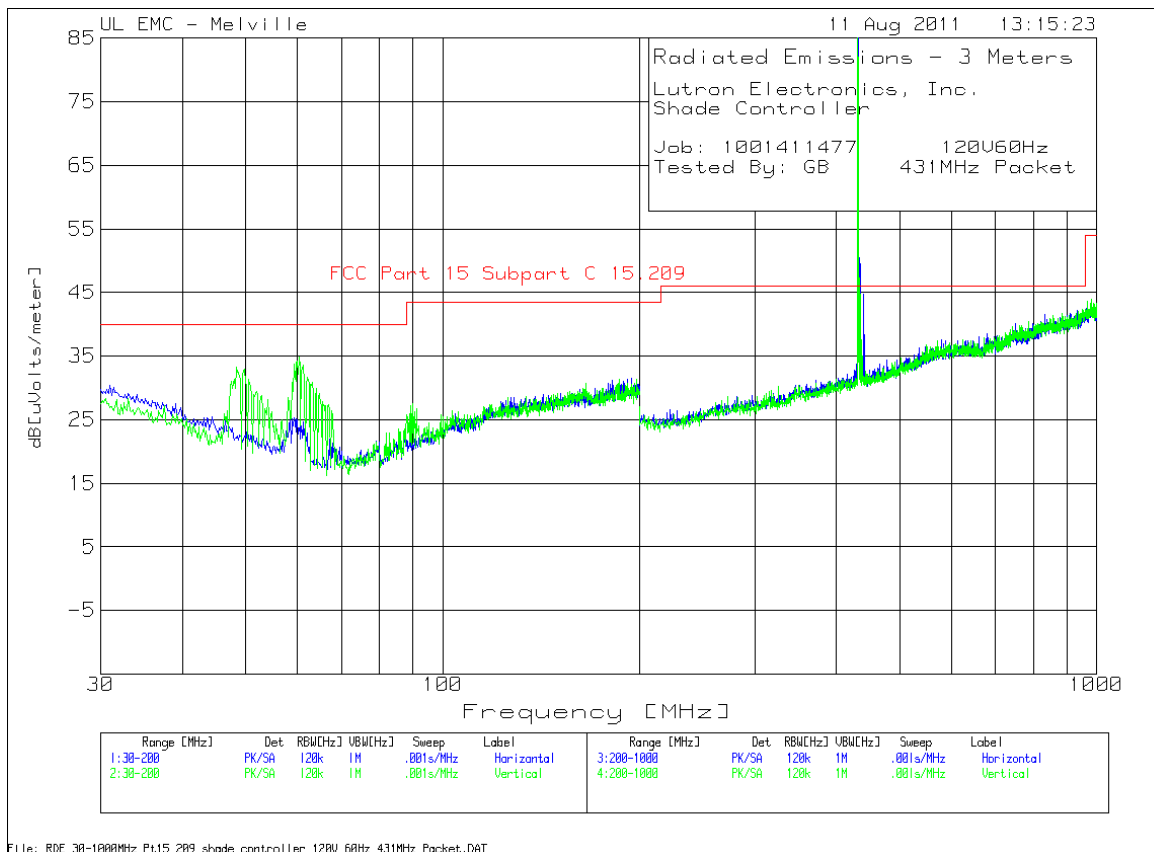
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

RESULTS

No non-compliance noted:

FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz)

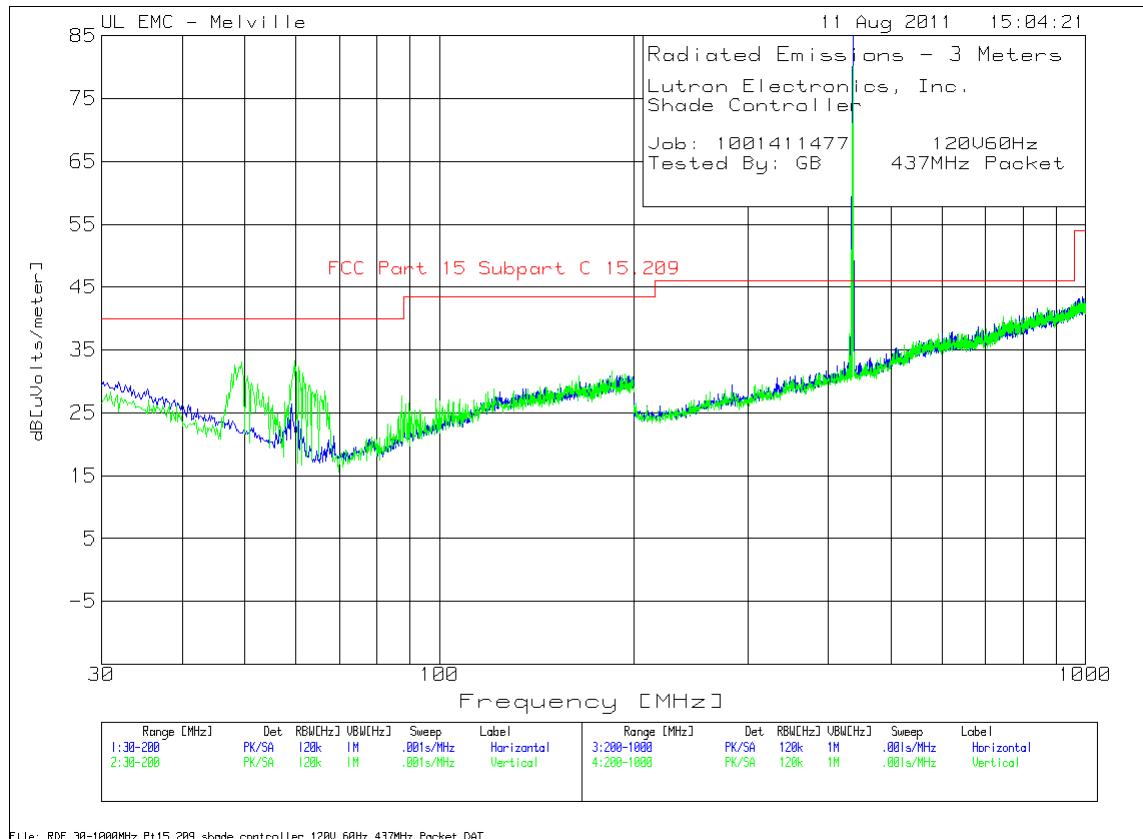
431MHz, AC Powered



Lutron Electronics, Inc.														
Shade Controller														
Job: 1001411477 120V60Hz														
Tested By: GB 431MHz Packet														
Vertical 30 - 200MHz														
Test	Meter		3M Bicon 54	3MLoc 30-		DCF	Corrected	FCC Part 15		FCC Part 15		Azimuth	Height	
Frequency	Reading	Detector	Vert 05Apr12 [dB]	1000MHz 02Feb12 [dB]	dB[uVolts/meter]	[dB]	Level	Subpart C 15.209	Margin	Subpart C 15.231	Margin	[Degr]	[cm]	Polarity
60.29	18.17	QP	6.6	0.8	25.57	-	-	40	-14.43	-	-	124	127	Vert
61.1	15.98	QP	6.5	0.8	23.28	-	-	40	-16.72	-	-	261	256	Vert
Horizontal 200 - 1000MHz														
Test	Meter		LogP 3M Horz	3MLoc 30-		DCF	Corrected	FCC Part 15		FCC Part 15		Azimuth	Height	
Frequency	Reading	Detector	44067 02May12 [dB]	1000MHz 02Feb12 [dB]	dB[uVolts/meter]	[dB]	Level	Subpart C 15.209	Margin	Subpart C 15.231	Margin	[Degr]	[cm]	Polarity
431.5074	80	PK	17	2.3	99.3	-20.4	78.9	-	-	80.7	-1.8	7	203	Horz
432.9	9.54	QP	17.1	2.3	28.94	-	-	46	-17.06	-	-	309	194	Horz
433.7	7.72	QP	17.1	2.3	27.12	-	-	46	-18.88	-	-	15	120	Horz
434.5	11.97	QP	17.1	2.3	31.37	-	-	46	-14.63	-	-	188	257	Horz
435.7	8.01	QP	17.1	2.3	27.41	-	-	46	-18.59	-	-	176	176	Horz
440.5	7.78	QP	17.2	2.3	27.28	-	-	46	-18.72	-	-	254	355	Horz
925.2	9.15	QP	23.5	3.5	36.15	-	-	46	-9.85	-	-	36	218	Horz
935.6	9.15	QP	23.5	3.5	36.15	-	-	46	-9.85	-	-	131	143	Horz
Vertical 200 - 1000MHz														
Test	Meter		LogP 3M Vert	3MLoc 30-		DCF	Corrected	FCC Part 15		FCC Part 15		Azimuth	Height	
Frequency	Reading	Detector	44067 02May12 [dB]	1000MHz 02Feb12 [dB]	dB[uVolts/meter]	[dB]	Level	Subpart C 15.209	Margin	Subpart C 15.231	Margin	[Degr]	[cm]	Polarity
431.4459	65.81	PK	16.5	2.3	84.61	-20.4	64.21	-	-	80.7	-16.49	241	184	Vert
432.5	11	QP	16.6	2.3	29.9	-	-	46	-16.1	-	-	125	290	Vert
433.7	7.9	QP	16.6	2.3	26.8	-	-	46	-19.2	-	-	152	202	Vert
436.2	7.72	QP	16.6	2.3	26.62	-	-	46	-19.38	-	-	229	195	Vert
PK - Peak detector														
QP - Quasi-Peak detector														
LnAv - Linear Average detector														
LgAv - Log Average detector														
Av - Average detector														
CAV - CISPR Average detector														
RMS - RMS detection														
CRMS - CISPR RMS detection														

FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz)

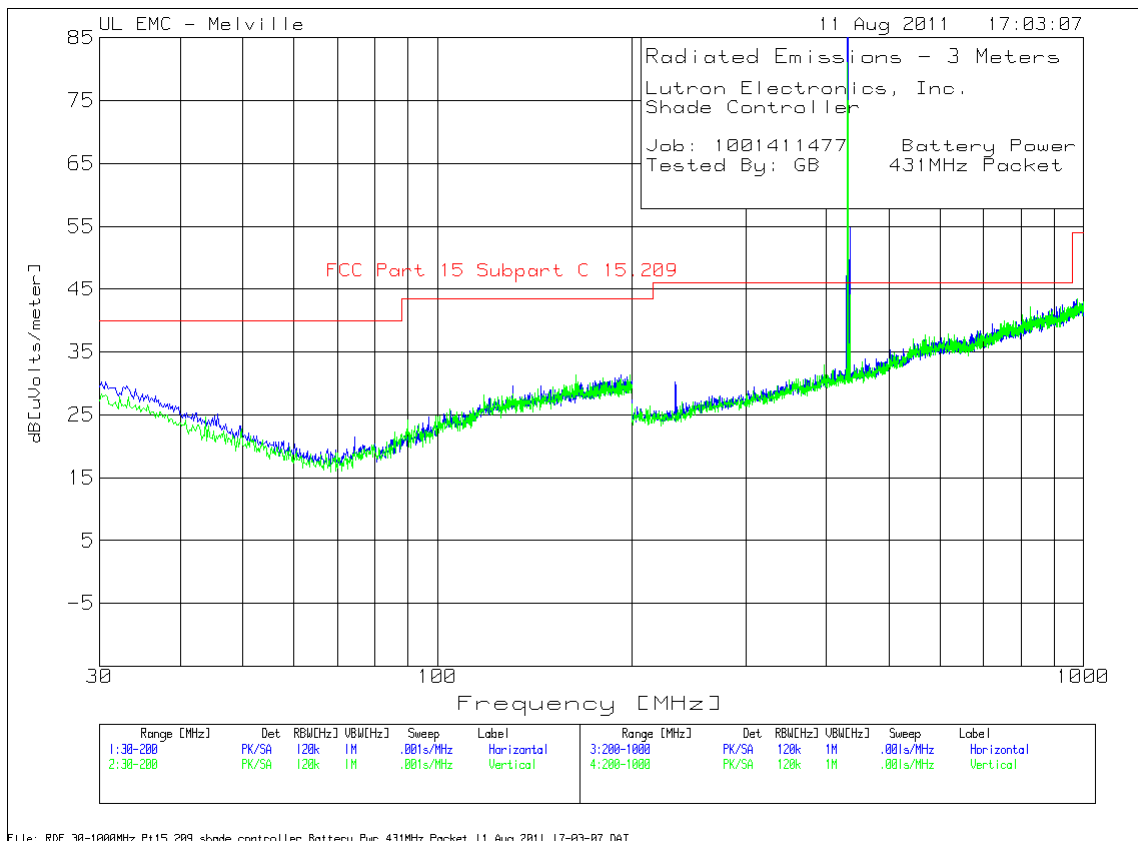
437MHz, AC Powered



Lutron Electronics, Inc.																
Shade Controller																
Job: 1001411477 120V60Hz																
Tested By: GB 437MHz Packet																
Horizontal 200 - 1000MHz																
Test	Meter		LogP 3M Horz	3MLoc 30-		DCF		FCC Part 15		FCC Part 15		Azimuth	Height			
Frequency	Reading	Detector	44067 02May12	1000MHz	02Feb12 [dB]	[dB]	Corrected Level	Subpart C 15.209	Margin	Subpart C 15.231	Margin	[Degs]	[cm]	Polarity		
436.6293	77.24	PK	17.1	2.3	96.64	-20	76.24	-	-	80.9	-4.66	185	104	Horz		
434.11	8.19	QP	17.1	2.3	27.59			46	-18.41	-	-	136	363	Horz		
434.9	15.68	QP	17.1	2.3	35.08			46	-10.92	-	-	349	148	Horz		
438.5	13.16	QP	17.2	2.3	32.66			46	-13.34	-	-	179	236	Horz		
917.9	9.09	QP	23.3	3.5	35.89			46	-10.11	-	-	336	390	Horz		
Vertical 200 - 1000MHz																
Test	Meter		LogP 3M Vert	3MLoc 30-		DCF		FCC Part 15		FCC Part 15		Azimuth	Height			
Frequency	Reading	Detector	44067 02May12	1000MHz	02Feb12 [dB]	[dB]	Corrected Level	Subpart C 15.209	Margin	Subpart C 15.231	Margin	[Degs]	[cm]	Polarity		
436.6142	67.69	QP	16.6	2.3	86.59	-20	66.19	-	-	80.9	-14.71	119	259	Vert		
430.9	7.72	QP	16.5	2.3	26.52			46	-19.48	-	-	316	181	Vert		
434.2	8.62	QP	16.6	2.3	27.52			46	-18.48	-	-	76	244	Vert		
878.4	8.89	QP	23.2	3.5	35.59			46	-10.41	-	-	42	240	Vert		
PK - Peak detector																
QP - Quasi-Peak detector																
LnAv - Linear Average detector																
LgAv - Log Average detector																
Av - Average detector																
CAV - CISPR Average detector																
RMS - RMS detection																
CRMS - CISPR RMS detection																

FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz)

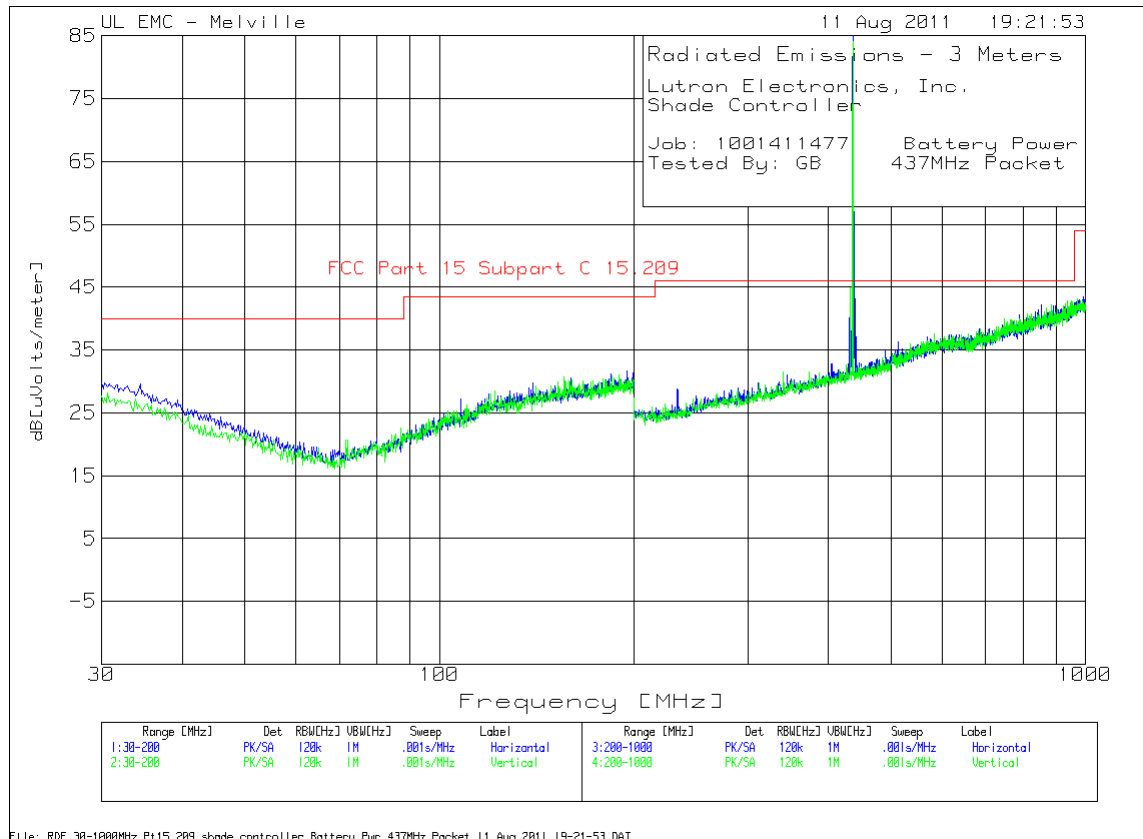
431MHz, Battery Powered



Lutron Electronics, Inc.														
Shade Controller														
Job: 1001411477 Battery Power														
Tested By: GB 431MHz Packet														
Horizontal 200 - 1000MHz														
Test Frequency	Meter Reading	Detector	LogP 3M Horz 44067 02May12 [dB]	3MLoc 30-1000MHz 02Feb12 [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Level	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C 15.231	Margin	Azimuth [Degs]	Height [cm]	Polarity
431.5059	74.94	PK	17	2.3	94.24	-20.4	73.84			80.7	-6.86	191	221	Horz
430.12	10.28	QP	17	2.3	29.58	-	-	46	-16.42	-	-	2	175	Horz
433.72	14.54	QP	17.1	2.3	33.94	-	-	46	-12.06	-	-	13	214	Horz
434.92	14.21	QP	17.1	2.3	33.61	-	-	46	-12.39	-	-	1	193	Horz
926.36	9.2	QP	23.5	3.5	36.2	-	-	46	-9.8	-	-	0	100	Horz
Vertical 200 - 1000MHz														
Test Frequency	Meter Reading	Detector	LogP 3M Vert 44067 02May12 [dB]	3MLoc 30-1000MHz 02Feb12 [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Level	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C 15.231	Margin	Azimuth [Degs]	Height [cm]	Polarity
431.5095	68.19	PK	16.5	2.3	86.99	-20.4	66.59			80.7	-14.11	260	235	Vert
434.92	7.72	QP	16.6	2.3	26.62	-	-	46	-19.38	-	-	7	136	Vert
435.32	7.9	QP	16.6	2.3	26.8	-	-	46	-19.2	-	-	47	100	Vert
828.71	8.73	QP	23	3.3	35.03	-	-	46	-10.97	-	-	68	100	Vert
PK - Peak detector														
QP - Quasi-Peak detector														
LnAv - Linear Average detector														
LgAv - Log Average detector														
Av - Average detector														
CAV - CISPR Average detector														
RMS - RMS detection														
CRMS - CISPR RMS detection														

