



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

CERTIFICATION TEST REPORT

FOR

DIMMER

MODEL NUMBER: RRD-2ANF

**FCC ID: JPZ0091
IC: 2851A-JPZ0091**

REPORT NUMBER: 1001576960

**ISSUE DATE: 2012-12-10
REVISION DATE: 2013-01-14**

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.
TEL: (631) 271-6200
FAX: (877) 854-3577**

NVLAP[®]

NVLAP LAB CODE 100255-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	2012-11-10	Initial Issue	B. DeLisi
1	2013-01-14	Updated configuration description	B. DeLisi

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS	4
2. TEST METHODOLOGY	6
3. FACILITIES AND ACCREDITATION	6
4. CALIBRATION AND UNCERTAINTY	6
4.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	<i>6</i>
4.2. <i>SAMPLE CALCULATION</i>	<i>6</i>
4.3. <i>MEASUREMENT UNCERTAINTY.....</i>	<i>6</i>
5. EQUIPMENT UNDER TEST	7
5.1. <i>DESCRIPTION OF EUT</i>	<i>7</i>
5.2. <i>DESCRIPTION OF AVAILABLE ANTENNAS</i>	<i>7</i>
5.3. <i>SOFTWARE AND FIRMWARE.....</i>	<i>7</i>
5.4. <i>WORST-CASE CONFIGURATION AND MODE.....</i>	<i>7</i>
5.5. <i>MODIFICATIONS</i>	<i>7</i>
5.6. <i>DESCRIPTION OF TEST SETUP.....</i>	<i>8</i>
6. TEST AND MEASUREMENT EQUIPMENT	10
7. ANTENNA PORT TEST RESULTS	12
7.1. <i>20 dB AND 99% BW</i>	<i>12</i>
7.2. <i>DUTY CYCLE.....</i>	<i>16</i>
7.3. <i>TRANSMISSION TIME.....</i>	<i>19</i>
8. RADIATED EMISSION TEST RESULTS.....	20
8.1. <i>TX RADIATED SPURIOUS EMISSION</i>	<i>20</i>
8.2. <i>RX RADIATED SPURIOUS EMISSION.....</i>	<i>27</i>
9. AC MAINS LINE CONDUCTED EMISSIONS.....	32
10. SETUP PHOTOS	49

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: COMPANY
STREET
CITY, STATE, ZIP, COUNTRY

EUT DESCRIPTION: Dimmer

MODEL: RRD-2ANF

In addition to the model number tested the following models are electrically identical, according to the manufacturer, and considered covered by this report.

HQRD-2ANF, CCD-2ANF, MRF2-2ANF, HRD-2ANF-W

SERIAL NUMBER: Non Serialized Production Unit

DATE TESTED: 2012-12-04 through 2012-12-10

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:



Joseph Danisi
WiSE Project Lead
UL LLC

Bob DeLisi
WiSE Principal Engineer
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:

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 dimmer used for ceiling fan loads.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral antenna that is not accessible to the user.

5.3. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was FAN_SPEED_CTRL_SHAPSHOT_DGC_10.18.12, Version: 3.20

The test utility software used during testing was FAN_SPEED_CTRL_SHAPSHOT_DGC_10.18.12, Version: 3.20.

5.4. WORST-CASE CONFIGURATION AND MODE

Testing was conducted on the lowest and highest channels for all radiated and conducted emissions tests. All other tests were conducted on the center channel. The configuration tested was the worst case configuration of possible orientations that the device could be installed in.

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Not Applicable

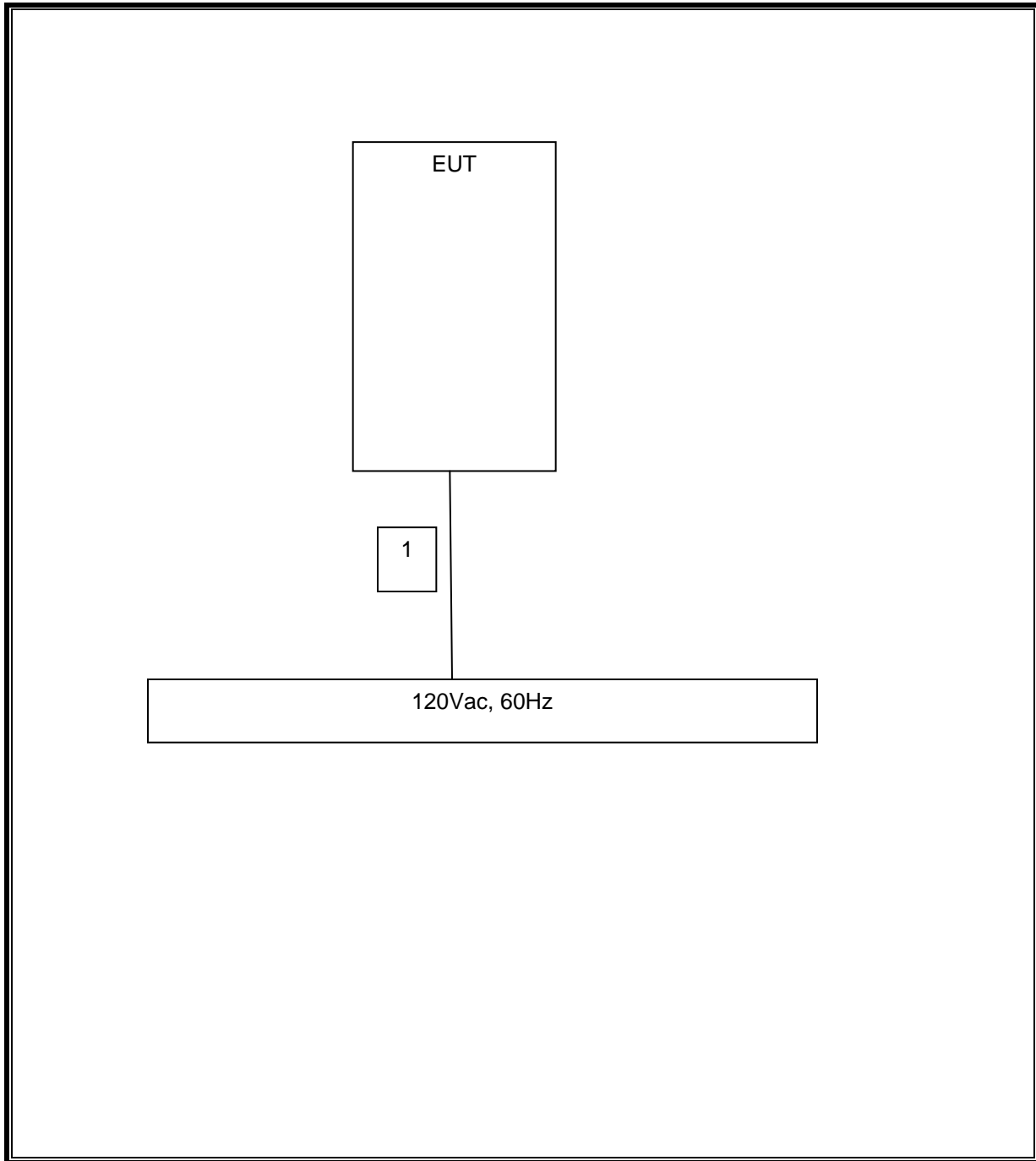
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	AC	Unshielded	>3m	None

TEST SETUP

The EUT was tested as a standalone device connected to AC mains power.

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	ESIB26	ME5B-081	2012-01-30	2013-01-30
Bicon Antenna	Schaffner	VBA6106A	43441	2012-11-12	2013-11-12
Log-P Antenna	Schaffner	UPA6109	44068	2012-05-16	2013-05-16
Bias Tee	Miteq	AM-1523-7687	44392	N/A	N/A
Bias Tee	Miteq	AM-1523-7687	44393	N/A	N/A
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	2014-12-07
Multimeter	Fluke	83V	43443	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	NA	NA
Gain Controller	HP	11713A	50251	NA	NA
RF Switch / Preamp Fixture	UL	BOMS1	50249	NA	NA
System Controller	UL	BOMS2	50252	NA	NA
Measurement Software	UL	Version 9.3	44740	NA	NA
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2014-12-07
Multimeter	Fluke	83V	43443	2012-02-01	2013-02-28
<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.</p> <p>* 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.</p>					

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	Solar	9252-50-R-24-BNC	ME5A-636	2012-02-03	2013-02-28
Switch Driver	HP	11713A	44397	NA	NA
RF Switch Box	UL	4	44404	NA	NA
Measurement Software	UL	Version 9.3	44736	NA	NA
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	72822	2012-01-31	2013-02-28
Dipole Antenna	EMCO	3121C	3359		
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2010-12-07	2014-12-07
Multimeter	Fluke	83III	ME5B-305	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:

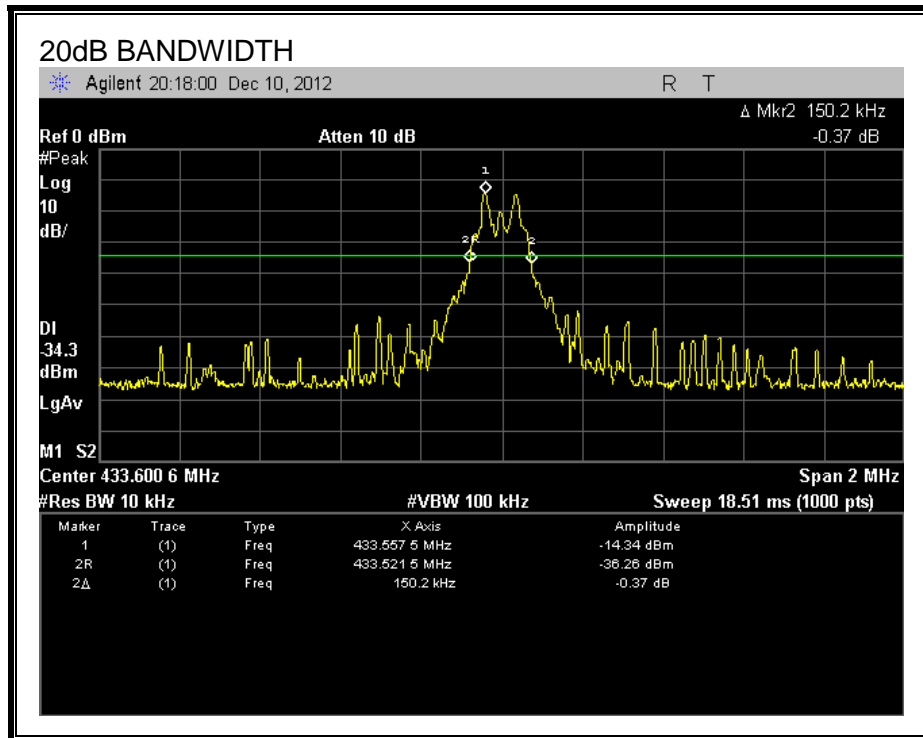
20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.6	150.2	1084	-933.8

