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

CERTIFICATION TEST REPORT

FOR

REPEATER

MODEL NUMBER: CCD-TRANS

FCC ID: JPZ0087
IC: 2851A-JPZ0087

REPORT NUMBER: 1001568098

ISSUE DATE: 2012-12-03

Prepared for
LUTRON ELECTRONICS
7200 SUTTER ROAD
COOPERSBURG
PA, 18036, USA

Prepared by
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NVLAP LAB CODE 100255-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	12/03/12	Initial Issue	M. Antola

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: REPEATER

MODEL: CCD-TRANS

SERIAL NUMBER: NON-SERIZLIZED PRODUCTION UNIT

DATE TESTED: 2012-11-12 to 2012-11-15

APPLICABLE STANDARDS{PRIVATE }	
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:

Bob DeLisi
WiSE Principle Engineer
UL LLC

Tested By:

Mike Antola
WiSE Project Lead
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:

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 repeater intended for use with Lutron lighting products.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an permanently attached dipole antenna.

5.3. SOFTWARE AND FIRMWARE

The “As-Sold” firmware installed in the EUT during testing was 2.0.0~NORMAL.

The “FCC” firmware installed in the EUT during testing was 2.0.0~FCC.

5.4. WORST-CASE CONFIGURATION AND MODE

Testing was conducted at the lowest and highest channels available in the device. The antenna and device were positioned in the worst case orientation.

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Compaq	CQ56-115DX	CNF1134NRP	---
Flash Drive	SanDisk	SDCZ36-002G	BE1011VPAB	---

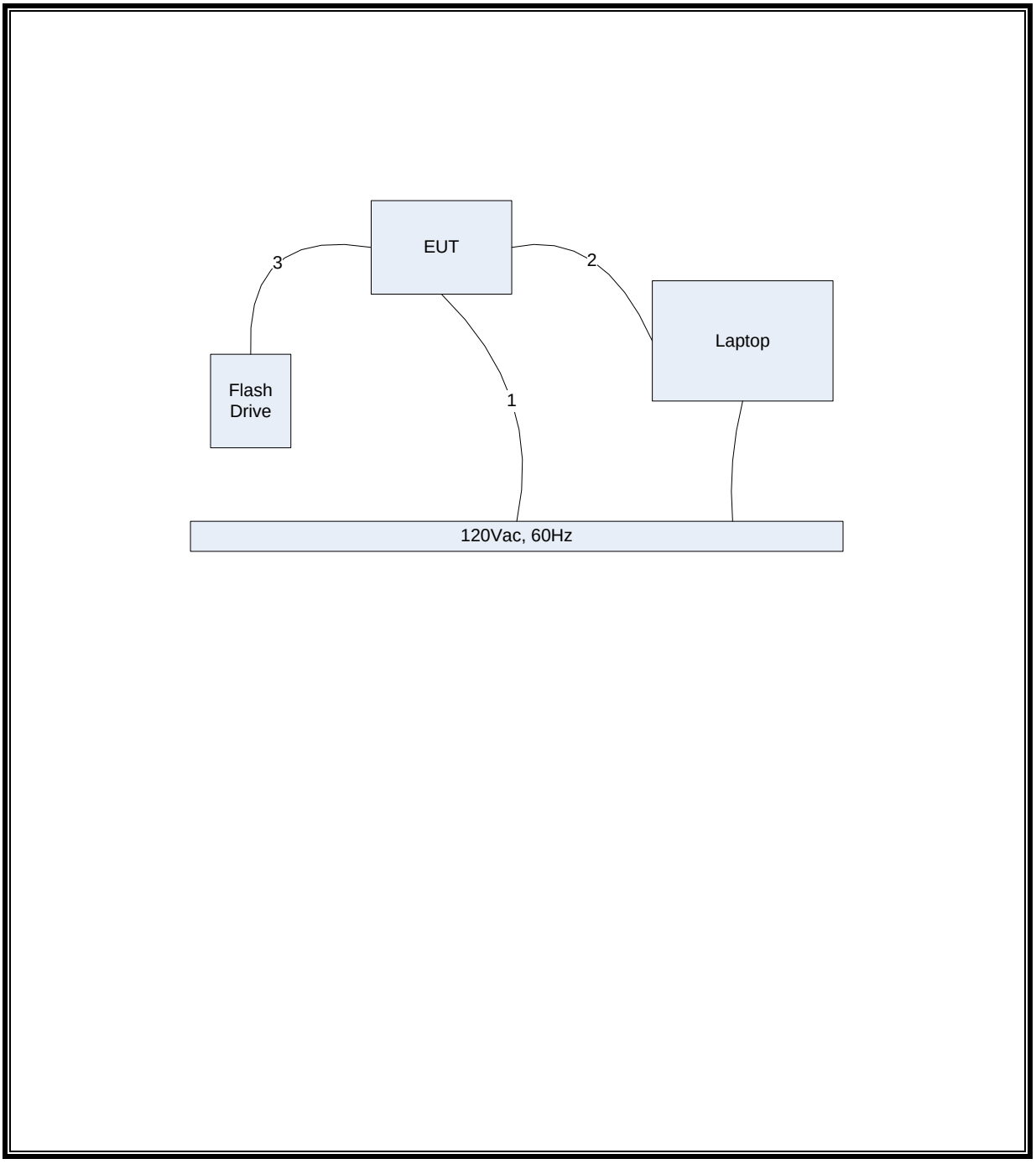
I/O CABLES

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Compaq	CQ56-115DX	CNF1134NRP	---
Flash Drive	SanDisk	SDCZ36-002G	BE1011VPAB	---

TEST SETUP

The EUT is connected to a host laptop computer during the tests via the Ethernet connection. Test software on the laptop exercised the radio device. The USB port was loaded down with a flash drive.

SETUP DIAGRAM FOR TESTS



SETUP FOR DIGITAL DEVICE TESTS

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Compaq	CQ56-115DX	CNF1134NRP	---
Flash Drive	SanDisk	SDCZ36-002G	BE1011VPAB	---

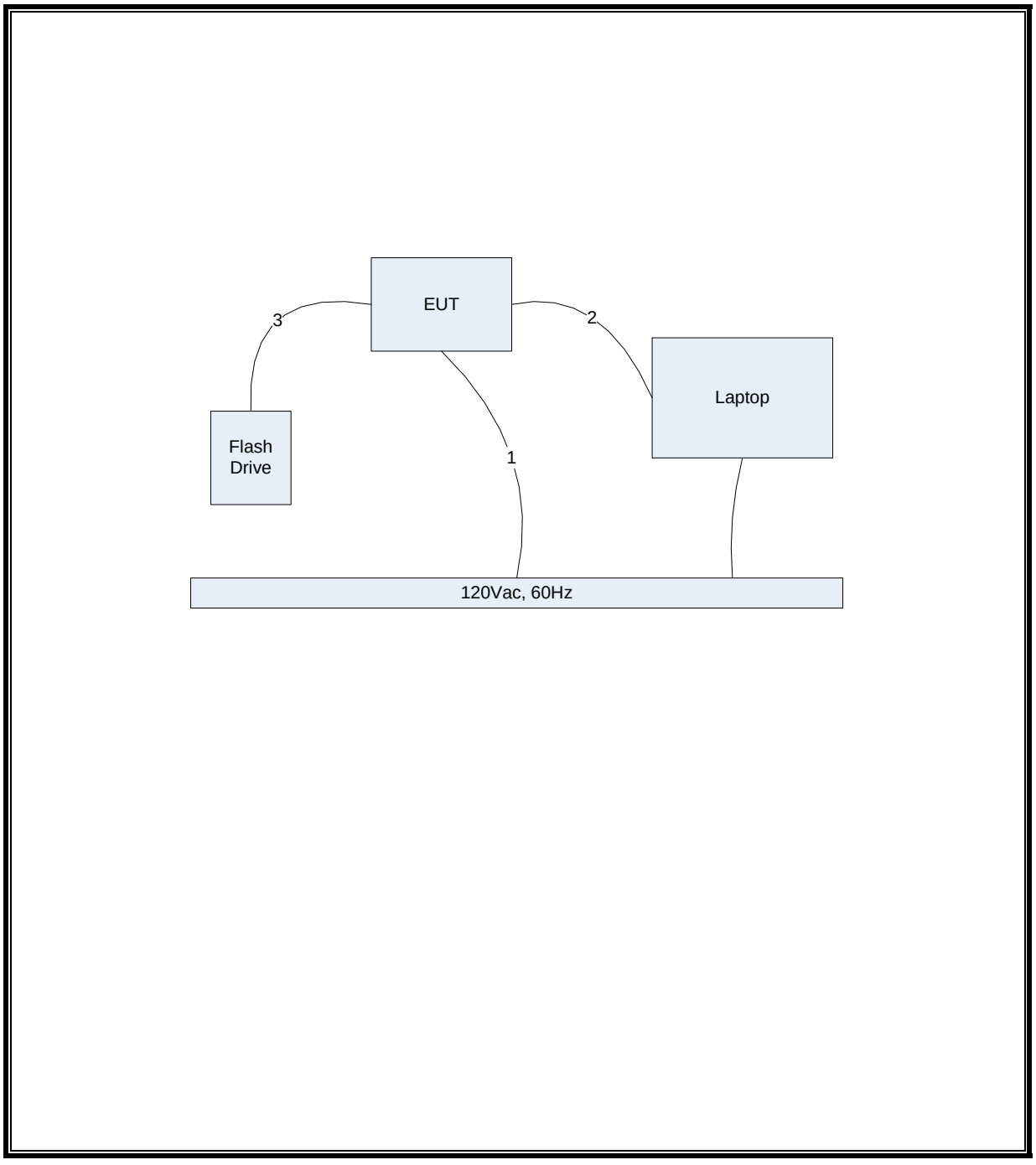
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identica Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	AC	Unshielded	<3M	None
2	Ethernet	1	RJ-45	Unshielded	<3M	None
3	USB	1	USB	Unshielded	<3M	None

TEST SETUP

The EUT is a stand-alone device. Test software was set to Receive (Listen) mode.

