



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

**PERMISSIVE II TEST REPORT**

**FOR**

**SHADE CONTROLLER**

**MODEL NUMBER: CS-EDU-(S) YJ-BULK**

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

**REPORT NUMBER: 13M15126**

**ISSUE DATE: 2013-05-17**

*Prepared for*  
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7200 SUTTER ROAD  
COOPERBURG  
PA 18036, USA**

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**NVLAP LAB CODE 100255-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	2013-05-17	Initial Issue	Joseph Danisi
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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:** CS-EDU-(S) YJ-BULK

**SERIAL NUMBER:** Non-serialized production unit

**DATE TESTED:** 2013-05-15 to 2013-05-17

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

UL LLC 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 UL LLC 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 UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC 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:

Tested By:



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Michael Antola  
Wise Project Lead  
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UL LLC

## 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, and RSS-210 Issue 8.

## 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:

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

### 4.3. MEASUREMENT UNCERTAINTY

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

Test	Uncertainty
Conducted Emissions (worst case 9kHz-30MHz)	□ 2.0, k=2 (95%)
Radiated Emissions, 30-200MHz, Horizontal	□ 3.6, k=2 (95%)
Radiated Emissions, 30-200MHz, Vertical	□ 3.8, k=2 (95%)
Radiated Emissions, 200-1000MHz, Horizontal	□ 2.8, k=2 (95%)
Radiated Emissions, 200-1000MHz, Vertical	□ 3.7, k=2 (95%)
Radiated Emissions, 1-26GHz (worst case, Ground Plane)	□ 5.7, k=2 (95%)

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 report is to evaluate a change in antenna length and location within the shade controller therefore the worst case configuration was evaluated which is the PVC antenna in the front of the head rail configuration this was based on pretesting to determine the worst case antenna position.

### **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 and high channels for both battery and AC powered Configurations for both field strength.

### **5.5. MODIFICATIONS**

No modifications were made during testing.

## 5.1. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

None

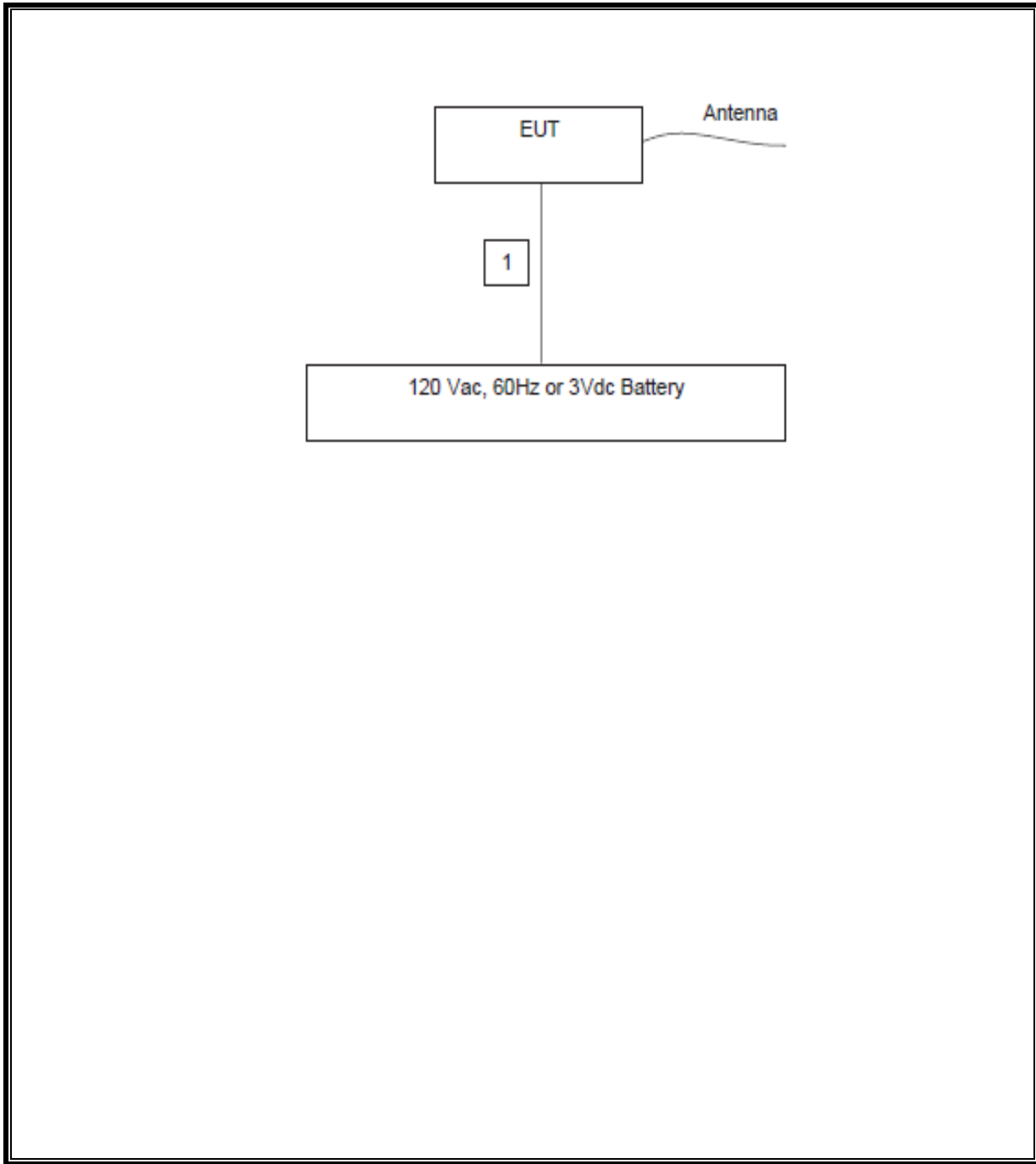
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	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:

Radiated Emissions					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
30-1000MHz					
EMI Receiver	Rohde & Schwarz	ESIB26	ME5B-081	2013-01-29	2014-01-31
Log-P Antenna	Schaffner	UPA6109	44068	2013-04-03	2014-04-03
Bicon Antenna	Schaffner	VBA6106A	54	2013-04-03	2014-04-03
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
Multimeter	Fluke	83III	ME5B-305	2013-01-29	2014-01-31
Above 1GHz (Band Optimized System)					
Spectrum Analyzer	Agilent	E4446A	72823	2013-01-13	2013-01-31
Horn Antenna (1-2 GHz)	ETS	3161-01 (26°)**	51442	2008-03-28	See * below
Horn Antenna (2-4 GHz)	ETS	3161-02 (22°)**	48107	2007-09-27	See * below
Horn Antenna (4-8 GHz)	ETS	3161-03 (22°)**	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	2012-12-22	2014-12-22
Multimeter	Fluke	83III	ME5B-305	2013-01-29	2014-01-31
<p>* - 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 <math>2D^2/\lambda</math>. Gain standard horn antennas have gains that are fixed by their dimensions and dimensional tolerances.</p> <p>** - Number in parentheses denotes antenna beam width.</p>					

## 7. RADIATED EMISSION TEST RESULTS

### 7.1. 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 3,750 <sup>1</sup>	125 to 375 <sup>1</sup>
174 - 260	3,750	375
260 - 470	3,750 to 12,500 <sup>1</sup>	375 to 1,250 <sup>1</sup>
Above 470	12,500	1,250

<sup>1</sup> 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
<sup>1</sup> 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	( <sup>2</sup> )
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.

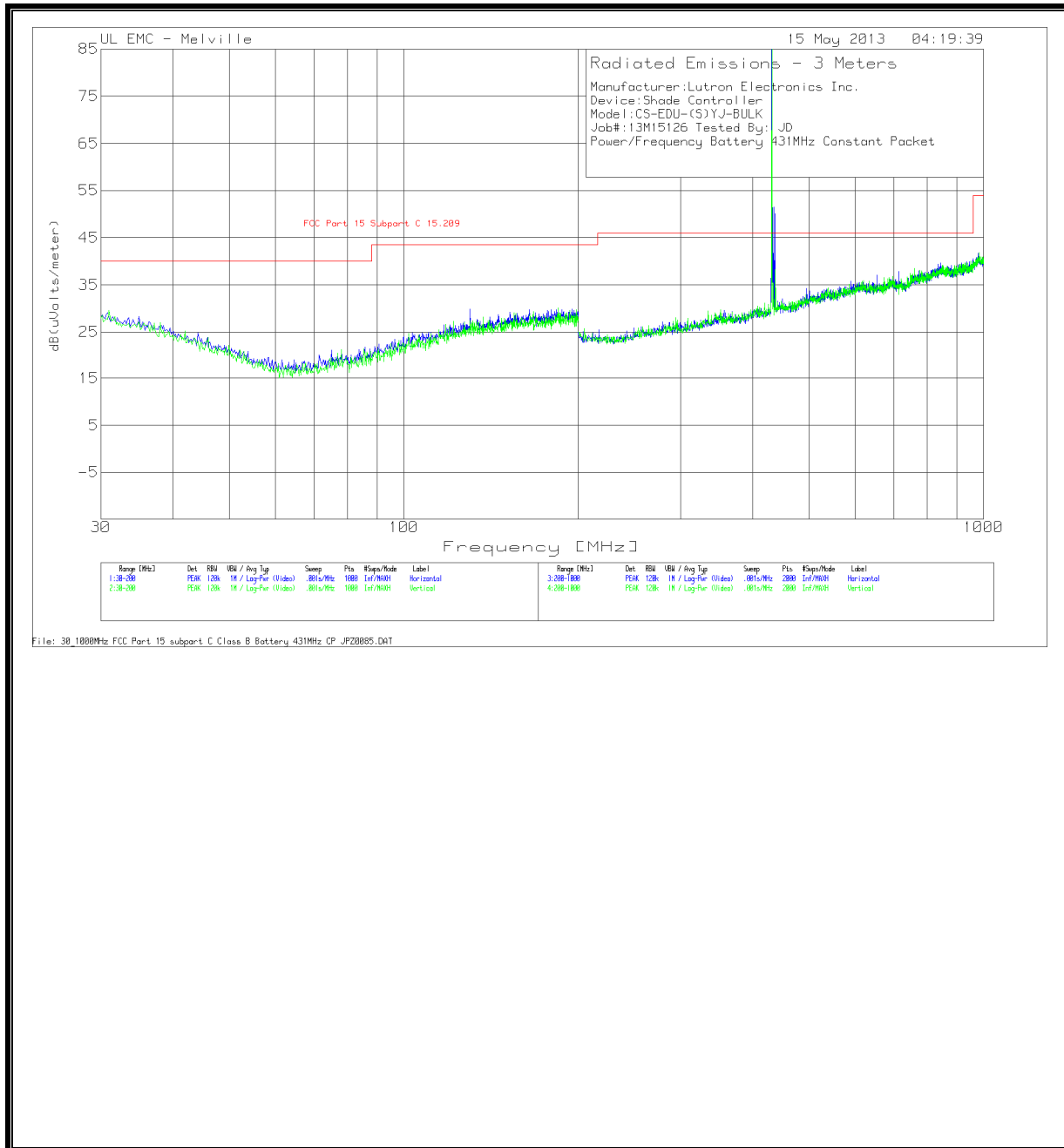
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