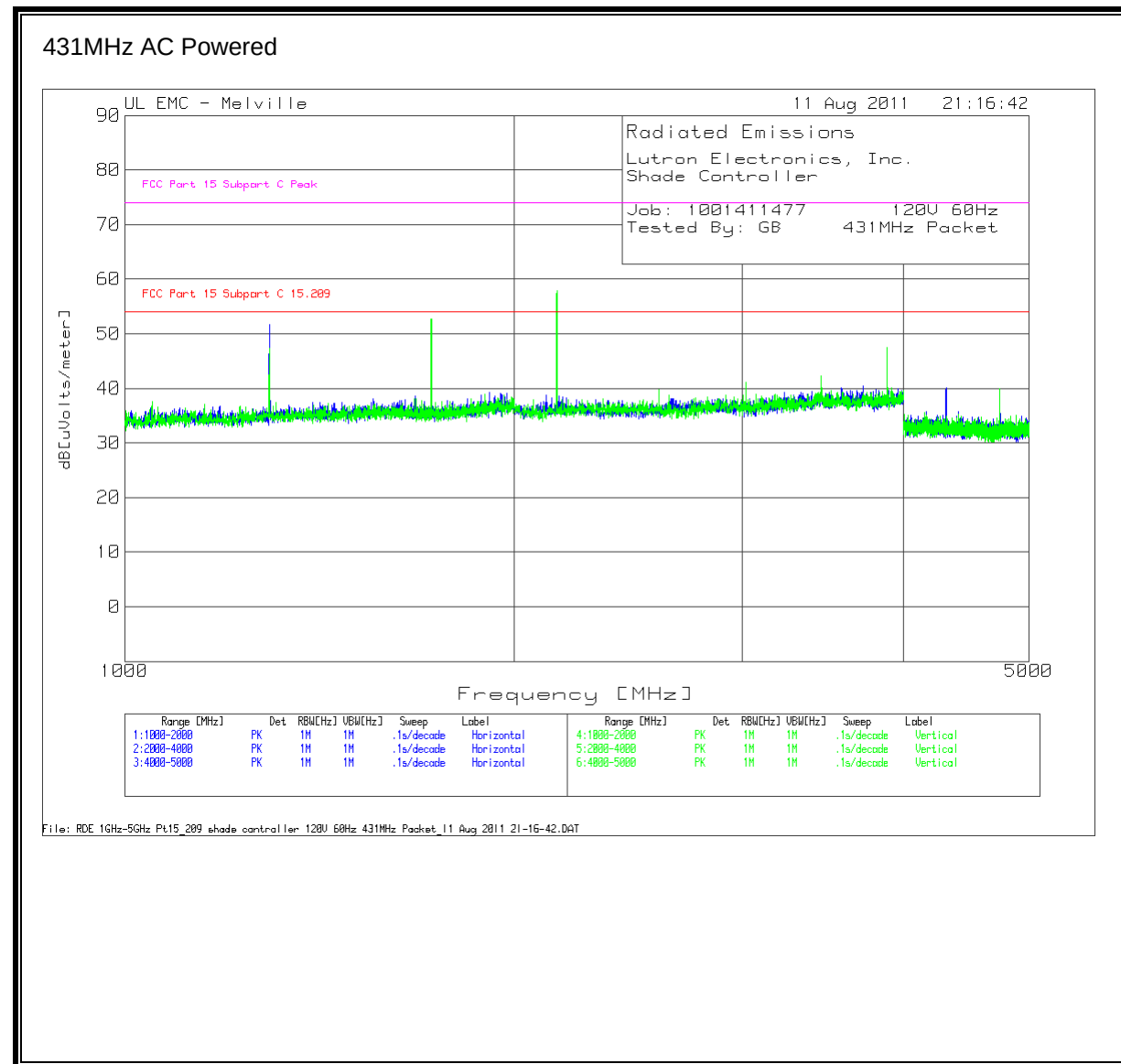
FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz)

437MHz, Battery Powered



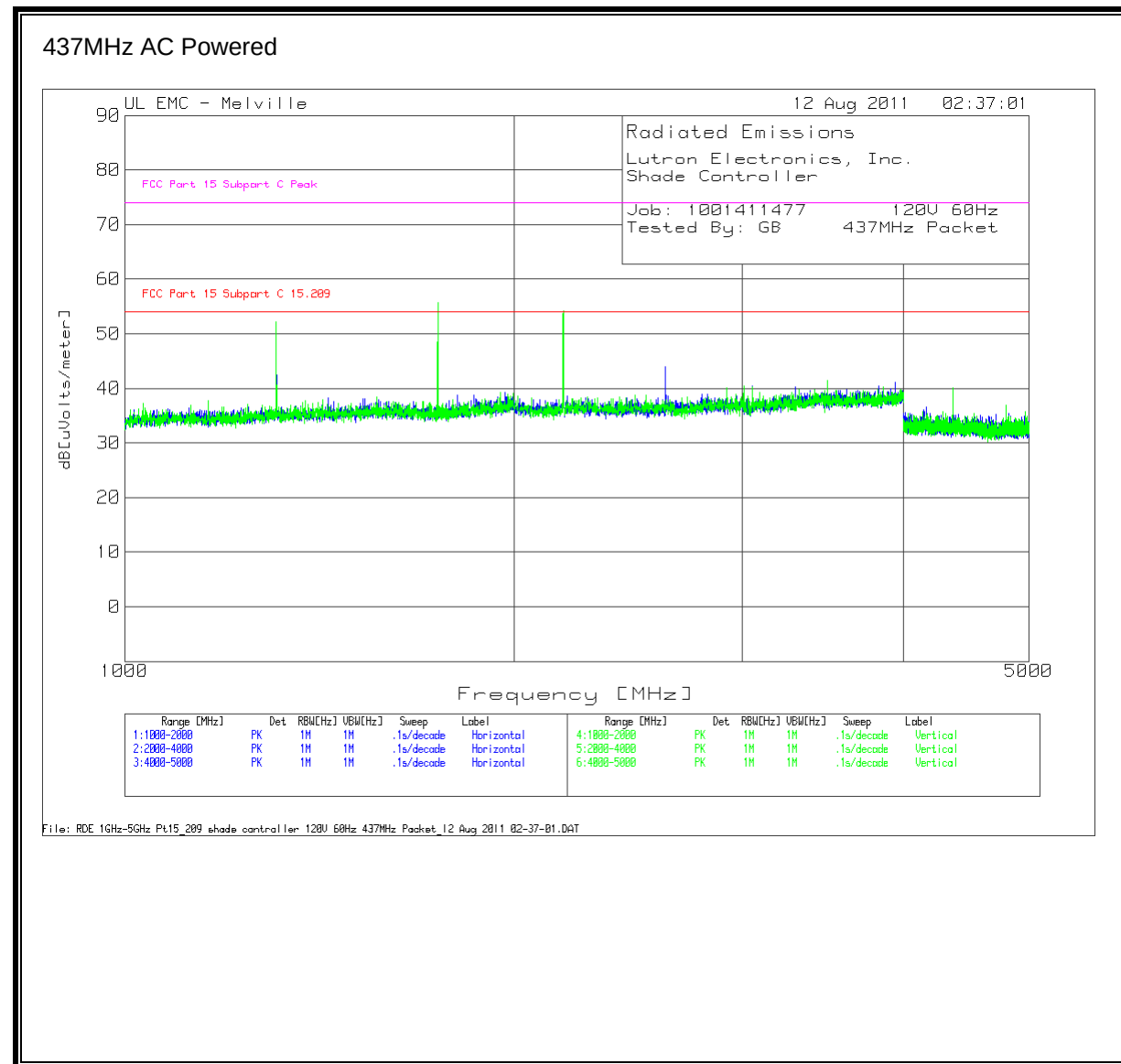
Lutron Electronics, Inc.														
Shade Controller														
Job: 1001411477 Battery Power														
Tested By: GB 437MHz Packet														
Horizontal 200 - 1000MHz														
Test Frequency	Meter Reading	Detector	LogP 3M Horz 44067 02May12 [dB]	3MLoc 30- 1000MHz 02Feb12 [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Level	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C 15.231	Margin	Azimuth [Degs]	Height [cm]	Polarity
436.5301	74.82	PK	17.1	2.3	94.22	-20.4	73.82	46	-18.98	80.9	-7.08	191	214	Horz
431.32	7.72	QP	17	2.3	27.02	-	-	46	-18.98	-	-	0	114	Horz
437.72	20.42	QP	17.2	2.3	39.92	-	-	46	-6.08	-	-	204	221	Horz
438.52	17.36	QP	17.2	2.3	36.86	-	-	46	-9.14	-	-	175	214	Horz
440.52	8.01	QP	17.2	2.3	27.51	-	-	46	-18.49	-	-	0	106	Horz
853.93	8.89	QP	23	3.4	35.29	-	-	46	-10.71	-	-	0	100	Horz
898.35	9.2	QP	23.2	3.5	35.9	-	-	46	-10.1	-	-	255	268	Horz
Vertical 200 - 1000MHz														
Test Frequency	Meter Reading	Detector	LogP 3M Vert 44067 02May12 [dB]	3MLoc 30- 1000MHz 02Feb12 [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Level	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C 15.231	Margin	Azimuth [Degs]	Height [cm]	Polarity
436.5306	69.8	PK	16.6	2.3	88.7	-20.4	68.3	46	-19.48	80.9	-12.6	269	234	Vert
432.12	7.72	QP	16.5	2.3	26.52	-	-	46	-19.48	-	-	1	103	Vert
883.94	9.04	QP	23.2	3.5	35.74	-	-	46	-10.26	-	-	8	104	Vert
949.98	9.15	QP	24.2	3.6	36.95	-	-	46	-9.05	-	-	57	114	Vert
PK - Peak detector														
QP - Quasi-Peak detector														
LnAv - Linear Average detector														
LgAv - Log Average detector														
Av - Average detector														
CAV - CISPR Average detector														
RMS - RMS detection														
CRMS - CISPR RMS detection														

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz



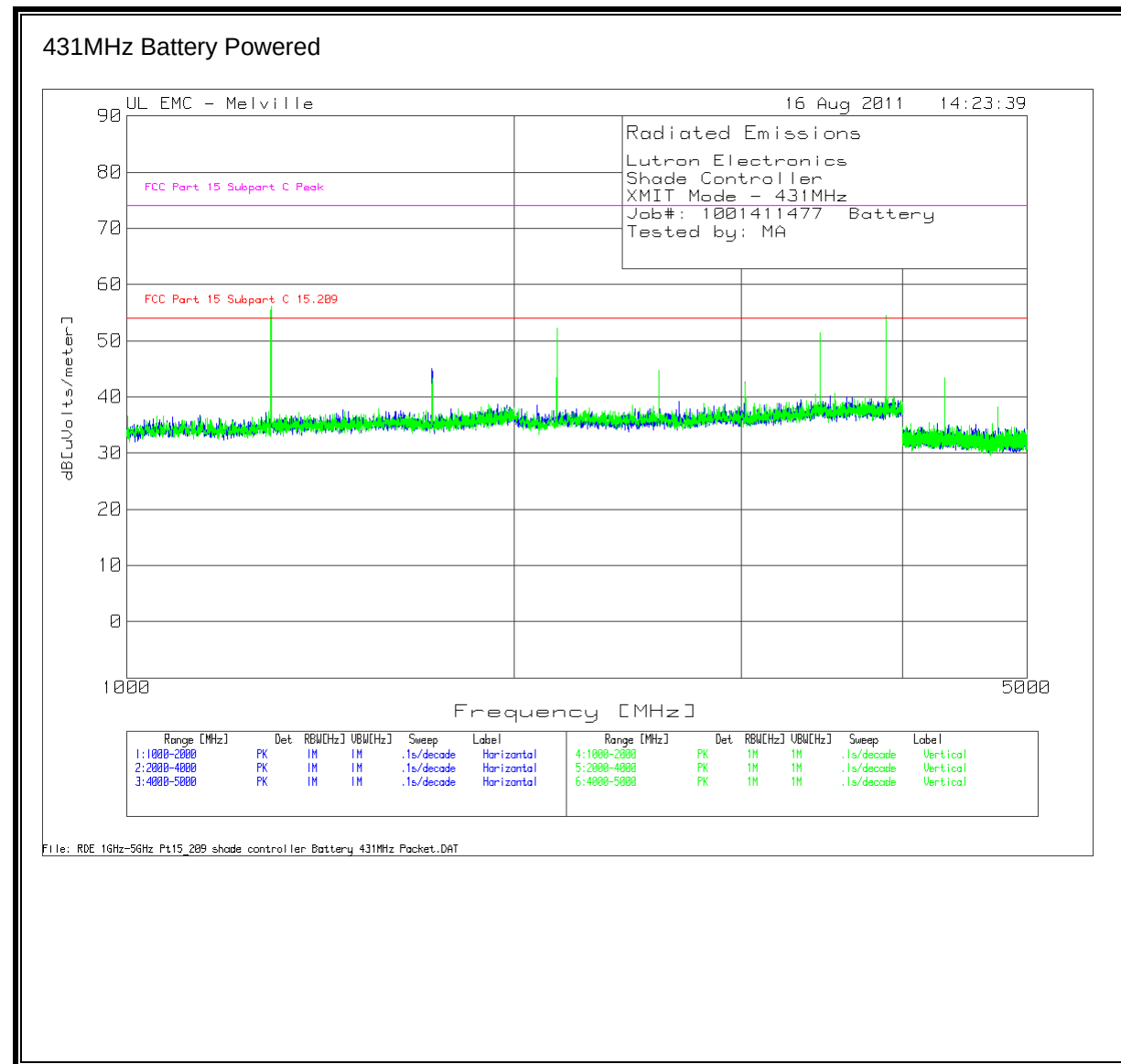
Lutron Electronics, Inc.														
Shade Controller														
Job: 1001411477 120V 60Hz														
Tested By: GB 431MHz Packet														
Horizontal 1000 - 2000MHz														
Test Frequency	Meter Reading	Detector	51442 1-2GHz [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degr]	Height [cm]	Polarity
1294.302	80.21	PK	20.5	-44.38	56.33	-20.4	35.93	54	2.33	74	-17.67	9	149	Horz
1726.018	96.36	PK	20.8	-44.11	73.05	-20.4	52.65	54	19.05	74	-0.95	129	146	Horz
Horizontal 2000 - 4000MHz														
Test Frequency	Meter Reading	Detector	3161-02_Horz_27 Sept08 [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degr]	Height [cm]	Polarity
2157.59	80.49	PK	21.4	-43.31	58.58	-20.4	38.18	54	-15.82	74	-15.42	240	231	Horz
2588.964	65.95	PK	21.3	-42.52	44.73	-20.4	24.33	54	-29.67	74	-29.27	325	265	Horz
3020.364	65.29	PK	21.5	-41.84	44.95	-20.4	24.55	54	-29.45	74	-29.05	299	223	Horz
3451.93	65.77	PK	22.2	-41.74	46.23	-20.4	25.83	54	-28.17	74	-27.77	247	271	Horz
3883.171	66.99	PK	22.6	-41.88	47.71	-20.4	27.31	54	-26.69	74	-26.29	223	388	Horz
Horizontal 4000 - 5000MHz														
Test Frequency	Meter Reading	Detector	3161-03_Horz_27 Sept08 [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degr]	Height [cm]	Polarity
4314.62	68.98	PK	27.7	-51.65	45.03	-20.4	24.63	54	-29.37	74	-28.97	129	343	Horz
4746.01	68.93	PK	27.2	-52.52	43.61	-20.4	23.21	54	-30.79	74	-30.39	318	358	Horz
Vertical 1000 - 2000MHz														
Test Frequency	Meter Reading	Detector	51442 1-2GHz [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degr]	Height [cm]	Polarity
1294.545	79.51	PK	20.5	-44.38	55.63	-20.4	35.23	54	-18.77	74	-18.37	92	373	Vert
1726.05	88.68	PK	20.8	-44.11	65.37	-20.4	44.97	54	-9.03	74	-8.63	340	162	Vert
Vertical 2000 - 4000MHz														
Test Frequency	Meter Reading	Detector	3161-02_Vert_27 Sept08 [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degr]	Height [cm]	Polarity
2157.245	80.4	PK	21	-43.32	58.08	-20.4	37.68	54	-16.32	74	-15.92	48	209	Vert
2588.99	66.73	PK	21.5	-42.52	45.71	-20.4	25.31	54	-28.69	74	-28.29	276	273	Vert
3020.49	65.75	PK	21.7	-41.85	45.6	-20.4	25.2	54	-28.8	74	-28.4	285	284	Vert
3451.59	66.6	PK	22.2	-41.74	47.06	-20.4	26.66	54	-27.34	74	-26.94	328	339	Vert
3883.715	67.94	PK	22.6	-41.88	48.66	-20.4	28.26	54	-25.74	74	-25.34	212	387	Vert
Vertical 4000 - 5000MHz														
Test Frequency	Meter Reading	Detector	3161-03_Vert_27 Sept08 [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degr]	Height [cm]	Polarity
4314.539	69.13	PK	27.8	-51.65	45.28	-20.4	24.88	54	-29.12	74	-28.72	44	352	Vert
4746.711	71.18	PK	27.1	-52.51	45.77	-20.4	25.37	54	-28.63	74	-28.23	212	280	Vert
NOTE: Uncorrected data was compared to the FCC Part 15 Peak Limit														
PK - Peak detector (Maximized)														
QP - Quasi-Peak detector														
LnAv - Linear Average detector														
LgAv - Log Average detector														
Av - Average detector														
CAV - CISPR Average detector														
RMS - RMS detection														
CRMS - CISPR RMS detection														