SETUP DIAGRAM FOR DIGITAL DEVICE 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	ESIB26	ME5B-081	2012-01-30	2013-01-30
Bicon Antenna	Schaffner	VBA6106A	54	2012-04-10	2013-04-10
Log-P Antenna	Schaffner	UPA6109	44067	2012-05-16	2013-05-16
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 9.3	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	87V	44547	2012-02-01	2013-02-28
Above 1GHz (Band Optimized System)					
EMI Receiver	Rohde & Schwarz	ESIB40	34968	2012-03-01	2013-03-01
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 9.3	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2012-12-07
Multimeter	Fluke	87V	44547	2012-02-01	2013-02-28

* - 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	ESCI7	75141	2012-01-05	2013-01-05
LISN	EMCO	3825/2R	ME5A-636	2012-02-04	2013-02-28
LISN	Solar	9252-50-R-24-BNC	75141	2012-01-05	2013-01-05
Switch Driver	HP	11713A	44397	N/A	N/A
RF Switch Box	UL	4	44404	N/A	N/A
Measurement Software	UL	Version 9.3	44736	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	43734	2012-03-13	2014-03-13
Multimeter	Fluke	83III	ME5B-305	2012-02-01	2013-02-28

Test Equipment Used – Occupied Bandwidth/Cease Operation/Duty Cycle					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Spectrum Analyzer	Agilent	E4446A	72823	2012-01-31	2013-02-28
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	426843733	2012-03-13	2014-03-13
Measurement Software	UL	Version 9.3	44740	N/A	N/A
Multimeter	Fluke	87V	44547	2012-02-01	2013-02-28

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

RESULTS

No non-compliance noted:

Low Channel - 431MHz

20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
431	154	1077.5	-923.5

99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
431	167	1077.5	-910.5

High Channel - 437MHz

20dB Bandwidth

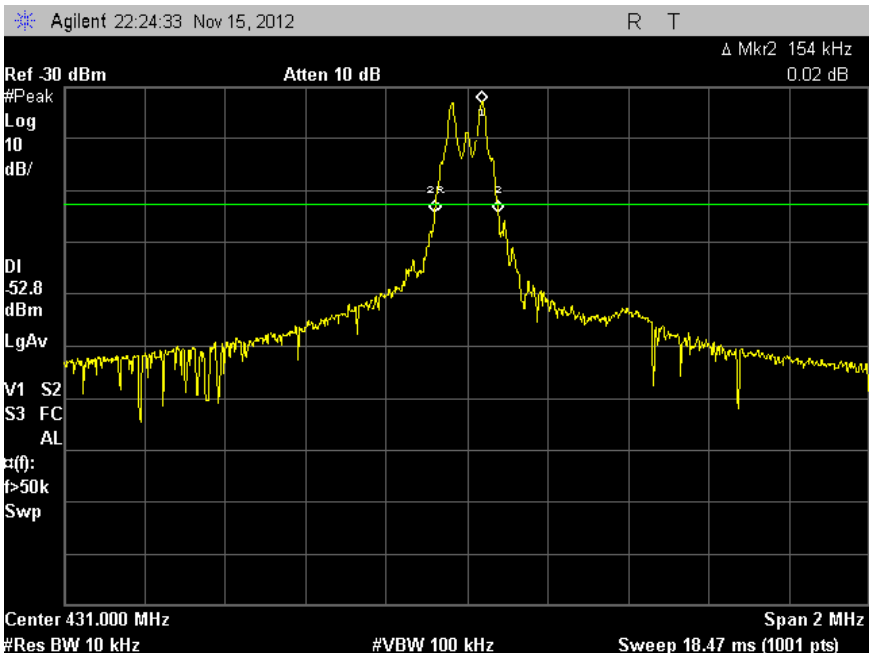
Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
437	146	1092.5	-946.5

99% Bandwidth

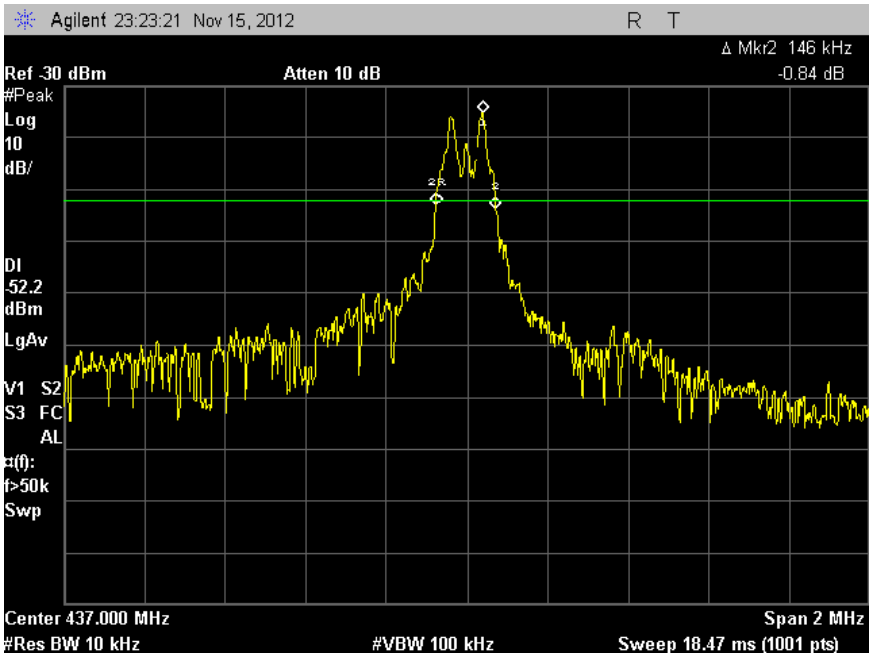
Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
437	161	1092.5	-931.5

20dB BANDWIDTH

20dB BANDWIDTH – LOW CHANNEL

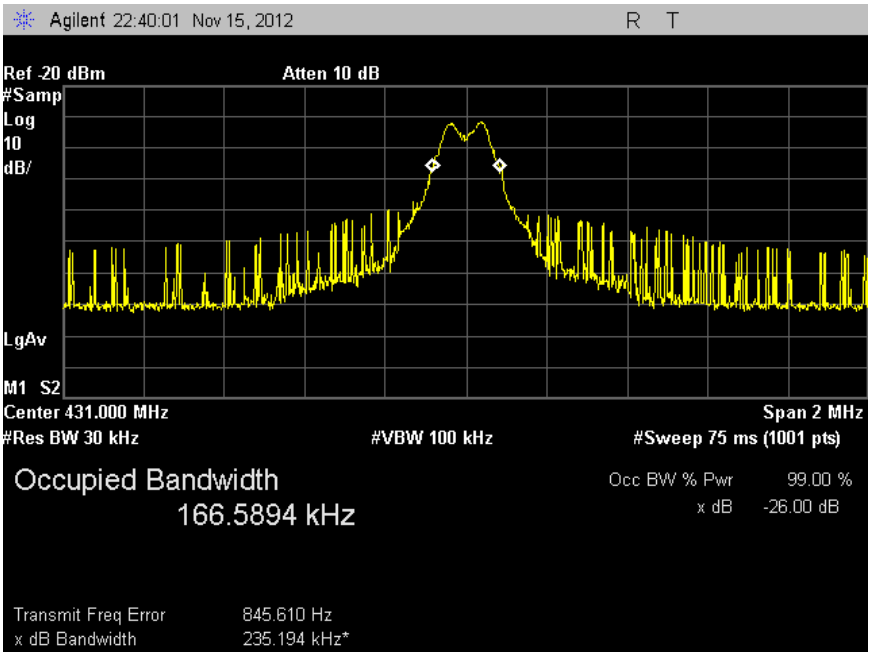


20dB BANDWIDTH – HIGH CHANNEL

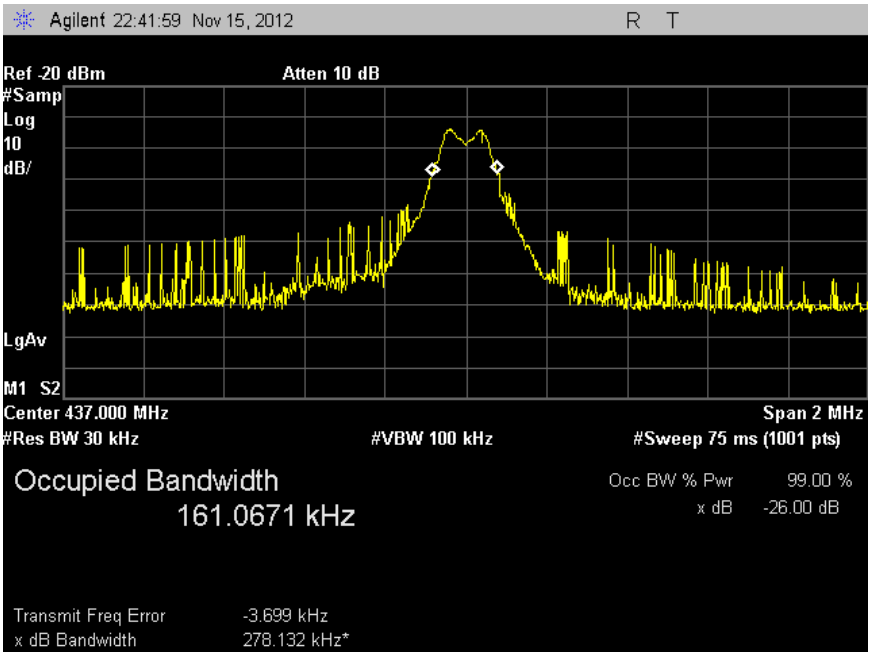


99% BANDWIDTH

99% BANDWIDTH – LOW CHANNEL



99% BANDWIDTH – HIGH CHANNEL



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 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