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: The duty cycle correction utilized from original grant see UL report number 1001411477.

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



Manufacturer: Lutron Electronics Inc.

Device: Shade Controller

Model: CS-EDU-(S)YJ-BULK

Job#:13M15126 Tested By: JD

Power/Frequency Battery 431MHz Constant Packet

Horizontal 30 - 200MHz

Test Frequency	Meter Reading	Detector	AF-43441 (dB/m)	GL-3M (dB)	DC Corr [dB]	dB (uVolts /meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
34.9349	12.36	PK	16	0	0	28.36	40	-11.64	160	300	Horz
44.1241	12.19	PK	12.5	0.2	0	24.89	40	-15.11	335	300	Horz
130.0601	15.41	PK	14	0.5	0	29.91	43.5	-13.59	357	300	Horz

Vertical 30 - 200MHz

Test Frequency	Meter Reading	Detector	AF-43441 (dB/m)	GL-3M (dB)	DC Corr [dB]	dB (uVolts /meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
31.021	12.1	PK	17.5	0	0	29.6	40	-10.4	111	100	Vert
41.9119	11.61	PK	13.4	0.2	0	25.21	40	-14.79	160	100	Vert
133.4635	12.71	PK	14.1	0.5	0	27.31	43.5	-16.19	259	100	Vert

Horizontal 200 - 1000MHz

Test Frequency	Meter Reading	Detector	AF-44067 (dB/m)	GL-3M (dB)	DC Corr [dB]	dB (uVolts /meter)	FCC Part 15 Subpart C 15.231	Margin (dB)	FCC Part 15 Subpart C Peak 100.4	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
431.4497	79.63	PK	16.4	1.4	-20.29	*77.14	80.4	-3.26	100.4	-2.97	358	200	Horz

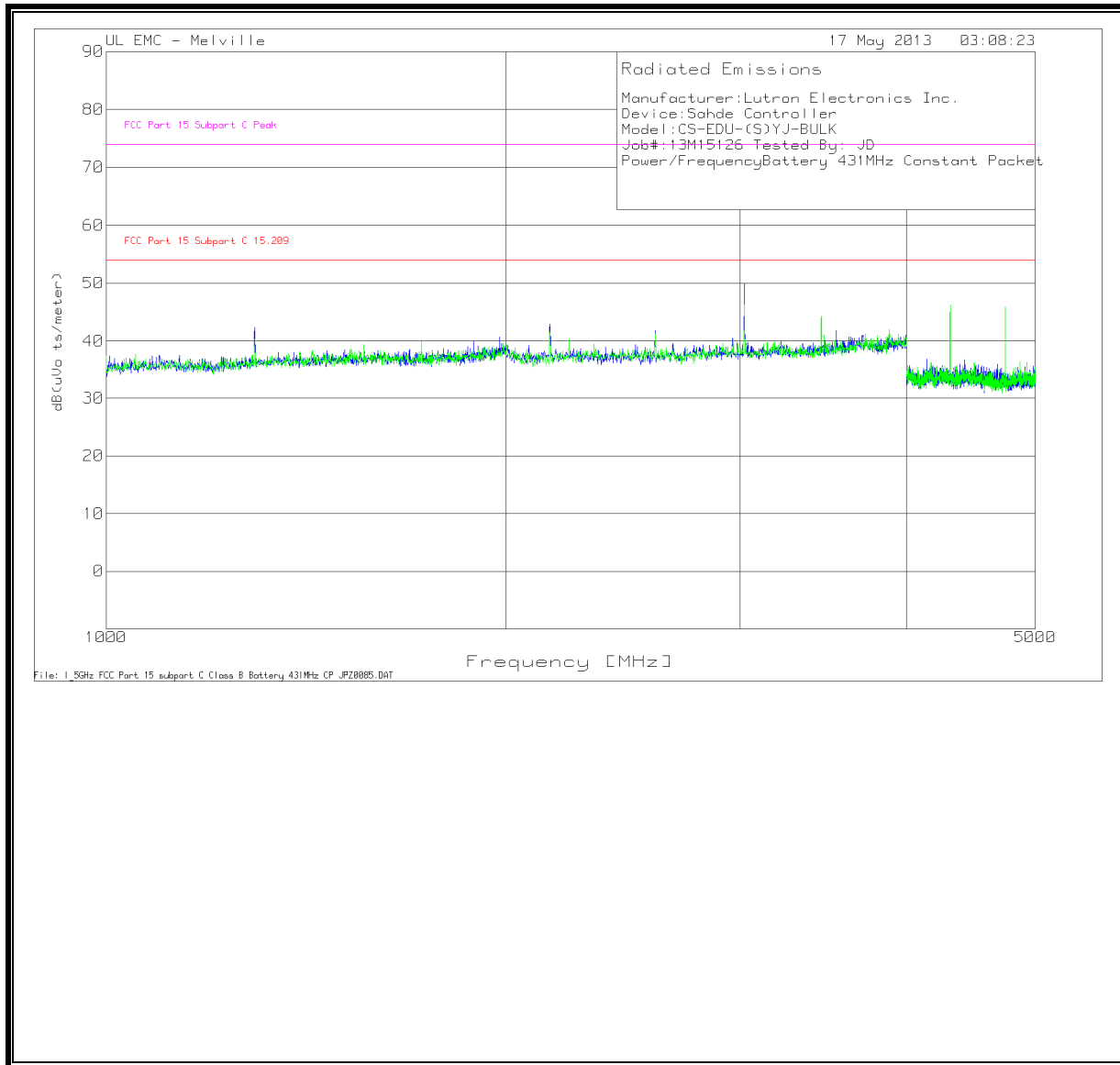
Vertical 200 - 1000MHz

Test Frequency	Meter Reading	Detector	AF-44067 (dB/m)	GL-3M (dB)	DC Corr [dB]	dB (uVolts /meter)	FCC Part 15 Subpart C 15.231	Margin (dB)	FCC Part 15 Subpart C Peak 100.4	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
431.4497	70.76	PK	16.4	1.4	-20.29	*68.27	80.4	-12.13	100.4	-11.84	357	200	Vert

PK - Peak detector

**\*Duty cycle corrected data = - 20.29**

**HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz**



Manufacturer: Lutron Electronics Inc.  
 Device: Shade Controller  
 Model: CS-EDU-(S)YJ-BULK  
 Job#:13M15126 Tested By: JD  
 Power/Frequency: Battery 431MHz Constant Packet

Horizontal 1000 - 2000MHz

Test Frequency	Meter Reading	Detector	AF-51442 (dB/m)	BOMS Factor [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1292.98	60.07	PK	20.5	-44.16	36.41	54	-17.59	74	-37.59	348	164	Horz
1294.523	66.55	PK	20.5	-44.16	42.89	54	-11.11	74	-31.11	56	338	Horz
1725.743	64.68	PK	20.8	-43.82	41.66	54	-12.34	74	-32.34	357	149	Horz

Horizontal 2000 - 4000MHz

Test Frequency	Meter Reading	Detector	AF-48107 (dB/m)	BOMS Factor [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2157.48	62.45	PK	21.4	-43.27	40.58	54	-13.42	74	-33.42	221	390	Horz
2588.81	64.29	PK	21.3	-42.47	43.12	54	-10.88	74	-30.88	120	138	Horz
3020.81	65.77	PK	21.5	-41.63	45.64	54	-8.36	74	-28.36	140	103	Horz
3020.29	65.02	PK	21.5	-41.65	44.87	54	-9.13	74	-29.13	140	103	Horz
3020.627	67.2	PK	21.5	-41.63	47.07	54	-6.93	74	-26.93	61	106	Horz
3452.384	64.43	PK	22.2	-41.26	45.37	54	-8.63	74	-28.63	214	108	Horz
3883.229	62.72	PK	22.6	-41.52	43.8	54	-10.2	74	-30.2	360	152	Horz

Horizontal 4000 - 5000MHz

Test Frequency	Meter Reading	Detector	AF-48106 (dB/m)	BOMS Factor [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4314.704	65.22	PK	27.7	-51.35	41.57	54	-12.43	74	-32.43	226	264	Horz

PK - Peak detector



Manufacturer: Lutron Electronics Inc.

