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

CERTIFICATION TEST REPORT

FOR

EUT

MODEL NUMBER: LRF2-SSW

FCC ID: JPZ0090
IC: 2851A-JPZ0090

REPORT NUMBER: 1001550724

ISSUE DATE: 2012-10-02

Prepared for
LUTRON ELECTRONICS CO INC
7200 SUTER RD
COOPERSBURG , PA 18036 USA

Prepared by
UL LLC
1285 WALT WHITMAN RD.
MELVILLE, NY 11747, U.S.A.
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NVLAP LAB CODE 100255-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	2012-10-02	Initial Issue	B. DeLisi

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Lutron Electronics Inc.
7200 Suter Rd
Coopersburg , PA 18036 USA

EUT DESCRIPTION: Radio Shadow Sensor

MODEL: LRF2-SSW

SERIAL NUMBER: Non-Serialized production unit

DATE TESTED: 2012-09-24 through 2012-09-25

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:

Joseph Danisi
WiSE Project Lead
UL LLC

Tested By:

Bob DeLisi
WiSE Principle Engineer
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, 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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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 light sensor intended for lighting applications.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral antenna.

5.3. SOFTWARE AND FIRMWARE

The test utility software used during testing was as follows:
FCC test code rev. 0794346
FCC "As-Is" code rev. 0794347

5.4. WORST-CASE CONFIGURATION AND MODE

Testing was conducted at the low and high channels and tested in the worst case orientation determined from preliminary testing. The X-axis was considered the worst case orientation.

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Not Applicable.

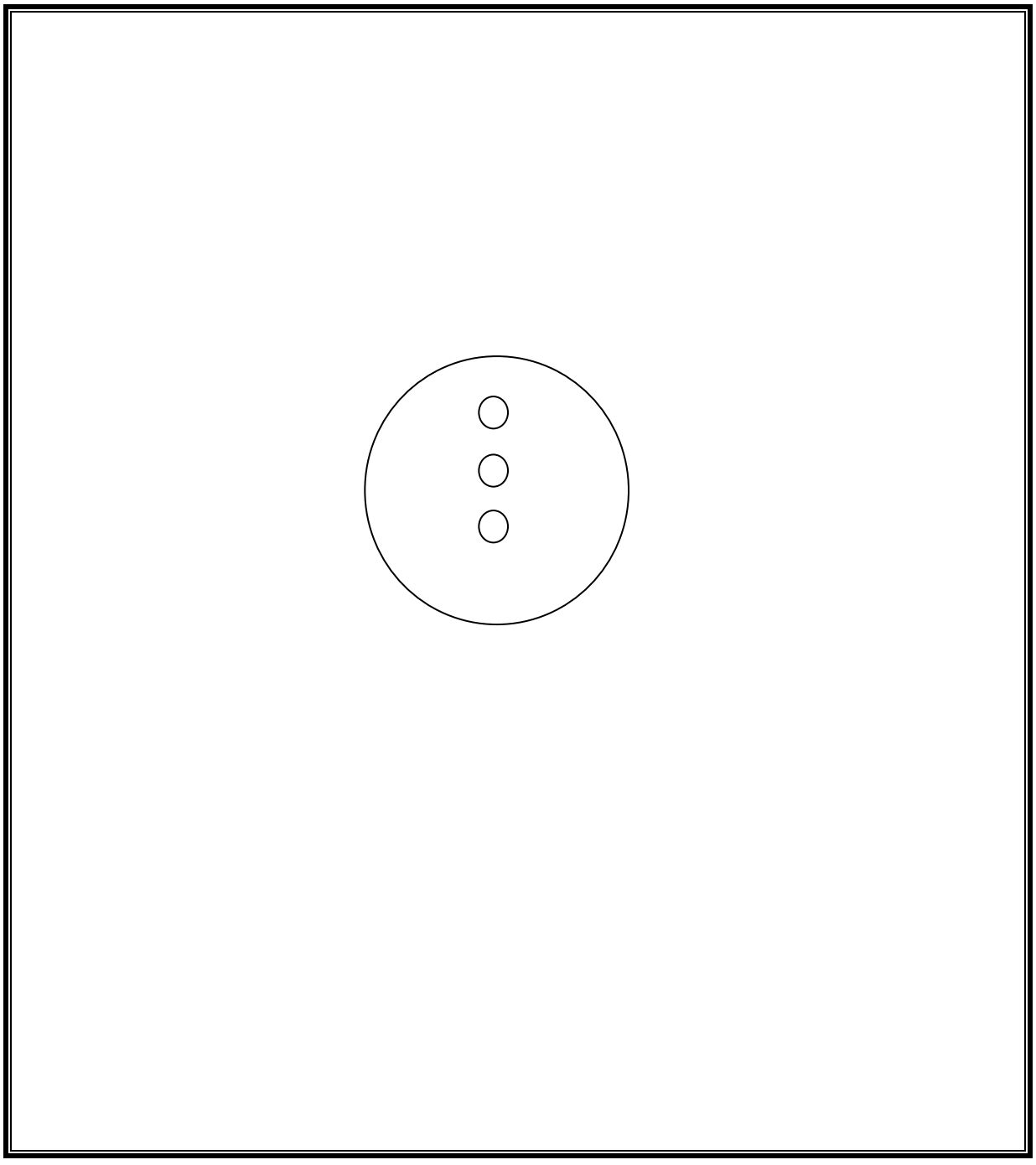
I/O CABLES

Not Applicable.

TEST SETUP

The EUT is a stand-alone device.