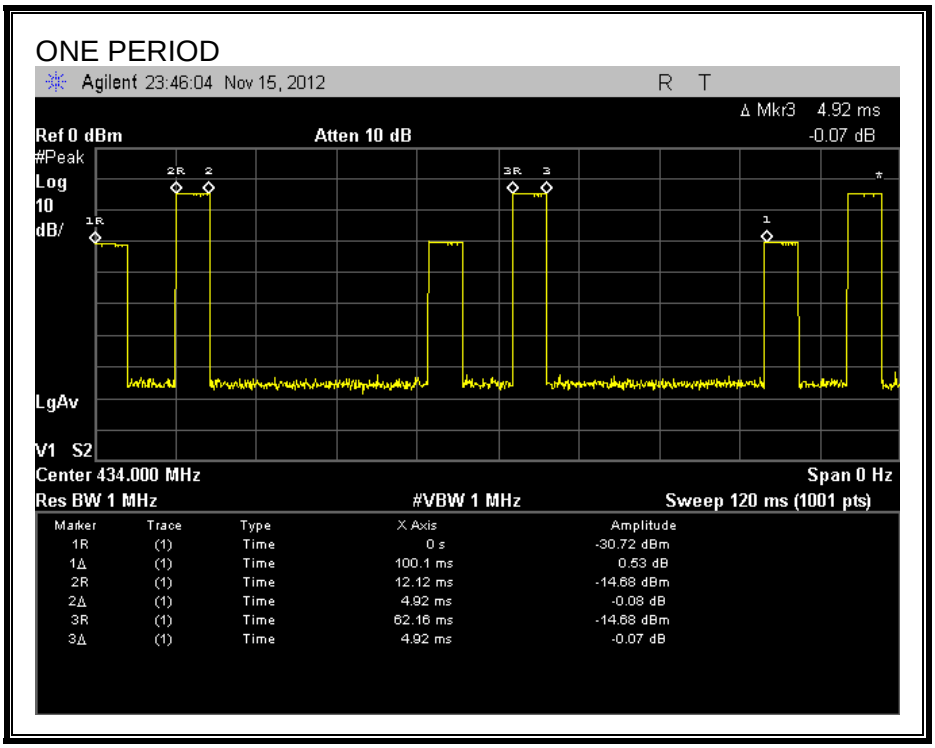
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is
(# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

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	4.92	2	0.00	0	0.098	-20.14

ONE PERIOD & PULSE WIDTH



NOTE: Lower level pulses are from triggering device for repeater to start transmission.

7.3. 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.

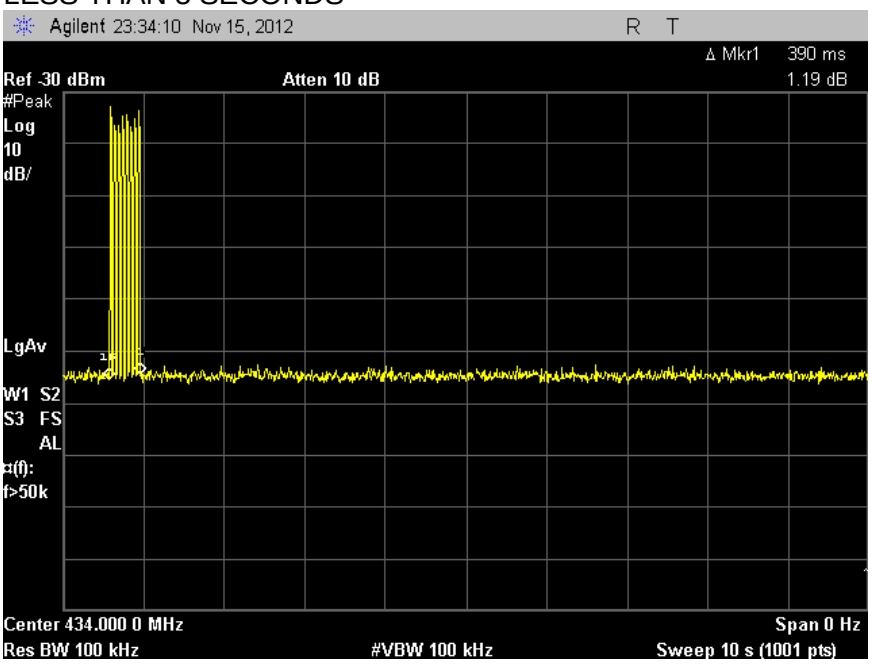
TEST PROCEDURE

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:

LESS THAN 5 SECONDS



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:

{PRIVATE } 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.

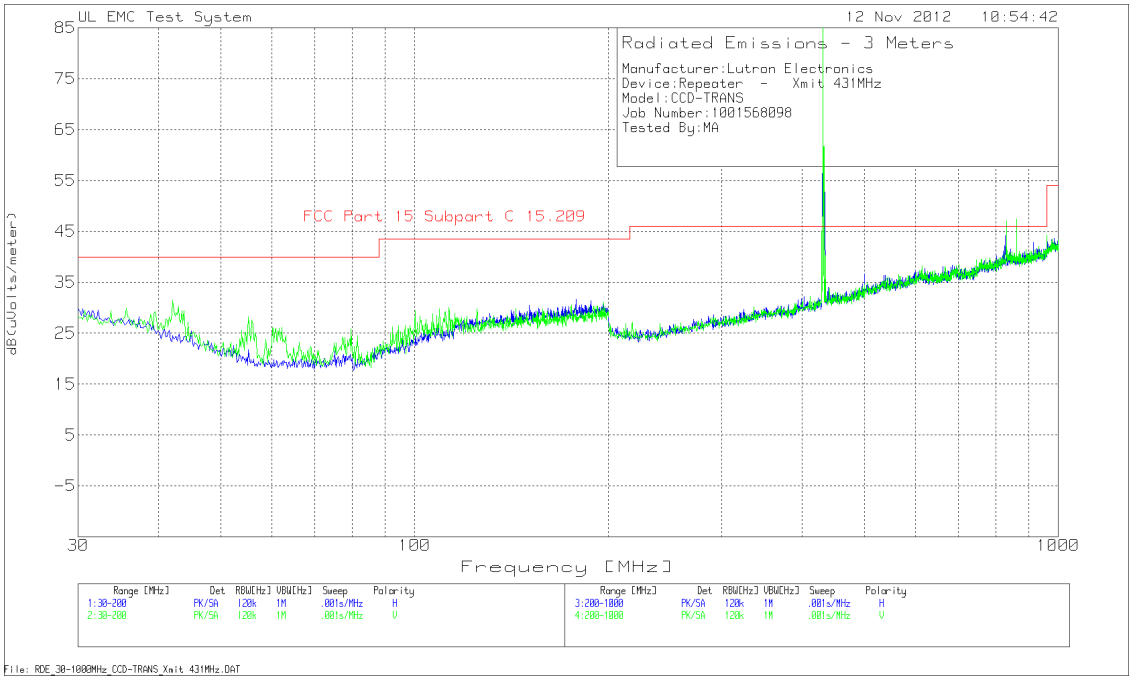
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

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.