Device: Shade Controller

Model: CS-EDU-(S)YJ-BULK

Job#:13M15126 Tested By: JD

Power/Frequency: Battery 431MHz Constant Packet

Vertical 1000 - 2000MHz

Test Frequency	Meter Reading	Detector	AF-51442 (dB/m)	BOMS Factor [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1294.483	65.52	PK	20.5	-44.16	41.86	54	-12.14	74	-32.14	296	372	Vert
1726.255	67.05	PK	20.8	-43.83	44.02	54	-9.98	74	-29.98	278	371	Vert

PK - Peak detector

Manufacturer: Lutron Electronics Inc.

Device: Shade Controller

Model: CS-EDU-(S)YJ-BULK

Job#:13M15126 Tested By: JD

Power/Frequency: Battery 431MHz Constant Packet

Vertical 2000 - 4000MHz

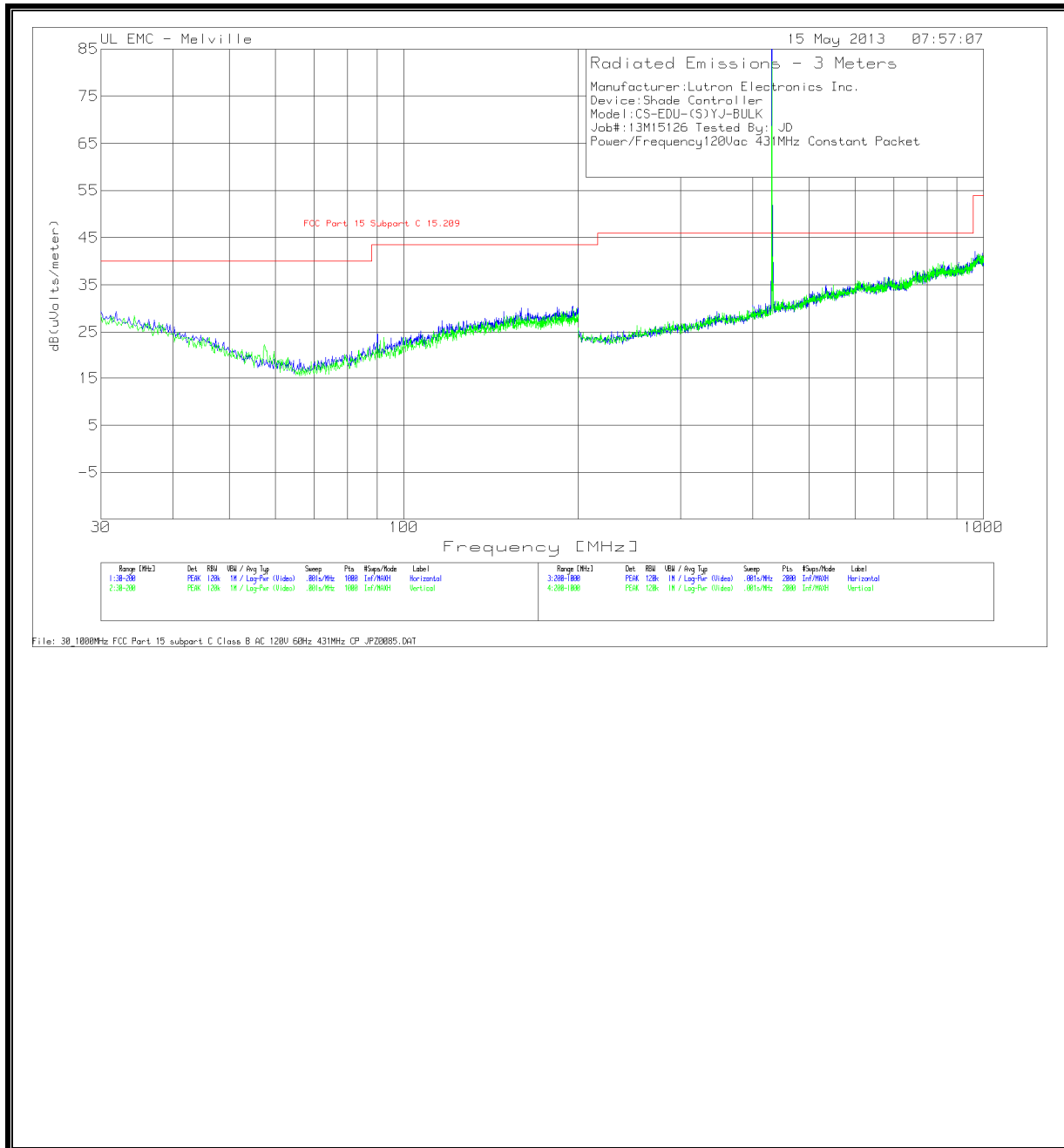
Test Frequency	Meter Reading	Detector	AF-48107 (dB/m)	BOMS Factor [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2157.505	62.63	PK	21	-43.27	40.36	54	-13.64	74	-33.64	299	317	Vert
2588.986	61.06	PK	21.5	-42.47	40.09	54	-13.91	74	-33.91	84	278	Vert
3020.778	62.93	PK	21.7	-41.63	43	54	-11	74	-31	140	123	Vert
3451.898	63.08	PK	22.2	-41.24	44.04	54	-9.96	74	-29.96	50	281	Vert
3883.99	61.14	PK	22.6	-41.48	42.26	54	-11.74	74	-31.74	58	318	Vert

Vertical 4000 - 5000MHz

Test Frequency	Meter Reading	Detector	AF-48106 (dB/m)	BOMS Factor [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4315.391	68.25	PK	27.8	-51.37	44.68	54	-9.32	74	-29.32	3	183	Vert

PK - Peak detector

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



Manufacturer: Lutron Electronics Inc.

Device: Shade Controller

Model: CS-EDU-(S)YJ-BULK

Job#:13M15126 Tested By: JD

Power/Frequency120Vac 431MHz Constant Packet

Horizontal 30 - 200MHz

Test Frequency	Meter Reading	Detector	AF-43441 (dB/m)	GL-3M	DC Corr [dB]	dB(uVolts /meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
31.87	6.02	QP	17.2	0	0	23.22	40	-16.78	62	221	Horz
148.6	7.6	QP	14.7	0.5	0	22.8	43.5	-20.7	0	104	Horz

Horizontal 200 - 1000MHz

Test Frequency	Meter Reading	Detector	AF-44067 (dB/m)	GL-3M	DC Corr [dB]	dB(uVolts /meter)	FCC Part 15 Subpart C 15.231	Margin (dB)	FCC Part 15 Subpart C peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
431.4459	76.44	PK	16.4	1.4	-20.29	*73.73	80.4	-6.67	100.4	-6.38	204	224	Horz

Horizontal 200 - 1000MHz

Test Frequency	Meter Reading	Detector	AF-43441 (dB/m)	GL-3M	DC Corr [dB]	dB(uVolts /meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
754.6162	8.52	QP	21.5	2	0	32.02	46	-13.98	42	387	Horz
967.5325	9.04	QP	23.9	2.3	0	35.24	54	-18.76	217	216	Horz

Vertical 200 - 1000MHz

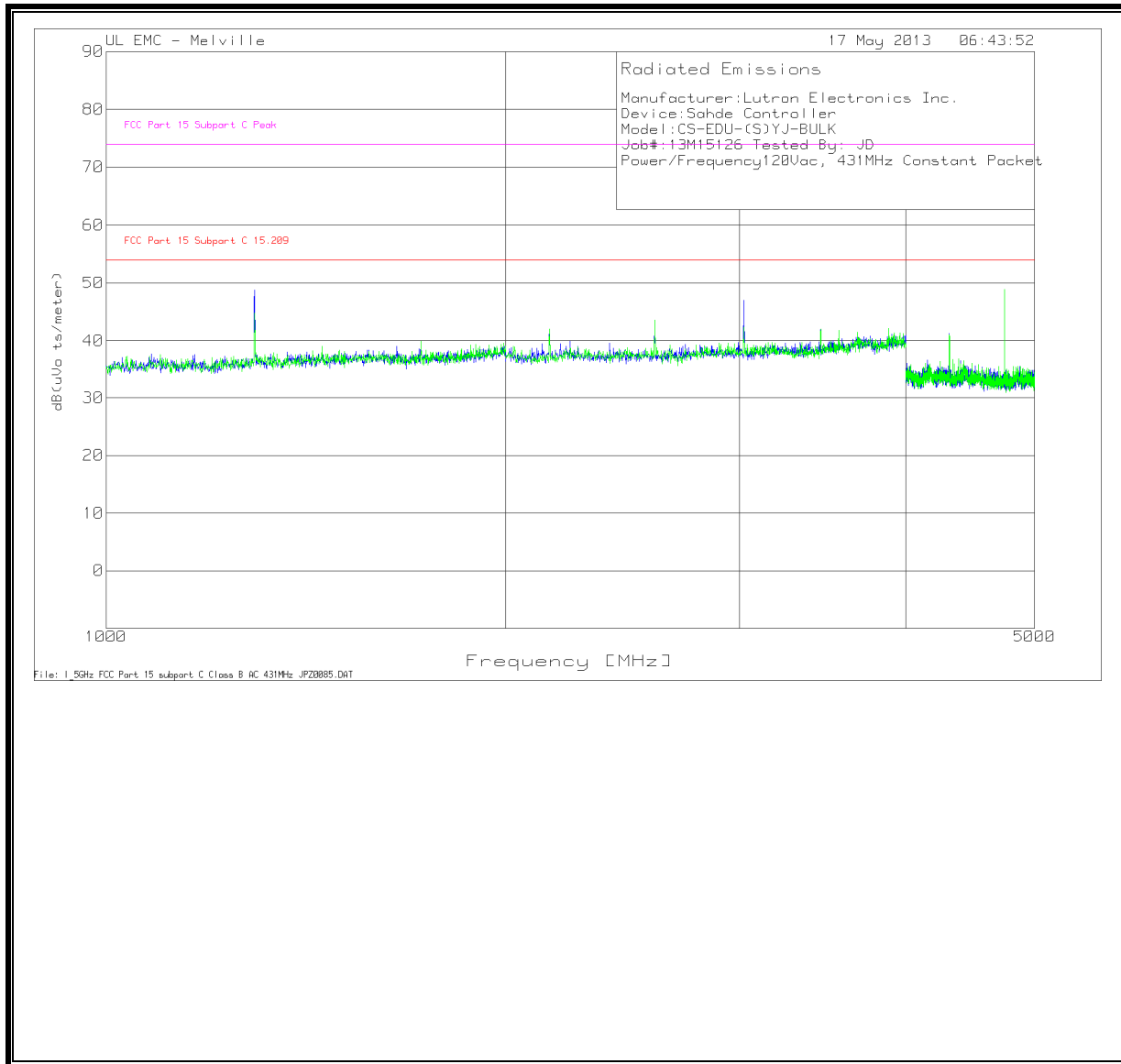
Test Frequency	Meter Reading	Detector	AF-44067 (dB/m)	GL-3M	DC Corr [dB]	dB(uVolts /meter)	FCC Part 15 Subpart C 15.231	Margin (dB)	FCC Part 15 Subpart C peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
431.4459	67.44	PK	16.4	1.4	-20.29	*64.73	80.4	-15.67	100.4	-15.38	266	117	Vert