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz



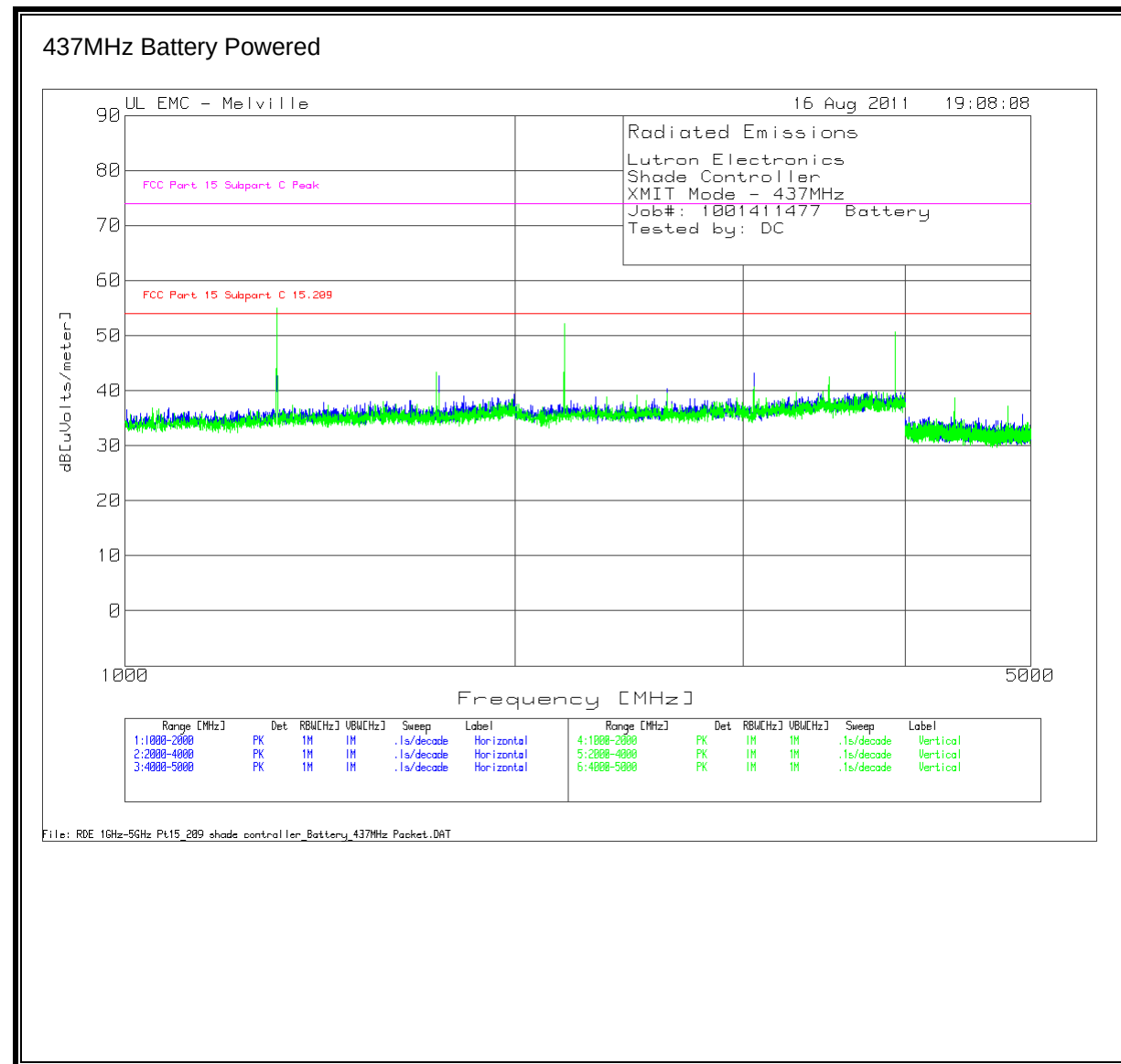
Lutron Electronics, Inc.														
Shade Controller														
Job: 1001411477 120V 60Hz														
Tested By: GB 437MHz Packet														
Horizontal 1000 - 2000MHz														
Test	Meter			BOMS		DCF		FCC Part 15		FCC Part 15		Azimuth	Height	
Frequency	Reading	Detector	51442 1-2GHz [dB]	Factor [dB]	dB[uVolts/meter]	[dB]	Corrected Value	Subpart C	Margin	Subpart C	Margin	[Degs]	[cm]	Polarity
1309.637	81.2	PK		20.5 -44.37	57.33	-20.4	36.93	54	-17.07	74	-16.67	134	241	Horz
1746.432	95.45	PK		20.8 -44.15	72.1	-20.4	51.7	54	-2.3	74	-1.9	141	137	Horz
Horizontal 2000 - 4000MHz														
Test	Meter		3161-02_Horz_27Sept08	BOMS		DCF		FCC Part 15		FCC Part 15		Azimuth	Height	
Frequency	Reading	Detector	[dB]	Factor [dB]	dB[uVolts/meter]	[dB]	Corrected Value	Subpart C	Margin	Subpart C	Margin	[Degs]	[cm]	Polarity
2182.982	80.53	PK		21.4 -43.2	58.73	-20.4	38.33	54	-15.67	74	-15.27	123	110	Horz
2619.617	66.51	PK		21.4 -42.51	45.4	-20.4	25	54	-29	74	-28.6	289	229	Horz
3055.955	65.5	PK		21.6 -41.86	45.24	-20.4	24.84	54	-29.16	74	-28.76	304	267	Horz
3493.1	66.52	PK		22.2 -41.73	46.99	-20.4	26.59	54	-27.41	74	-27.01	222	377	Horz
3929.36	64.84	PK		22.7 -41.72	45.82	-20.4	25.42	54	-28.58	74	-28.18	256	373	Horz
Horizontal 4000 - 5000MHz														
Test	Meter		3161-03_Horz_27Sept08	BOMS		DCF		FCC Part 15		FCC Part 15		Azimuth	Height	
Frequency	Reading	Detector	[dB]	Factor [dB]	dB[uVolts/meter]	[dB]	Corrected Value	Subpart C	Margin	Subpart C	Margin	[Degs]	[cm]	Polarity
4365.49	67.63	PK		27.6 -51.63	43.6	-20.4	23.2	54	-30.8	74	-30.4	317	286	Horz
4802.795	65.79	PK		27.1 -52.52	40.37	-20.4	19.97	54	-34.03	74	-33.63	131	137	Horz
Vertical 1000 - 2000MHz														
Test	Meter			BOMS		DCF		FCC Part 15		FCC Part 15		Azimuth	Height	
Frequency	Reading	Detector	51442 1-2GHz [dB]	Factor [dB]	dB[uVolts/meter]	[dB]	Corrected Value	Subpart C	Margin	Subpart C	Margin	[Degs]	[cm]	Polarity
1309.84	78.55	PK		20.5 -44.37	54.68	-20.4	34.28	54	-19.72	74	-19.32	172	145	Vert
1746.485	92.35	PK		20.8 -44.15	69	-20.4	48.6	54	-5.4	74	-5	250	250	Vert
Vertical 2000 - 4000MHz														
Test	Meter		3161-02_Vert_27Sept08	BOMS		DCF		FCC Part 15		FCC Part 15		Azimuth	Height	
Frequency	Reading	Detector	[dB]	Factor [dB]	dB[uVolts/meter]	[dB]	Corrected Value	Subpart C	Margin	Subpart C	Margin	[Degs]	[cm]	Polarity
2182.955	79.68	PK		21.2 -43.2	57.68	-20.4	37.28	54	-16.72	74	-16.32	64	199	Vert
2619.521	68.38	PK		21.4 -42.51	47.27	-20.4	26.87	54	-27.13	74	-26.73	272	198	Vert
3056.104	67.12	PK		21.8 -41.86	47.06	-20.4	26.66	54	-27.34	74	-26.94	280	102	Vert
3492.718	65.82	PK		22.4 -41.73	46.49	-20.4	26.09	54	-27.91	74	-27.51	152	289	Vert
3929.63	67.16	PK		22.7 -41.72	48.14	-20.4	27.74	54	-26.26	74	-25.86	167	367	Vert
Vertical 4000 - 5000MHz														
Test	Meter		3161-03_Vert_27Sept08	BOMS		DCF		FCC Part 15		FCC Part 15		Azimuth	Height	
Frequency	Reading	Detector	[dB]	Factor [dB]	dB[uVolts/meter]	[dB]	Corrected Value	Subpart C	Margin	Subpart C	Margin	[Degs]	[cm]	Polarity
4366.27	68.83	PK		27.7 -51.63	44.9	-20.4	24.5	54	-29.5	74	-29.1	184	280	Vert
4802.14	67.62	PK		27.3 -52.51	42.41	-20.4	22.01	54	-31.99	74	-31.59	216	198	Vert
PK - Peak detector														
QP - Quasi-Peak detector														
LnAv - Linear Average detector														
LgAv - Log Average detector														
Av - Average detector														
CAV - CISPR Average detector														
RMS - RMS detection														
CRMS - CISPR RMS detection														

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz



Lutron Electronics														
Shade Controller														
XMIT Mode - 431MHz														
Job#: 1001411477 Battery														
Tested by: MA														
Horizontal 1000 - 2000MHz														
Test Frequency	Meter Reading	Detector	51442 1-2GHz [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
1294.49	81.68	PK		20.5	-44.38	57.8	-20.4	37.4	54	-16.6	74	-16.2	127	139 Horz
1725.912	69.24	PK		20.8	-44.11	45.93	-20.4	25.53	54	-28.47	74	-28.07	116	139 Horz
Horizontal 2000 - 4000MHz														
Test Frequency	Meter Reading	Detector	3161-02_Horz_27Sept08 [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
2157.44	72.27	PK		21.4	-43.31	50.36	-20.4	29.96	54	-24.04	74	-23.64	96	339 Horz
2588.93	65.11	PK		21.3	-42.52	43.89	-20.4	23.49	54	-30.51	74	-30.11	311	291 Horz
3020.324	65.53	PK		21.5	-41.84	45.19	-20.4	24.79	54	-29.21	74	-28.81	207	347 Horz
3451.823	67.43	PK		22.2	-41.74	47.89	-20.4	27.49	54	-26.51	74	-26.11	322	283 Horz
3883.292	74.67	PK		22.6	-41.88	55.39	-20.4	34.99	54	-19.01	74	-18.61	219	394 Horz
Horizontal 4000 - 5000MHz														
Test Frequency	Meter Reading	Detector	3161-03_Horz_27Sept08 [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4314.7775	69.75	PK		27.7	-51.64	45.81	-20.4	25.41	54	-28.59	74	-28.19	125	379 Horz
4746.274	64.41	PK		27.2	-52.51	39.1	-20.4	18.7	54	-35.3	74	-34.9	263	330 Horz
Vertical 1000 - 2000MHz														
Test Frequency	Meter Reading	Detector	51442 1-2GHz [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
1294.4013	82.2	PK		20.5	-44.38	58.32	-20.4	37.92	54	-16.08	74	-15.68	84	315 Vert
1725.878	69.82	PK		20.8	-44.11	46.51	-20.4	26.11	54	-27.89	74	-27.49	72	371 Vert
Vertical 2000 - 4000MHz														
Test Frequency	Meter Reading	Detector	3161-02_Vert_27Sept08 [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
2157.3875	76.55	PK		21	-43.31	54.24	-20.4	33.84	54	-20.16	74	-19.76	261	370 Vert
2588.822	68.14	PK		21.5	-42.52	47.12	-20.4	26.72	54	-27.28	74	-26.88	95	339 Vert
3020.456	66.64	PK		21.7	-41.85	46.49	-20.4	26.09	54	-27.91	74	-27.51	140	344 Vert
3451.814	71.42	PK		22.2	-41.74	51.88	-20.4	31.48	54	-22.52	74	-22.12	76	347 Vert
3883.332	75.98	PK		22.6	-41.88	56.7	-20.4	36.3	54	-17.7	74	-17.3	162	383 Vert
Vertical 4000 - 5000MHz														
Test Frequency	Meter Reading	Detector	3161-03_Vert_27Sept08 [dB]	BOMS Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4314.7113	68.89	PK		27.8	-51.64	45.05	-20.4	24.65	54	-29.35	74	-28.95	342	384 Vert
4746.33	66.08	PK		27.1	-52.51	40.67	-20.4	20.27	54	-33.73	74	-33.33	203	380 Vert
NOTE: Uncorrected data was compared to the FCC Part 15 Peak Limit														
PK - Peak detector (Maximized)														
QP - Quasi-Peak detector														
LnAv - Linear Average detector														
LgAv - Log Average detector														
Av - Average detector														
CAV - CISPR Average detector														
RMS - RMS detection														
CRMS - CISPR RMS detection														

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz



Lutron Electronics														
Shade Controller														
XMIT Mode - 437MHz														
Job#: 1001411477 Battery														
Tested by: DC														
Horizontal 1000 - 2000MHz														
Test	Meter			BOMS				FCC Part 15		FCC Part 15				
Frequency	Reading	Detector	51442 1-2GHz [dB]	Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	Subpart C	Margin	Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
1309.839	82.58	PK	20.5	-44.37	58.71	-20.4	38.31	54	-15.69	74	-15.29	128	139	Horz
1746.4649	66.04	PK	20.8	-44.15	42.69	-20.4	22.29	54	-31.71	74	-31.31	163	346	Horz
Horizontal 2000 - 4000MHz														
Test	Meter		3161-02_Horz_27Sept08	BOMS				FCC Part 15		FCC Part 15				
Frequency	Reading	Detector	[dB]	Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	Subpart C	Margin	Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
2183.073	71.04	PK	21.4	-43.2	49.24	-20.4	28.84	54	-25.16	74	-24.76	278	351	Horz
2619.2277	62.19	PK	21.4	-42.51	41.08	-20.4	20.68	54	-33.32	74	-32.92	152	371	Horz
3056.2972	64.37	PK	21.6	-41.86	44.11	-20.4	23.71	54	-30.29	74	-29.89	198	345	Horz
3492.307	60.24	PK	22.2	-41.74	40.7	-20.4	20.3	54	-33.7	74	-33.3	70	290	Horz
3928.8386	70.05	PK	22.7	-41.73	51.02	-20.4	30.62	54	-23.38	74	-22.98	248	342	Horz
Horizontal 4000 - 5000MHz														
Test	Meter		3161-03_Horz_27Sept08	BOMS				FCC Part 15		FCC Part 15				
Frequency	Reading	Detector	[dB]	Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	Subpart C	Margin	Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4366.1436	66.21	PK	27.6	-51.63	42.18	-20.4	21.78	54	-32.22	74	-31.82	133	376	Horz
4932.0858	53.75	PK	27.3	-52.56	28.49	-20.4	8.09	54	-45.91	74	-45.51	340	374	Horz
4802.7601	61.44	PK	27.1	-52.52	36.02	-20.4	15.62	54	-38.38	74	-37.98	129	298	Horz
Vertical 1000 - 2000MHz														
Test	Meter			BOMS				FCC Part 15		FCC Part 15				
Frequency	Reading	Detector	51442 1-2GHz [dB]	Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	Subpart C	Margin	Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
1309.8727	84.13	PK	20.5	-44.37	60.26	-20.4	39.86	54	-14.14	74	-13.74	82	294	Vert
1746.496	69.34	PK	20.8	-44.15	45.99	-20.4	25.59	54	-28.41	74	-28.01	72	348	Vert
Vertical 2000 - 4000MHz														
Test	Meter		3161-02_Vert_27Sept08	BOMS				FCC Part 15		FCC Part 15				
Frequency	Reading	Detector	[dB]	Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	Subpart C	Margin	Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
2183.0768	75.9	PK	21.2	-43.2	53.9	-20.4	33.5	54	-20.5	74	-20.1	272	356	Vert
2619.7113	67.56	PK	21.4	-42.51	46.45	-20.4	26.05	54	-27.95	74	-27.55	89	340	Vert
3056.078	65.21	PK	21.8	-41.86	45.15	-20.4	24.75	54	-29.25	74	-28.85	1	330	Vert
3492.8629	67.9	PK	22.4	-41.73	48.57	-20.4	28.17	54	-25.83	74	-25.43	73	380	Vert
3929.6672	72.27	PK	22.7	-41.72	53.25	-20.4	32.85	54	-21.15	74	-20.75	135	366	Vert
Vertical 4000 - 5000MHz														
Test	Meter		3161-03_Vert_27Sept08	BOMS				FCC Part 15		FCC Part 15				
Frequency	Reading	Detector	[dB]	Factor [dB]	dB[uVolts/meter]	DCF [dB]	Corrected Value	Subpart C	Margin	Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
4366.1876	67.54	PK	27.7	-51.63	43.61	-20.4	23.21	54	-30.79	74	-30.39	12	360	Vert
4802.002	67.46	PK	27.3	-52.51	42.25	-20.4	21.85	54	-32.15	74	-31.75	177	373	Vert
NOTE: Uncorrected data was compared to the FCC Part 15 Peak Limit														
PK - Peak detector (Maximized)														
QP - Quasi-Peak detector														
LnAv - Linear Average detector														
LgAv - Log Average detector														
Av - Average detector														
CAV - CISPR Average detector														
RMS - RMS detection														
CRMS - CISPR RMS detection														

8.2. RX RADIATED SPURIOUS EMISSION

LIMITS

IC RSS-Gen Issue 2, section 7.2.3.2

All spurious emissions shall comply with the limits shown below:

Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dB μ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54
Note: The lower limit shall apply at the transition frequency.	