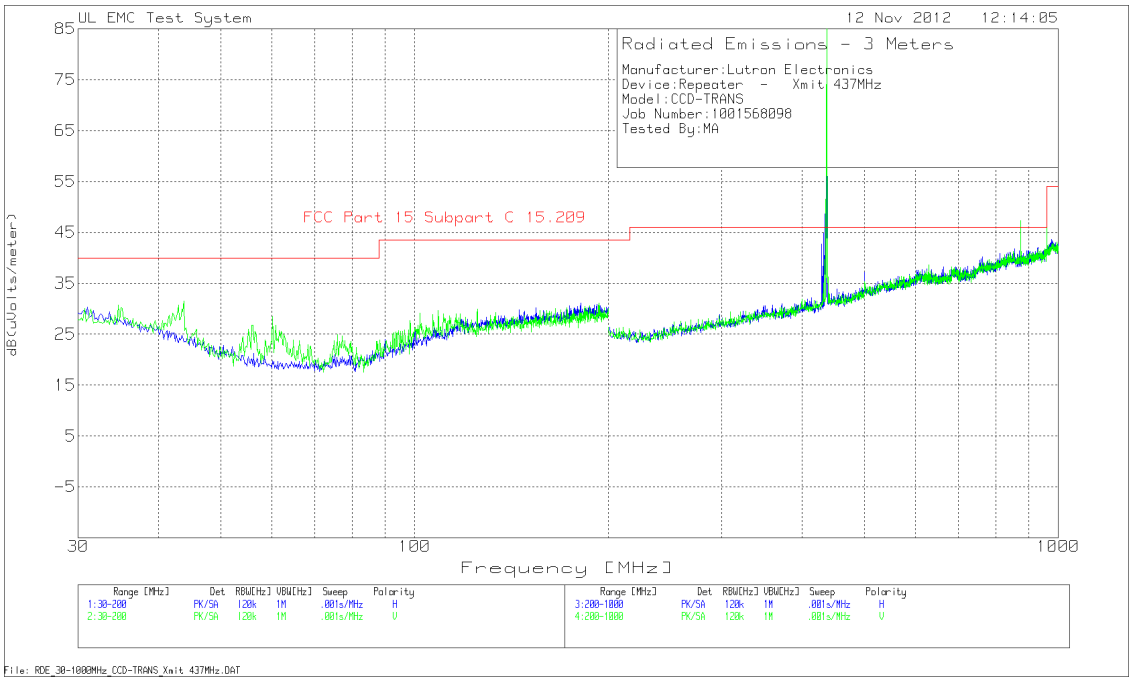
RESULTS

No non-compliance noted:

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



Low Channel



High Channel

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

Manufacturer:Lutron Electronics
Device:Repeater - Xmit Mode
Model:CCD-TRANS
Job Number:1001568098
Tested By:MA

Low Channel - 431MHz

Test Frequency	Meter Reading	Detector	AF-44067 [dB]	GL-3M [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C 15.231	Margin	Azimuth [Degs]	Height [cm]	Polarity
431.0331	72.94	PK	16.3	2.3	71.4*	-	-	80.9	-9.5	105	111	Horz
827.1134	9.04	QP	22.4	3.3	34.74	46	-11.26	-	-	108	245	Horz
915.497	9.3	QP	22.8	3.5	35.6	46	-10.4	-	-	176	144	Horz
433.7246	8.19	QP	16.4	2.3	26.89	46	-19.11	-	-	314	256	Horz
431	75.81	PK	16.3	2.3	74.27*	-	-	80.9	-6.63	202	132	Vert
831.0917	9.09	QP	22.4	3.3	34.79	46	-11.21	-	-	57	388	Vert
862.0036	32.56	PK	22.4	3.4	58.36	-	-	60.9	-2.54	170	128	Vert
432.292	16.69	QP	16.4	2.3	35.39	46	-10.61	-	-	173	289	Vert

High Channel - 437MHz

Test Frequency	Meter Reading	Detector	AF-44067 [dB]	GL-3M [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C 15.231	Margin	Azimuth [Degs]	Height [cm]	Polarity
437	72.54	PK	16.6	2.3	71.3*	-	-	80.9	-9.6	145	110	Horz
434.9301	9.09	QP	16.5	2.3	27.89	46	-18.11	-	-	171	394	Horz
431.7872	8.46	QP	16.4	2.3	27.16	46	-18.84	-	-	175	136	Horz
437	73.81	PK	16.6	2.3	72.57*	-	-	80.9	-8.33	185	117	Vert
437.9291	8.19	QP	16.6	2.3	27.09	46	-18.91	-	-	231	202	Vert
874	24.46	PK	22.5	3.4	50.36	-	-	60.9	-10.54	230	210	Vert
960.259	17.97	QP	23.5	3.6	45.07	54	-8.93	-	-	161	112	Vert

* - 20.14dB Correction Factor was applied

PK - Peak detector (Maximized)
QP - Quasi-Peak detector

HARMONICS AND TX SPURIOUS EMISSIONS PLOTS ABOVE 1GHz

Low Channel

High Channel

HARMONICS AND TX SPURIOUS EMISSIONS DATA ABOVE 1GHz

Manufacturer:Lutron Electronics
Device:Repeater
Model:CCD-TRANS
Job#:1001568098 Tested By: GB
XMT Packet Mode

Low Channel - 431MHz

Test Frequency	Meter Reading	Detector	AF [dB]	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
1294	63.86	PK	20.5	-44.69	39.67	54	-14.33	74	-34.33	218	125	Horz
1294	63.54	PK	20.5	-44.69	39.35	54	-14.65	74	-34.65	241	147	Vert
2155.0997	68.21	PK	21.4	-43.99	45.62	54	-8.38	74	-28.38	341	130	Vert
2155.0997	69.78	PK	21.4	-43.99	47.19	54	-6.81	74	-26.81	204	122	Horz
3017.1503	65.96	PK	21.5	-42.63	44.83	54	-9.17	74	-29.17	43	125	Vert
3017.1503	64.94	PK	21.5	-42.63	43.81	54	-10.19	74	-30.19	360	101	Horz

High Channel - 437MHz

Test Frequency	Meter Reading	Detector	AF [dB]	BOMS Factor [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	FCC Part 15 Subpart C Peak	Margin	Azimuth [Degs]	Height [cm]	Polarity
1748.0335	66.29	PK	20.8	-44.17	42.92	54	-11.08	74	-31.08	321	100	Horz
1748.0335	67.41	PK	20.8	-44.17	44.04	54	-9.96	74	-29.96	210	103	Vert
2185.1068	70.32	PK	21.5	-43.8	48.02	54	-5.98	74	-25.98	111	101	Vert
2185.1068	70.05	PK	21.5	-43.8	47.75	54	-6.25	74	-26.25	31	148	Horz
3059	62.66	PK	21.6	-42.7	41.56	54	-12.44	74	-32.44	245	110	Horz
3059	67.24	PK	21.6	-42.7	46.14	54	-7.86	74	-27.86	280	135	Vert
4370.1553	61.5	PK	27.6	-51.94	37.16	54	-16.84	74	-36.84	289	361	Vert
4370.1553	61.41	PK	27.6	-51.94	37.07	54	-16.93	74	-36.93	275	364	Horz

PK - Peak detector (Maximized)

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 (dBµV/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.

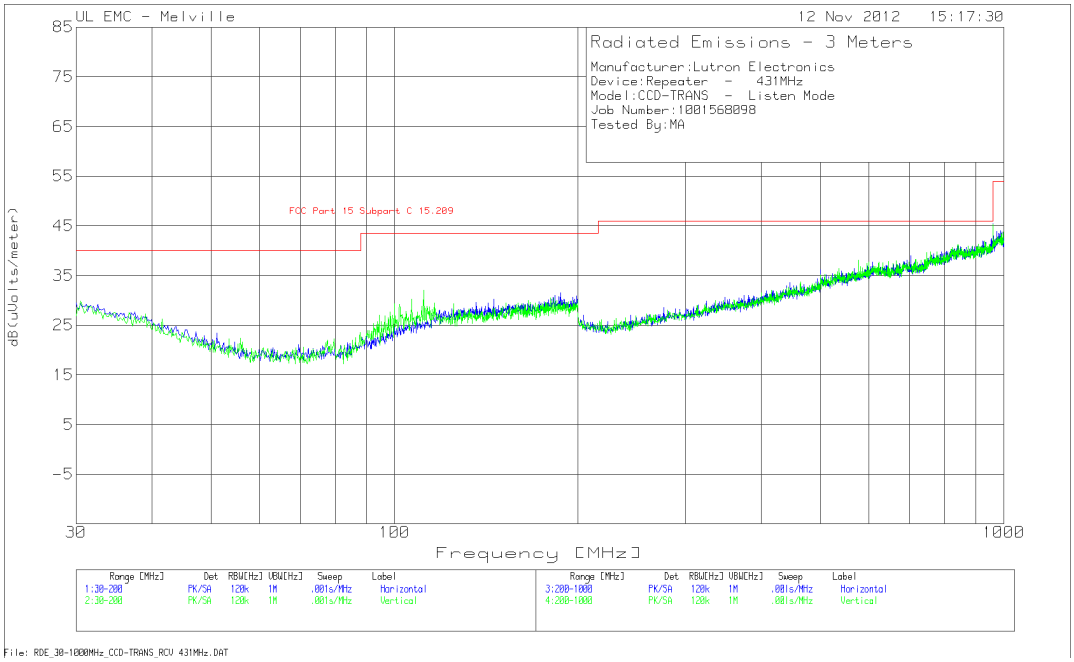
The spectrum from 30 MHz to 5th harmonic is investigated with the transmitter set to the middle channel.

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.