PK - Peak detector

QP - Quasi-Peak detector

**\*Duty cycle corrected data = - 20.29**

**HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz**



Manufacturer: Lutron Electronics Inc.

Device: Shade Controller

Model: CS-EDU-(S)YJ-BULK

Job#:13M15126 Tested By: JD

Power/Frequency120Vac, 431MHz Constant Packet

Horizontal 1000 - 2000MHz

Test Frequency	Meter Reading	Detector	AF-51442 (dB/m)	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak 74	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1294.463	63.69	PK	20.5	-44.16	40.03	54	-13.97	74	-33.97	204	274	Horz
1725.974	61.64	PK	20.8	-43.83	38.61	54	-15.39	74	-35.39	266	383	Horz

Horizontal 2000 - 4000MHz

Test Frequency	Meter Reading	Detector	AF-48107 (dB/m)	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak 74	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2157.174	61.9	PK	21.4	-43.25	40.05	54	-13.95	74	-33.95	352	233	Horz
2588.685	64.56	PK	21.3	-42.47	43.39	54	-10.61	74	-30.61	207	366	Horz
3020.186	67.51	PK	21.5	-41.66	47.35	54	-6.65	74	-26.65	356	322	Horz
3451.788	64.75	PK	22.2	-41.24	45.71	54	-8.29	74	-28.29	323	375	Horz
3883.547	61.33	PK	22.6	-41.5	42.43	54	-11.57	74	-31.57	201	184	Horz

Horizontal 4000 - 5000MHz

Test Frequency	Meter Reading	Detector	AF-48106 (dB/m)	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak 74	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4314.41	64.67	PK	27.7	-51.35	41.02	54	-12.98	74	-32.98	128	383	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

Manufacturer: Lutron Electronics Inc.

Device: Shade Controller

Model: CS-EDU-(S)YJ-BULK

Job#:13M15126 Tested By: JD

Power/Frequency120Vac, 431MHz Constant Packet

Vertical 1000 - 2000MHz

Test Frequency	Meter Reading	Detector	AF-51442 (dB/m)	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1294.28	72.06	PK	20.5	-44.14	48.42	54	-5.58	74	-25.58	267	273	Vert
1725.683	66.35	PK	20.8	-43.82	43.33	54	-10.67	74	-30.67	67	378	Vert

Vertical 2000 - 4000MHz

Test Frequency	Meter Reading	Detector	AF-48107 (dB/m)	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2157.565	64.97	PK	21	-43.27	42.7	54	-11.3	74	-31.3	335	163	Vert
2588.906	63.82	PK	21.5	-42.47	42.85	54	-11.15	74	-31.15	299	229	Vert
3020.347	71.86	PK	21.7	-41.65	51.91	54	-2.09	74	-22.09	281	131	Vert
3451.728	64.6	PK	22.2	-41.24	45.56	54	-8.44	74	-28.44	102	173	Vert
3883.229	64.24	PK	22.6	-41.52	45.32	54	-8.68	74	-28.68	157	246	Vert

Vertical 4000 - 5000MHz

Test Frequency	Meter Reading	Detector	AF-48106 (dB/m)	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4314.79	69.36	PK	27.8	-51.35	45.81	54	-8.19	74	-28.19	2	316	Vert

PK - Peak detector

QP - Quasi-Peak detector

LnAv - Linear Average detector

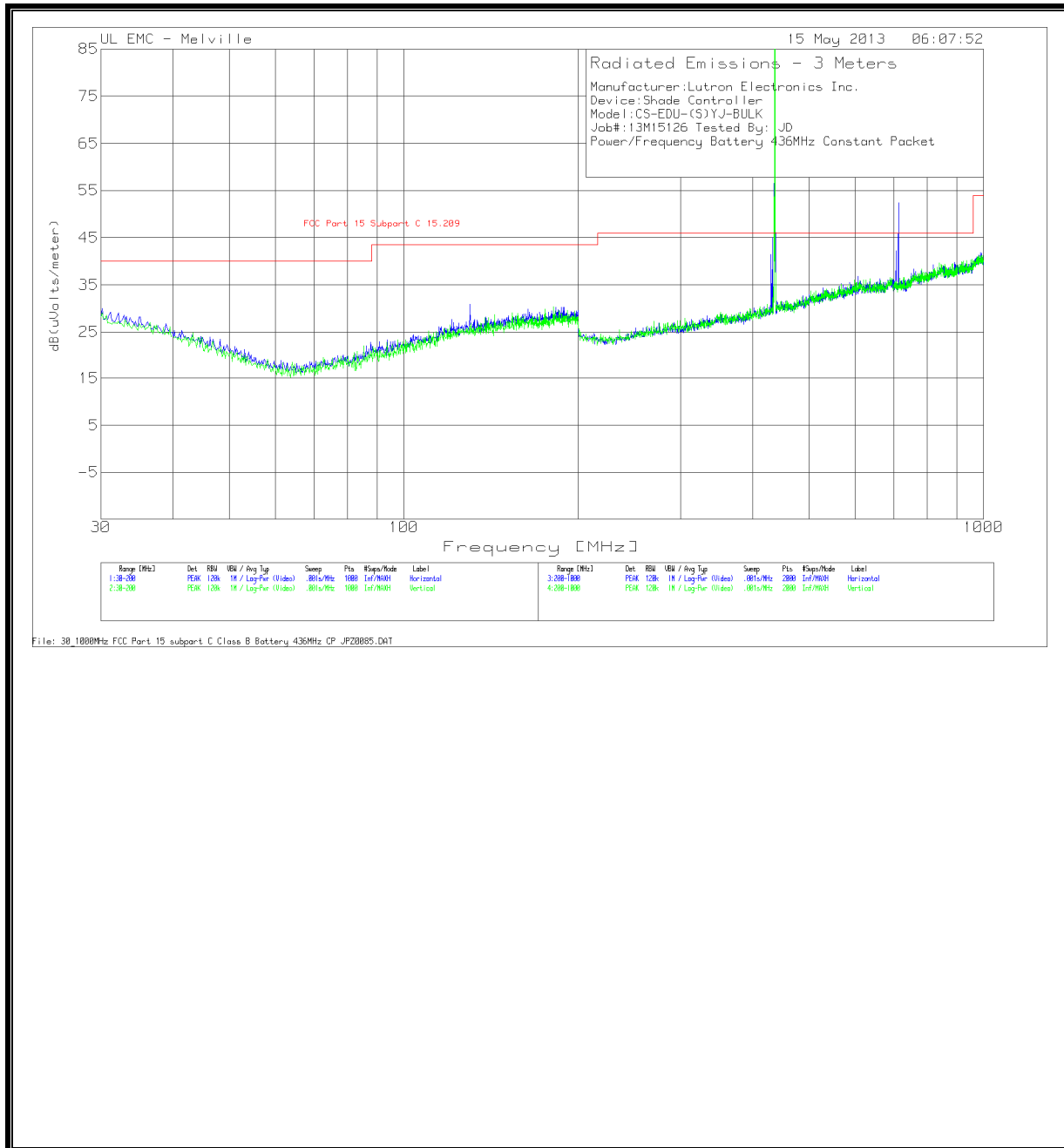
LgAv - Log Average detector

Av - Average detector

CAV - CISPR Average detector

RMS - RMS detection

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





Manufacturer: Lutron Electronics Inc.  
 Device: Shade Controller  
 Model: CS-EDU-(S)YJ-BULK  
 Job#:13M15126 Tested By: JD  
 Power/Frequency :Battery 436MHz Constant Packet

Horizontal 200 - 1000MHz

Test Frequency	Meter Reading	Detector	AF-44067	GL-3M	DC Corr [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
430.1	7.96	QP	16.3	1.4	0	25.66	46	-20.34	216	192	Horz
432	9.54	QP	16.4	1.5	0	27.44	46	-18.56	38	210	Horz
707	8.3	QP	20.2	1.7	0	30.2	46	-15.8	110	162	Horz
713.4	18.3	QP	20.3	1.8	0	40.4	46	-5.6	117	334	Horz

Test Frequency	Meter Reading	Detector	AF-44067	GL-3M	DC Corr [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.231	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
436.5	74.24	PK	16.6	1.5	-20.29	*71.83	80.7	-8.87	100.7	-8.58	224	184	Horz