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to receive in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 5th harmonic is investigated with the transmitter set to the middle channel.

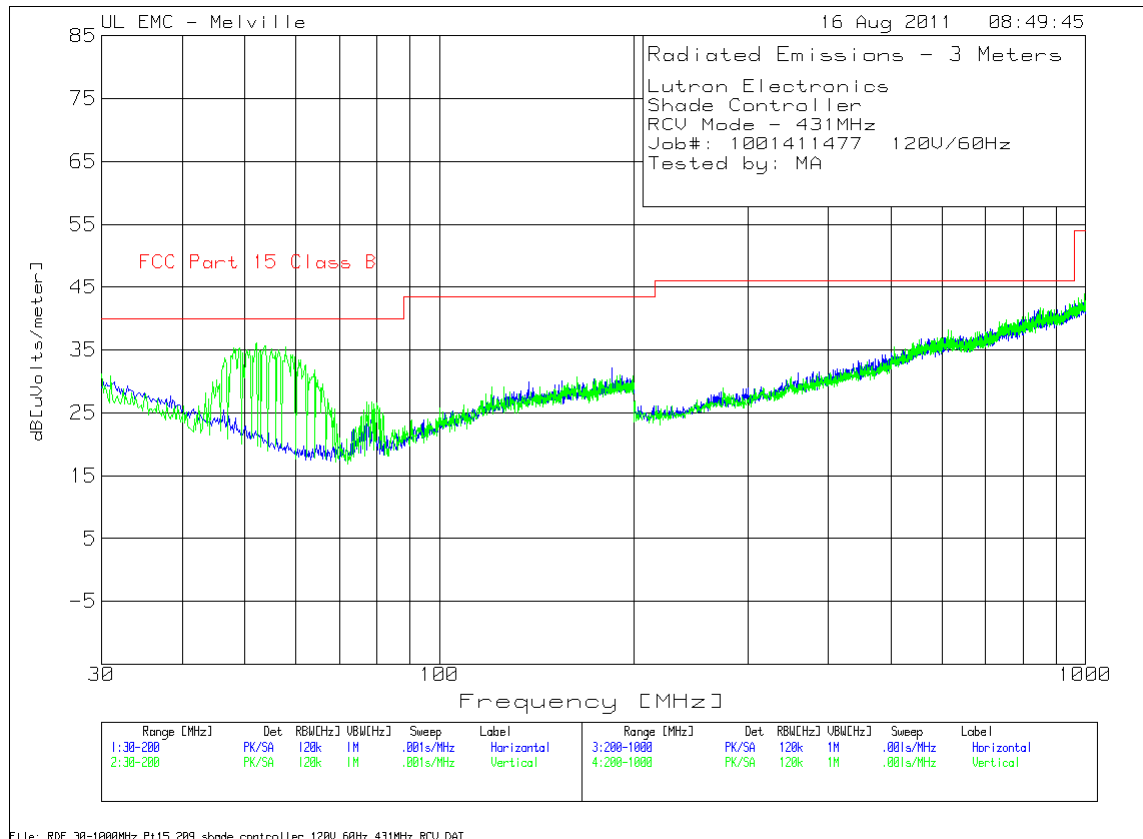
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

RESULTS

No non-compliance noted:

RECEIVER SPURIOUS EMISSION (30MHz - 1GHz)

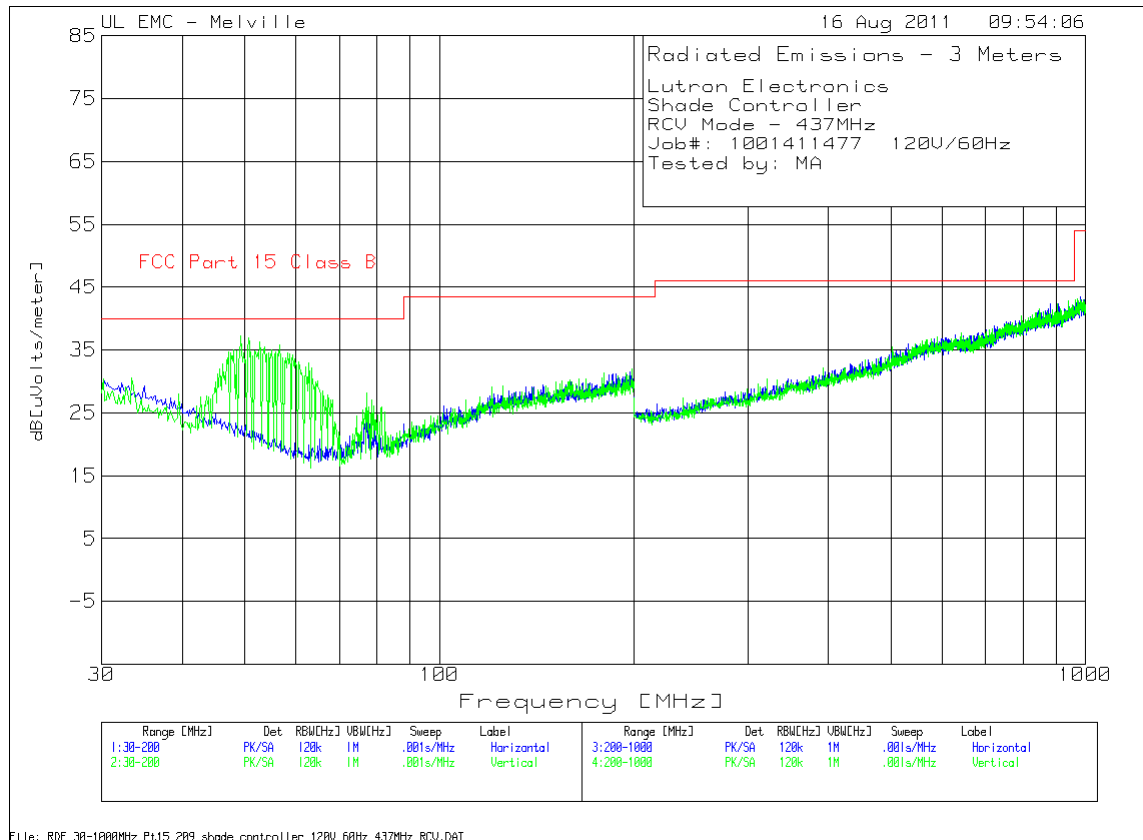
431MHz AC Powered



Lutron Electronics										
Shade Controller										
RCV Mode - 431MHz										
Job#: 1001411477 120V/60Hz										
Tested by: MA										
Vertical 30 - 200MHz										
Test	Meter		3M Bicon	3MLoc 30-						
Frequency	Reading	Detector	54 Vert	1000MHz						
			05Apr12	02Feb12	dB[uVolts	FCC Part		Azimuth	Height	Polarity
			[dB]	[dB]	/meter]	15 Class B	Margin	[Degs]	[cm]	
52.1221	26.39	PK	9	0.7	36.09	40	-3.91	357	100	Vert
48.038	24.39	PK	10.3	0.7	35.39	40	-4.61	72	100	Vert
57.7377	27.55	PK	7.3	0.7	35.55	40	-4.45	358	100	Vert
55.015	26.53	PK	8	0.7	35.23	40	-4.77	15	100	Vert
Horizontal 200 - 1000MHz										
845.1226	14.73	PK	23.3	3.4	41.43	46	-4.57	29	300	Horz
Vertical 200 - 1000MHz										
961.5808	15.04	PK	24.2	3.6	42.84	54	-11.16	190	100	Vert
Vertical 30 - 200MHz										
52.1038	19.98	QP	9	0.7	29.68	40	-10.32	236	110	Vert
48.0038	18.31	QP	10.3	0.7	29.31	40	-10.69	302	110	Vert
57.718	18.87	QP	7.3	0.7	26.87	40	-13.13	119	146	Vert
55.0443	20.6	QP	8	0.7	29.3	40	-10.7	280	106	Vert
Horizontal 200 - 1000MHz										
845.1929	8.73	QP	23.3	3.4	35.43	46	-10.57	13	238	Horz
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

RECEIVER SPURIOUS EMISSION (30MHz - 1GHz)

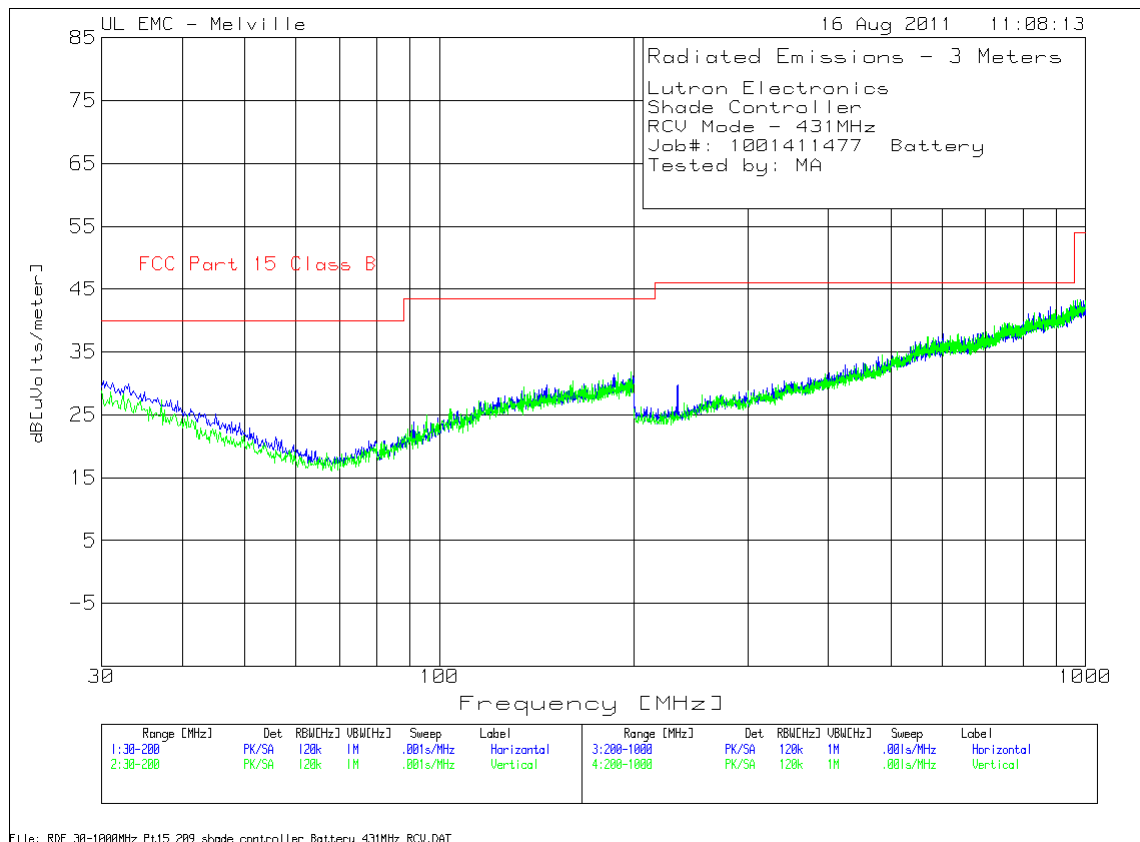
437MHz AC Powered



Lutron Electronics										
Shade Controller										
RCV Mode - 437MHz										
Job#: 1001411477 120V/60Hz										
Tested by: MA										
Vertical 30 - 200MHz										
Test	Meter		3M Bicon	3MLoc 30-						
Frequency	Reading	Detector	54 Vert	1000MHz						
			05Apr12	02Feb12	dB[uVolts/	FCC Part		Azimuth	Height	
			[dB]	[dB]	meter]	15 Class B	Margin	[Degs]	[cm]	Polarity
48.038	23.95	PK	10.3	0.7	34.95	40	-5.05	300	100	Vert
49.2292	26.72	PK	9.8	0.7	37.22	40	-2.78	331	100	Vert
50.5906	26.8	PK	9.4	0.7	36.9	40	-3.1	29	100	Vert
52.6326	26.96	PK	8.7	0.7	36.36	40	-3.64	119	100	Vert
56.5465	27.51	PK	7.6	0.7	35.81	40	-4.19	271	100	Vert
Horizontal 200 - 1000MHz										
881.1406	15.67	PK	23.2	3.5	42.37	46	-3.63	89	400	Horz
Vertical 30 - 200MHz										
48.1046	16.19	QP	10.2	0.7	27.09	40	-12.91	147	156	Vert
49.2095	17.16	QP	9.8	0.7	27.66	40	-12.34	99	141	Vert
50.5716	18.01	QP	9.4	0.7	28.11	40	-11.89	152	148	Vert
52.6233	18.92	QP	8.7	0.7	28.32	40	-11.68	155	138	Vert
56.4775	20.06	QP	7.6	0.7	28.36	40	-11.64	199	125	Vert
Horizontal 200 - 1000MHz										
881.0827	9.04	QP	23.2	3.5	35.74	46	-10.26	77	246	Horz
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

RECEIVER SPURIOUS EMISSION (30MHz - 1GHz)

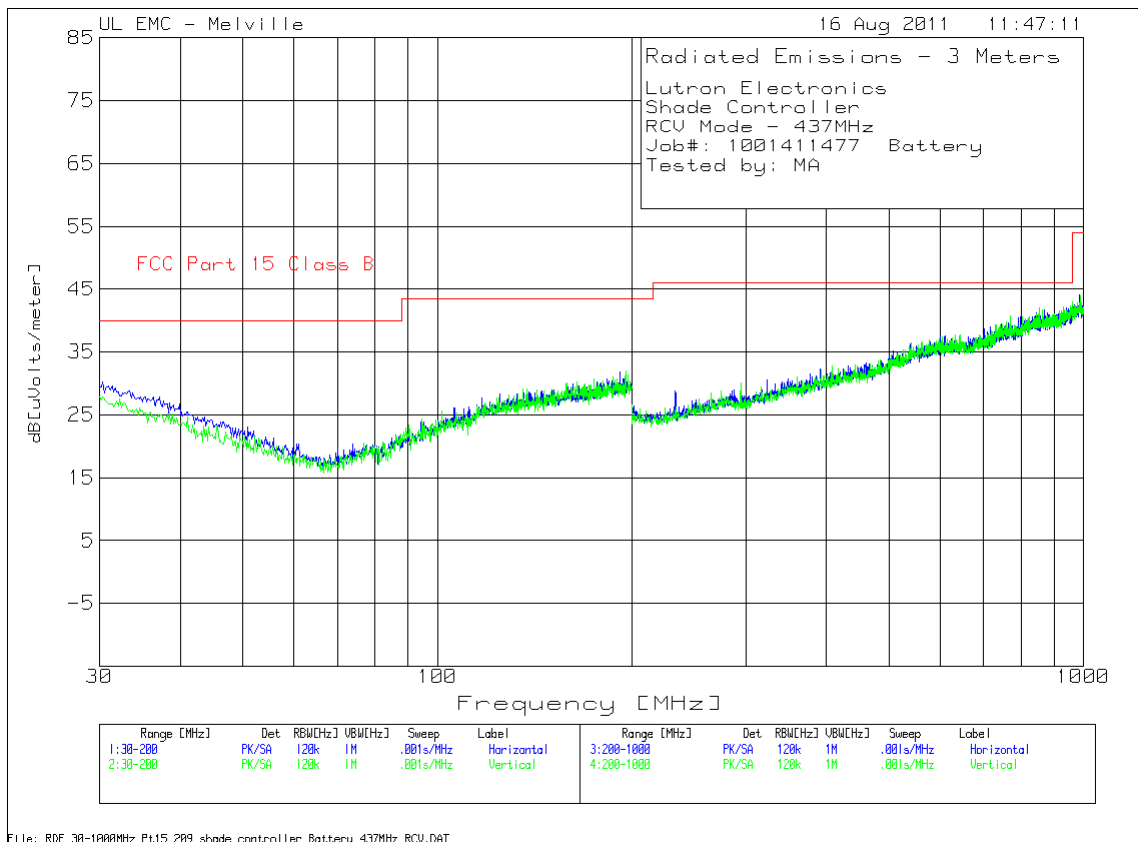
431MHz Battery Powered



Lutron Electronics										
Shade Controller										
RCV Mode - 431MHz										
Job#: 1001411477 Battery										
Tested by: MA										
Horizontal 30 - 200MHz										
Test	Meter		3M Bicon	3M Loc 30-						
Frequency	Reading	Detector	54 Horz	1000MHz						
			05Apr12	02Feb12	dB[uVolts	FCC Part		Azimuth	Height	
			[dB]	[dB]	/meter]	15 Class B	Margin	[Degs]	[cm]	Polarity
33.0631	11.96	PK	17.4	0.6	29.96	40	-10.04	272	400	Horz
186.3864	14.18	PK	15.6	1.5	31.28	43.5	-12.22	101	299	Horz
Vertical 30 - 200MHz										
160.8609	13.28	PK	15.8	1.3	30.38	43.5	-13.12	88	100	Vert
Horizontal 200 - 1000MHz										
234.017	15.88	PK	12.1	1.7	29.68	46	-16.32	290	100	Horz
881.5408	15.5	PK	23.2	3.5	42.2	46	-3.8	17	400	Horz
Vertical 200 - 1000MHz										
981.991	14.77	PK	24.7	3.7	43.17	54	-10.83	291	100	Vert
Horizontal 200 - 1000MHz										
881.4339	8.99	QP	23.2	3.5	35.69	46	-10.31	241	102	Horz
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