SETUP DIAGRAM FOR TESTS



6. ANTENNA PORT TEST RESULTS

6.1. 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 100 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 greater than 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

No non-compliance noted:

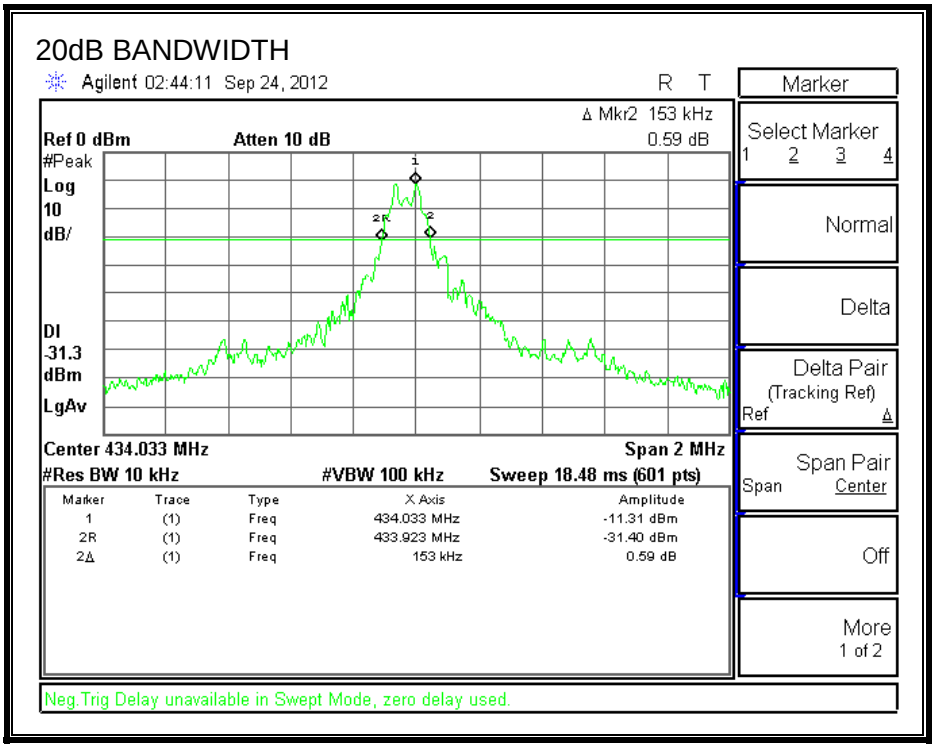
20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
434.03	153	1085.075	-932.075

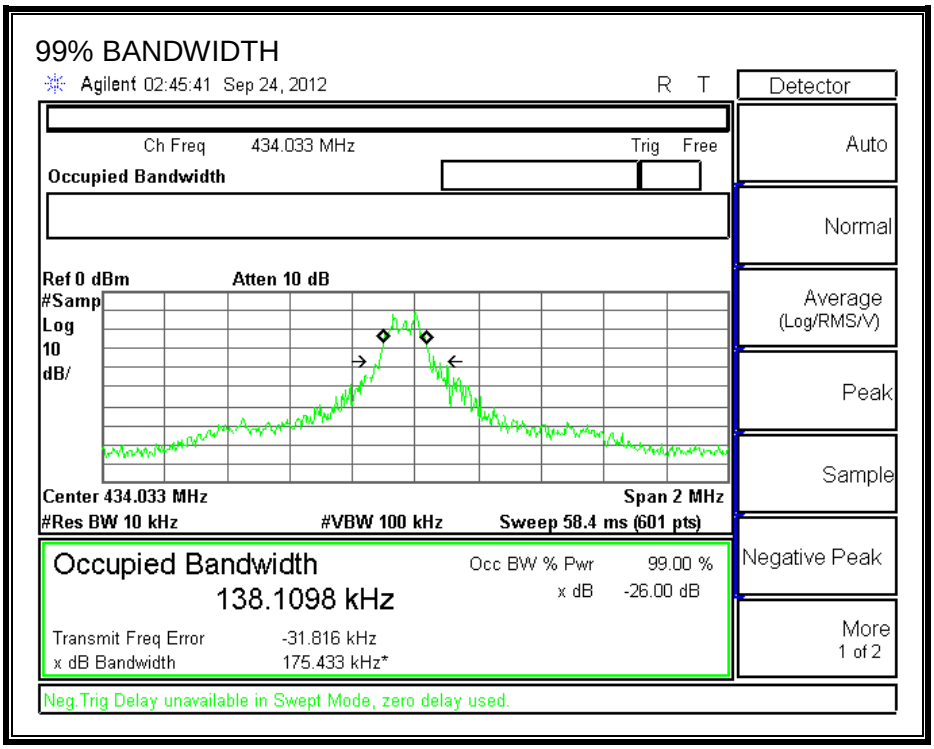
99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
434.03	138.1	1085.075	-946.975

20dB BANDWIDTH



99% BANDWIDTH



6.2. 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 1 MHz and the VBW is set to 1 MHz. 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

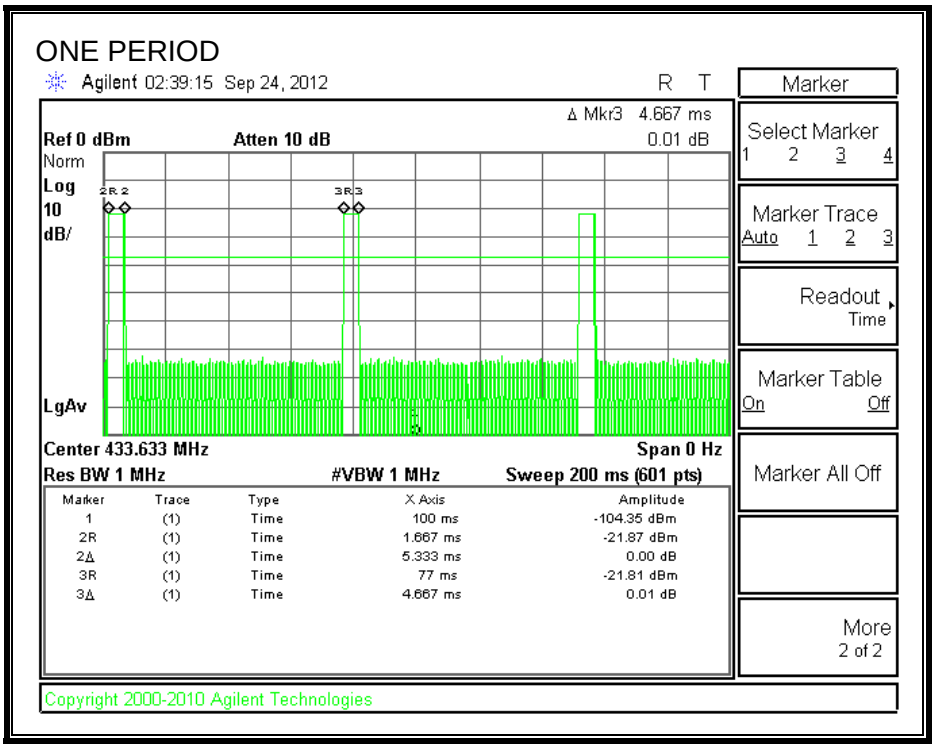
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is
(# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