Vertical 200 - 1000MHz

Test Frequency	Meter Reading	Detector	AF-44067	GL-3M	DC Corr [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.231	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
436.5	69.35	PK	16.6	1.5	-20.29	*66.94	80.7	-13.76	100.7	-13.47	122	234	Vert

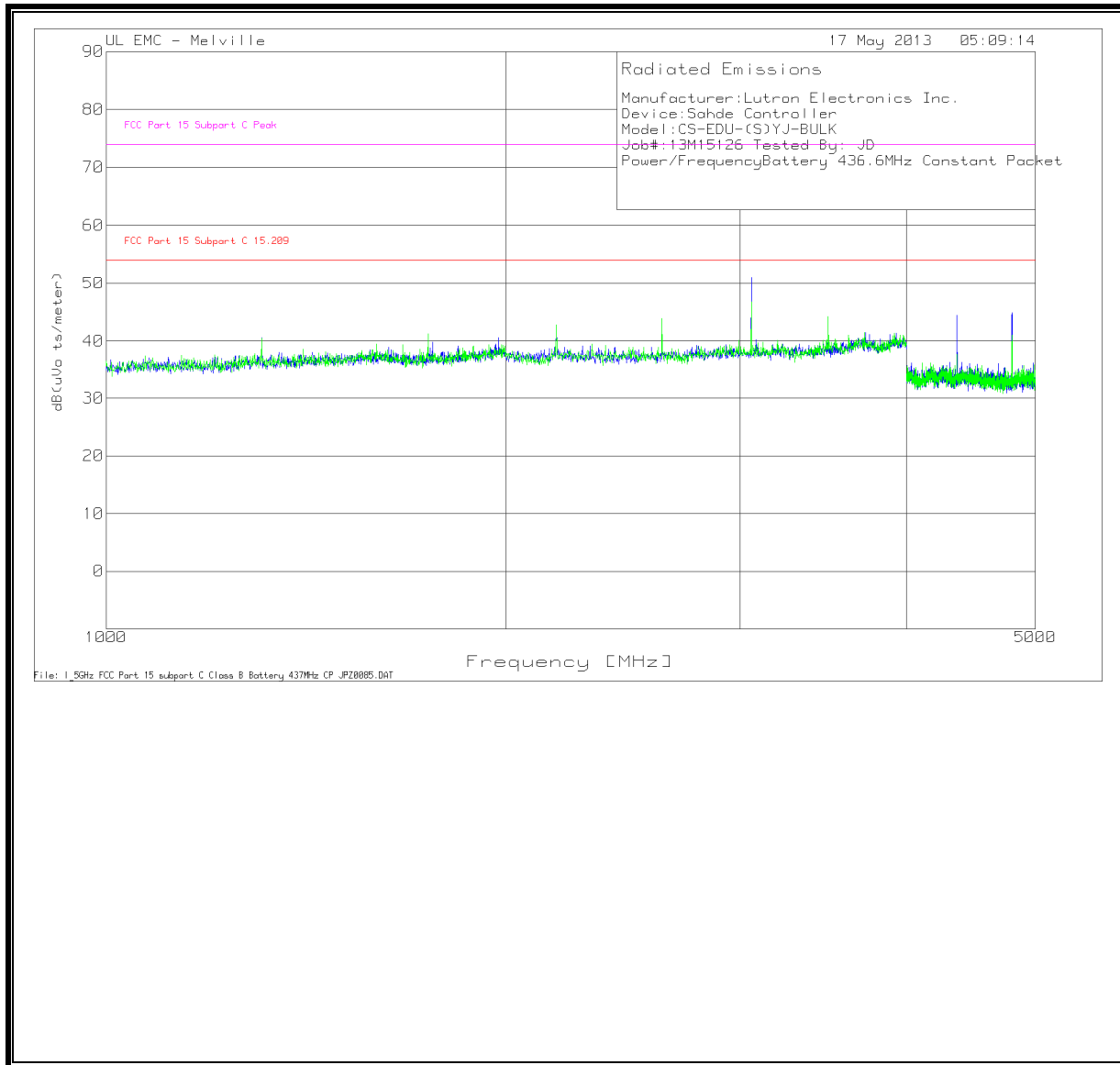
Vertical 200 - 1000MHz

Test Frequency	Meter Reading	Detector	AF-44067	GL-3M	DC Corr [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
624.6	8.3	QP	19.9	1.7	0	29.9	46	-16.1	166	143	Vert
982	9.15	QP	24.7	2.2	0	36.05	54	-17.95	187	162	Vert

PK - Peak detector  
 QP - Quasi-Peak detector  
 LnAv - Linear Average detector  
 LgAv - Log Average detector

\*Duty cycle corrected data = - 20.29

**HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz**



Manufacturer: Lutron Electronics Inc.  
 Device: Shade Controller  
 Model: CS-EDU-(S)YJ-BULK  
 Job#:13M15126 Tested By: JD  
 Power/Frequency: Battery 436.6MHz Constant Packet

Horizontal 1000 - 2000MHz

Test Frequency	Meter Reading	Detector	AF-51442 (dB/m)	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1309.541	65.56	PK	20.5	-44.23	41.83	54	-12.17	74	-32.17	126	171	Horz
1746.581	62.52	PK	20.8	-43.52	39.8	54	-14.2	74	-34.2	235	378	Horz

Horizontal 2000 - 4000MHz

Test Frequency	Meter Reading	Detector	AF-48107 (dB/m)	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2182.699	66	PK	21.4	-43.14	44.26	54	-9.74	74	-29.74	312	146	Horz
2619.281	64.2	PK	21.4	-42.61	42.99	54	-11.01	74	-31.01	244	372	Horz
3056	66.85	PK	21.6	-41.67	46.78	54	-7.22	74	-27.22	285	292	Horz
3494.425	60.36	PK	22.2	-41.51	41.05	54	-12.95	74	-32.95	60	271	Horz
3929.421	62.54	PK	22.7	-41.47	43.77	54	-10.23	74	-30.23	214	314	Horz

Horizontal 4000 - 5000MHz

Test Frequency	Meter Reading	Detector	AF-48106 (dB/m)	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4366.261	68.74	PK	27.6	-51.54	44.8	54	-9.2	74	-29.2	112	248	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

Manufacturer: Lutron Electronics Inc.  
 Device: Shade Controller  
 Model: CS-EDU-(S)YJ-BULK  
 Job#:13M15126 Tested By: JD  
 Power/Frequency: Battery 436.6MHz Constant Packet

Vertical 1000 - 2000MHz

Test Frequency	Meter Reading	Detector	AF-51442 (dB/m)	BOMS Factor [dB]	dB(uVolts /meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1309	64.53	PK	20.5	-44.23	40.8	54	-13.2	74	-33.2	254	400	Vert
1746	66.82	PK	20.8	-43.51	44.11	54	-9.89	74	-29.89	91	385	Vert

Vertical 2000 - 4000MHz

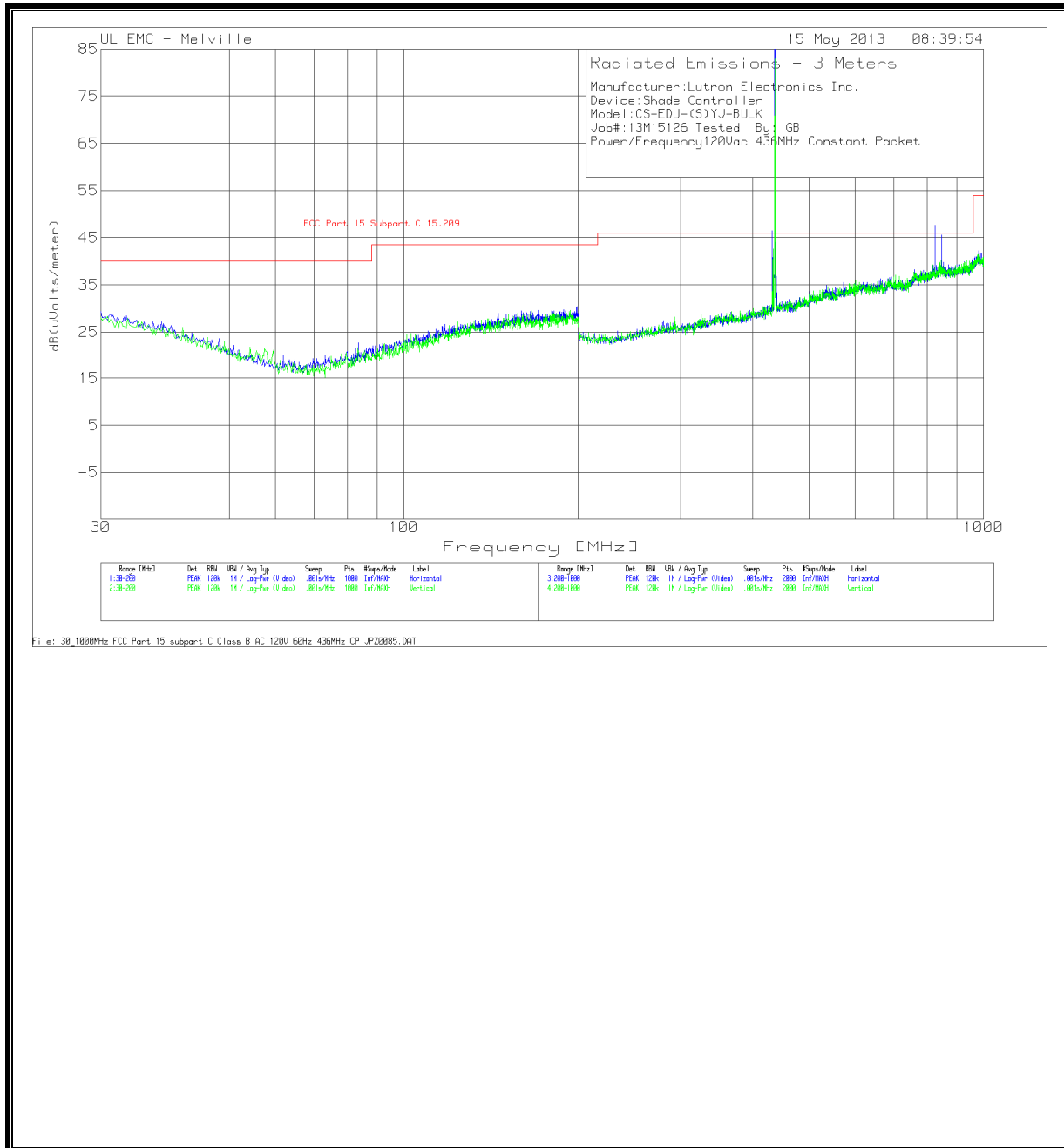
Test Frequency	Meter Reading	Detector	AF-48107 (dB/m)	BOMS Factor [dB]	dB(uVolts /meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2183	66.6	PK	21.2	-43.13	44.67	54	-9.33	74	-29.33	17	309	Vert
2619	63.02	PK	21.4	-42.58	41.84	54	-12.16	74	-32.16	217	231	Vert
3056	70	PK	21.8	-41.67	50.13	54	-3.87	74	-23.87	214	133	Vert
3493.062	66.72	PK	22.4	-41.47	47.65	54	-6.35	74	-26.35	250	324	Vert
3929	65.93	PK	22.7	-41.46	47.17	54	-6.83	74	-26.83	17	226	Vert