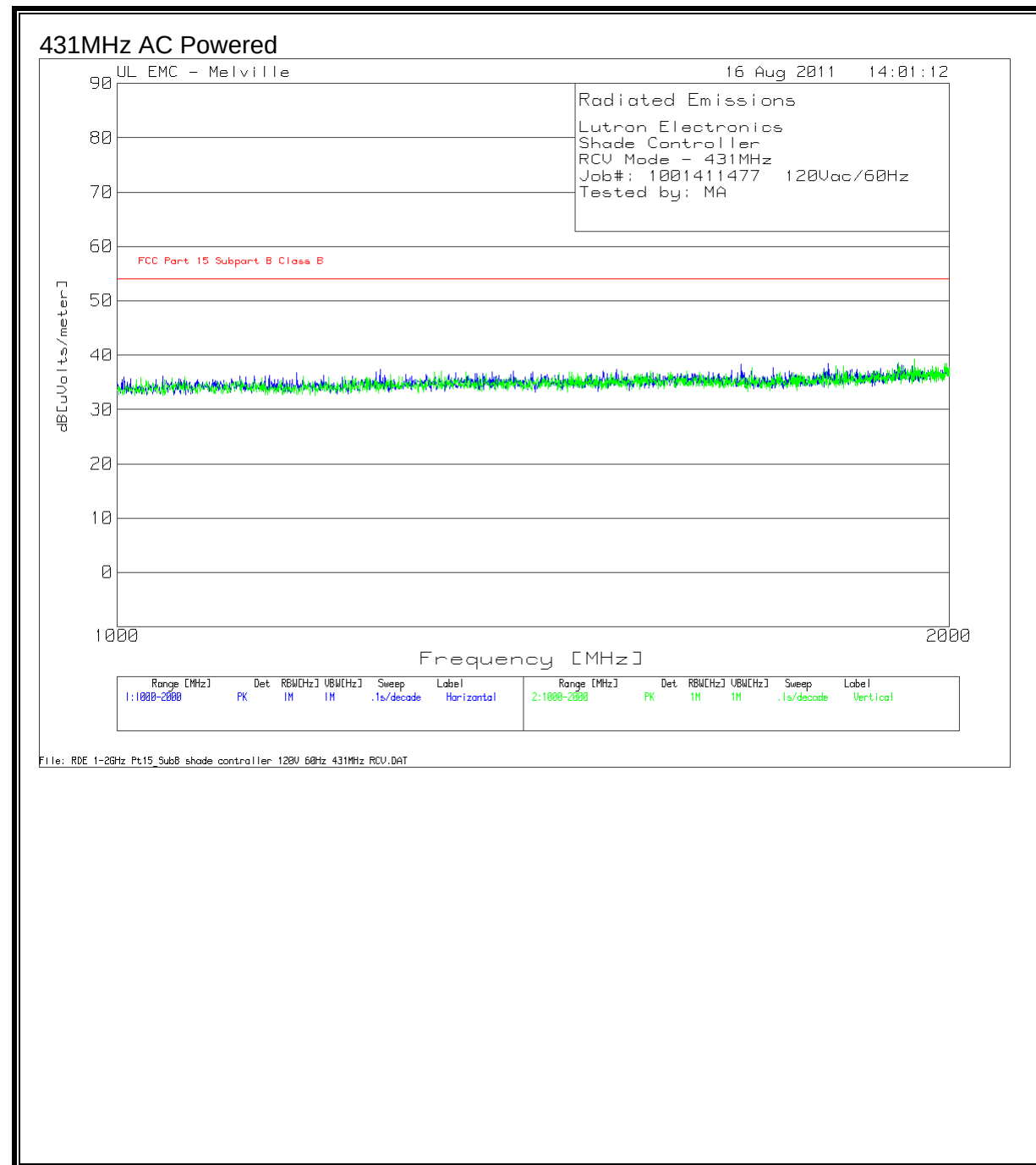
RECEIVER SPURIOUS EMISSION (30MHz - 1GHz)

437MHz Battery Powered



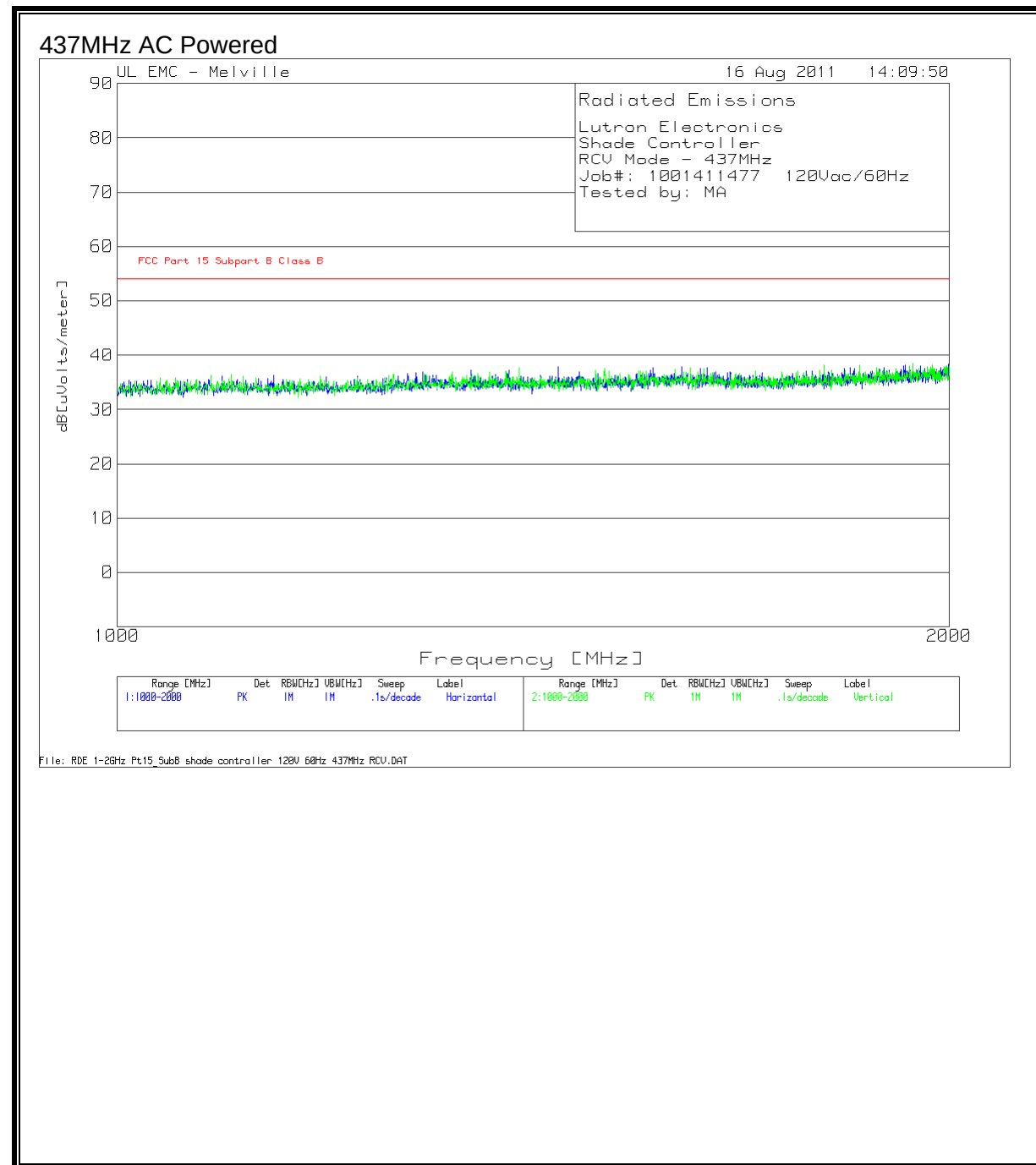
Lutron Electronics										
Shade Controller										
RCV Mode - 437MHz										
Job#: 1001411477 Battery										
Tested by: MA										
Horizontal 30 - 200MHz										
Test	Meter		3M Bicon	3MLoc 30-						
Frequency	Reading	Detector	54 Horz	1000MHz						
			05Apr12	02Feb12	dB[uVolts	FCC Part		Azimuth	Height	
			[dB]	[dB]	/meter]	15 Class B	Margin	[Degs]	[cm]	Polarity
31.021	10.8	PK	18.3	0.5	29.6	40	-10.4	217	300	Horz
124.955	13.67	PK	13.5	1.2	28.37	43.5	-15.13	104	102	Horz
191.8318	14.56	PK	15.7	1.5	31.76	43.5	-11.74	104	200	Horz
Vertical 30 - 200MHz										
195.5756	14.25	PK	16.3	1.5	32.05	43.5	-11.45	274	100	Vert
Horizontal 200 - 1000MHz										
798.6994	15.01	PK	22.3	3.3	40.61	46	-5.39	99	400	Horz
Vertical 200 - 1000MHz										
961.981	15.24	PK	24.2	3.6	43.04	54	-10.96	17	400	Vert
Horizontal 200 - 1000MHz										
798.0331	8.68	QP	22.3	3.3	34.28	46	-11.72	55	380	Horz
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

RECEIVER SPURIOUS EMISSION ABOVE 1GHz



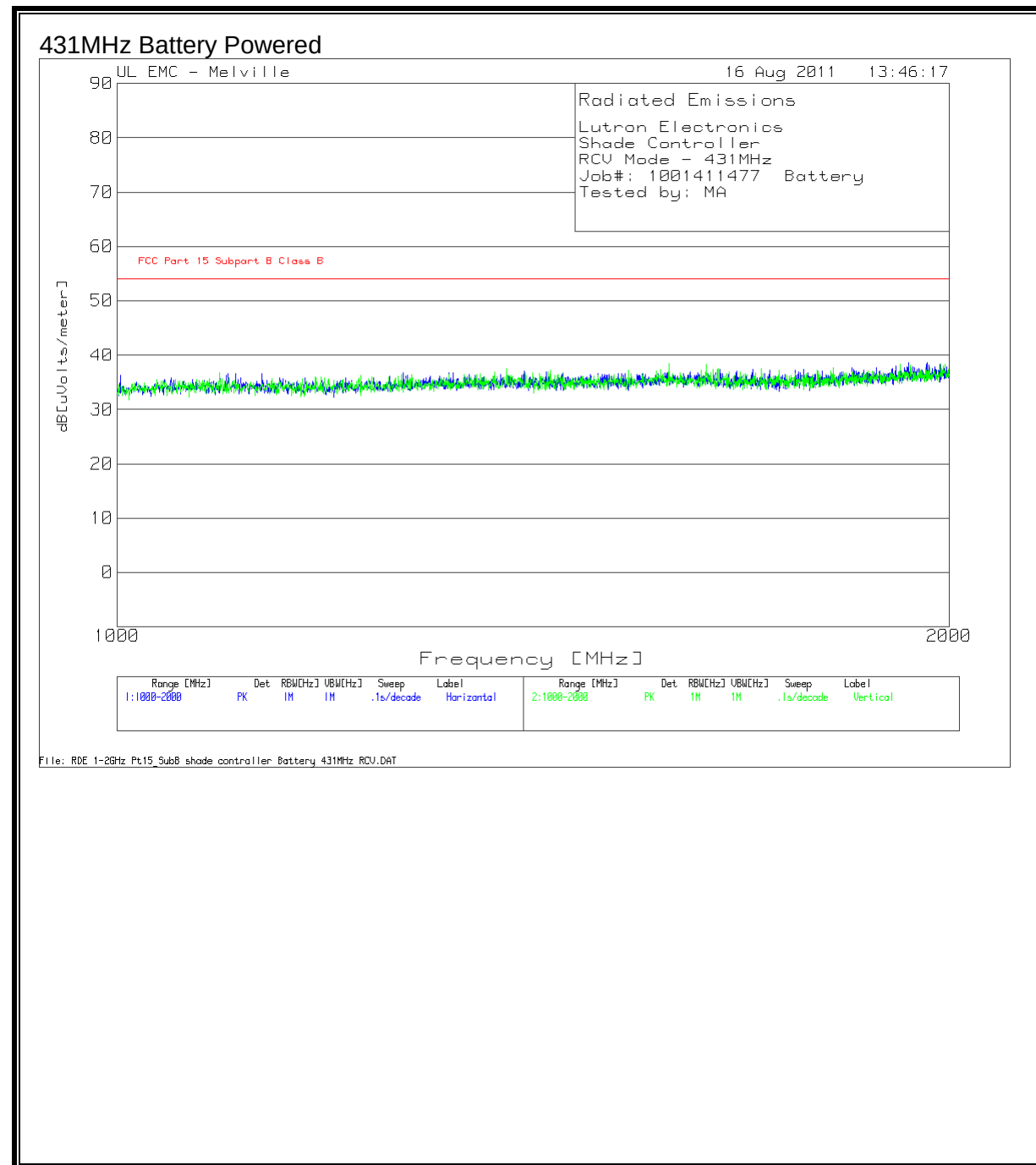
Lutron Electronics										
Shade Controller										
RCV Mode - 431MHz										
Job#: 1001411477 120Vac/60Hz										
Tested by: MA										
Horizontal 1000 - 2000MHz										
Test	Meter		51442 1-	BOMS		FCC Part				
Frequency	Reading	Detector	2GHz	Factor	dB[uVolts/ meter]	15 Subpart B	Margin	Azimuth	Height	Polarity
			[dB]	[dB]		Class B		[Degs]	[cm]	
1161.419	61.5	PK	19.9	-44.58	36.82	54	-17.18	354	214	Horz
1244.878	61.63	PK	20.1	-44.42	37.31	54	-16.69	357	214	Horz
1681.659	61.64	PK	20.8	-44.15	38.29	54	-15.71	124	99	Horz
1807.596	61.44	PK	21	-44.03	38.41	54	-15.59	175	99	Horz
Vertical 1000 - 2000MHz										
1310.345	60.99	PK	20.5	-44.37	37.12	54	-16.88	256	215	Vert
1943.528	61.11	PK	21.9	-43.78	39.23	54	-14.77	1	99	Vert
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