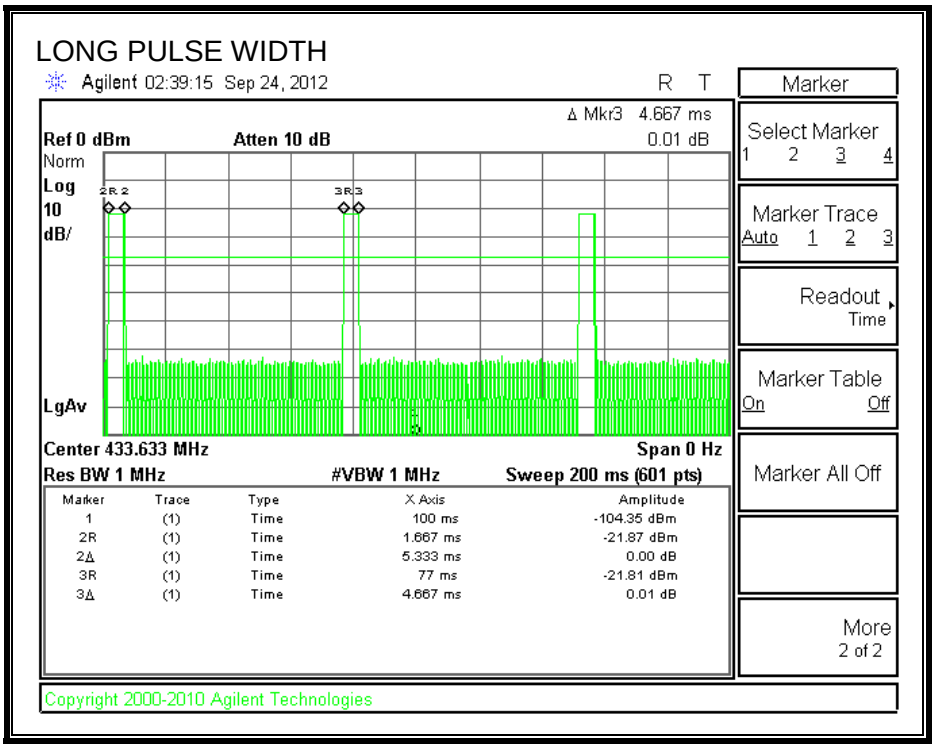
No non-compliance noted:

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	5.333	1	4.67	1	0.100	-20.00

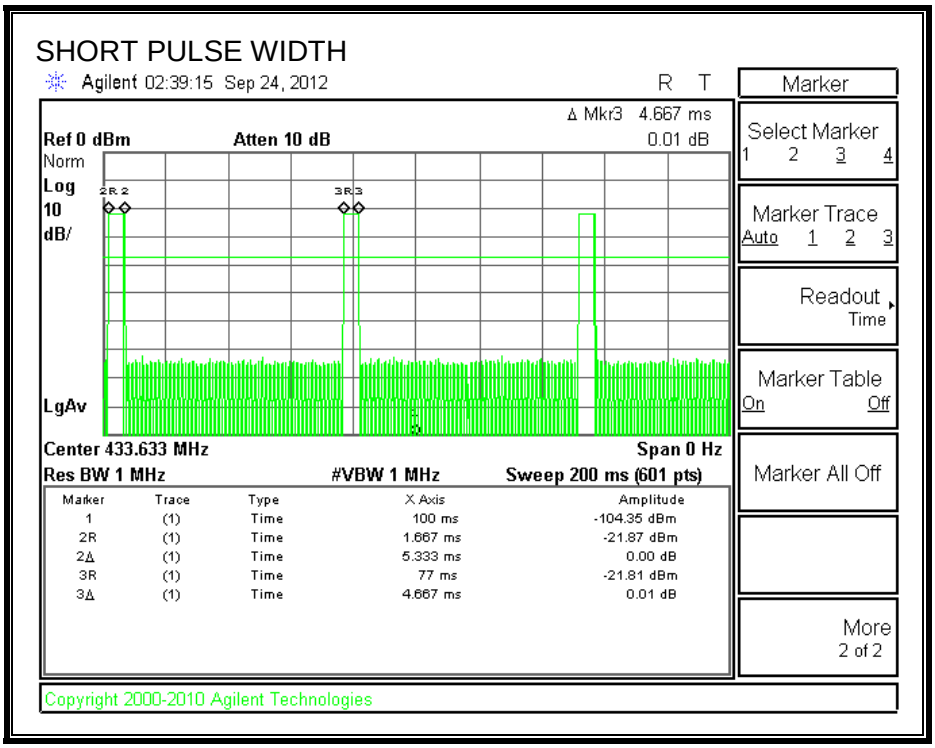
ONE PERIOD



LONG PULSE WIDTH



SHORT PULSE WIDTH



6.3. TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)

IC A1.1.1 (b)