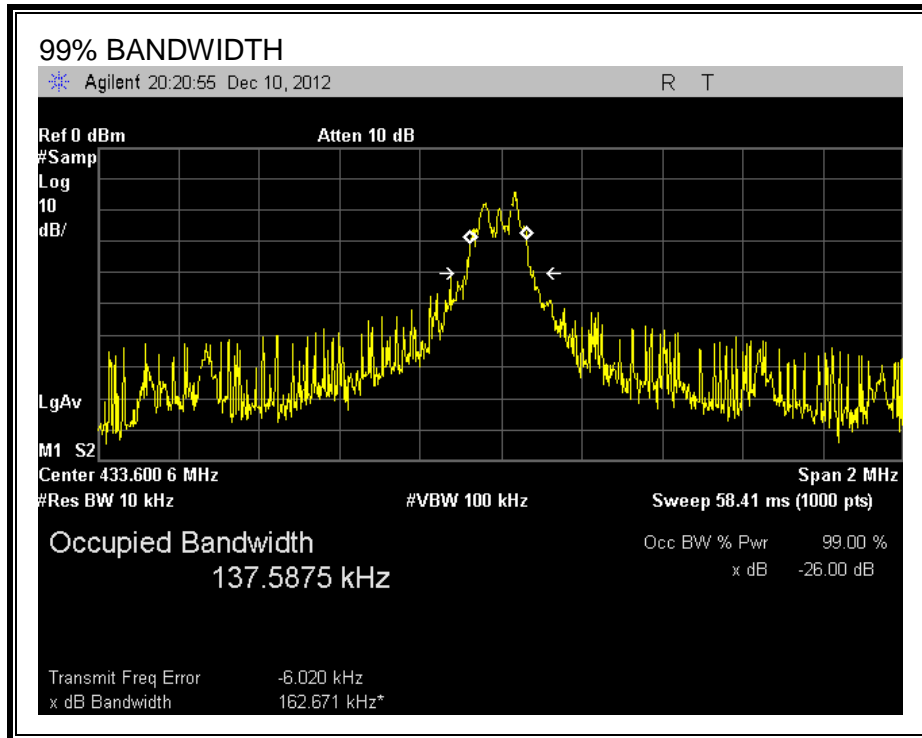
99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
433.6	137.6	1084	-946.4

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 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

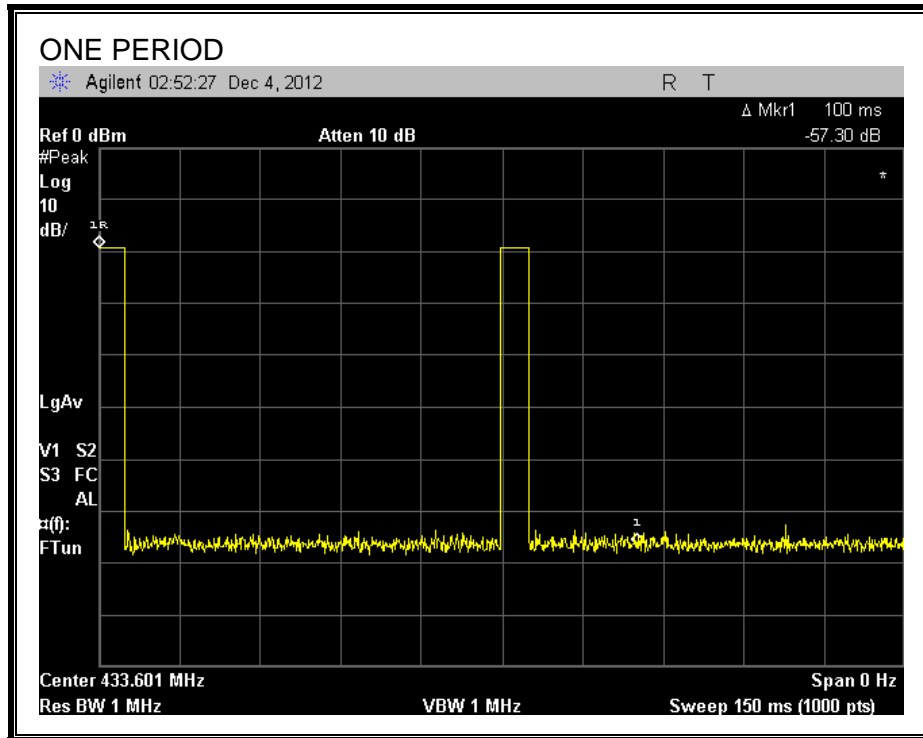
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is (# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

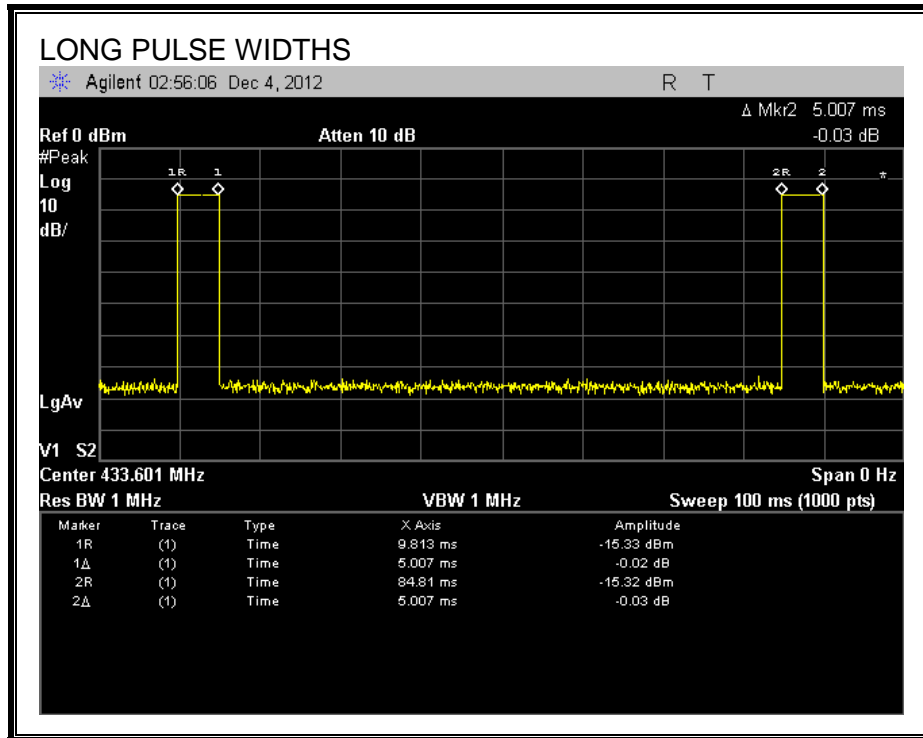
No non-compliance noted:

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	2	0.00	0	0.100	-20.00

ONE PERIOD



LONG PULSE WIDTHS



7.3. TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)

IC A1.1.1 (b)

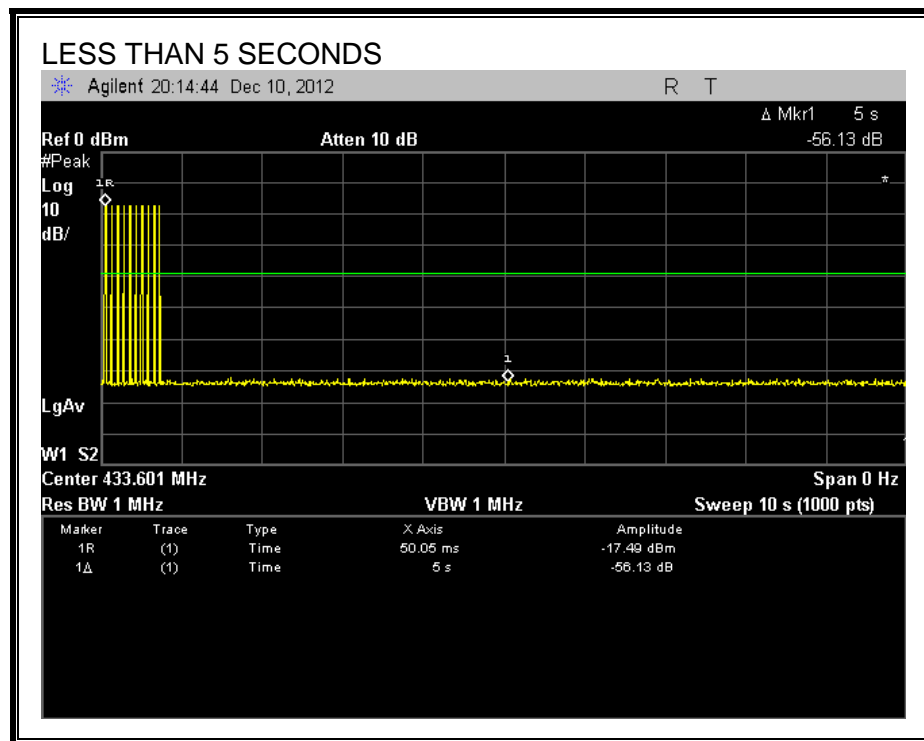
A transmitter activated automatically shall cease transmission within 5 seconds after activation.

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:



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 3,750 ¹	125 to 375 ¹
174 - 260	3,750	375
260 - 470	3,750 to 12,500 ¹	375 to 1,250 ¹
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.

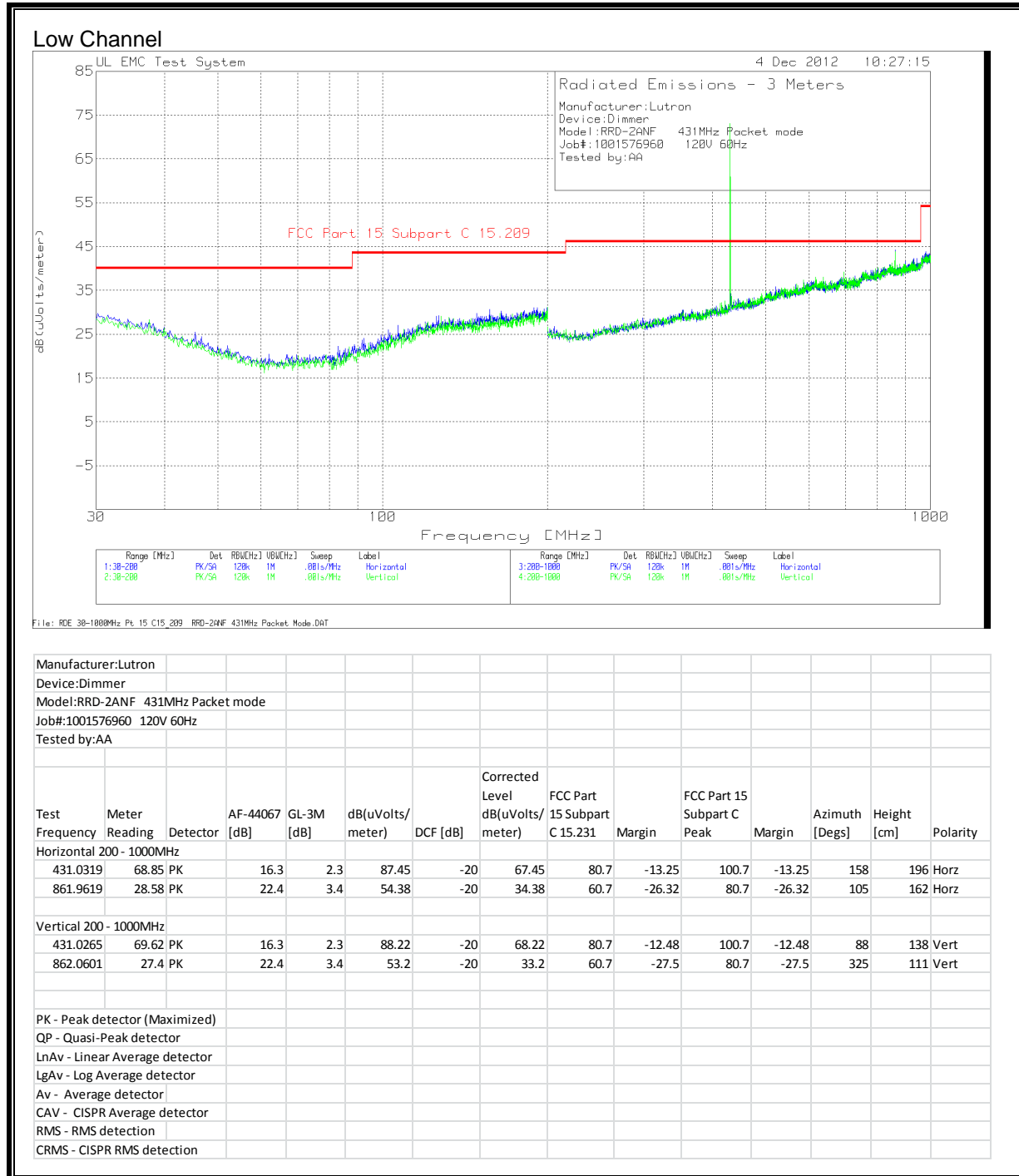
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