RECEIVER SPURIOUS EMISSION ABOVE 1GHz



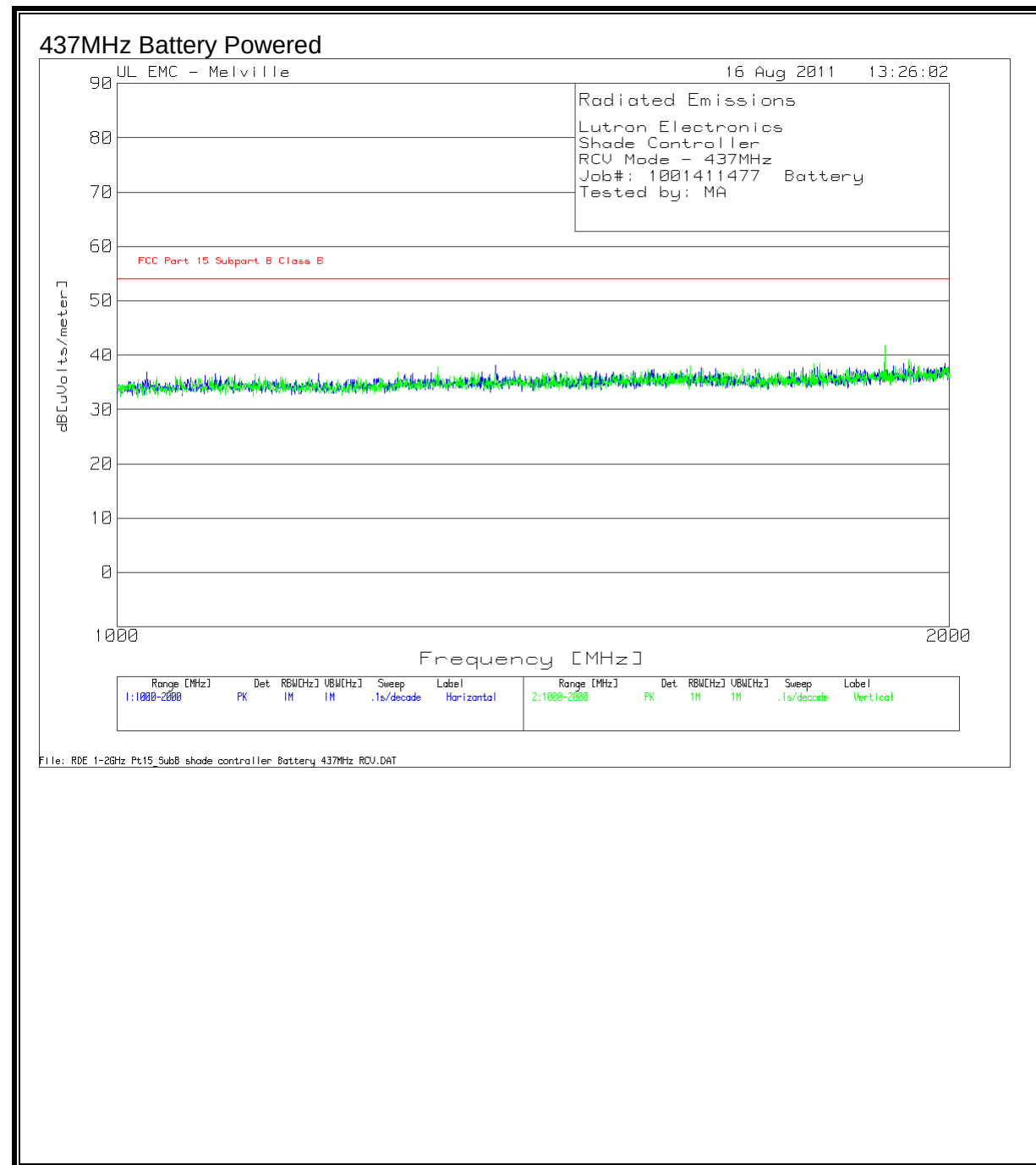
Lutron Electronics										
Shade Controller										
RCV Mode - 437MHz										
Job#: 1001411477 120Vac/60Hz										
Tested by: MA										
Horizontal 1000 - 2000MHz										
Test	Meter		51442 1-	BOMS		FCC Part				
Frequency	Reading	Detector	2GHz	Factor	dB[uVolts/ meter]	15 Subpart B Class B	Margin	Azimuth [Degs]	Height [cm]	Polarity
1138.931	60.92	PK	19.9	-44.46	36.36	54	-17.64	50	100	Horz
1342.329	60.91	PK	20.6	-44.32	37.19	54	-16.81	25	214	Horz
1444.278	61.57	PK	20.7	-44.38	37.89	54	-16.11	358	214	Horz
1600.7	60.78	PK	21.2	-44.18	37.8	54	-16.2	284	100	Horz
Vertical 1000 - 2000MHz										
1397.801	61.28	PK	20.7	-44.33	37.65	54	-16.35	128	214	Vert
1500.75	61.05	PK	20.8	-44.29	37.56	54	-16.44	77	99	Vert
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

RECEIVER SPURIOUS EMISSION ABOVE 1GHz



Lutron Electronics										
Shade Controller										
RCV Mode - 431MHz										
Job#: 1001411477 Battery										
Tested by: MA										
Horizontal 1000 - 2000MHz										
Test	Meter		51442 1-	BOMS		FCC Part				
Frequency	Reading	Detector	2GHz	Factor	dB[uVolts	15	Subpart B	Azimuth	Height	
			[dB]	[dB]	/meter]	Class B	Margin	[Degs]	[cm]	Polarity
1103.448	61.12	PK	20	-44.55	36.57	54	-17.43	309	215	Horz
1403.298	60.78	PK	20.7	-44.43	37.05	54	-16.95	358	99	Horz
1933.033	60.56	PK	21.8	-43.7	38.66	54	-15.34	28	99	Horz
Vertical 1000 - 2000MHz										
1088.956	61.45	PK	19.9	-44.58	36.77	54	-17.23	80	215	Vert
1583.208	61.63	PK	21.1	-44.27	38.46	54	-15.54	358	215	Vert
1919.54	60.41	PK	21.7	-43.77	38.34	54	-15.66	283	215	Vert
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

RECEIVER SPURIOUS EMISSION ABOVE 1GHz



Lutron Electronics										
Shade Controller										
RCV Mode - 437MHz										
Job#: 1001411477 Battery										
Tested by: MA										
Horizontal 1000 - 2000MHz										
Test	Meter		51442 1-	BOMS		FCC Part				
Frequency	Reading	Detector	2GHz	Factor	dB[uVolts/	15	Subpart B	Azimuth	Height	Polarity
			[dB]	[dB]	meter]	Class B	Margin	[Degs]	[cm]	
1024.988	62.05	PK	19.5	-44.57	36.98	54	-17.02	1	215	Horz
1370.815	61.92	PK	20.6	-44.41	38.11	54	-15.89	28	215	Horz
1563.218	60.47	PK	21.1	-44.2	37.37	54	-16.63	258	215	Horz
Vertical 1000 - 2000MHz										
1049.975	61.18	PK	19.6	-44.61	36.17	54	-17.83	131	214	Vert
1305.847	61.78	PK	20.5	-44.36	37.92	54	-16.08	155	214	Vert
1895.552	63.99	PK	21.6	-43.87	41.72	54	-12.28	104	214	Vert
PK - Peak detector										
QP - Quasi-Peak detector										
LnAv - Linear Average detector										
LgAv - Log Average detector										
Av - Average detector										
CAV - CISPR Average detector										
RMS - RMS detection										
CRMS - CISPR RMS detection										

9. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207 (a)
IC RSS-GEN, Section 7.2.2

Frequency of emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50
* Decreases with the logarithm of the frequency.		

TEST PROCEDURE

ANSI C63.4

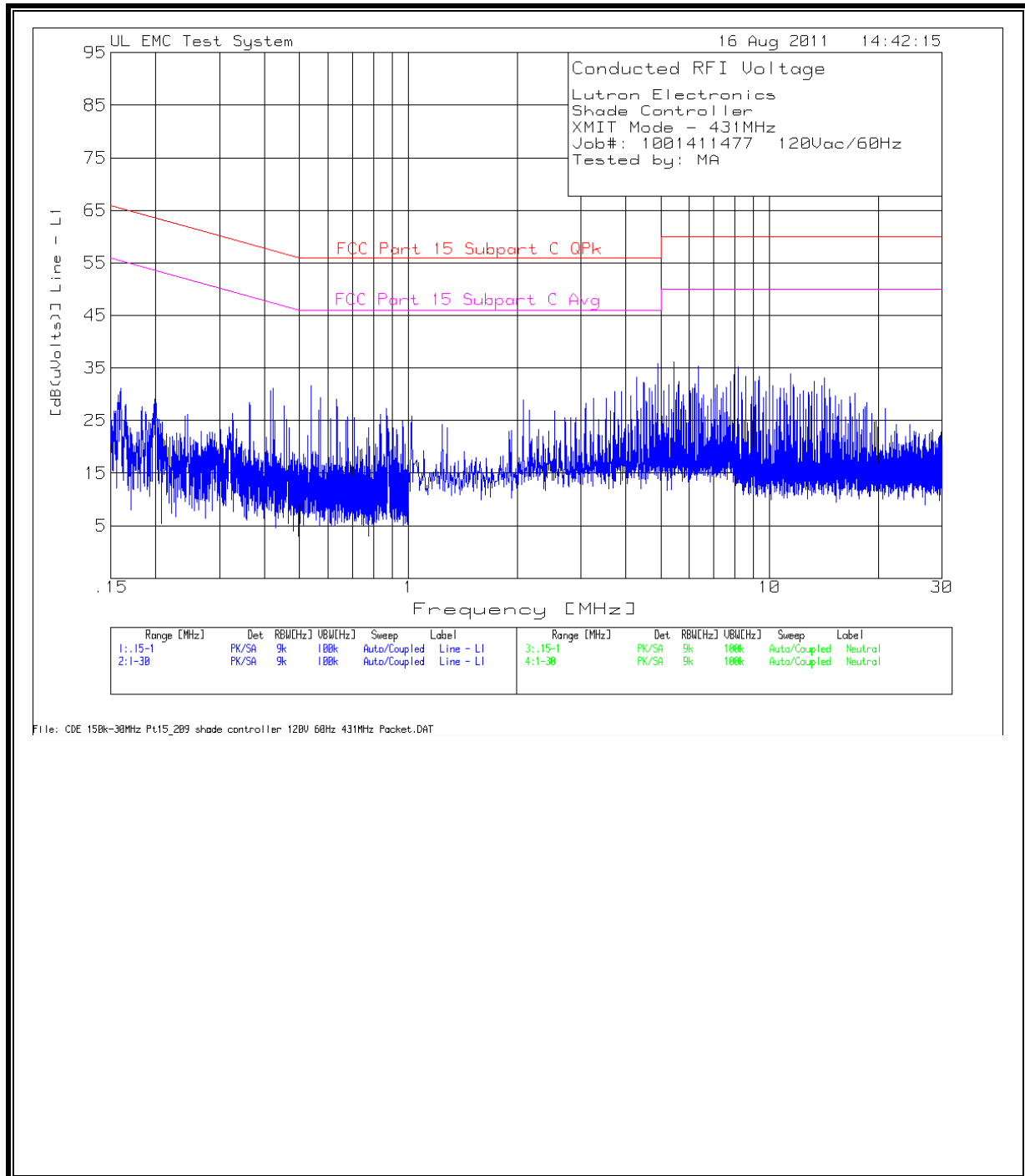
RESULTS

No non-compliance noted:

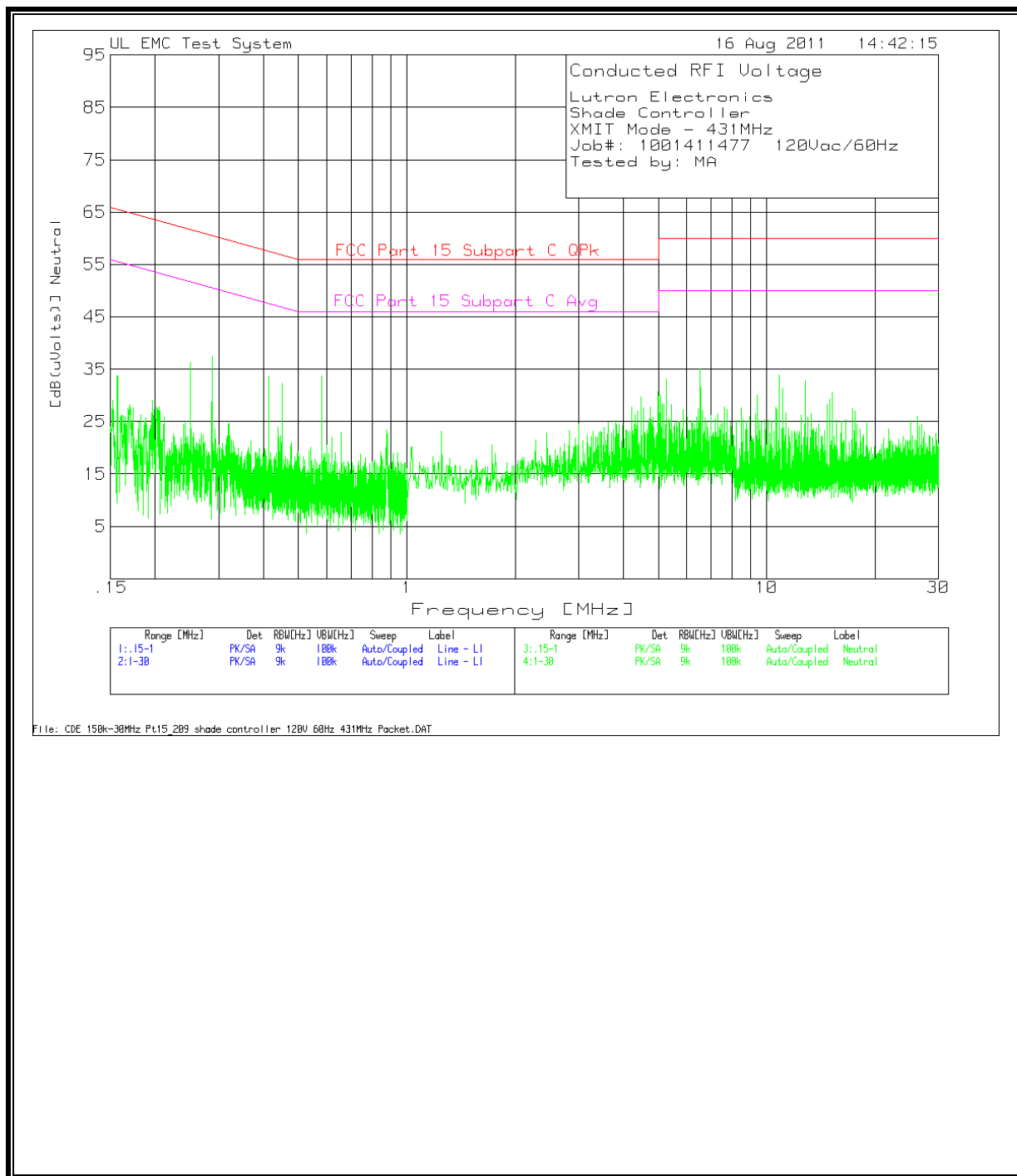
CONDUCTED EMISSIONS – 431MHz Transmit Mode

Lutron Electronics									
Shade Controller									
XMIT Mode - 431MHz									
Job#: 1001411477 120Vac/60Hz									
Tested by: MA									
Line - L1 .15 - 1MHz									
Test	Meter		5A636			FCC Part		FCC Part	
Frequency	Reading	Detector	with TI			15		15	
			and Sw			Subpart C		Subpart C	
			Line 1						
			[dB]		[dB(uVolts)]	QPk	Margin	Avg	Margin
0.537	21.21	PK	10.5	31.71	56	-24.29	46	-14.29	
Line - L1 1 - 30MHz									
4.89258	25.45	PK	10.4	35.85	56	-20.15	46	-10.15	
5.42048	25.82	PK	10.4	36.22	60	-23.78	50	-13.78	
6.36027	24.9	PK	10.4	35.3	60	-24.7	50	-14.7	
8.15863	24.64	PK	10.5	35.14	60	-24.86	50	-14.86	
11.43629	23.23	PK	10.6	33.83	60	-26.17	50	-16.17	
Neutral .15 - 1MHz									
0.28722	26.72	PK	10.8	37.52	60.6	-23.08	50.6	-13.08	
0.25015	25.35	PK	10.9	36.25	61.8	-25.55	51.8	-15.55	
0.57968	23.3	PK	10.5	33.8	56	-22.2	46	-12.2	
0.4127	22.93	PK	10.6	33.53	57.6	-24.07	47.6	-14.07	
Neutral 1 - 30MHz									
6.54011	24.56	PK	10.5	35.06	60	-24.94	50	-14.94	
10.82717	23.23	PK	10.6	33.83	60	-26.17	50	-16.17	
PK - Peak detector									
QP - Quasi-Peak detector									
LnAv - Linear Average detector									
LgAv - Log Average detector									
Av - Average detector									
CAV - CISPR Average detector									
RMS - RMS detection									
CRMS - CISPR RMS detection									