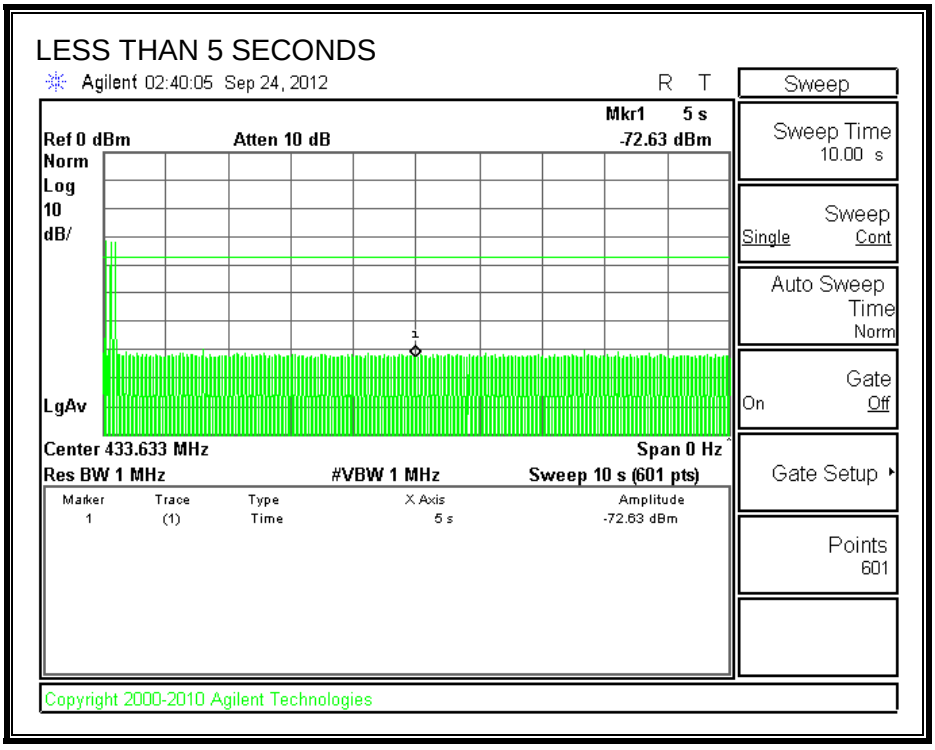
A transmitter activated automatically shall cease transmission within 5 seconds after activation.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 1 MHz and the VBW is set to 1 MHz. The sweep time is set to 10 seconds and the span is set to 0 Hz.

RESULTS

No non-compliance noted:



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 3,7501	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.

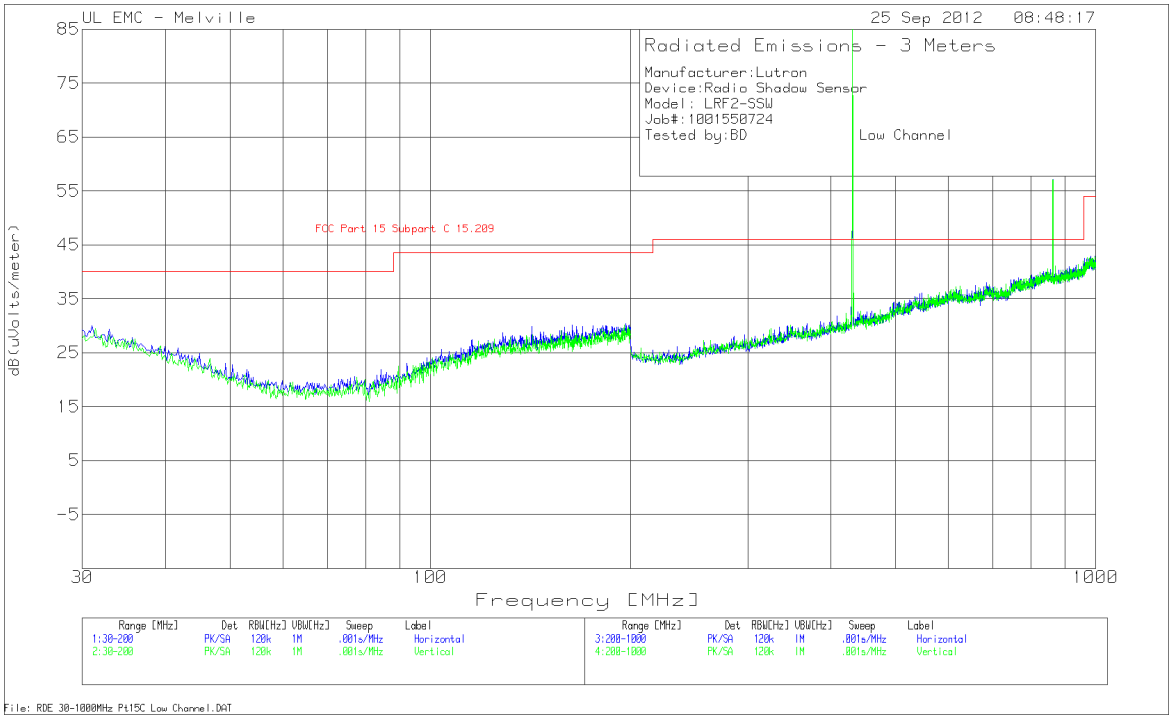
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