Vertical 4000 - 5000MHz

Test Frequency	Meter Reading	Detector	AF-48106 (dB/m)	BOMS Factor [dB]	dB(uVolts /meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4366.301	69.68	PK	27.7	-51.54	45.84	54	-8.16	74	-28.16	0	316	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

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



Manufacturer: Lutron Electronics Inc.

Device: Shade Controller

Model: CS-EDU-(S)YJ-BULK

Job#:13M15126 Tested By: GB

Power/Frequency: 120Vac 436MHz Constant Packet

Horizontal 200 - 1000MHz

Test Frequency	Meter Reading	Detector	AF-44067 (dB/m)	GL-3M	DC Corr [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.231	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
436.6263	74.86	PK	16.6	1.5	-20.29	*72.45	80.7	-8.25	100.7	-8.25	198	209	Horz

Horizontal 200 - 1000MHz

Test Frequency	Meter Reading	Detector	AF-44067 (dB/m)	GL-3M	DC Corr [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
431	7.54	QP	16.3	1.4	0	25.24	46	-20.76	62	351	Horz
438.5	7.66	QP	16.6	1.5	0	25.76	46	-20.24	229	315	Horz
824.7	8.57	QP	22.4	2.1	0	33.07	46	-12.93	104	277	Horz
864	8.57	QP	22.4	2.3	0	33.27	46	-12.73	60	197	Horz

Vertical 200 - 1000MHz

Test Frequency	Meter Reading	Detector	AF-44067 (dB/m)	GL-3M	DC Corr [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.231	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
436.6263	66.3	PK	16.6	1.5	-20.29	*63.89	80.7	-16.81	100.7	-16.52	257	132	Vert

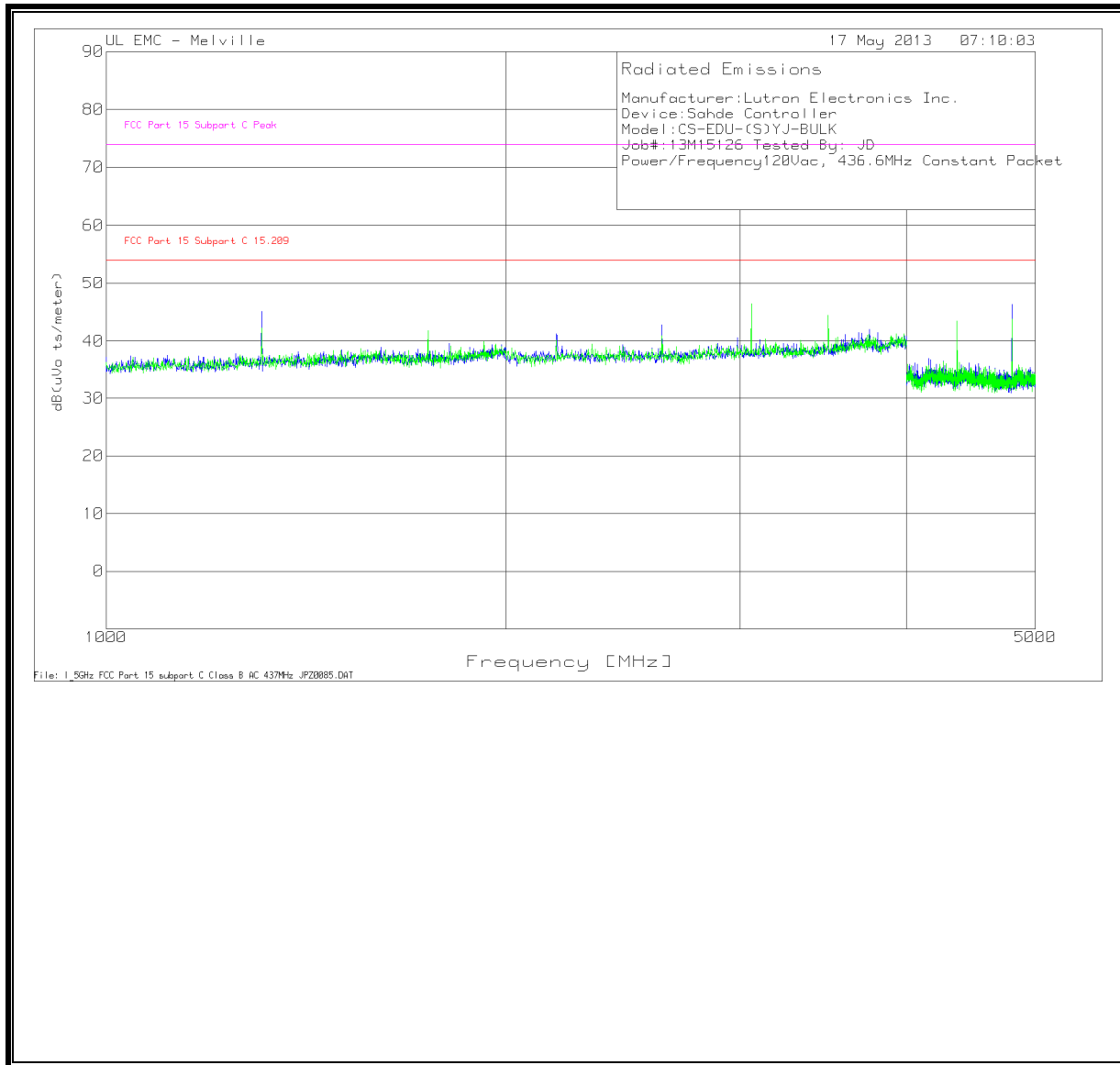
Test Frequency	Meter Reading	Detector	AF-44067 (dB/m)	GL-3M	DC Corr [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
433.7	7.9	QP	16.4	1.4	0	25.7	46	-20.3	251	121	Vert

PK - Peak detector

QP - Quasi-Peak detector

**\*Duty cycle corrected data = - 20.29**

**HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz**



Manufacturer: Lutron Electronics Inc.

Device: Shade Controller

Model: CS-EDU-(S)YJ-BULK

Job#:13M15126 Tested By: JD

Power/Frequency: 120Vac, 436.6MHz Constant Packet

Horizontal 1000 - 2000MHz

Test Frequency	Meter Reading	Detector	AF-51442 (dB/m)	BOMS Factor [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1309	70.24	PK	20.5	-44.23	46.51	54	-7.49	74	-27.49	164	241	Horz
1746	64.86	PK	20.8	-43.51	42.15	54	-11.85	74	-31.85	211	160	Horz

Horizontal 2000 - 4000MHz

Test Frequency	Meter Reading	Detector	AF-48107 (dB/m)	BOMS Factor [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2183	64.41	PK	21.4	-43.13	42.68	54	-11.32	74	-31.32	198	296	Horz
2619	63.34	PK	21.4	-42.58	42.16	54	-11.84	74	-31.84	344	142	Horz
3056	67.3	PK	21.6	-41.67	47.23	54	-6.77	74	-26.77	248	246	Horz
3492.501	65.99	PK	22.2	-41.45	46.74	54	-7.26	74	-27.26	347	368	Horz
3929	64.12	PK	22.7	-41.46	45.36	54	-8.64	74	-28.64	110	207	Horz

Horizontal 4000 - 5000MHz

Test Frequency	Meter Reading	Detector	AF-48106 (dB/m)	BOMS Factor [dB]	dB (uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4366	67.64	PK	27.6	-51.54	43.7	54	-10.3	74	-30.3	11	261	Horz

PK - Peak detector

QP - Quasi-Peak detector

LnAv - Linear Average detector

LgAv - Log Average detector

Av - Average detector



Manufacturer: Lutron Electronics Inc.