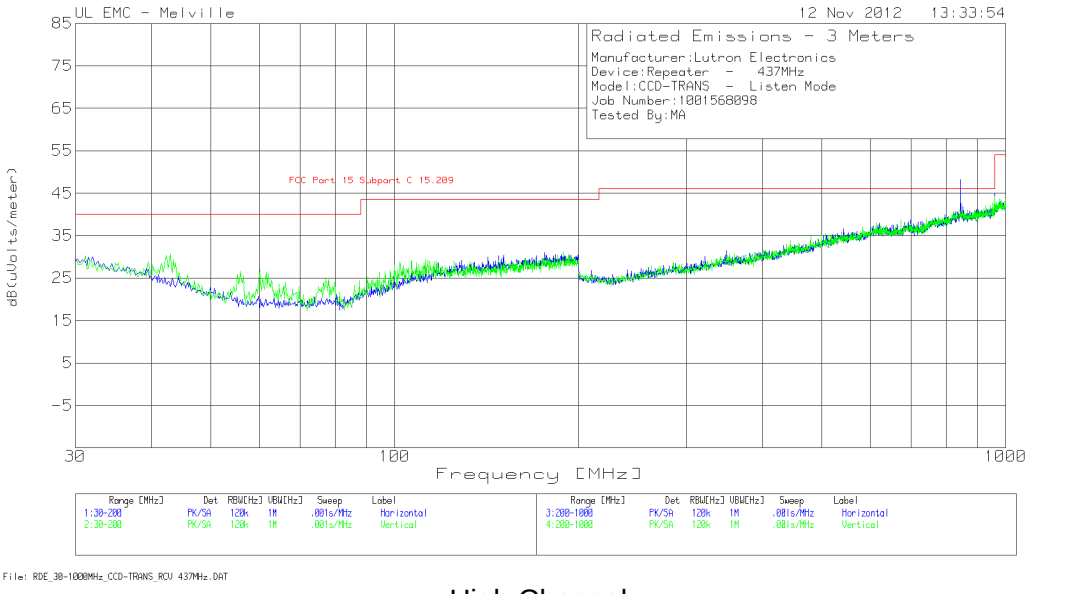
RESULTS

No non-compliance noted:

RECEIVER SPURIOUS EMISSION PLOTS (30MHz - 1GHz)



Low Channel



High Channel

RECEIVER SPURIOUS EMISSION DATA (30MHz - 1GHz)

Manufacturer:Lutron Electronics
Device:Repeater
Model:CCD-TRANS - Listen Mode
Job Number:1001568098
Tested By:MA

Low Channel - 431MHz

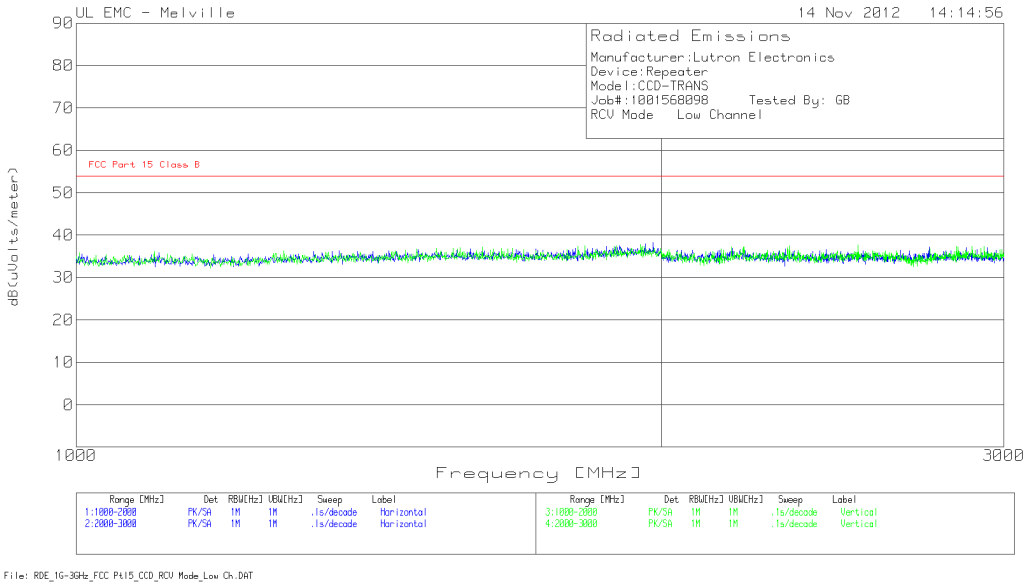
Test Frequency	Meter Reading	Detector	AF-54 (dB)	GL-3M (dB)	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	Azimuth [Degs]	Height [cm]	Polarity
111.6817	18.4	PK	12.5	1.1	32	43.5	-11.5	310	100	Vert
106.7467	17.31	PK	11.8	1.1	30.21	43.5	-13.29	69	100	Vert
100.1101	17.6	PK	10.7	1	29.3	43.5	-14.2	310	100	Vert
960.3802	18.33	PK	23.5	3.6	45.43	54	-8.57	33	100	Horz
960.3802	18.22	PK	23.5	3.6	45.32	54	-8.68	5	100	Vert
577.7889	16.15	PK	19.2	2.7	38.05	46	-7.95	291	400	Vert

High Channel - 437MHz

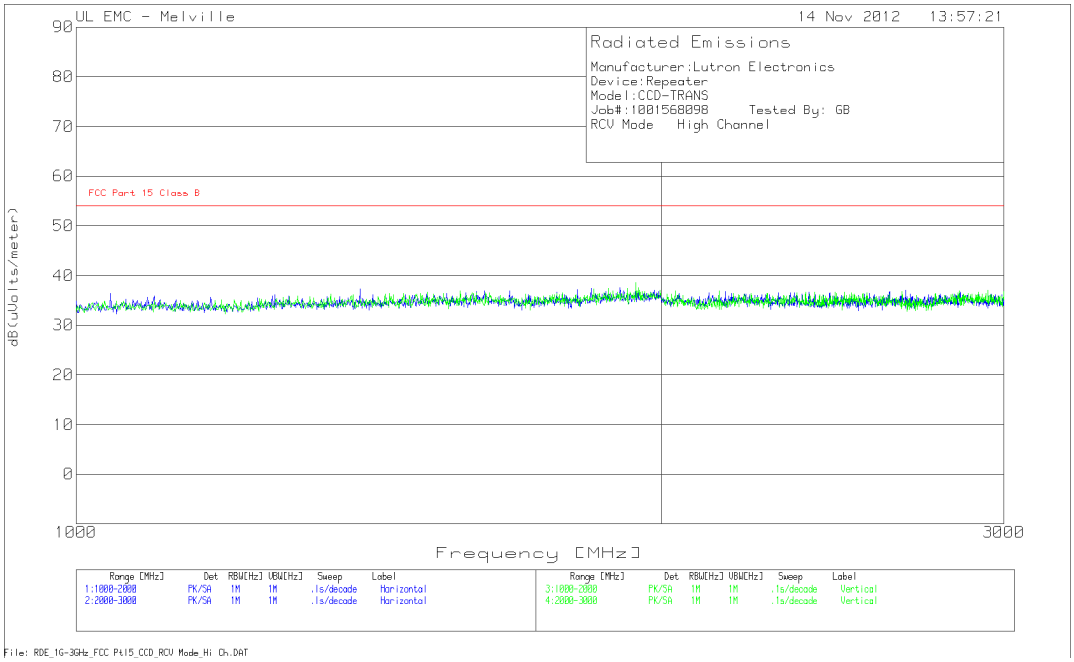
Test Frequency	Meter Reading	Detector	AF-54 [dB]	GL-3M [dB]	dB(uVolts/meter)	FCC Part 15 Subpart C 15.209	Margin	Azimuth [Degs]	Height [cm]	Polarity
42.9715	14.54	QP	12.5	0.7	27.74	40	-12.26	228	103	Vert
61.6109	13.95	QP	6.6	0.8	21.35	40	-18.65	241	144	Vert
843.1277	9.09	QP	22.9	3.4	35.39	46	-10.61	54	139	Horz
960.2561	12.32	QP	23.5	3.6	39.42	54	-14.58	15	381	Horz
960.2453	16.94	QP	23.5	3.6	44.04	54	-9.96	1	110	Vert
480.0585	8.3	QP	17.1	2.4	27.8	46	-18.2	227	160	Vert

PK - Peak detector
QP - Quasi-Peak detector

RECEIVER SPURIOUS EMISSION PLOTS ABOVE 1GHz



Low Channel



High Channel

RECEIVER SPURIOUS EMISSION ABOVE 1GHz

Manufacturer:Lutron Electronics
Device:Repeater
Model:CCD-TRANS
Job#:1001568098 Tested By: GB
RCV Mode

Low Channel - 431MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF (dB)	BOMS Factor (dB)	dB(uVolts/meter)	FCC Part 15 Class B	Margin	Azimuth [Degs]	Height [cm]	Polarity
1	1103.103	60.65	PK	20	-44.79	35.86	54	-18.14	13	99	Horz
2	1365.365	60.3	PK	20.6	-44.66	36.24	54	-17.76	261	99	Horz
3	1980.981	59.95	PK	22.1	-43.82	38.23	54	-15.77	261	99	Horz
4	1279.279	60.59	PK	20.4	-44.66	36.33	54	-17.67	279	99	Vert
5	2523.524	59.37	PK	21.7	-43.47	37.6	54	-16.4	51	99	Vert
6	2888.889	58.25	PK	22	-42.88	37.37	54	-16.63	13	99	Vert