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) – Low Channel

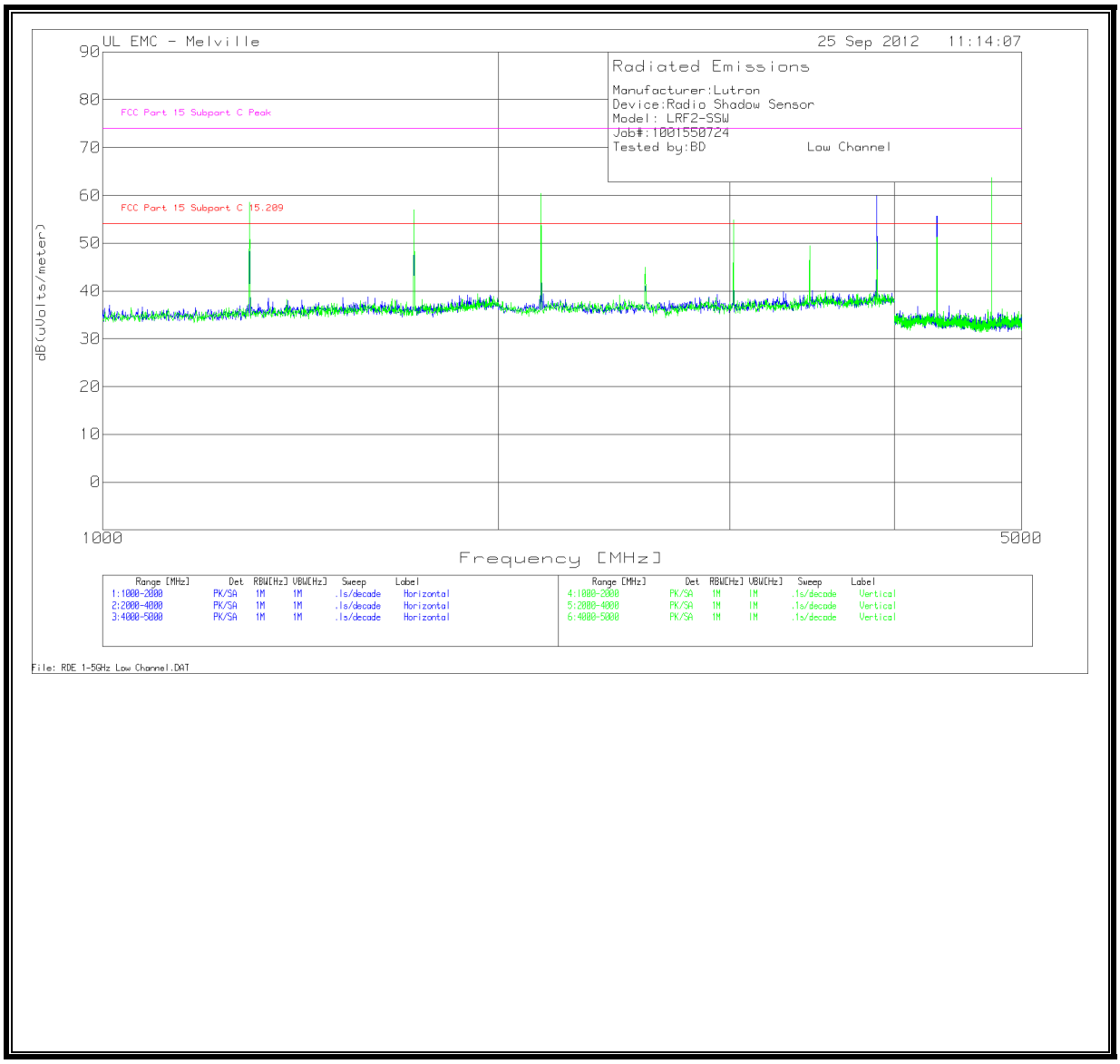


Manufacturer:Lutron
Device:Radio Shadow Sensor
Model: LRF2-SSW
Job#:1001550724
Tested by:BD Low Channel

Test Frequency	Meter Reading	Detector	AF-44067 [dB]	GL-3M [dB]	dB(uVolts /meter)	DCF (dB)	Corrected Value dB(uVolts /meter)	FCC Part 15 Subpart C 15.209 / 15.231	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
Horizontal 200 - 1000MHz														
431.0195	66.82	PK	16.3	2.3	85.42	-20	65.42	80.9	-15.48	100.9	-15.48	227	389	Horz
861.9158	38.12	PK	22.4	3.4	63.92	-20	43.92	60.9	-16.98	80.9	-16.98	25	228	Horz
978.3892	13.93	PK	24.7	3.7	42.33	-	-	54	-11.67	-	-	2	200	Horz
Vertical 200 - 1000MHz														
431.0183	73.32	PK	16.3	2.3	91.92	-20	71.92	80.9	-8.98	100.9	-8.98	142	143	Vert
861.9126	43.64	PK	22.4	3.4	69.44	-20	49.44	60.9	-11.46	80.9	-11.46	291	143	Vert
981.5908	14.26	PK	24.7	3.7	42.66	-	-	54	-11.34	-	-	298	200	Vert

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 – Low Channel



Manufacturer:Lutron
Device:Radio Shadow Sensor
Model: LRF2-SSW
Job#:1001550724
Tested by:BD Low Channel

Test Frequency	Meter Reading	Detector	AF-51442 [dB]	BOMS Factor [dB]	dB(uVolts/ meter)	DCF (dB)	Corrected Value dB(uVolts/ meter)	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
Horizontal 1000 - 2000MHz														
1292.8641	79.99	PK	20.5	-44.68	55.81	-20	35.81	54	-18.19	74	-18.19	136	363	Horz
1724.7	74.45	PK	20.8	-44.28	50.97	-20	30.97	54	-23.03	74	-23.03	331	280	Horz
Horizontal 2000 - 4000MHz														
2155.107	82.34	PK	21.4	-43.99	59.75	-20	39.75	54	-14.25	74	-14.25	327	398	Horz
2586.083	72.65	PK	21.3	-43.29	50.66	-20	30.66	54	-23.34	74	-23.34	162	379	Horz
3016.6944	75.89	PK	21.5	-42.63	54.76	-20	34.76	54	-19.24	74	-19.24	324	357	Horz
3447.976	80.34	PK	22.1	-42.98	59.46	-20	39.46	54	-14.54	74	-14.54	298	337	Horz
3879.3138	81.24	PK	22.6	-42.53	61.31	-20	41.31	54	-12.69	74	-12.69	174	340	Horz
Horizontal 4000 - 5000MHz														
4309.9232	87.75	PK	27.7	-51.8	63.65	-20	43.65	54	-10.35	74	-10.35	287	386	Horz
4741.1	85.69	PK	27.2	-52.53	60.36	-20	40.36	54	-13.64	74	-13.64	166	372	Horz
Vertical 1000 - 2000MHz														
1293.0166	84.36	PK	20.5	-44.68	60.18	-20	40.18	54	-13.82	74	-13.82	12	214	Vert
1723.8244	83.94	PK	20.8	-44.29	60.45	-20	40.45	54	-13.55	74	-13.55	36	223	Vert
Vertical 2000 - 4000MHz														
2155.107	88.82	PK	21.4	-43.99	66.23	-20	46.23	54	-7.77	74	-7.77	79	303	Vert
2586.083	74.51	PK	21.3	-43.29	52.52	-20	32.52	54	-21.48	74	-21.48	243	374	Vert
3016.6944	77	PK	21.5	-42.63	55.87	-20	35.87	54	-18.13	74	-18.13	0	299	Vert
3447.976	78.69	PK	22.1	-42.98	57.81	-20	37.81	54	-16.19	74	-16.19	75	359	Vert
3879.3138	79.93	PK	22.6	-42.53	60	-20	40	54	-14	74	-14	247	394	Vert
Vertical 4000 - 5000MHz														
4309.9232	88.85	PK	27.7	-51.8	64.75	-20	44.75	54	-9.25	74	-9.25	241	386	Vert
4741.1	89.16	PK	27.2	-52.53	63.83	-20	43.83	54	-10.17	74	-10.17	125	360	Vert