Device: Shade Controller

Model: CS-EDU-(S)YJ-BULK

Job#:13M15126 Tested By: JD

Power/Frequency: 120Vac, 436.6MHz Constant Packet

Vertical 1000 - 2000MHz

Test Frequency	Meter Reading	Detector	AF-51442 (dB/m)	BOMS Factor [dB]	dB(uVolts /meter)	FCC Part 15 Subpart C	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
1309	65.46	PK	20.5	-44.23	41.73	54	-12.27	74	-32.27	181	107	Vert
1746	66.46	PK	20.8	-43.51	43.75	54	-10.25	74	-30.25	247	355	Vert

Vertical 2000 - 4000MHz

Test Frequency	Meter Reading	Detector	AF-48107 (dB/m)	BOMS Factor [dB]	dB(uVolts /meter)	FCC Part 15 Subpart C	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
2183	65.96	PK	21.2	-43.13	44.03	54	-9.97	74	-29.97	49	202	Vert
2619	67.48	PK	21.4	-42.58	46.3	54	-7.7	74	-27.7	271	256	Vert
3056	66.35	PK	21.8	-41.67	46.48	54	-7.52	74	-27.52	302	338	Vert
3492.581	63.1	PK	22.4	-41.46	44.04	54	-9.96	74	-29.96	117	185	Vert
3929	64.3	PK	22.7	-41.46	45.54	54	-8.46	74	-28.46	0	184	Vert

Vertical 4000 - 5000MHz

Test Frequency	Meter Reading	Detector	AF-48106 (dB/m)	BOMS Factor [dB]	dB(uVolts /meter)	FCC Part 15 Subpart C	Margin (dB)	FCC Part 15 Subpart C Peak	Margin (dB)	Azimuth [Degs]	Height [cm]	Polarity
4366.301	68.34	PK	27.7	-51.54	44.5	54	-9.5	74	-29.5	6	151	Vert