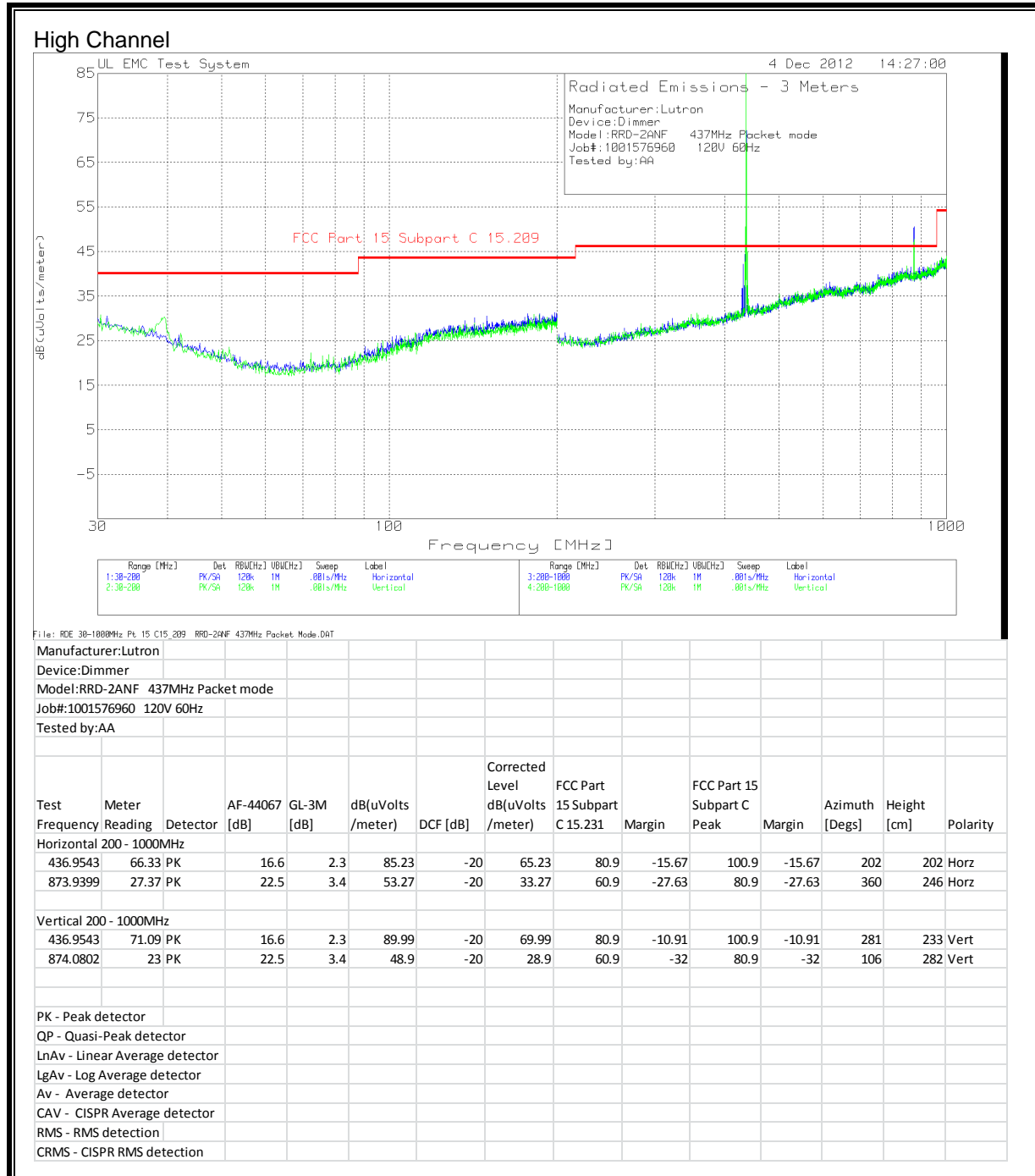
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

RESULTS

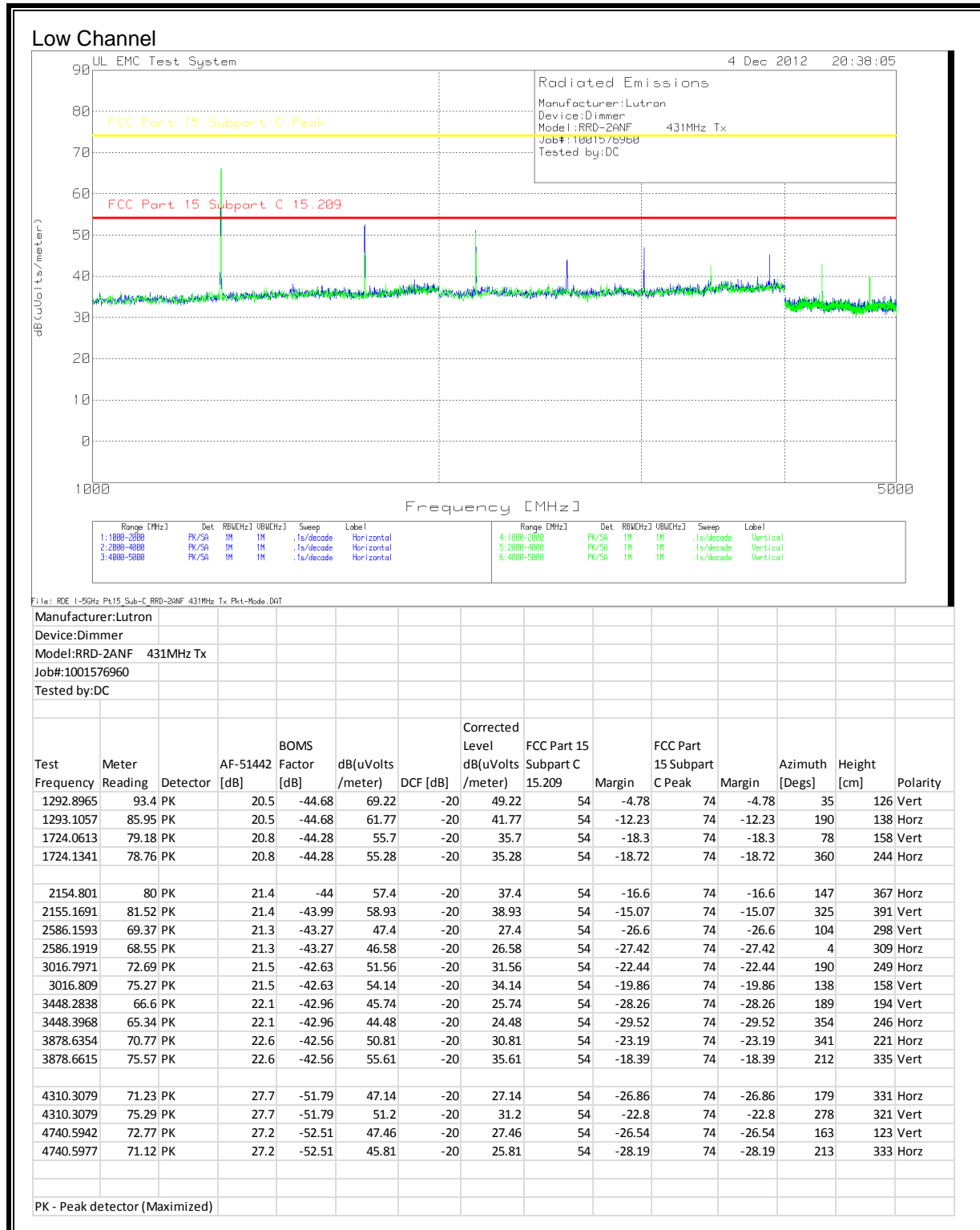
No non-compliance noted:

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





HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz



High Channel



File: RDE 1-5GHz PL15_Sub-C_RRD-2ANF_437MHz_Tx_Pkt-Mode.DAT

Manufacturer: Lutron
 Device: Dimmer
 Model: RRD-2ANF 437MHz Tx
 Job#: 1001576960
 Tested by: GB

Test Frequency	Meter Reading	Detector	BOMS		dB(uVolts /meter)	DCF [dB]	Corrected Level dB(uVolts /meter)	FCC Part 15 Subpart C		FCC Part 15 Subpart C		Azimuth [Degs]	Height [cm]	Polarity
			AF-51442 [dB]	Factor [dB]				15.209	Margin	Peak	Margin			
1311.0866	86.96	PK	20.5	-44.7	62.76	-20	42.76	54	-11.24	74	-11.24	341	392	Horz
1311.1373	91.52	PK	20.5	-44.7	67.32	-20	47.32	54	-6.68	74	-6.68	77	133	Vert
1747.8382	77.52	PK	20.8	-44.17	54.15	-20	34.15	54	-19.85	74	-19.85	322	376	Horz
1748.1058	77.12	PK	20.8	-44.18	53.74	-20	33.74	54	-20.26	74	-20.26	128	104	Vert
2185.222	77.43	PK	21.5	-43.79	55.14	-20	35.14	54	-18.86	74	-18.86	273	354	Horz
2184.8864	80.11	PK	21.2	-43.8	57.51	-20	37.51	54	-16.49	74	-16.49	345	385	Vert
2621.8535	69.35	PK	21.4	-43.23	47.52	-20	27.52	54	-26.48	74	-26.48	38	371	Horz
2621.8926	69.9	PK	21.4	-43.23	48.07	-20	28.07	54	-25.93	74	-25.93	134	153	Vert
3059	68.9	PK	21.6	-42.7	47.8	-20	27.8	54	-26.2	74	-26.2	41	361	Horz
3059	74.87	PK	21.8	-42.7	53.97	-20	33.97	54	-20.03	74	-20.03	140	166	Vert
3933.1234	72.56	PK	22.7	-42.57	52.69	-20	32.69	54	-21.31	74	-21.31	290	331	Horz
3933.494	71.3	PK	22.7	-42.6	51.4	-20	31.4	54	-22.6	74	-22.6	3	309	Vert
4369.5651	65.51	PK	27.6	-51.94	41.17	-20	21.17	54	-32.83	74	-32.83	326	314	Horz
4370.2	72.96	PK	27.7	-51.94	48.72	-20	28.72	54	-25.28	74	-25.28	236	351	Vert
4807.4309	66.92	PK	27.1	-52.59	41.43	-20	21.43	54	-32.57	74	-32.57	276	387	Horz
4807.42	70.56	PK	27.3	-52.59	45.27	-20	25.27	54	-28.73	74	-28.73	349	379	Vert

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 (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.