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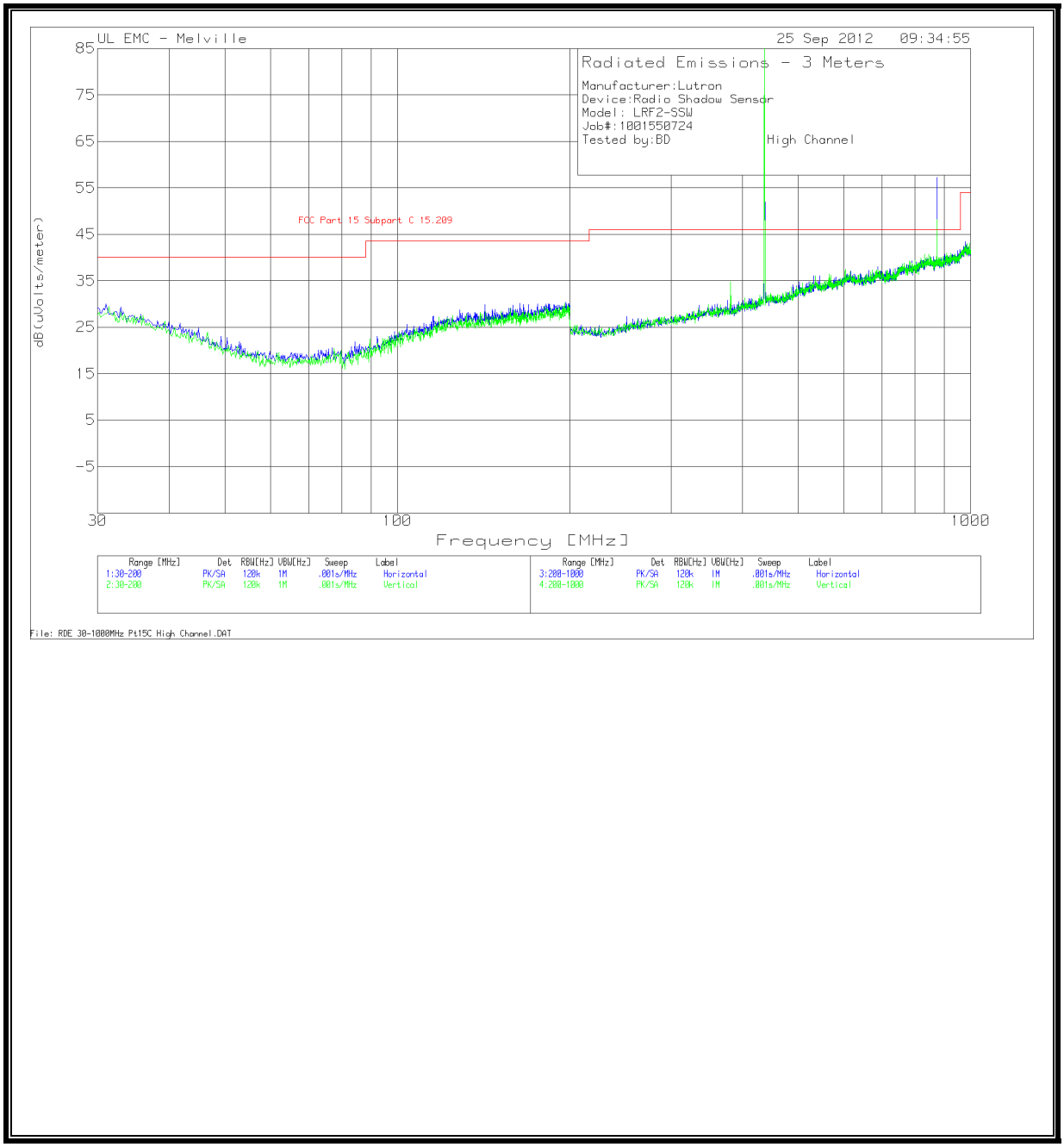
FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz) – High Channel



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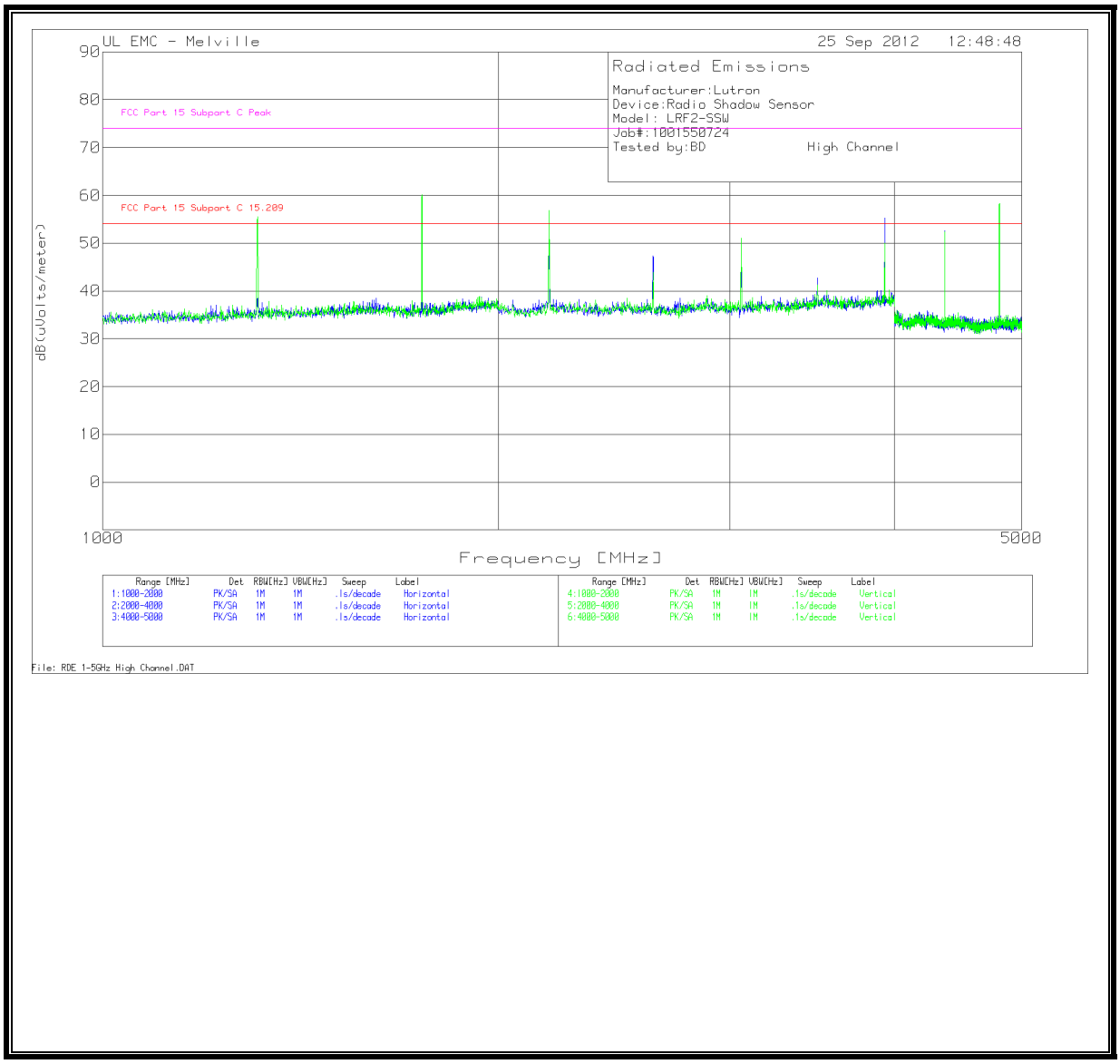
Device:Radio Shadow Sensor
Model: LRF2-SSW
Job#:1001550724
Tested by:BD High Channel