High Channel - 437MHz

Marker No.	Test Frequency	Meter Reading	Detector	AF (dB)	BOMS Factor (dB)	dB(uVolts/meter)	FCC Part 15 Class B	Margin	Azimuth [Degs]	Height [cm]	Polarity
1	1042.042	61.69	PK	19.6	-44.85	36.44	54	-17.56	128	99	Horz
2	1400.4	61.23	PK	20.7	-44.68	37.25	54	-16.75	356	250	Horz
3	1810.811	60.22	PK	21.1	-44.16	37.16	54	-16.84	336	250	Horz
5	2157.157	59.31	PK	21.4	-43.87	36.84	54	-17.16	0	250	Horz
6	2670.671	58.83	PK	21.5	-43.32	37.01	54	-16.99	56	99	Horz
4	1940.941	60.61	PK	21.8	-43.81	38.6	54	-15.4	184	100	Vert

PK - Peak detector

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:

6 WORST EMISSIONS

Manufacturer:Lutron Electronics
Device:Repeater
Model:CCD-TRANS Normal Operation
Job#:1001568098 120V 60Hz
Tested by:GB

Line - L1 .15 - 30MHz

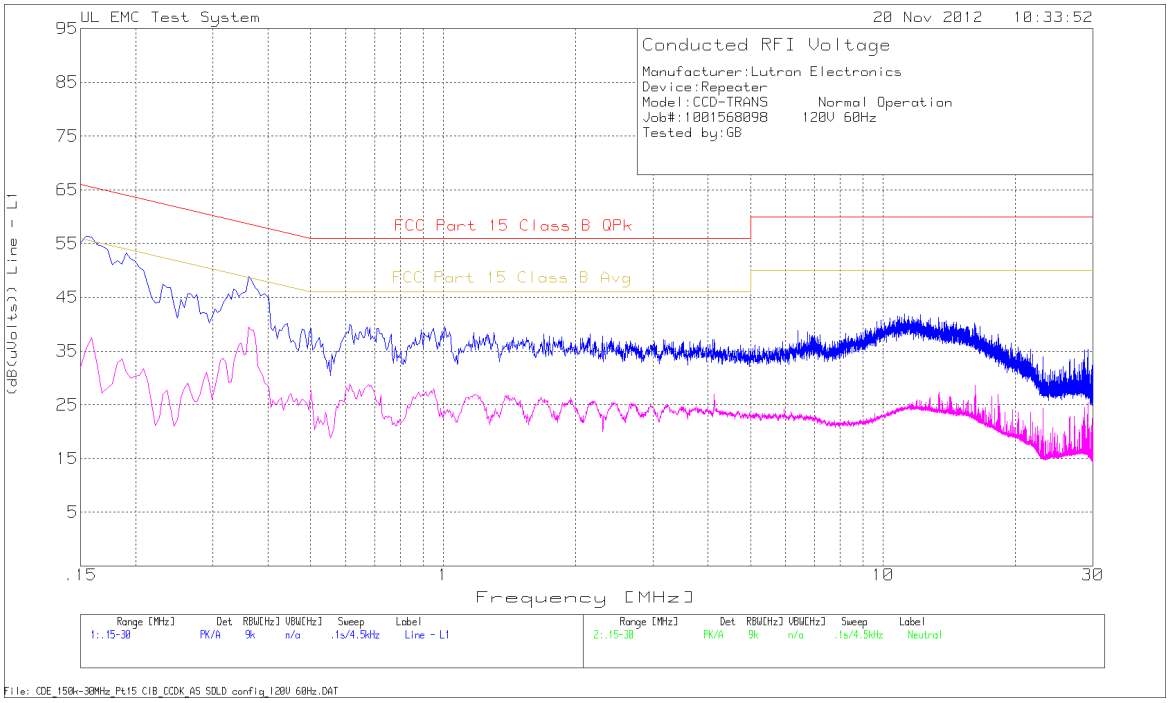
Marker No.	Test Frequency	Meter Reading	Detector	LISN 5A636 L1 (dB)	(dB(uVolts))	FCC Part 15 Class B QPk	Margin	FCC Part 15 Class B Avg	Margin
1	0.1545	46.21	PK	10.1	56.31	65.8	-9.49	55.8	0.51
2	0.1545	25.18	Av	10.1	35.28	65.8	-30.52	55.8	-20.52
3	0.168	44.38	PK	10.1	54.48	65.1	-10.62	55.1	-0.62
4	0.168	17.08	Av	10.1	27.18	65.1	-37.92	55.1	-27.92
5	0.3615	38.9	PK	10	48.9	58.7	-9.8	48.7	0.2
6	0.3615	29.44	Av	10	39.44	58.7	-19.26	48.7	-9.26
7	0.6135	29.82	PK	10.1	39.92	56	-16.08	46	-6.08
8	0.6135	18.74	Av	10.1	28.84	56	-27.16	46	-17.16
9	1.0095	29.5	PK	10.1	39.6	56	-16.4	46	-6.4
10	1.0095	13.8	Av	10.1	23.9	56	-32.1	46	-22.1
11	12.1785	31.04	PK	10.8	41.84	60	-18.16	50	-8.16
12	12.1785	13.8	Av	10.8	24.6	60	-35.4	50	-25.4

Neutral .15 - 30MHz

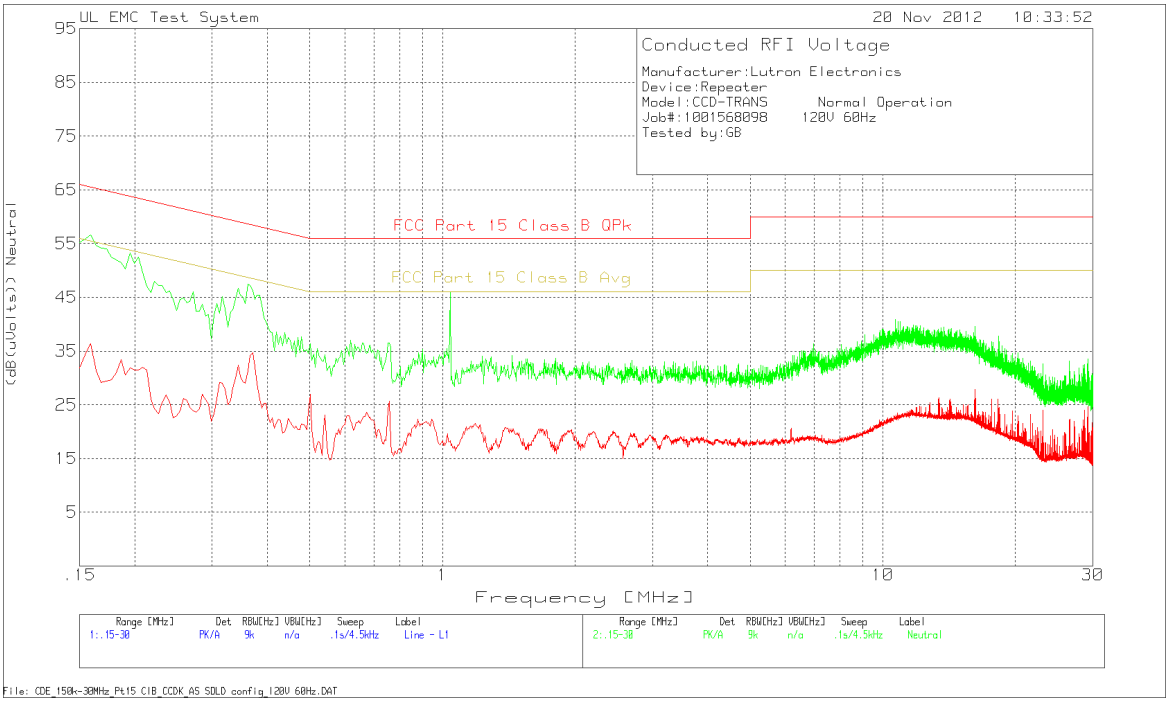
Marker No.	Test Frequency	Meter Reading	Detector	LISN 5A636 L2 (dB)	(dB(uVolts))	FCC Part 15 Class B QPk	Margin	FCC Part 15 Class B Avg	Margin
13	0.159	46.5	PK	10.1	56.6	65.5	-8.9	55.5	1.1
14	0.159	26.25	Av	10.1	36.35	65.5	-29.15	55.5	-19.15
15	0.1635	44.57	PK	10.1	54.67	65.3	-10.63	55.3	-0.63
16	0.1635	21.25	Av	10.1	31.35	65.3	-33.95	55.3	-23.95
17	0.195	43.2	PK	10.1	53.3	63.8	-10.5	53.8	-0.5
18	0.195	21.74	Av	10.1	31.84	63.8	-31.96	53.8	-21.96
19	0.3615	37.41	PK	10	47.41	58.7	-11.29	48.7	-1.29
20	0.3615	21.36	Av	10	31.36	58.7	-27.34	48.7	-17.34
21	1.041	35.81	PK	10.1	45.91	56	-10.09	46	-0.09
22	1.041	8.19	Av	10.1	18.29	56	-37.71	46	-27.71
23	10.8195	29.83	PK	10.7	40.53	60	-19.47	50	-9.47
24	10.8195	12.39	Av	10.7	23.09	60	-36.91	50	-26.91