LINE 1 RESULTS



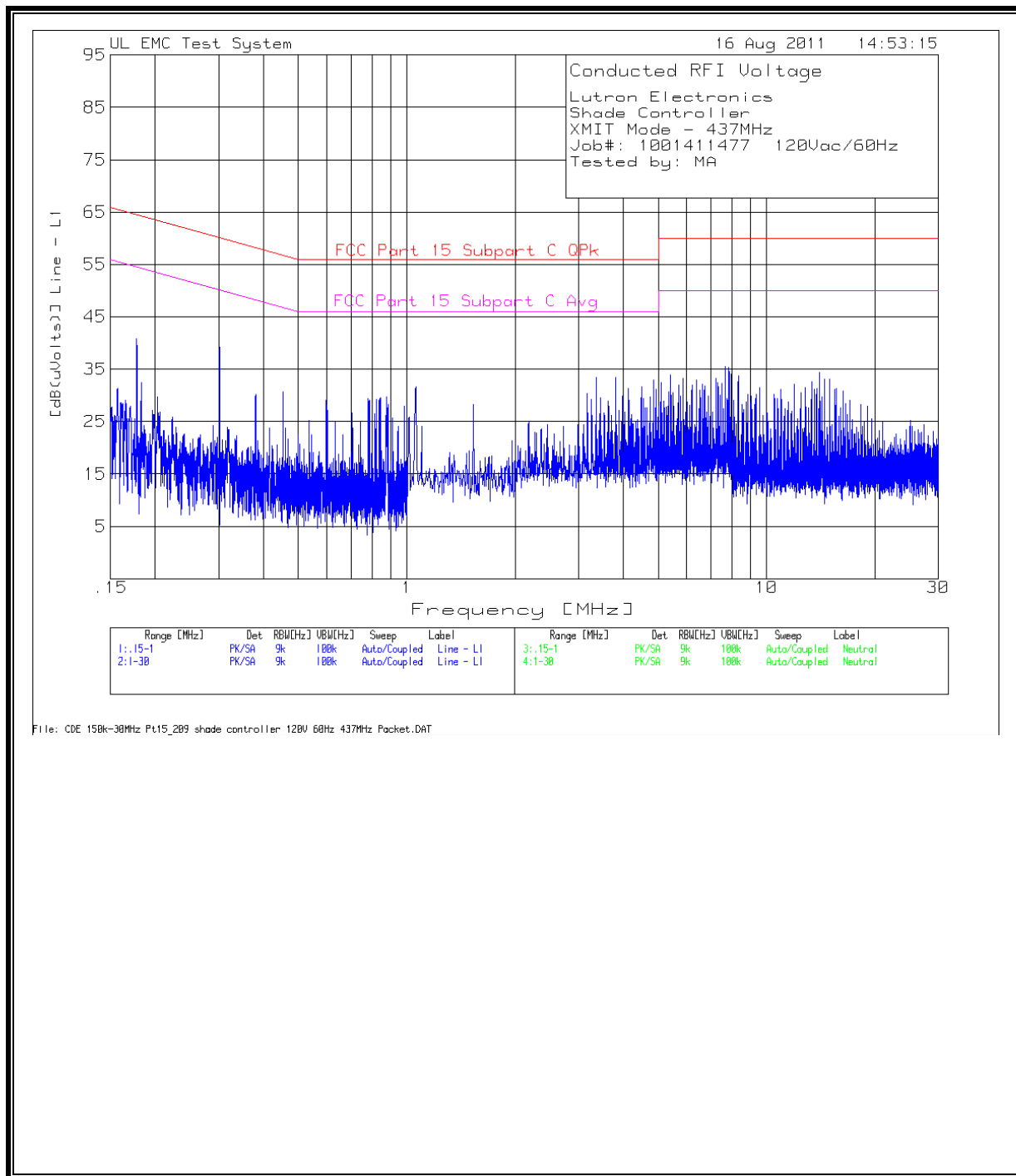
LINE 2 RESULTS



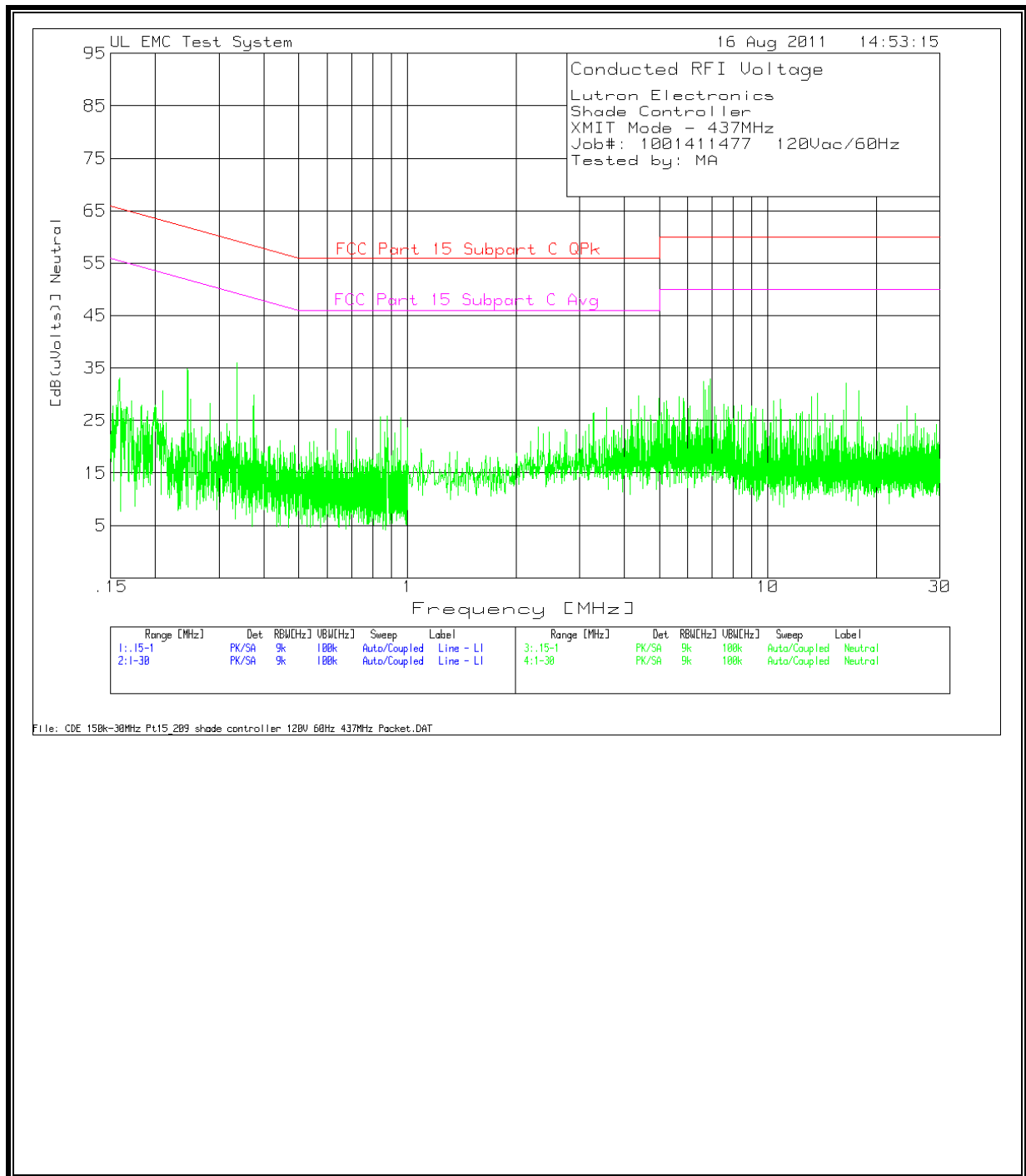
CONDUCTED EMISSIONS – 437MHz Transmit Mode

Lutron Electronics									
Shade Controller									
XMIT Mode - 437MHz									
Job#: 1001411477 120Vac/60Hz									
Tested by: MA									
Line - L1 .15 - 1MHz									
Test	Meter		5A636 with TI and Sw		FCC Part 15 Subpart C		FCC Part 15 Subpart C		
Frequency	Reading	Detector	Line 1 [dB]	[dB(uVolts)]	QPk	Margin	Avg	Margin	
0.17755	29.57	PK	11.3	40.87	64.6	-23.73	54.6	-13.73	
0.30133	28.55	PK	10.7	39.25	60.2	-20.95	50.2	-10.95	
Line - L1 1 - 30MHz									
1.05801	21.3	PK	10.4	31.7	56	-24.3	46	-14.3	
3.36107	23.02	PK	10.4	33.42	56	-22.58	46	-12.58	
7.67133	25.07	PK	10.5	35.57	60	-24.43	50	-14.43	
13.9888	23.84	PK	10.6	34.44	60	-25.56	50	-15.56	
Neutral .15 - 1MHz									
0.24539	23.92	PK	10.9	34.82	61.9	-27.08	51.9	-17.08	
0.3367	25.31	PK	10.7	36.01	59.3	-23.29	49.3	-13.29	
0.37411	19.34	PK	10.6	29.94	58.4	-28.46	48.4	-18.46	
Neutral 1 - 30MHz									
3.28566	16.09	PK	10.4	26.49	56	-29.51	46	-19.51	
6.61552	21.94	PK	10.5	32.44	60	-27.56	50	-17.56	
6.91718	22.4	PK	10.5	32.9	60	-27.1	50	-17.1	
PK - Peak detector									
QP - Quasi-Peak detector									
LnAv - Linear Average detector									
LgAv - Log Average detector									
Av - Average detector									
CAV - CISPR Average detector									
RMS - RMS detection									
CRMS - CISPR RMS detection									

LINE 1 RESULTS



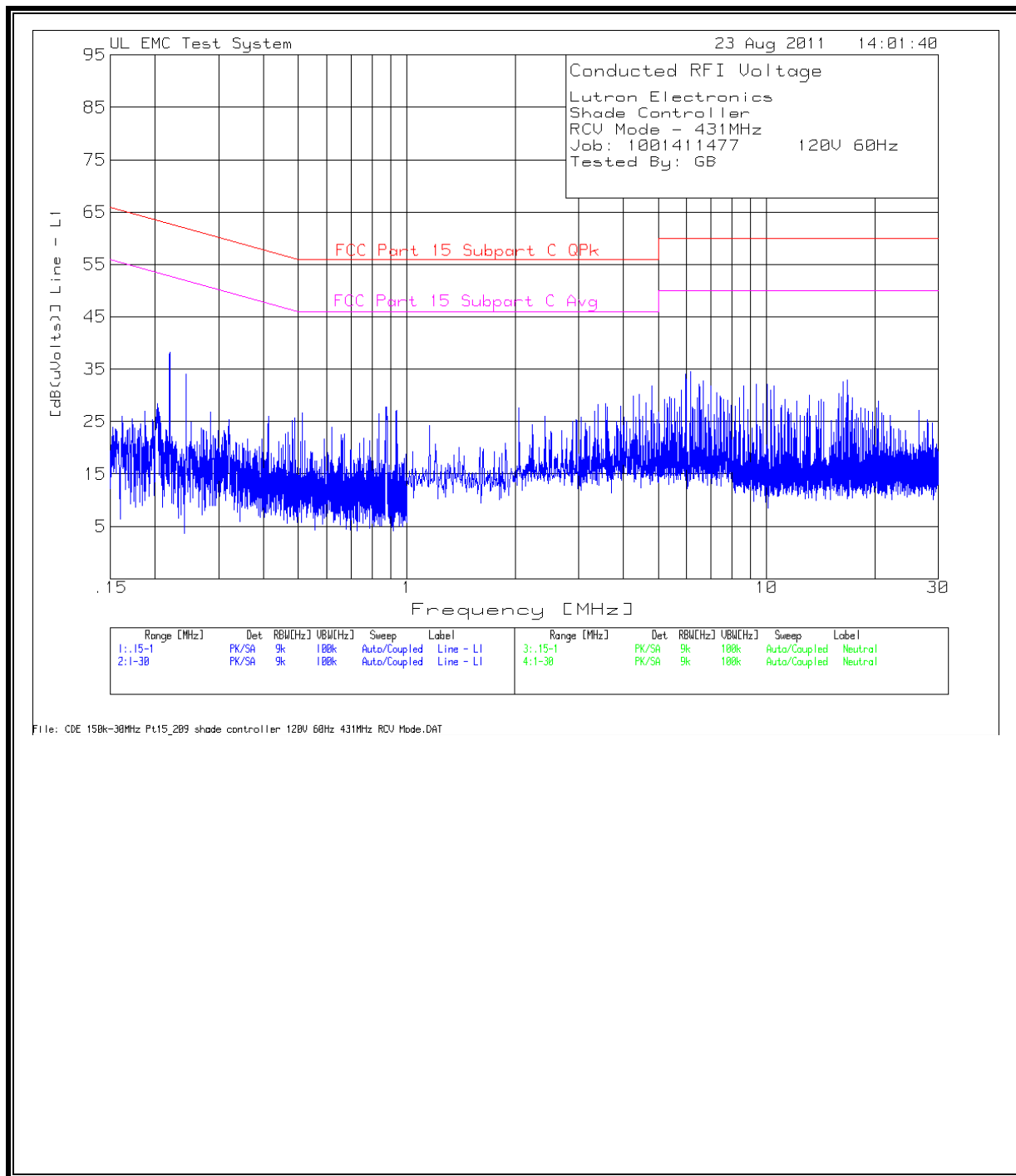
LINE 2 RESULTS



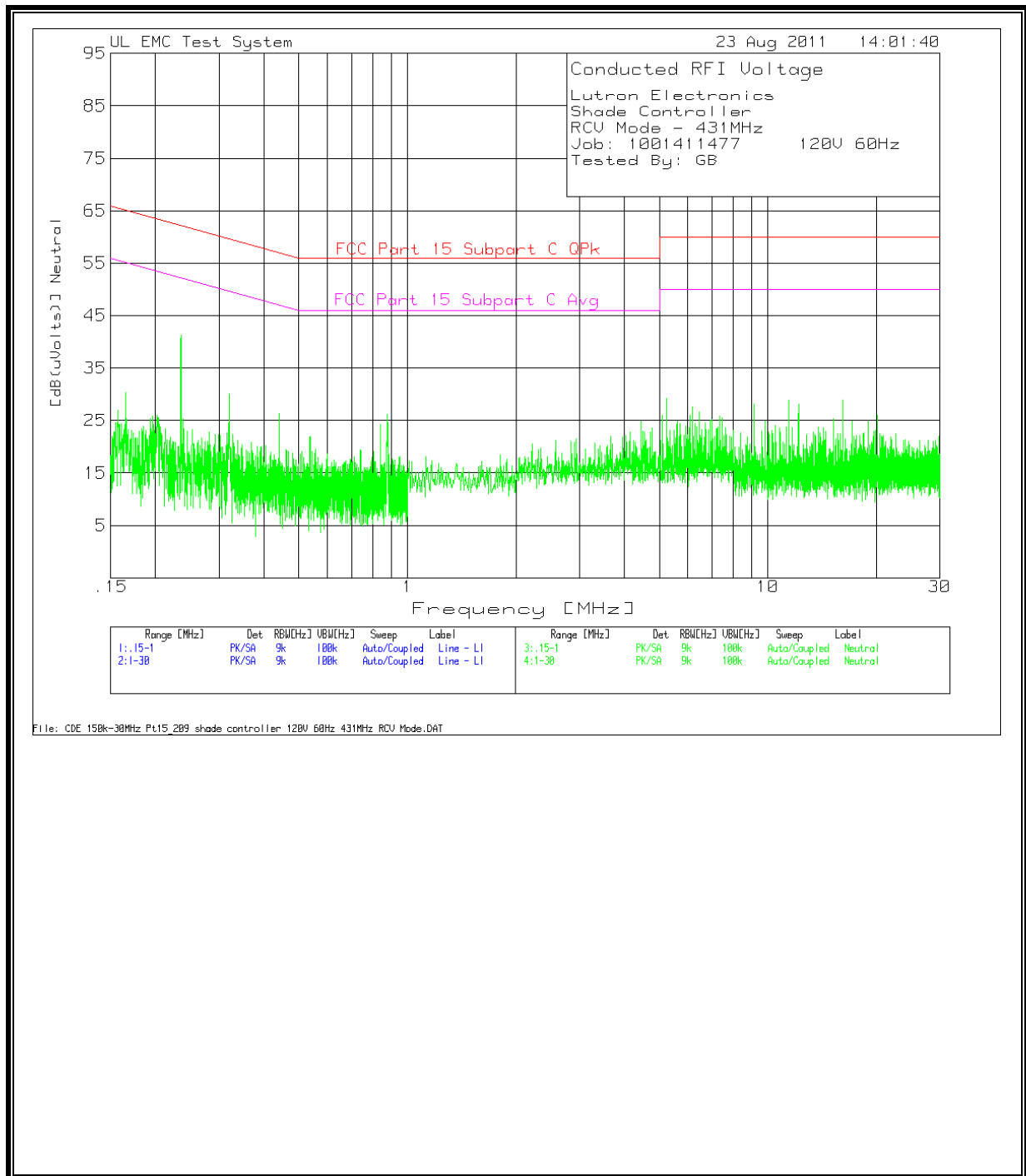
CONDUCTED EMISSIONS – 431MHz Receive Mode

Lutron Electronics									
Shade Controller									
RCV Mode - 431MHz									
Job: 1001411477 120V 60Hz									
Tested By: GB									
Line - L1 .15 - 1MHz									
Test	Meter		5A636		FCC Part		FCC Part		
Frequency	Reading	Detector	with TI		15		15		
			and Sw		Subpart C		Subpart C		
			Line 1						
			[dB]	[dB(uVolts)]	QPk	Margin	Avg	Margin	
0.21937	27.22	PK	11	38.22	62.8	-24.58	52.8	-14.58	
0.24352	23.13	PK	10.9	34.03	62	-27.97	52	-17.97	
0.87775	17.45	PK	10.4	27.85	56	-28.15	46	-18.15	
Line - L1 1 - 30MHz									
5.96579	23.64	PK	10.4	34.04	60	-25.96	50	-15.96	
6.13403	24.16	PK	10.4	34.56	60	-25.44	50	-15.44	
9.34207	21.59	PK	10.5	32.09	60	-27.91	50	-17.91	
Neutral .15 - 1MHz									
0.23519	30.47	PK	10.9	41.37	62.3	-20.93	52.3	-10.93	
0.32105	19.35	PK	10.7	30.05	59.7	-29.65	49.7	-19.65	
0.87928	15.83	PK	10.4	26.23	56	-29.77	46	-19.77	
Neutral 1 - 30MHz									
9.14483	17.56	PK	10.6	28.16	60	-31.84	50	-21.84	
11.44789	18.24	PK	10.6	28.84	60	-31.16	50	-21.16	
16.14103	18.26	PK	10.7	28.96	60	-31.04	50	-21.04	
PK - Peak detector									
QP - Quasi-Peak detector									
LnAv - Linear Average detector									
LgAv - Log Average detector									
Av - Average detector									
CAV - CISPR Average detector									
RMS - RMS detection									
CRMS - CISPR RMS detection									