Test Frequency	Meter Reading	Detector	AF-44067 [dB]	GL-3M [dB]	dB(uVolts/ meter)	DCF (dB)	Corrected Value dB(uVolts/ meter)	FCC Part 15 Subpart C 15.209 / 15.231	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
Horizontal 200 - 1000MHz														
436.948	69.49	PK	16.6	2.3	88.39	-20	68.39	80.9	-12.51	100.9	-12.51	230	145	Horz
873.9447	29.27	PK	22.5	3.4	55.17	-20	35.17	60.9	-25.73	80.9	-25.73	198	234	Horz
977.5888	14.96	PK	24.7	3.7	43.36	-	-	54	-10.64	-		18	200	Horz
Vertical 200 - 1000MHz														
436.9498	74.89	PK	16.6	2.3	93.79	-20	73.79	80.9	-7.11	100.9	-7.11	325	158	Vert
873.9527	33.27	PK	22.5	3.4	59.17	-20	39.17	60.9	-21.73	80.9	-21.73	108	143	Vert
381.2906	17.73	PK	14.9	2.1	34.73	-	-	46	-11.27	-		179	400	Vert

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 – High Channel



Manufacturer:Lutron
Device:Radio Shadow Sensor
Model: LRF2-SSW
Job#:1001550724
Tested by:BD High Channel

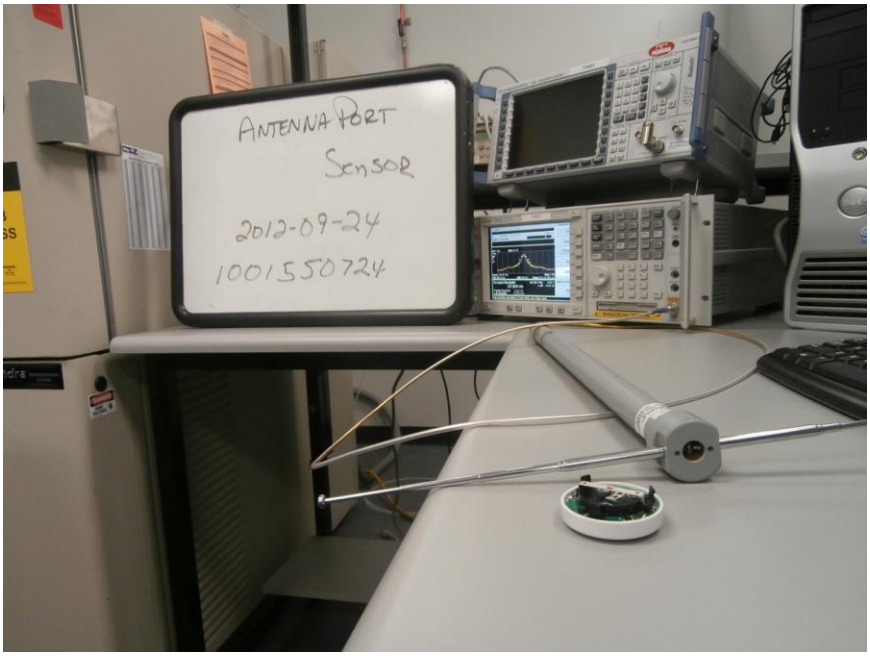
Test Frequency	Meter Reading	Detector	AF-51442 [dB]	BOMS Factor [dB]	dB(uVolts/ meter)	DCF (dB)	Corrected Value dB(uVolts/ meter)	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
Horizontal 1000 - 2000MHz														
1310.9944	75.71	PK	20.5	-44.7	51.51	-20	31.51	54	-22.49	74	-22.49	333	336	Horz
1748.1457	80.8	PK	20.8	-44.18	57.42	-20	37.42	54	-16.58	74	-16.58	312	383	Horz
Vertical 1000 - 2000MHz														
1310.9944	82.73	PK	20.5	-44.7	58.53	-20	38.53	54	-15.47	74	-15.47	31	352	Vert
1748.1457	86.3	PK	20.8	-44.18	62.92	-20	42.92	54	-11.08	74	-11.08	200	162	Vert
Horizontal 2000 - 4000MHz														
2184.8164	82.46	PK	21.5	-43.8	60.16	-20	40.16	54	-13.84	74	-13.84	325	392	Horz
2622.2383	75.48	PK	21.4	-43.28	53.6	-20	33.6	54	-20.4	74	-20.4	126	372	Horz
3059.1222	73.6	PK	21.6	-42.71	52.49	-20	32.49	54	-21.51	74	-21.51	326	305	Horz
3495.8146	76.16	PK	22.2	-42.52	55.84	-20	35.84	54	-18.16	74	-18.16	97	187	Horz
3933.2928	81.19	PK	22.7	-42.58	61.31	-20	41.31	54	-12.69	74	-12.69	0	374	Horz
Horizontal 2000 - 4000MHz														
2184.8164	86.49	PK	21.5	-43.8	64.19	-20	44.19	54	-9.81	74	-9.81	278	180	Vert
2622.2383	75.51	PK	21.4	-43.28	53.63	-20	33.63	54	-20.37	74	-20.37	95	357	Vert
3059.1222	74.7	PK	21.6	-42.71	53.59	-20	33.59	54	-20.41	74	-20.41	17	362	Vert
3495.8146	78.71	PK	22.2	-42.52	58.39	-20	38.39	54	-15.61	74	-15.61	183	367	Vert
3933.2928	80.73	PK	22.7	-42.58	60.85	-20	40.85	54	-13.15	74	-13.15	48	322	Vert
Horizontal 4000 - 5000MHz														
4369.7355	83.32	PK	27.6	-51.94	58.98	-20	38.98	54	-15.02	74	-15.02	355	303	Horz
4806.5902	84.23	PK	27.1	-52.62	58.71	-20	38.71	54	-15.29	74	-15.29	316	371	Horz
Horizontal 4000 - 5000MHz														
4369.7355	86.05	PK	27.6	-51.94	61.71	-20	41.71	54	-12.29	74	-12.29	222	302	Vert
4806.5902	90.16	PK	27.1	-52.62	64.64	-20	44.64	54	-9.36	74	-9.36	75	307	Vert