PK - Peak detector
Av - Average detector

LINE 1 RESULTS



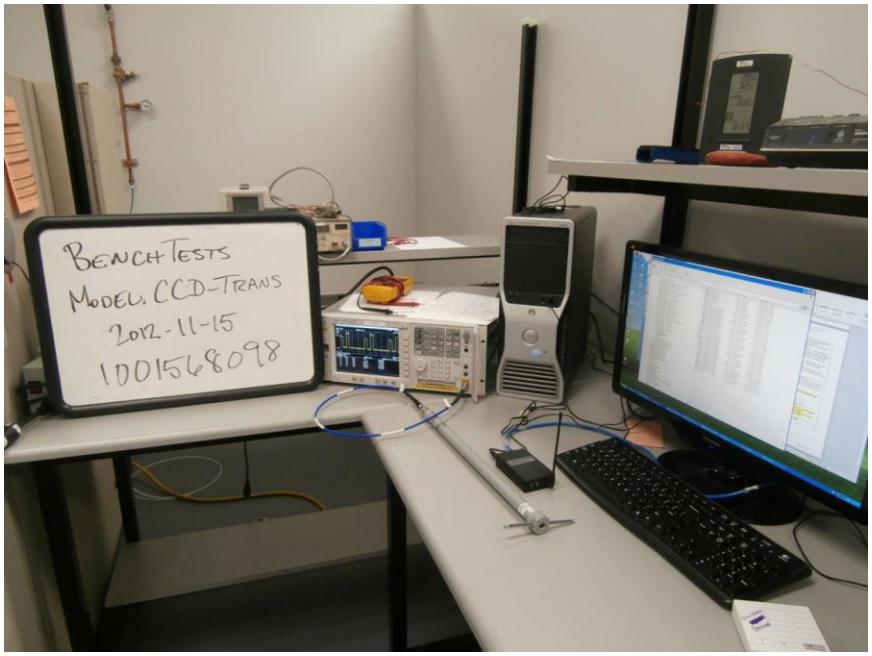
LINE 2 RESULTS



10. SETUP PHOTOS

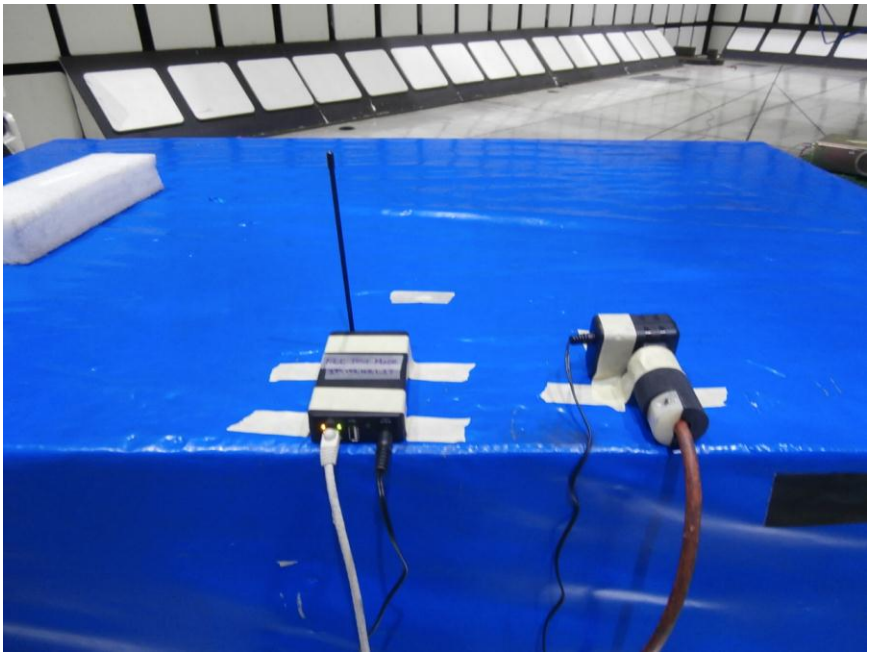
ANTENNA PORT

ANTENNA PORT



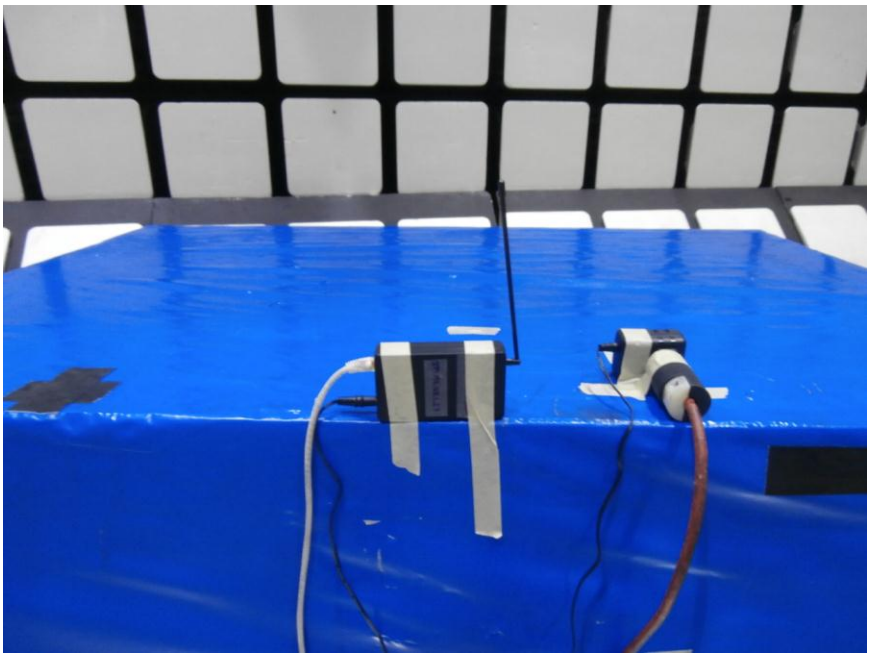
RADIATED EMISSION FOR PORTABLE CONFIGURATION – X ORIENTATION

RADIATED EMISSION FOR PORTABLE CONFIGURATION – X ORIENTATION



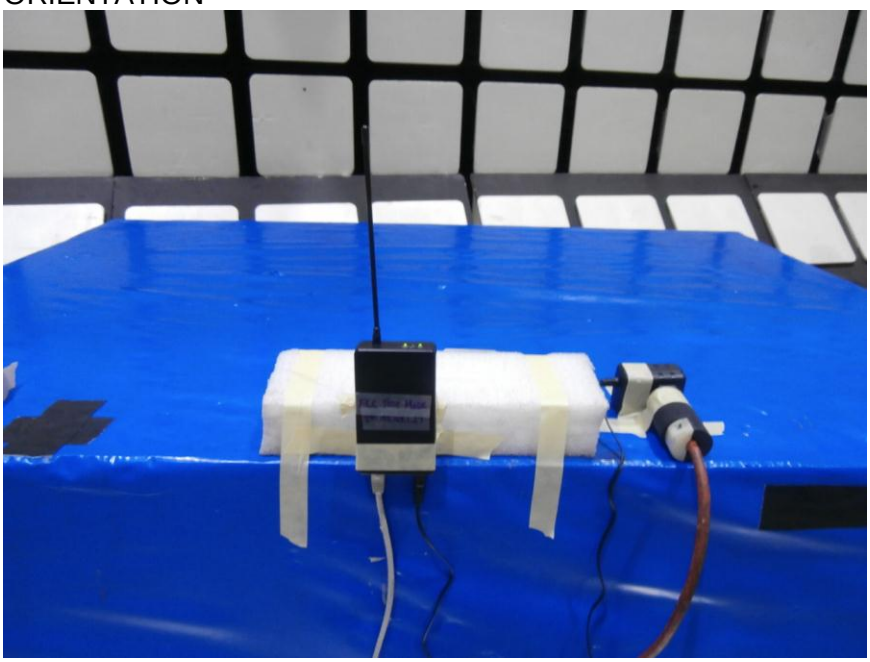
RADIATED EMISSION FOR PORTABLE CONFIGURATION – Y ORIENTATION

RADIATED EMISSION FOR PORTABLE CONFIGURATION – Y ORIENTATION



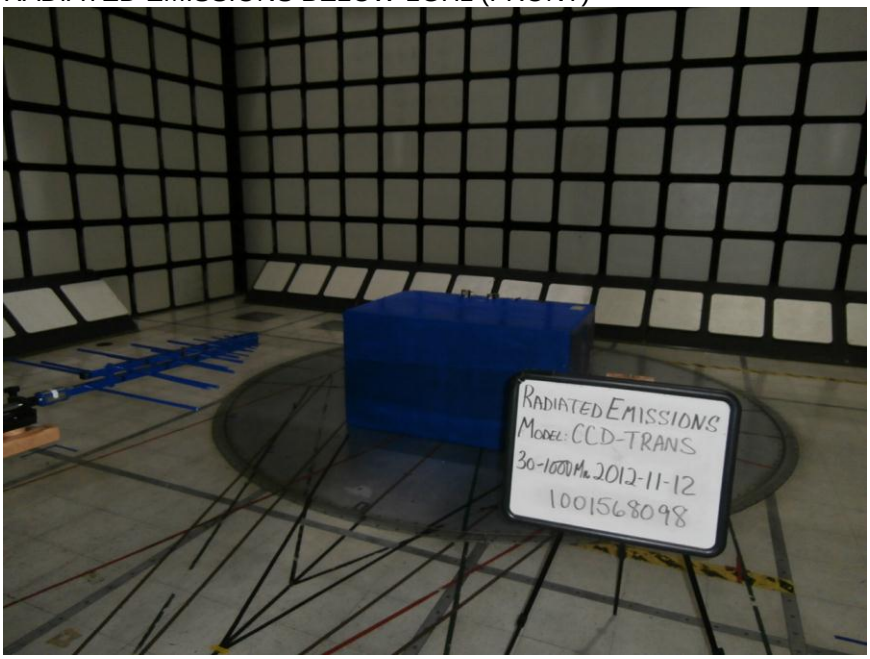
RADIATED EMISSION FOR PORTABLE CONFIGURATION – Z ORIENTATION