LINE 1 RESULTS



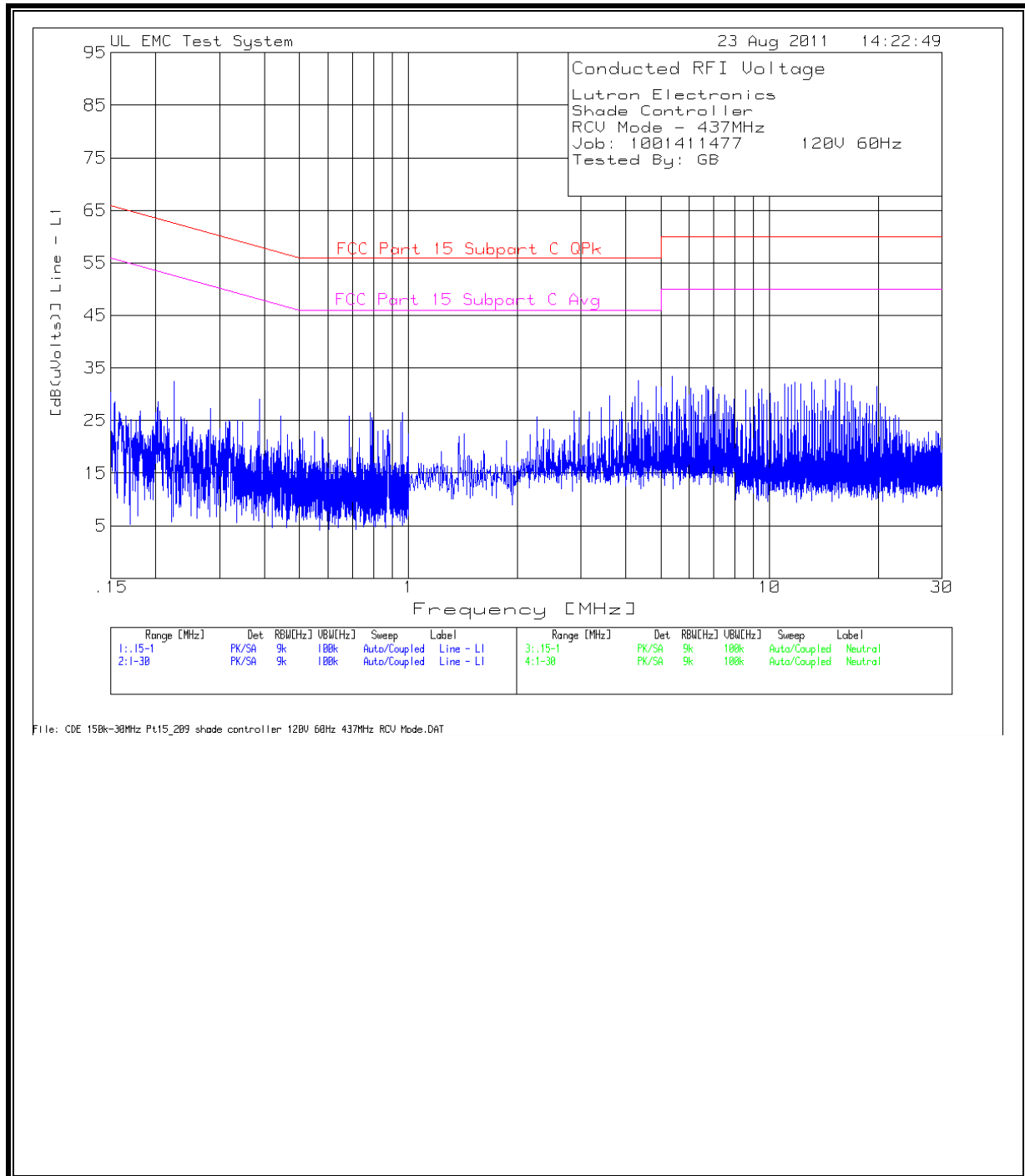
LINE 2 RESULTS



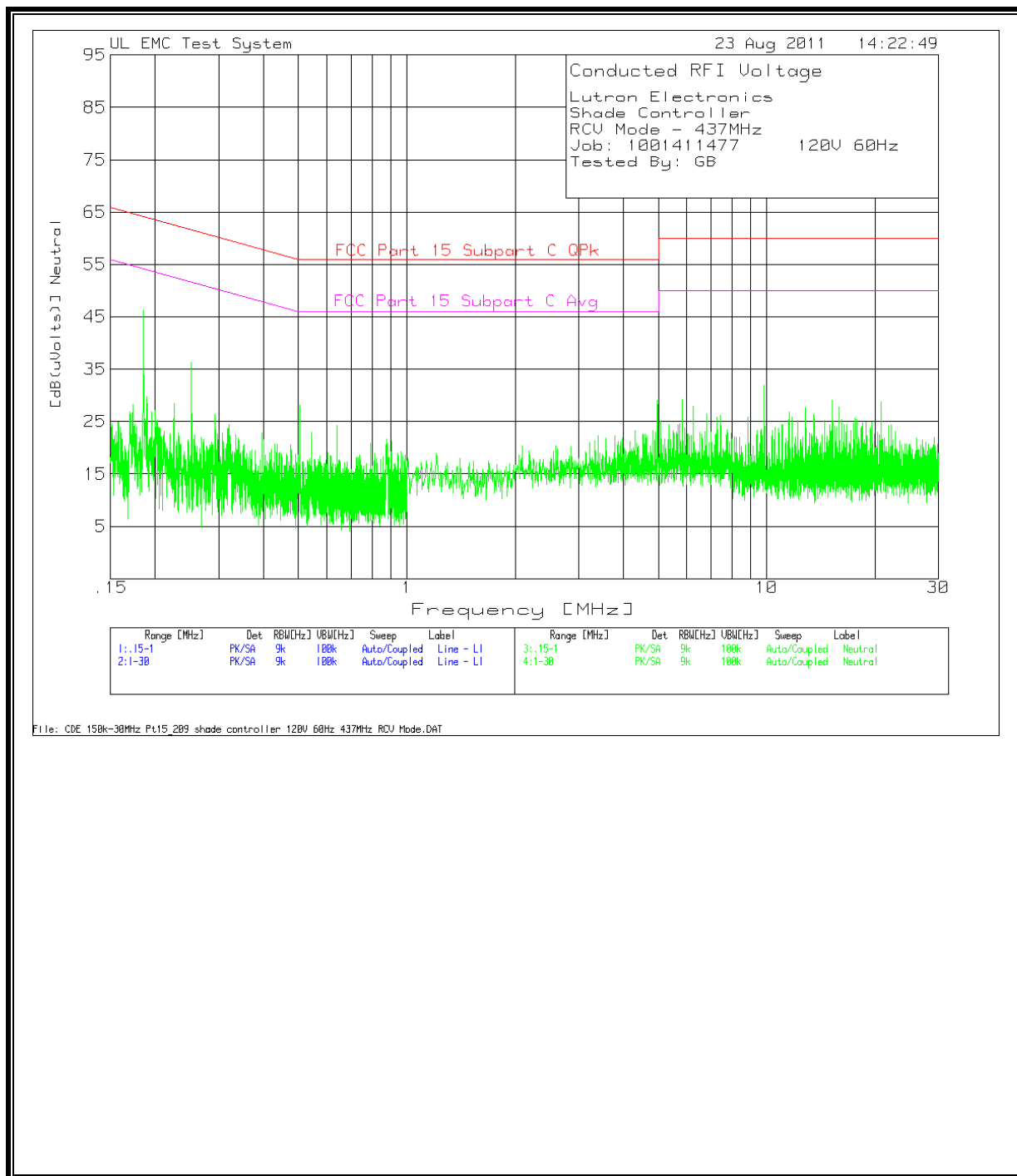
CONDUCTED EMISSIONS – 437MHz Receive Mode

Lutron Electronics								
Shade Controller								
RCV Mode - 437MHz								
Job: 1001411477 120V 60Hz								
Tested By: GB								
Line - L1 .15 - 1MHz								
Test Frequency	Meter Reading	Detector	5A636 with TI and Sw Line 1 [dB]	[dB(uVolts)]	FCC Part 15 Subpart C QPk	Margin	FCC Part 15 Subpart C Avg	Margin
0.22465	21.47	PK	11	32.47	62.6	-30.13	52.6	-20.13
0.38754	18.52	PK	10.6	29.12	58.1	-28.98	48.1	-18.98
0.78321	16.14	PK	10.4	26.54	56	-29.46	46	-19.46
0.96276	16.17	PK	10.4	26.57	56	-29.43	46	-19.43
Line - L1 1 - 30MHz								
5.37408	23	PK	10.4	33.4	60	-26.6	50	-16.6
14.27886	22.17	PK	10.6	32.77	60	-27.23	50	-17.23
Neutral .15 - 1MHz								
0.18486	35.14	PK	11.2	46.34	64.3	-17.96	54.3	-7.96
0.25185	25.47	PK	10.9	36.37	61.7	-25.33	51.7	-15.33
0.5035	17.62	PK	10.5	28.12	56	-27.88	46	-17.88
Neutral 1 - 30MHz								
4.96799	18.7	PK	10.4	29.1	56	-26.9	46	-16.9
9.83517	21.32	PK	10.6	31.92	60	-28.08	50	-18.08
15.20704	18.4	PK	10.7	29.1	60	-30.9	50	-20.9
PK - Peak detector								
QP - Quasi-Peak detector								
LnAv - Linear Average detector								
LgAv - Log Average detector								
Av - Average detector								
CAV - CISPR Average detector								
RMS - RMS detection								
CRMS - CISPR RMS detection								

LINE 1 RESULTS

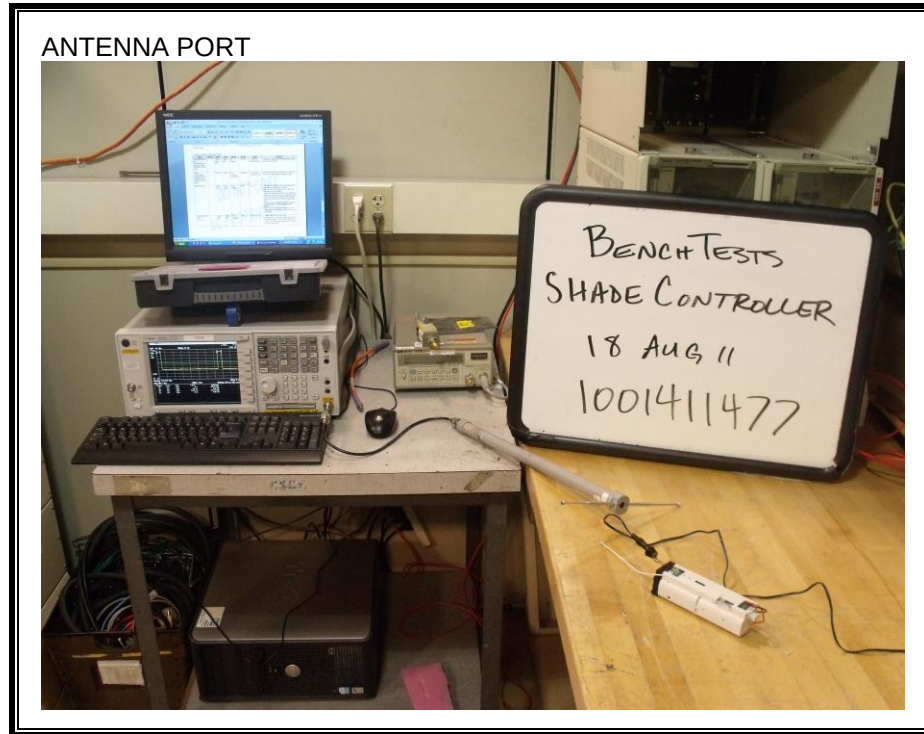


LINE 2 RESULTS



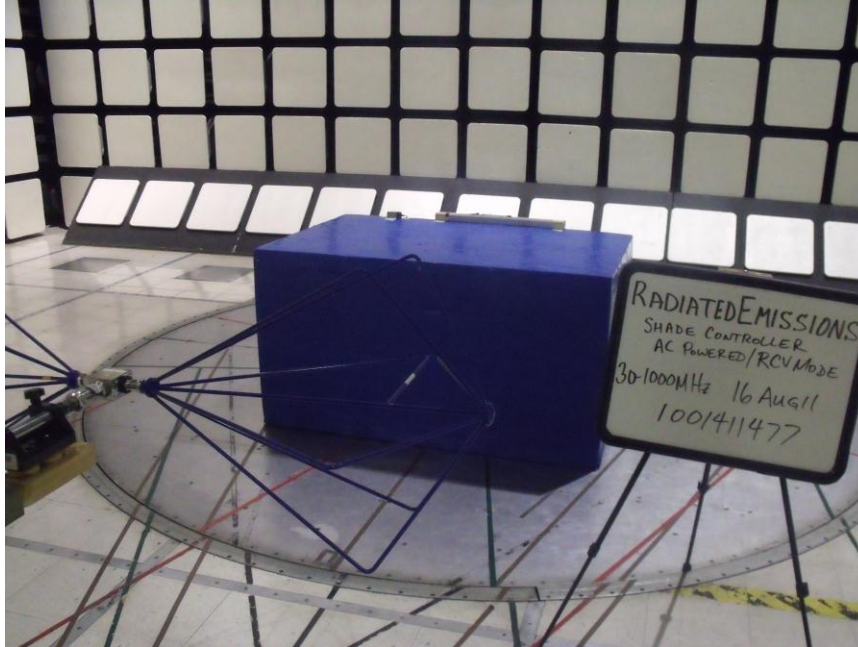
10. SETUP PHOTOS

ANTENNA PORT

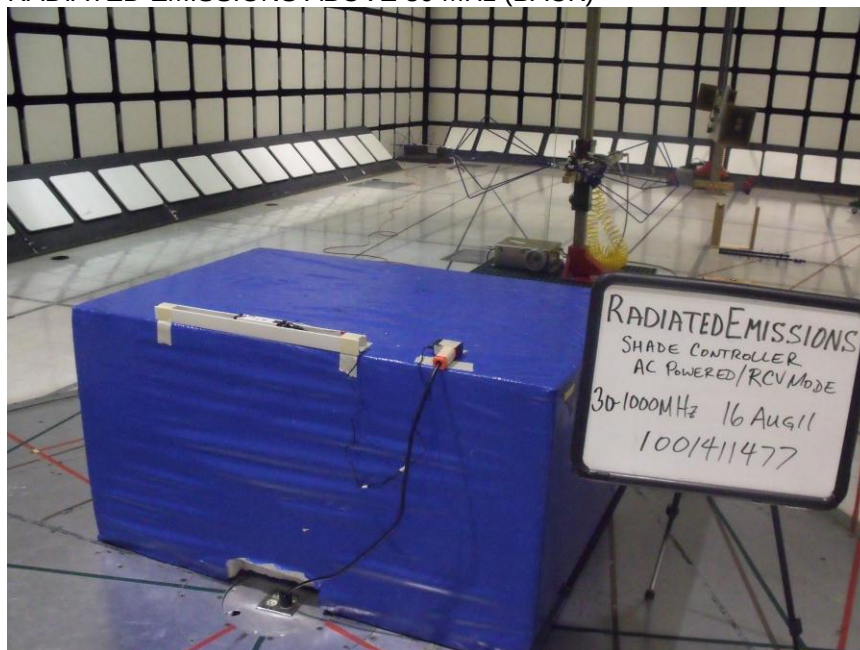


RADIATED EMISSION ABOVE 30 MHz

RADIATED EMISSIONS ABOVE 30 MHz (FRONT)

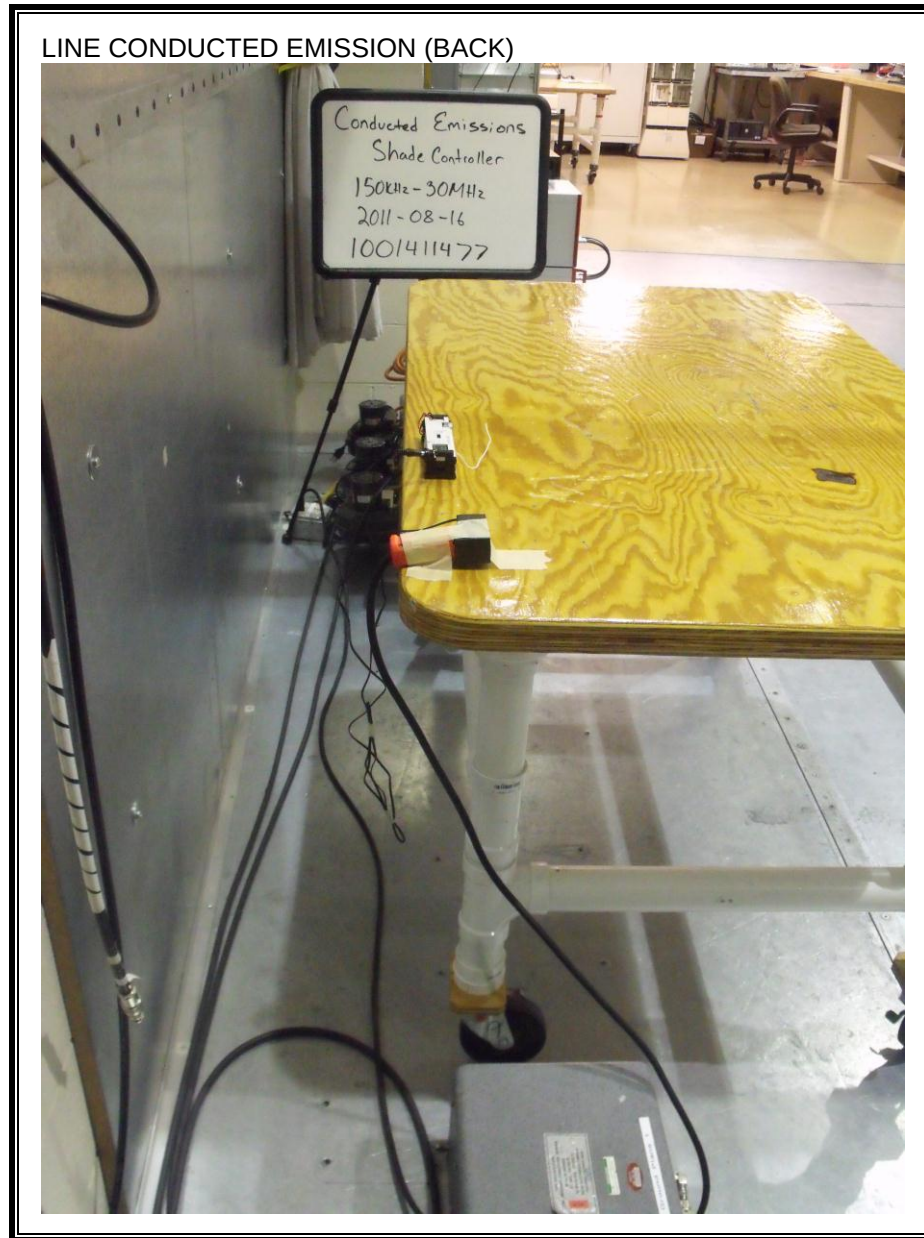


RADIATED EMISSIONS ABOVE 30 MHz (BACK)



AC MAINS LINE CONDUCTED EMISSION





END OF REPORT