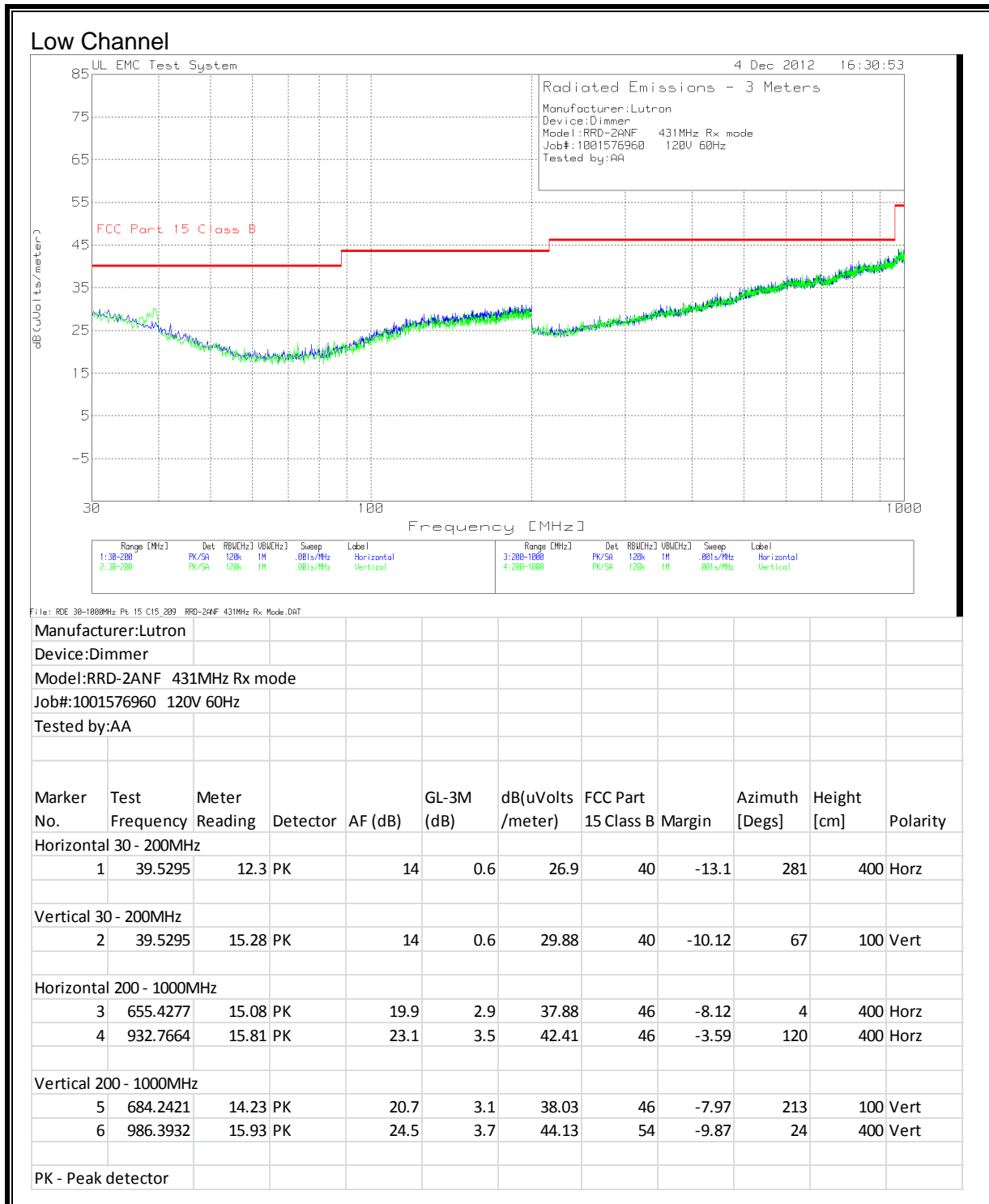
The spectrum from 30 MHz to 5th harmonic is investigated with the transmitter set to the middle channel.

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.

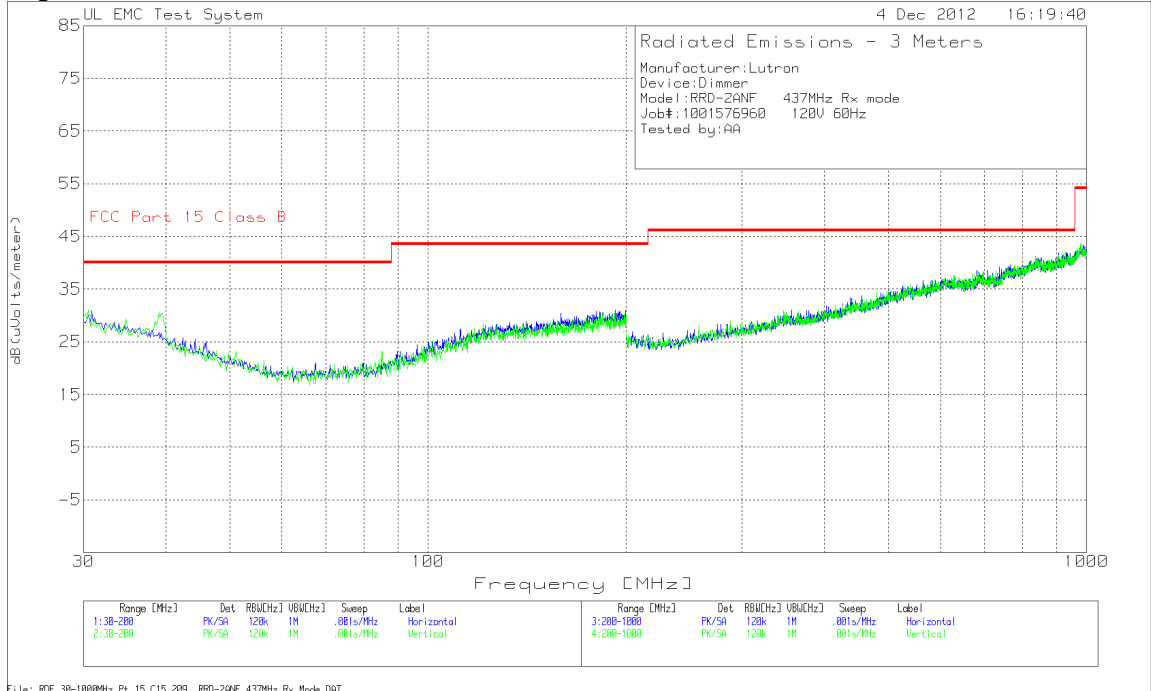
RESULTS

No non-compliance noted:

RECEIVER SPURIOUS EMISSION (30MHz - 1GHz)