RADIATED EMISSION FOR PORTABLE CONFIGURATION – Z ORIENTATION

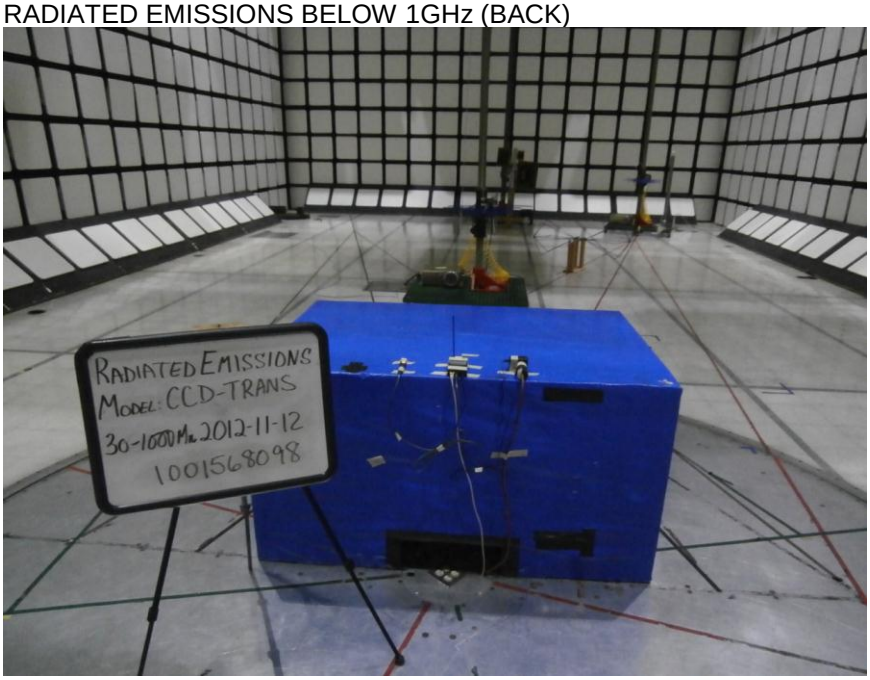


RADIATED EMISSION BELOW 1 GHz

RADIATED EMISSIONS BELOW 1GHz (FRONT)

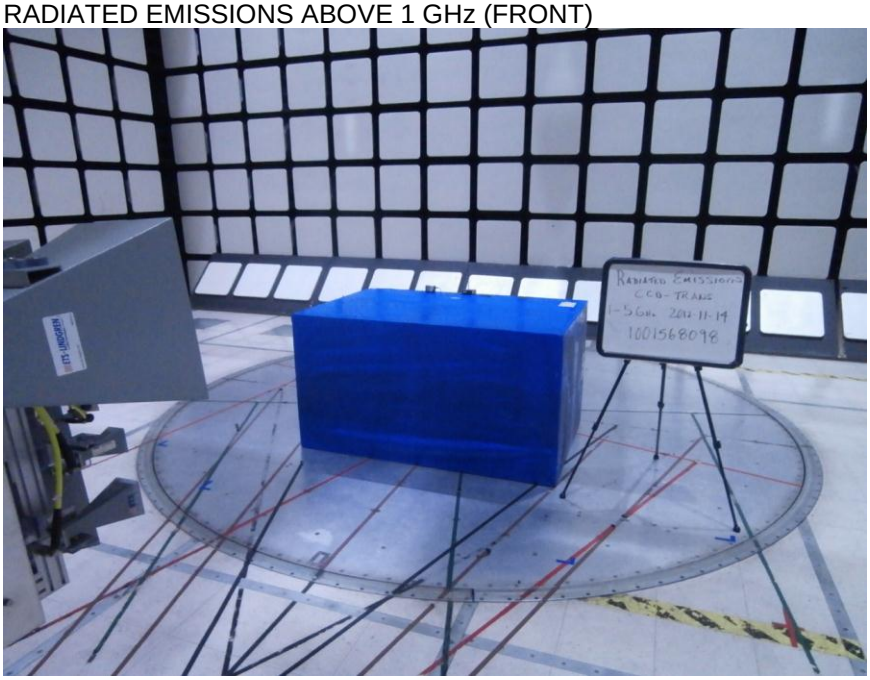


RADIATED EMISSIONS BELOW 1GHz (BACK)

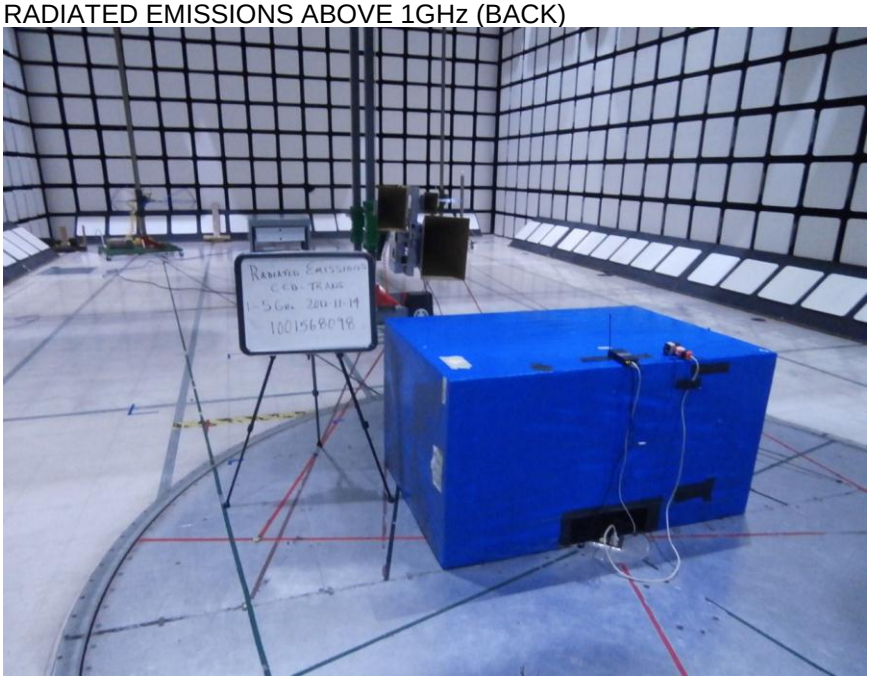


RADIATED EMISSION ABOVE 1 GHz

RADIATED EMISSIONS ABOVE 1 GHz (FRONT)

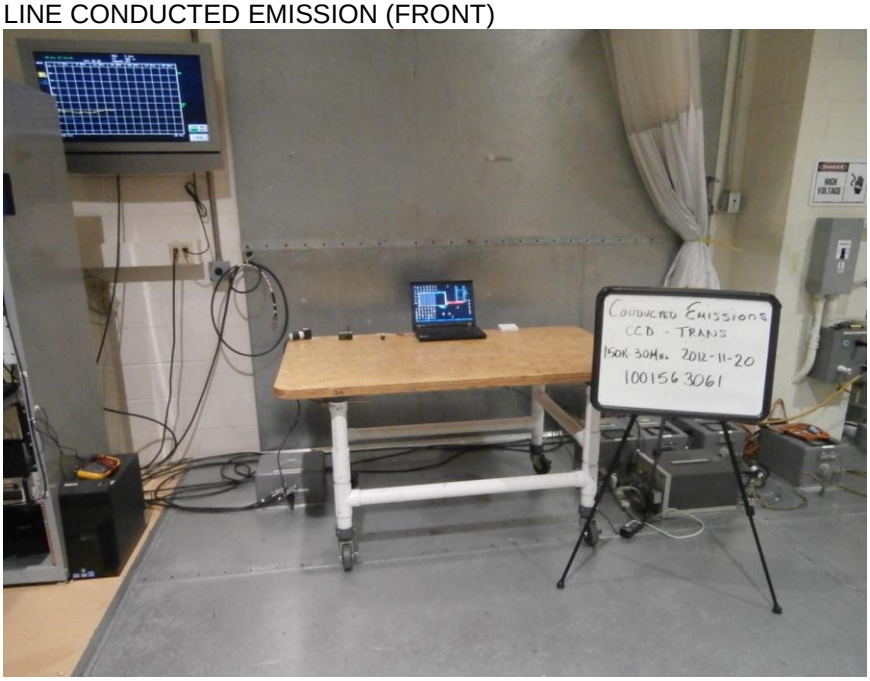


RADIATED EMISSIONS ABOVE 1GHz (BACK)



AC MAINS LINE CONDUCTED EMISSION

LINE CONDUCTED EMISSION (FRONT)



LINE CONDUCTED EMISSION (BACK)

END OF REPORT

UL LLC. FORM NO: CCSUP4701D
1285 WALT WHITMAN RD, MELVILLE, NY 11747, USA TEL: (631) 271-6200 FAX: (877) 854-3577