PK - Peak detector

QP - Quasi-Peak detector

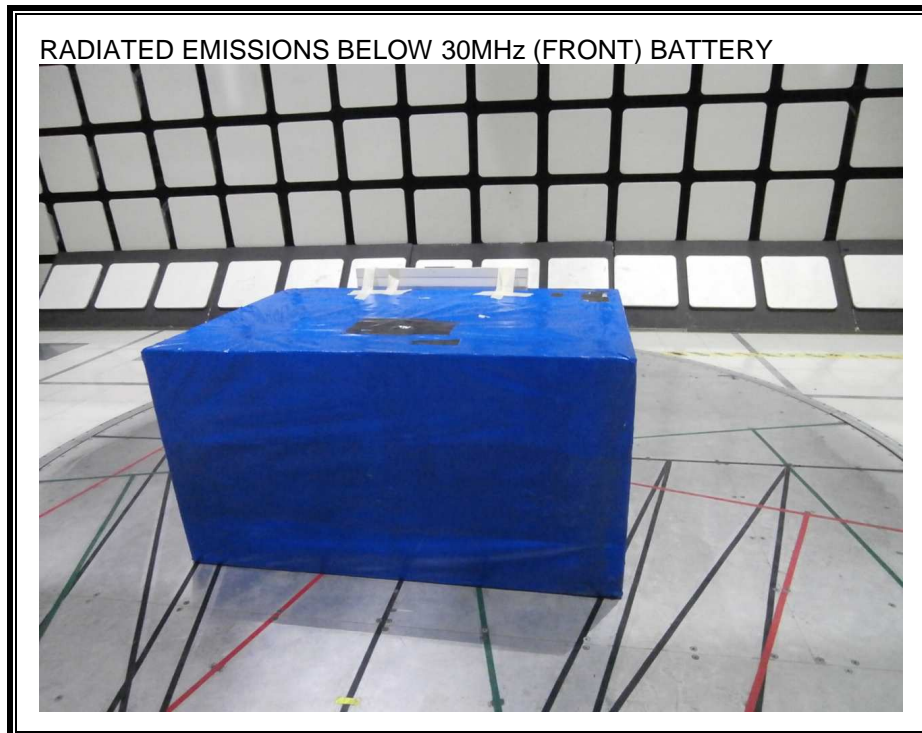
LnAv - Linear Average detector

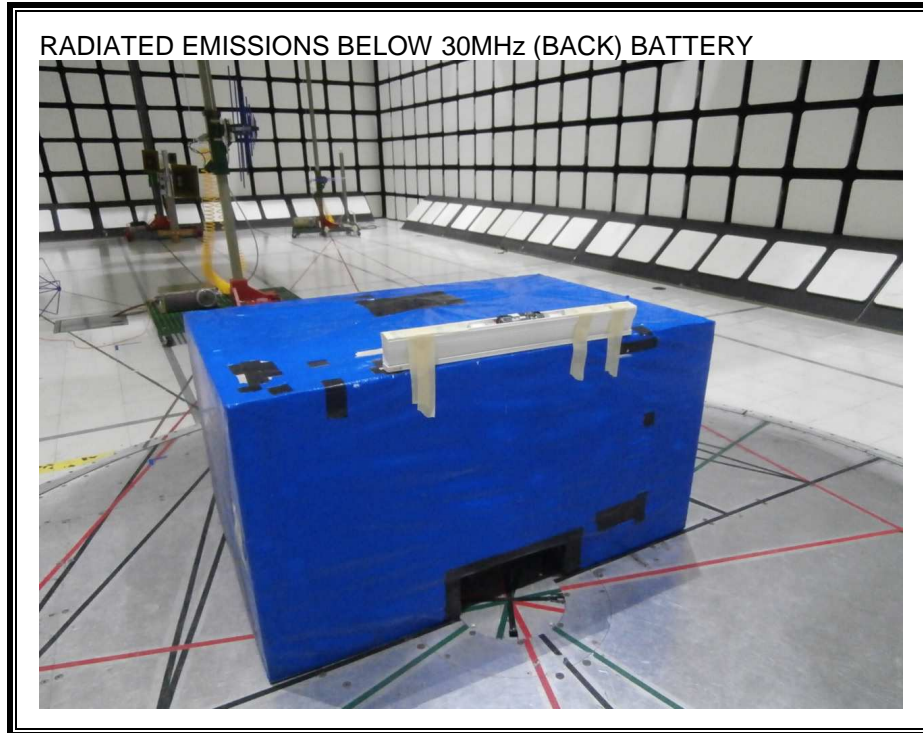
LgAv - Log Average detector

Av - Average detector

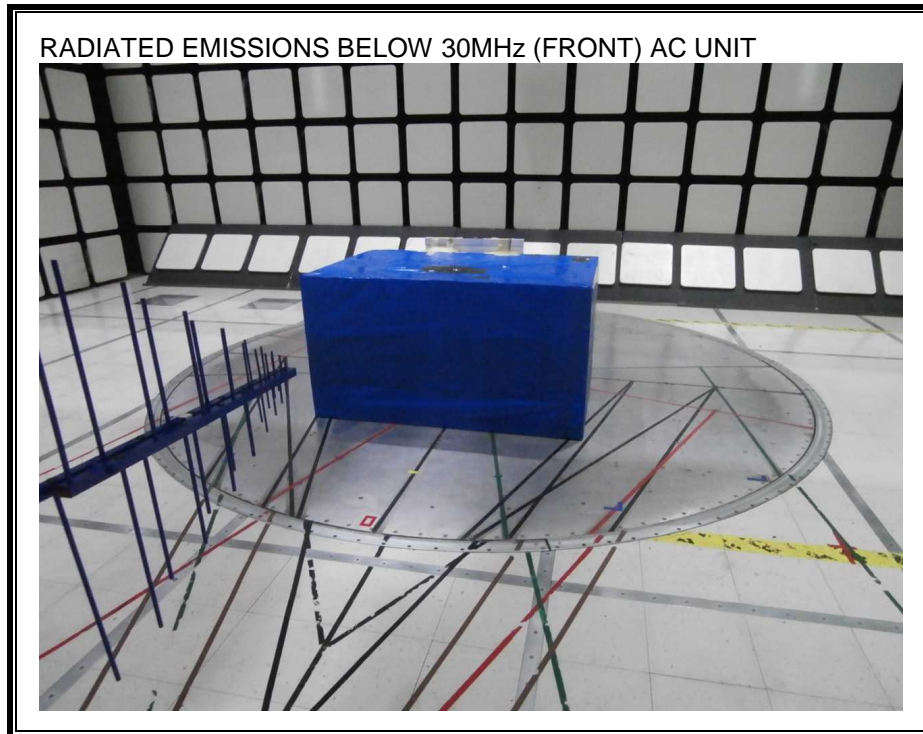
## 8. SETUP PHOTOS

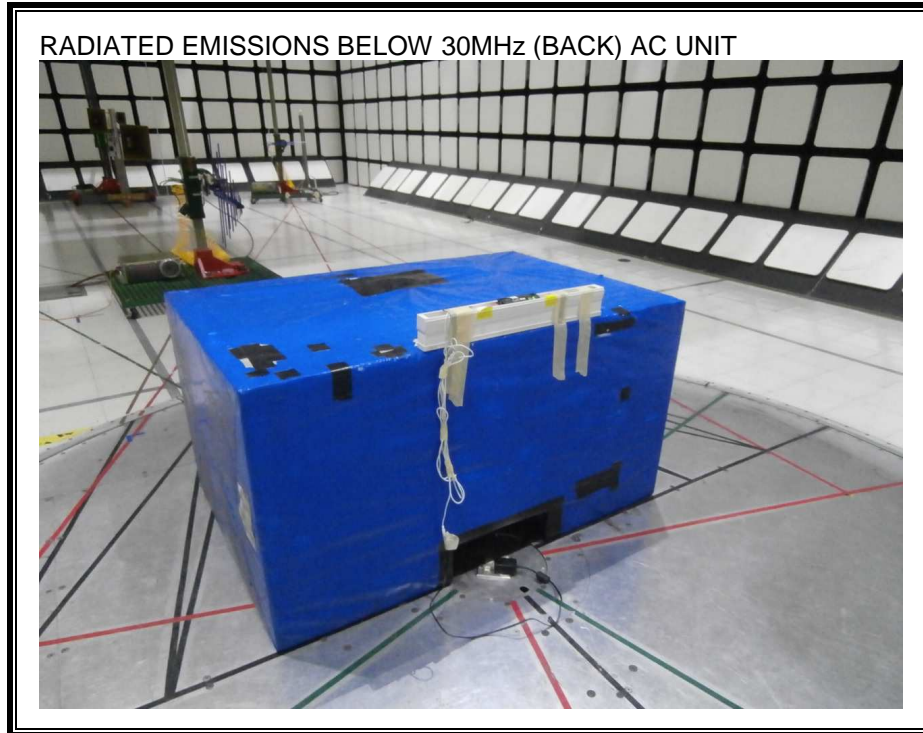
### RADIATED EMISSION BELOW 30 MHz



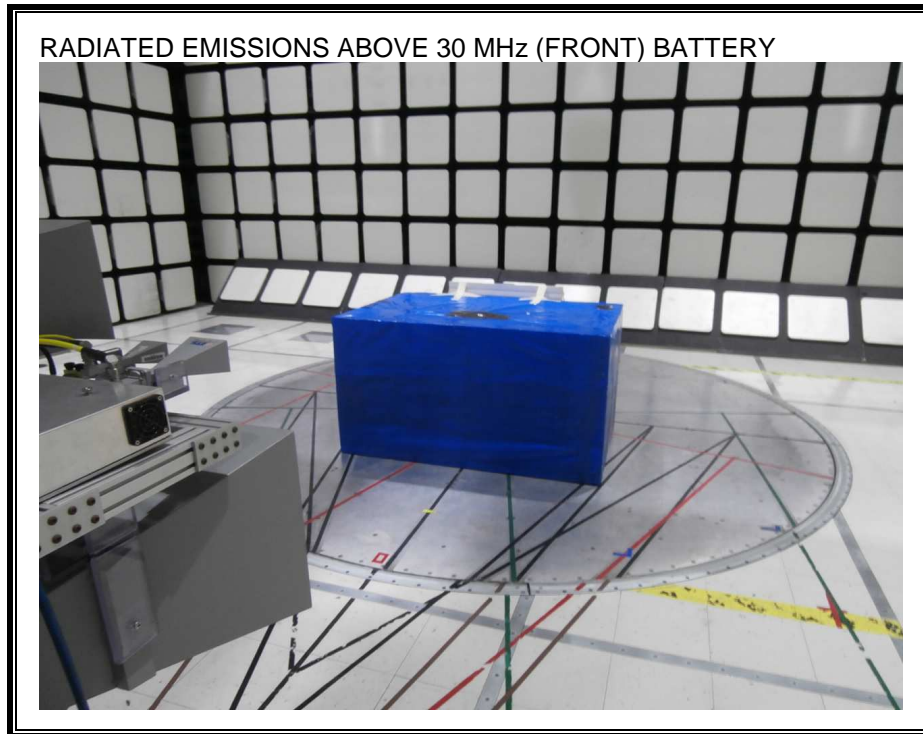


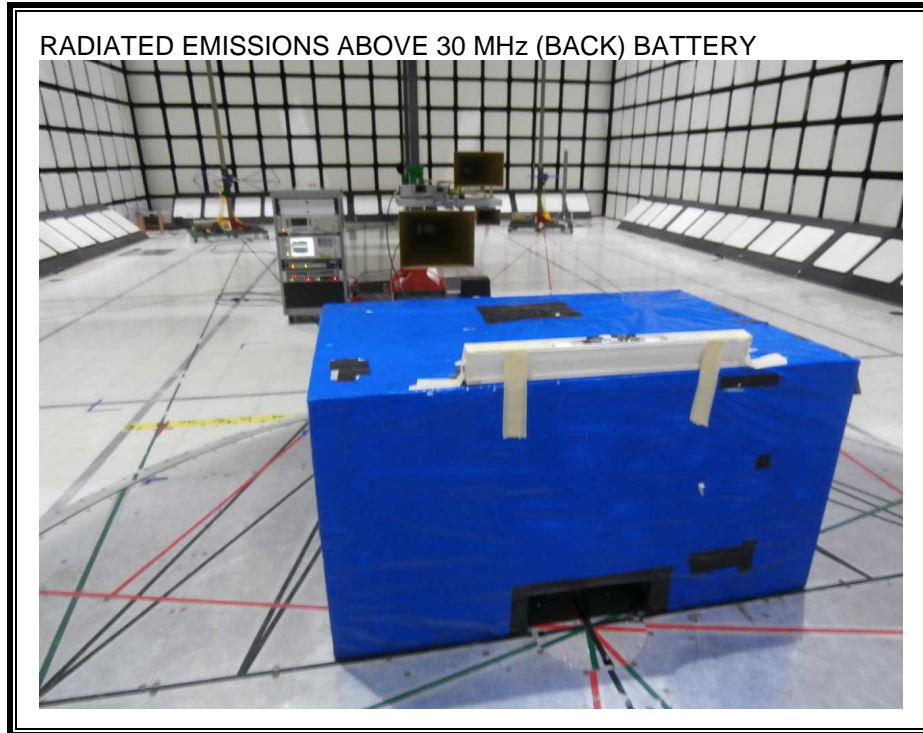
**RADIATED EMISSION BELOW 30 MHz**



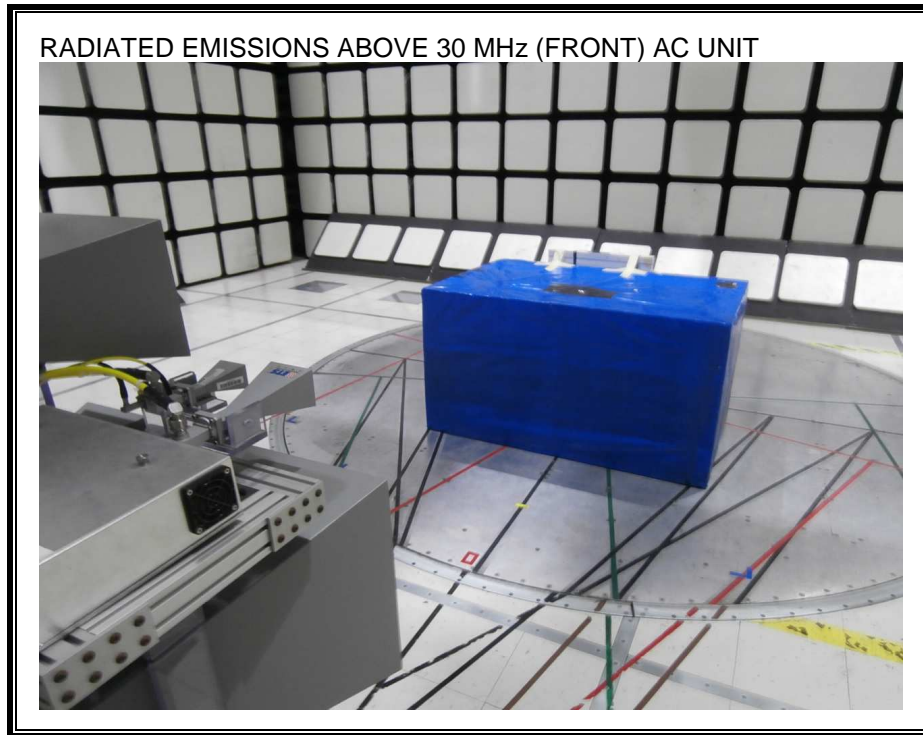


**RADIATED EMISSION ABOVE 30 MHz**

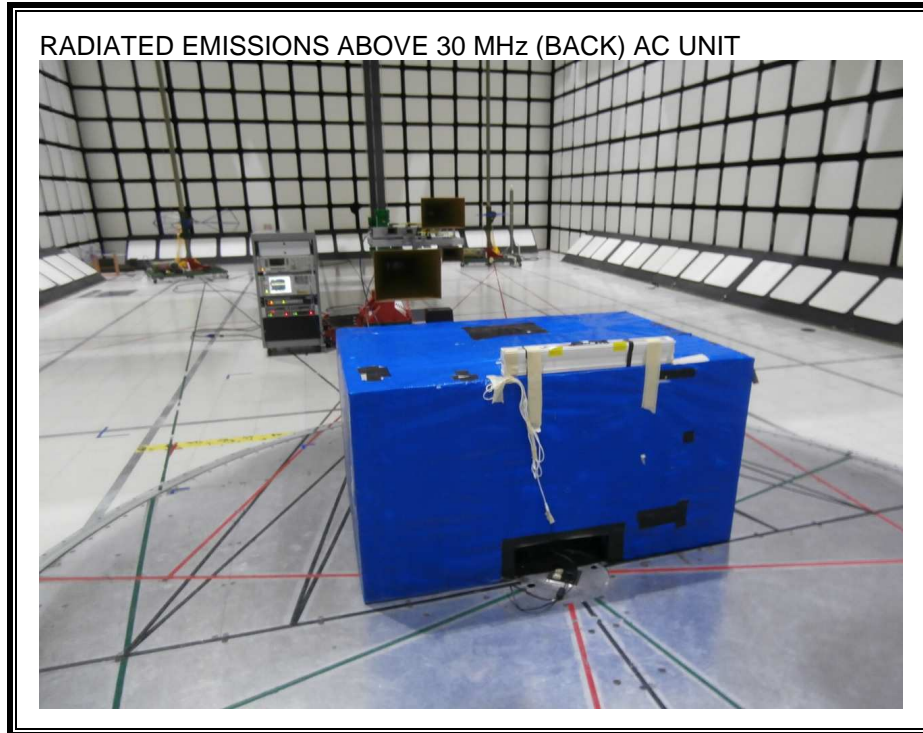




**RADIATED EMISSION ABOVE 30 MHz**







**END OF REPORT**