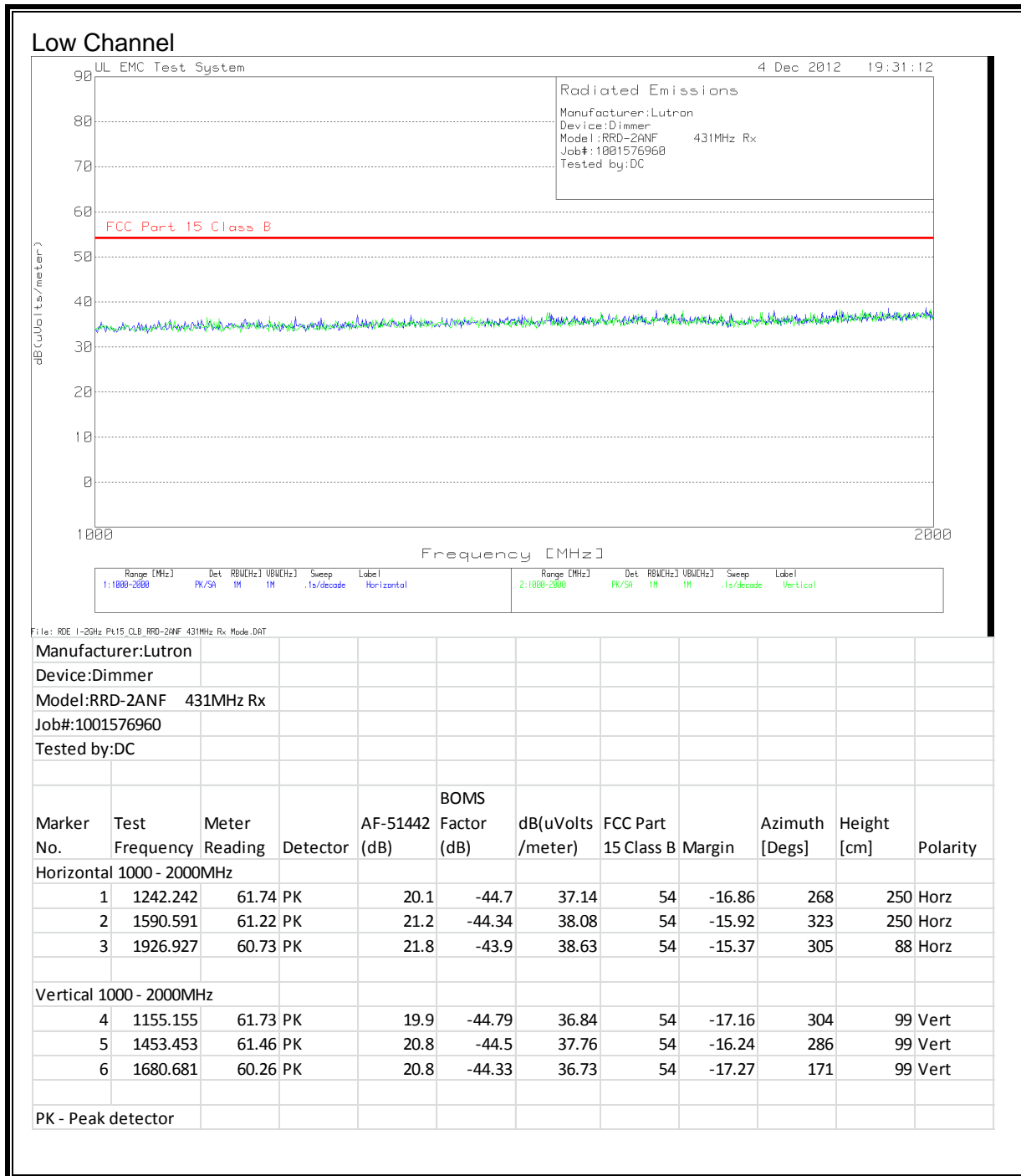
High Channel

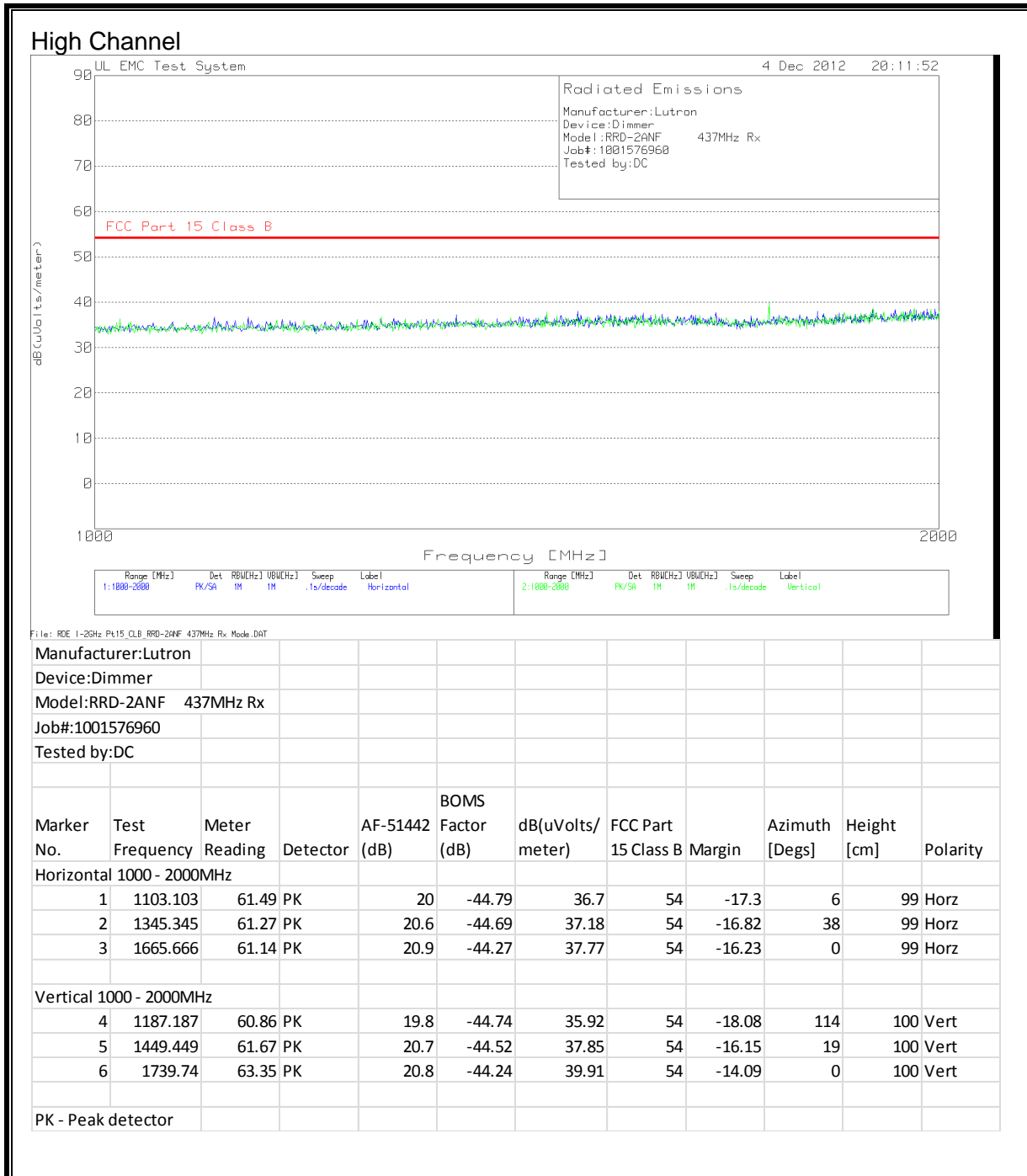


File: RDE 30-1000MHz Pt. 15 C15_209_RRD-2ANF_437MHz_Rx_Mode.DAT

Manufacturer: Lutron											
Device: Dimmer											
Model: RRD-2ANF 437MHz Rx mode											
Job#: 1001576960 120V 60Hz											
Tested by: AA											
Marker No.	Test Frequency	Meter Reading	Detector	AF (dB)	GL-3M (dB)	dB(uVolts /meter)	FCC Part 15 Class B	Margin	Azimuth [Degs]	Height [cm]	Polarity
Horizontal 30 - 200MHz											
1	30.8509	12.86	PK	17.5	0.5	30.86	40	-9.14	308	400	Horz
2	192.3423	14.08	PK	15.5	1.5	31.08	43.5	-12.42	334	100	Horz
Vertical 30 - 200MHz											
3	34.7648	12.92	PK	15.8	0.6	29.32	40	-10.68	228	100	Vert
4	39.3594	15.74	PK	14.1	0.6	30.44	40	-9.56	228	100	Vert
Horizontal 200 - 1000MHz											
5	988.3942	15.28	PK	24.4	3.7	43.38	54	-10.62	358	300	Horz
Vertical 200 - 1000MHz											
6	981.5908	15.34	PK	24.7	3.7	43.74	54	-10.26	298	300	Vert
PK - Peak detector											

RECEIVER SPURIOUS EMISSION ABOVE 1GHz





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

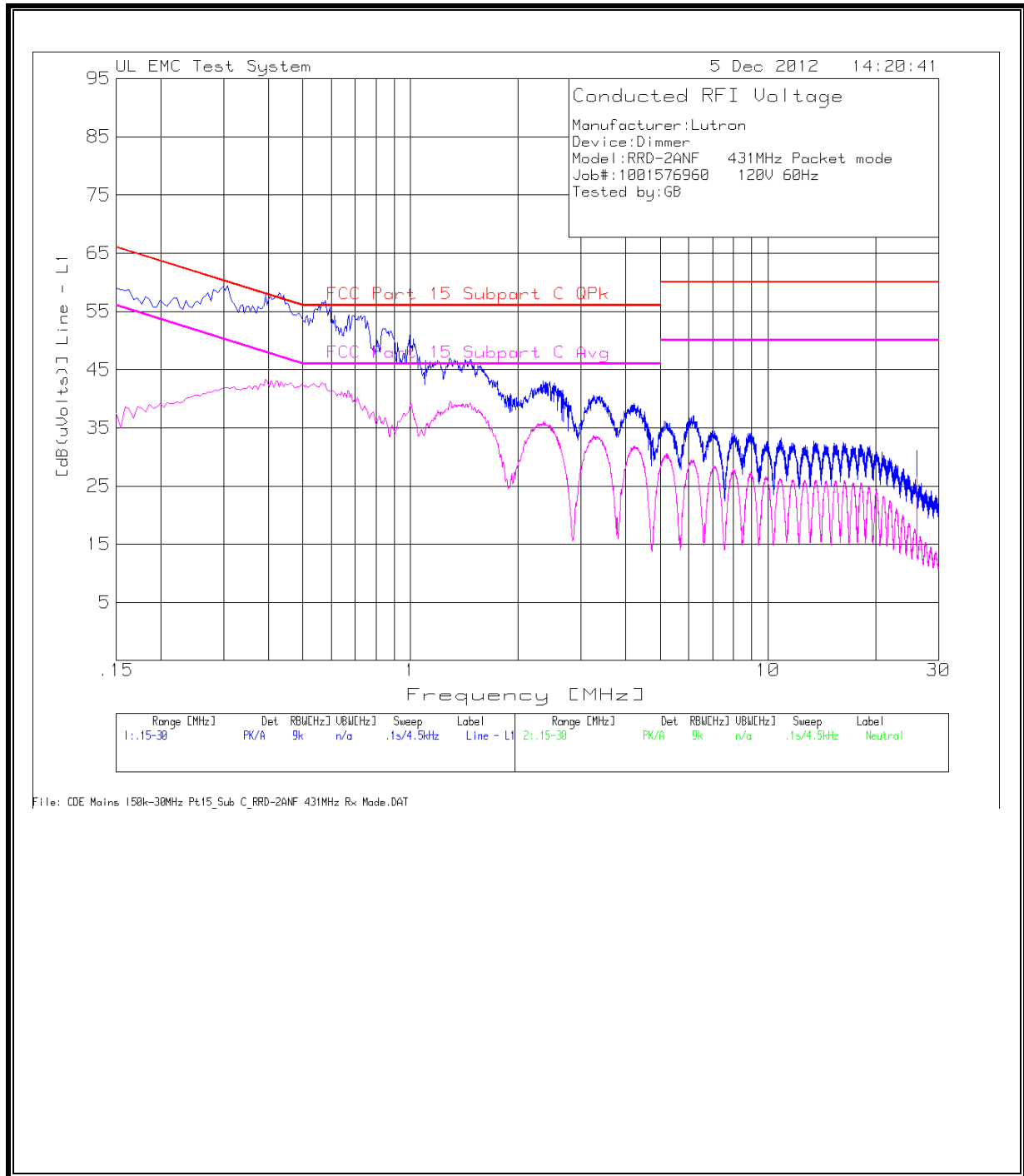
No non-compliance noted:

6 WORST EMISSIONS – TX Mode Low Channel

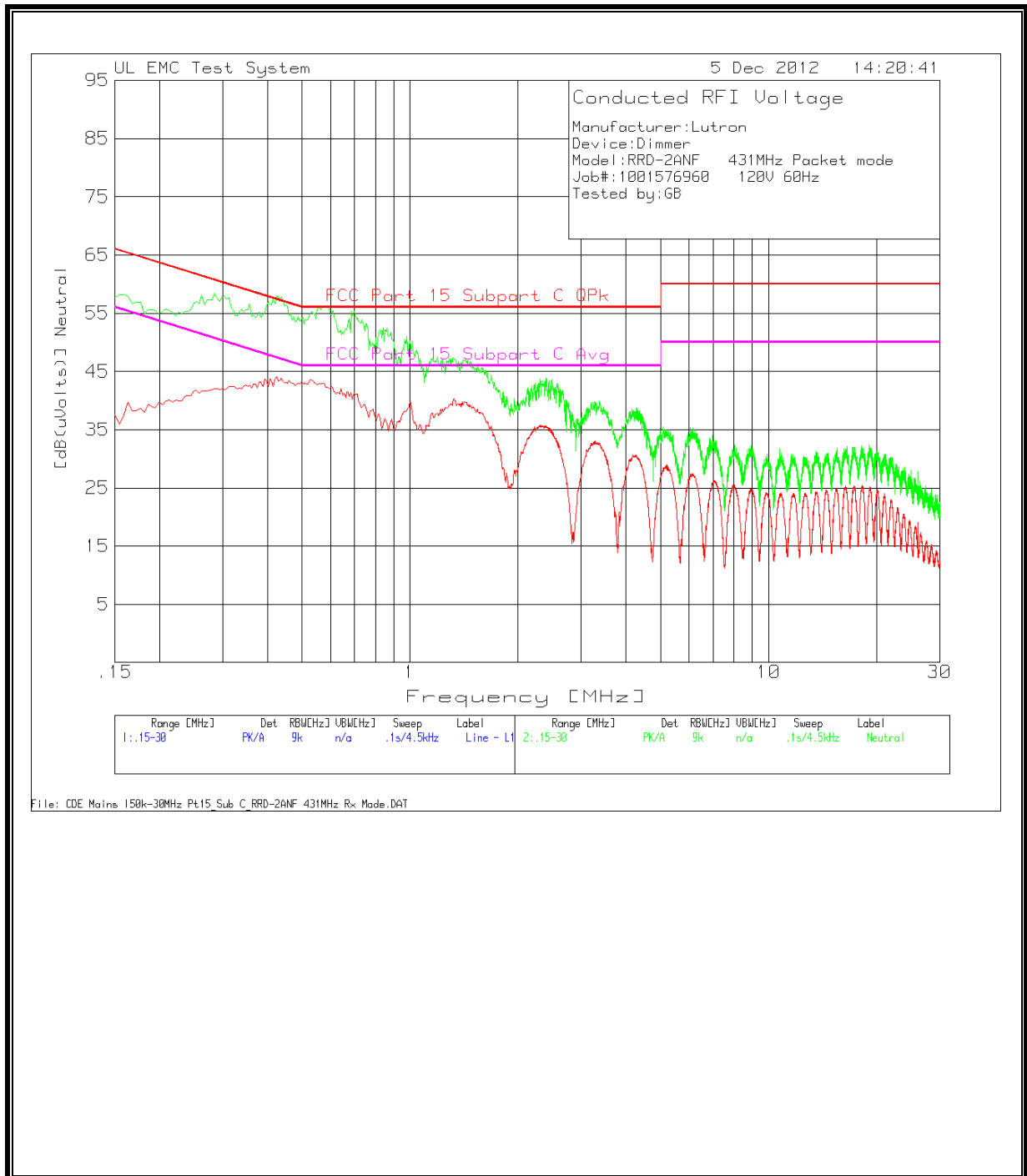
Manufacturer:Lutron								
Device:Dimmer								
Model:RRD-2ANF 431MHz Packet mode								
Job#:1001576960 120V 60Hz								
Tested by:GB								
Test	Meter		LISN 5A636		FCC Part		FCC Part	
Frequency	Reading	Detector	Line 1 Cab	[dB(uVolts)]	15	Margin	15	Margin
			L1 SW TL		Subpart C		Subpart C	
Line - L1 .15 - 30MHz								
0.3075	49.31	PK	10	59.31	60	-0.69	50	9.31
0.393	47.74	PK	10.1	57.84	58	-0.16	48	9.84
0.429	48.11	PK	10.1	58.21	57.3	0.91	47.3	10.91
0.4875	44.54	PK	10.1	54.64	56.2	-1.56	46.2	8.44
0.5775	46.77	PK	10.1	56.87	56	0.87	46	10.87
0.672	44.32	PK	10.1	54.42	56	-1.58	46	8.42
0.726	44.16	PK	10.1	54.26	56	-1.74	46	8.26
0.3075	31.83	Av	10	41.83	60	-18.17	50	-8.17
0.393	33.27	Av	10.1	43.37	58	-14.63	48	-4.63
0.429	31.96	Av	10.1	42.06	57.3	-15.24	47.3	-5.24
0.4875	31.86	Av	10.1	41.96	56.2	-14.24	46.2	-4.24
0.5775	32.43	Av	10.1	42.53	56	-13.47	46	-3.47
0.672	31.15	Av	10.1	41.25	56	-14.75	46	-4.75
0.726	28.28	Av	10.1	38.38	56	-17.62	46	-7.62
Neutral .15 - 30MHz								
0.285	48.48	PK	10	58.48	60.7	-2.22	50.7	7.78
0.4245	47.87	PK	10.1	57.97	57.4	0.57	47.4	10.57
0.5505	45.68	PK	10.1	55.78	56	-0.22	46	9.78
0.591	46.17	PK	10.1	56.27	56	0.27	46	10.27
0.6855	45.25	PK	10.1	55.35	56	-0.65	46	9.35
0.843	42.32	PK	10.1	52.42	56	-3.58	46	6.42
0.285	32.02	Av	10	42.02	60.7	-18.68	50.7	-8.68
0.4245	34.05	Av	10.1	44.15	57.4	-13.25	47.4	-3.25
0.5505	32.54	Av	10.1	42.64	56	-13.36	46	-3.36
0.591	32.06	Av	10.1	42.16	56	-13.84	46	-3.84
0.6855	30.93	Av	10.1	41.03	56	-14.97	46	-4.97
0.843	25.97	Av	10.1	36.07	56	-19.93	46	-9.93
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								

Manufacturer:Lutron									
Device:Dimmer									
Model:RRD-2ANF 431MHz Packet mode									
Job#:1001576960 120V 60Hz									
Tested by:GB									
			LISN 5A636		FCC Part		FCC Part		
			Line 1 Cab		15		15		
			L1 SW TL		Subpart C		Subpart C		
Test	Meter	Detector	[dB]	[dB(uVolts)]	QPk	Margin	Avg	Margin	
Frequency	Reading								
Line - L1 .15 - 30MHz									
0.303	41.61	QP	10	51.61	60.16	-8.55	50.16	1.45	
0.3939	41.35	QP	10.1	51.45	57.98	-6.53	47.98	3.47	
0.4326	41.26	QP	10.1	51.36	57.2	-5.84	47.2	4.16	
0.4866	39.16	QP	10.1	49.26	56.23	-6.97	46.23	3.03	
0.5748	39.34	QP	10.1	49.44	56	-6.56	46	3.44	
0.6747	36.36	QP	10.1	46.46	56	-9.54	46	0.46	
0.7251	36.75	QP	10.1	46.85	56	-9.15	46	0.85	
Neutral .15 - 30MHz									
0.285	42.33	QP	10	52.33	60.67	-8.34	50.67	1.66	
0.429	41.65	QP	10.1	51.75	57.27	-5.52	47.27	4.48	
0.5532	39.77	QP	10.1	49.87	56	-6.13	46	3.87	
0.5874	38.99	QP	10.1	49.09	56	-6.91	46	3.09	
0.6891	37.73	QP	10.1	47.83	56	-8.17	46	1.83	
0.8475	34.55	QP	10.1	44.65	56	-11.35	46	-1.35	
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									
Text File: CDE Mains 150k-30MHz Pt15_Sub C_RRD-2ANF 431MHz Rx Mode.TXT									