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. SETUP PHOTOS

ANTENNA PORT

ANTENNA PORT

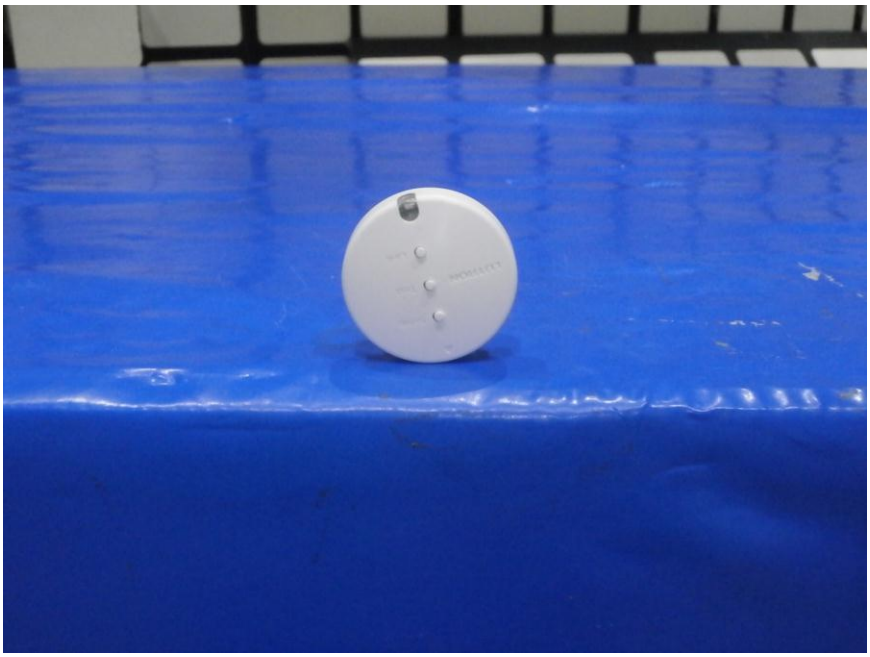


RADIATED EMISSION FOR PORTABLE CONFIGURATION – X ORIENTATION

RADIATED EMISSION FOR PORTABLE CONFIGURATION – X ORIENTATION

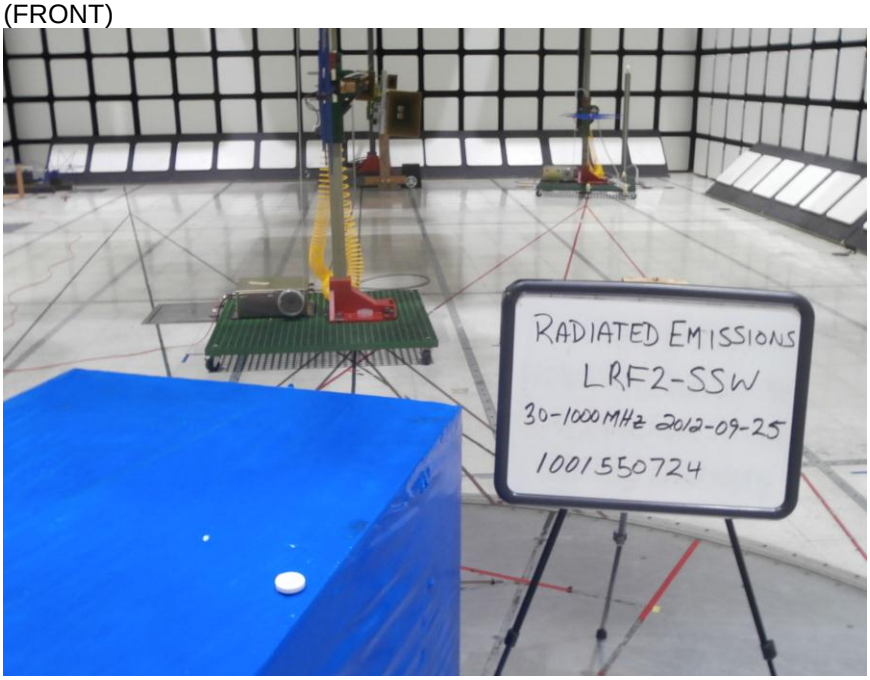
RADIATED EMISSION FOR PORTABLE CONFIGURATION – Y ORIENTATION

RADIATED EMISSION FOR PORTABLE CONFIGURATION – Y ORIENTATION



RADIATED EMISSION ABOVE 30 MHz

RADIATED EMISSIONS ABOVE 30 MHz
(FRONT)



END OF REPORT