LINE 1 RESULTS



LINE 2 RESULTS

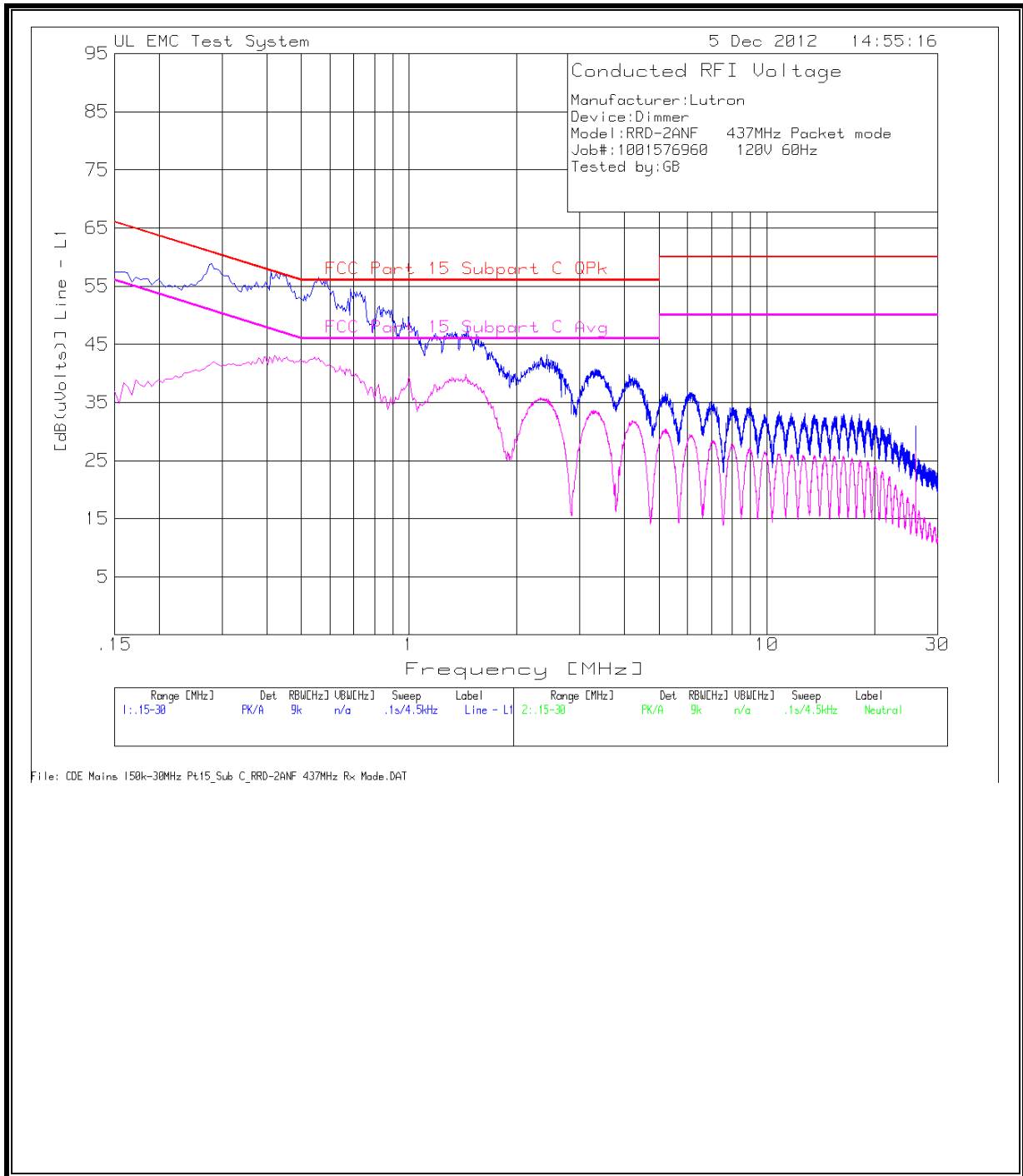


6 WORST EMISSIONS – Tx Mode High Channel

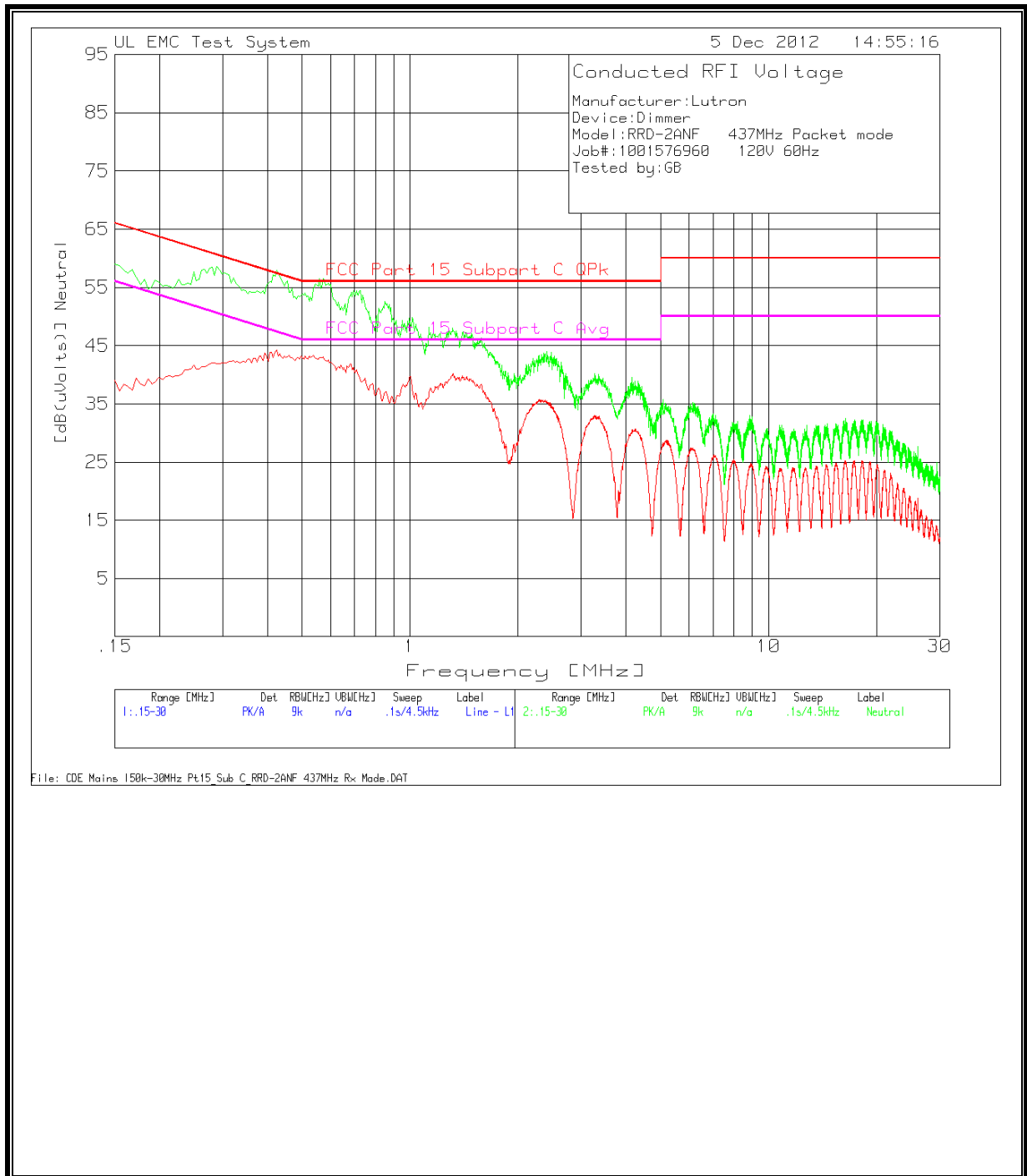
Manufacturer:Lutron									
Device:Dimmer									
Model:RRD-2ANF 437MHz Packet mode									
Job#:1001576960 120V 60Hz									
Tested by:GB									
			LISN 5A636		FCC Part		FCC Part		
Test	Meter		Line 1 Cab		15		15		
Frequency	Reading	Detector	L1 SW TL	[dB(uVolts)]	Subpart C	Margin	Subpart C	Avg	Margin
Line - L1 .15 - 30MHz									
0.2805	48.85	PK	10	58.85	60.8	-1.95	50.8	8.05	
0.3975	45.67	PK	10.1	55.77	57.9	-2.13	47.9	7.87	
0.411	47.44	PK	10.1	57.54	57.6	-0.06	47.6	9.94	
0.5595	46.35	PK	10.1	56.45	56	0.45	46	10.45	
0.6855	44.51	PK	10.1	54.61	56	-1.39	46	8.61	
0.825	41.47	PK	10.1	51.57	56	-4.43	46	5.57	
0.2805	31.78	Av	10	41.78	60.8	-19.02	50.8	-9.02	
0.3975	32.65	Av	10.1	42.75	57.9	-15.15	47.9	-5.15	
0.411	32.43	Av	10.1	42.53	57.6	-15.07	47.6	-5.07	
0.5595	32.62	Av	10.1	42.72	56	-13.28	46	-3.28	
0.6855	30.19	Av	10.1	40.29	56	-15.71	46	-5.71	
0.825	26.92	Av	10.1	37.02	56	-18.98	46	-8.98	
Neutral .15 - 30MHz									
0.2895	48.58	PK	10	58.58	60.5	-1.92	50.5	8.08	
0.4245	47.78	PK	10.1	57.88	57.4	0.48	47.4	10.48	
0.4245	47.78	PK	10.1	57.88	57.4	0.48	47.4	10.48	
0.573	46.34	PK	10.1	56.44	56	0.44	46	10.44	
0.726	44.35	PK	10.1	54.45	56	-1.55	46	8.45	
0.852	42.53	PK	10.1	52.63	56	-3.37	46	6.63	
0.2895	31.91	Av	10	41.91	60.5	-18.59	50.5	-8.59	
0.4245	34.08	Av	10.1	44.18	57.4	-13.22	47.4	-3.22	
0.4245	34.08	Av	10.1	44.18	57.4	-13.22	47.4	-3.22	
0.573	32.95	Av	10.1	43.05	56	-12.95	46	-2.95	
0.726	28.94	Av	10.1	39.04	56	-16.96	46	-6.96	
0.852	26.82	Av	10.1	36.92	56	-19.08	46	-9.08	
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									

Manufacturer:Lutron									
Device:Dimmer									
Model:RRD-2ANF 437MHz Packet mode									
Job#:1001576960 120V 60Hz									
Tested by:GB									
LISN 5A636									
Line 1 Cab									
L1 SW TL									
Test	Meter				FCC Part		FCC Part		
Frequency	Reading	Detector	[dB]	[dB(uVolts)]	15 Subpart C QPk	Margin	15 Subpart C Avg	Margin	
Line - L1 .15 - 30MHz									
0.2778	42	QP	10	52	60.88	-8.88	50.88	1.12	
0.3939	40.71	QP	10.1	50.81	57.98	-7.17	47.98	2.83	
0.4101	40.71	QP	10.1	50.81	57.65	-6.84	47.65	3.16	
0.5604	39.54	QP	10.1	49.64	56	-6.36	46	3.64	
0.6873	36.8	QP	10.1	46.9	56	-9.1	46	0.9	
0.8277	33.82	QP	10.1	43.92	56	-12.08	46	-2.08	
Neutral .15 - 30MHz									
0.2886	43.03	QP	10	53.03	60.56	-7.53	50.56	2.47	
0.4245	41.88	QP	10.1	51.98	57.36	-5.38	47.36	4.62	
0.5739	40.06	QP	10.1	50.16	56	-5.84	46	4.16	
0.7233	37.88	QP	10.1	47.98	56	-8.02	46	1.98	
0.8502	34.83	QP	10.1	44.93	56	-11.07	46	-1.07	
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

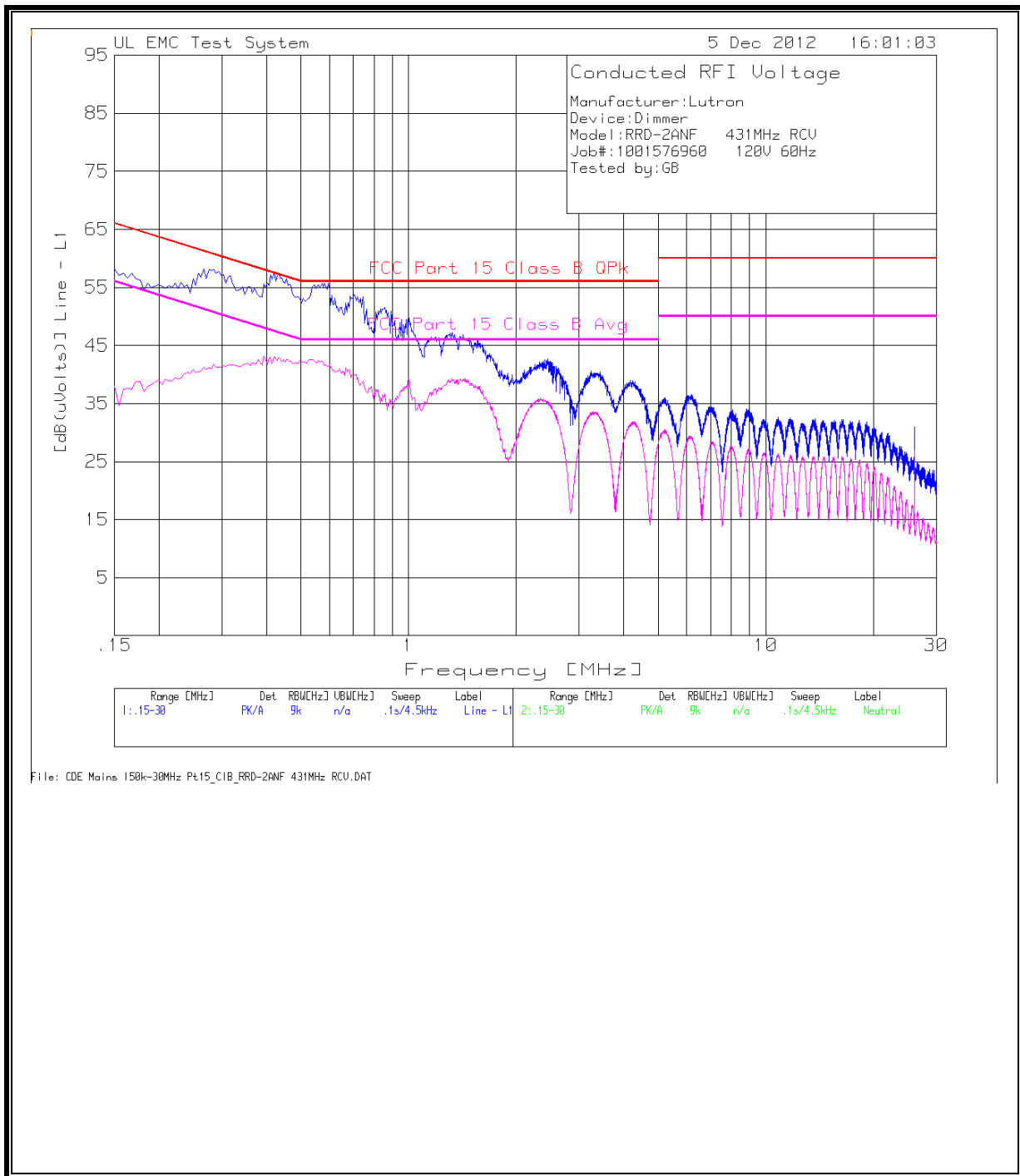


6 WORST EMISSIONS – Rx Mode Low Channel

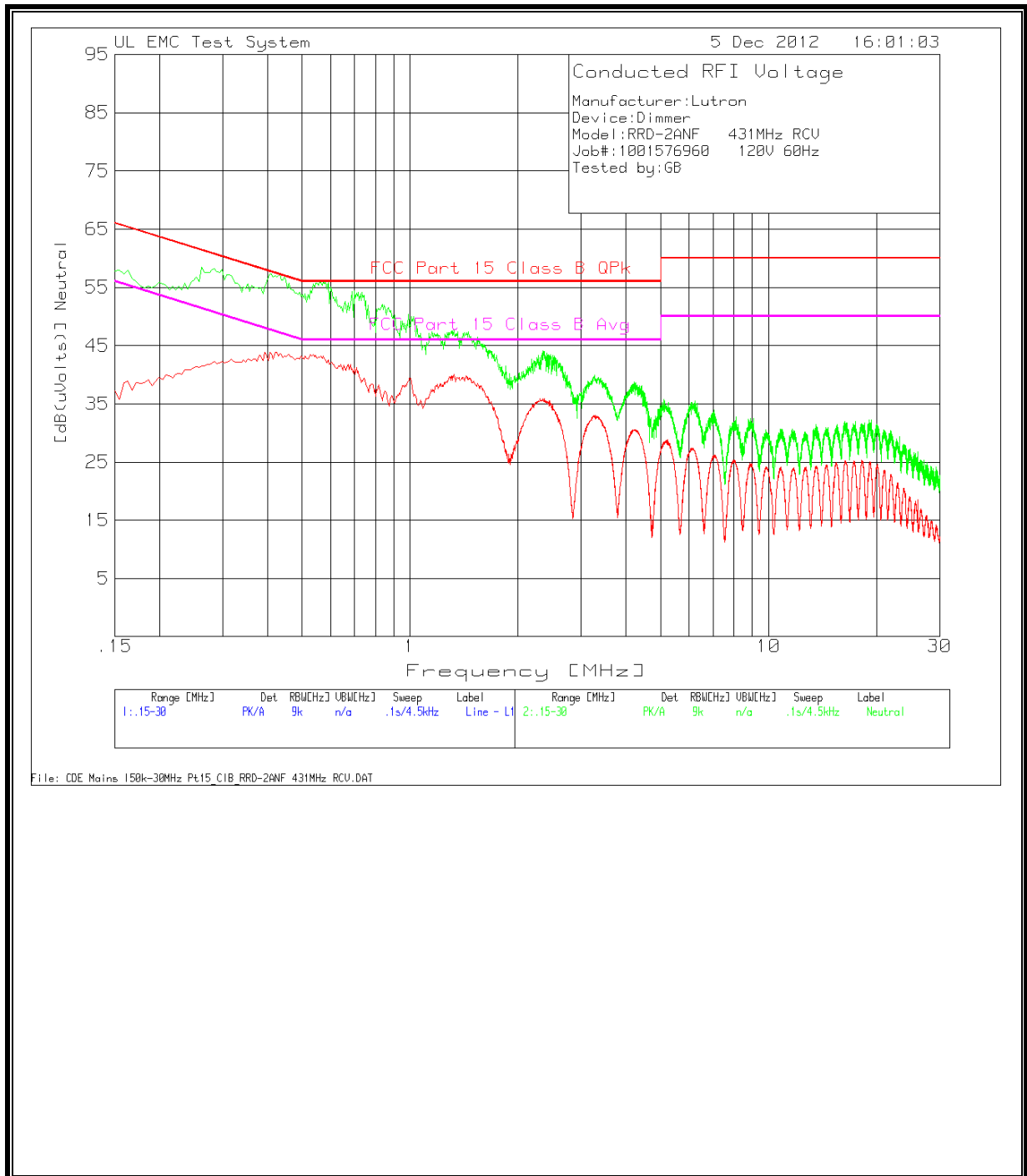
Manufacturer:Lutron									
Device:Dimmer									
Model:RRD-2ANF 431MHz RCV									
Job#:1001576960 120V 60Hz									
Tested by:GB									
LISN 5A636									
Line 1 Cab									
L1 SW TL									
Test	Meter				FCC Part		FCC Part		
Frequency	Reading	Detector	[dB]	[dB(uVolts)]	15 Class B	Margin	15 Class B	Avg	Margin
Line - L1 .15 - 30MHz									
0.267	48.16	PK	10.1	58.26	61.2	-2.94	51.2		7.06
0.294	47.53	PK	10.1	57.63	60.4	-2.77	50.4		7.23
0.3165	46.99	PK	10	56.99	59.8	-2.81	49.8		7.19
0.42	47.42	PK	10.1	57.52	57.4	0.12	47.4		10.12
0.573	45.61	PK	10.1	55.71	56	-0.29	46		9.71
0.7035	43.62	PK	10.1	53.72	56	-2.28	46		7.72
0.8565	41.43	PK	10.1	51.53	56	-4.47	46		5.53
0.267	31.08	Av	10.1	41.18	61.2	-20.02	51.2		-10.02
0.294	31.11	Av	10.1	41.21	60.4	-19.19	50.4		-9.19
0.3165	31.6	Av	10	41.6	59.8	-18.2	49.8		-8.2
0.42	33.03	Av	10.1	43.13	57.4	-14.27	47.4		-4.27
0.573	32.22	Av	10.1	42.32	56	-13.68	46		-3.68
0.7035	29.71	Av	10.1	39.81	56	-16.19	46		-6.19
0.8565	26.56	Av	10.1	36.66	56	-19.34	46		-9.34
Neutral .15 - 30MHz									
0.2625	48.34	PK	10.1	58.44	61.4	-2.96	51.4		7.04
0.285	48.21	PK	10	58.21	60.7	-2.49	50.7		7.51
0.2985	48.12	PK	10	58.12	60.3	-2.18	50.3		7.82
0.4065	47.22	PK	10.1	57.32	57.7	-0.38	47.7		9.62
0.591	45.94	PK	10.1	56.04	56	0.04	46		10.04
0.699	44.34	PK	10.1	54.44	56	-1.56	46		8.44
0.8385	42.02	PK	10.1	52.12	56	-3.88	46		6.12
0.2625	31.44	Av	10.1	41.54	61.4	-19.86	51.4		-9.86
0.285	32.26	Av	10	42.26	60.7	-18.44	50.7		-8.44
0.2985	32.26	Av	10	42.26	60.3	-18.04	50.3		-8.04
0.4065	33.72	Av	10.1	43.82	57.7	-13.88	47.7		-3.88
0.591	32.39	Av	10.1	42.49	56	-13.51	46		-3.51
0.699	31.07	Av	10.1	41.17	56	-14.83	46		-4.83
0.8385	25.4	Av	10.1	35.5	56	-20.5	46		-10.5
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									

Manufacturer:Lutron									
Device:Dimmer									
Model:RRD-2ANF 431MHz RCV									
Job#:1001576960 120V 60Hz									
Tested by:GB									
LISN 5A636									
Line 1 Cab									
L1 SW TL									
FCC Part									
FCC Part									
Test	Meter								
Frequency	Reading	Detector	[dB]	[dB(uVolts)]	QPk	Margin	Avg	Margin	
Line - L1 .15 - 30MHz									
0.2634	42.48	QP	10.1	52.58	61.32	-8.74	51.32	1.26	
0.294	41.74	QP	10.1	51.84	60.41	-8.57	50.41	1.43	
0.3165	41.31	QP	10	51.31	59.8	-8.49	49.8	1.51	
0.4155	40.55	QP	10.1	50.65	57.54	-6.89	47.54	3.11	
0.5694	38.94	QP	10.1	49.04	56	-6.96	46	3.04	
0.7017	37.16	QP	10.1	47.26	56	-8.74	46	1.26	
0.8538	34.11	QP	10.1	44.21	56	-11.79	46	-1.79	
Neutral .15 - 30MHz									
0.2625	42.59	QP	10.1	52.69	61.35	-8.66	51.35	1.34	
0.2895	42.59	QP	10	52.59	60.54	-7.95	50.54	2.05	
0.2949	42.33	QP	10.1	52.43	60.39	-7.96	50.39	2.04	
0.4083	41.68	QP	10.1	51.78	57.68	-5.9	47.68	4.1	
0.5937	39.39	QP	10.1	49.49	56	-6.51	46	3.49	
0.7017	37.56	QP	10.1	47.66	56	-8.34	46	1.66	
0.8403	34.36	QP	10.1	44.46	56	-11.54	46	-1.54	
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

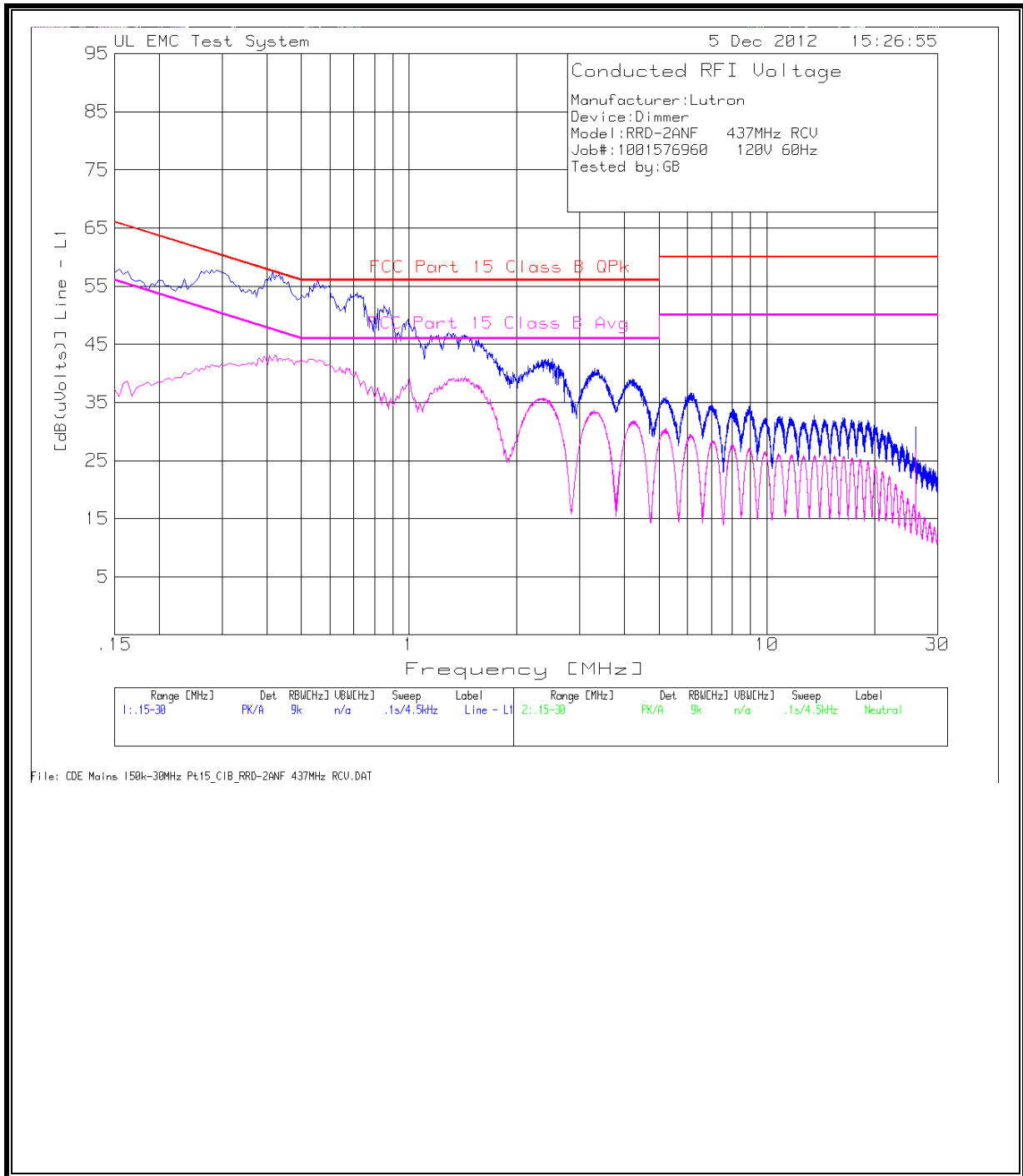


6 WORST EMISSIONS – Rx Mode High Channel

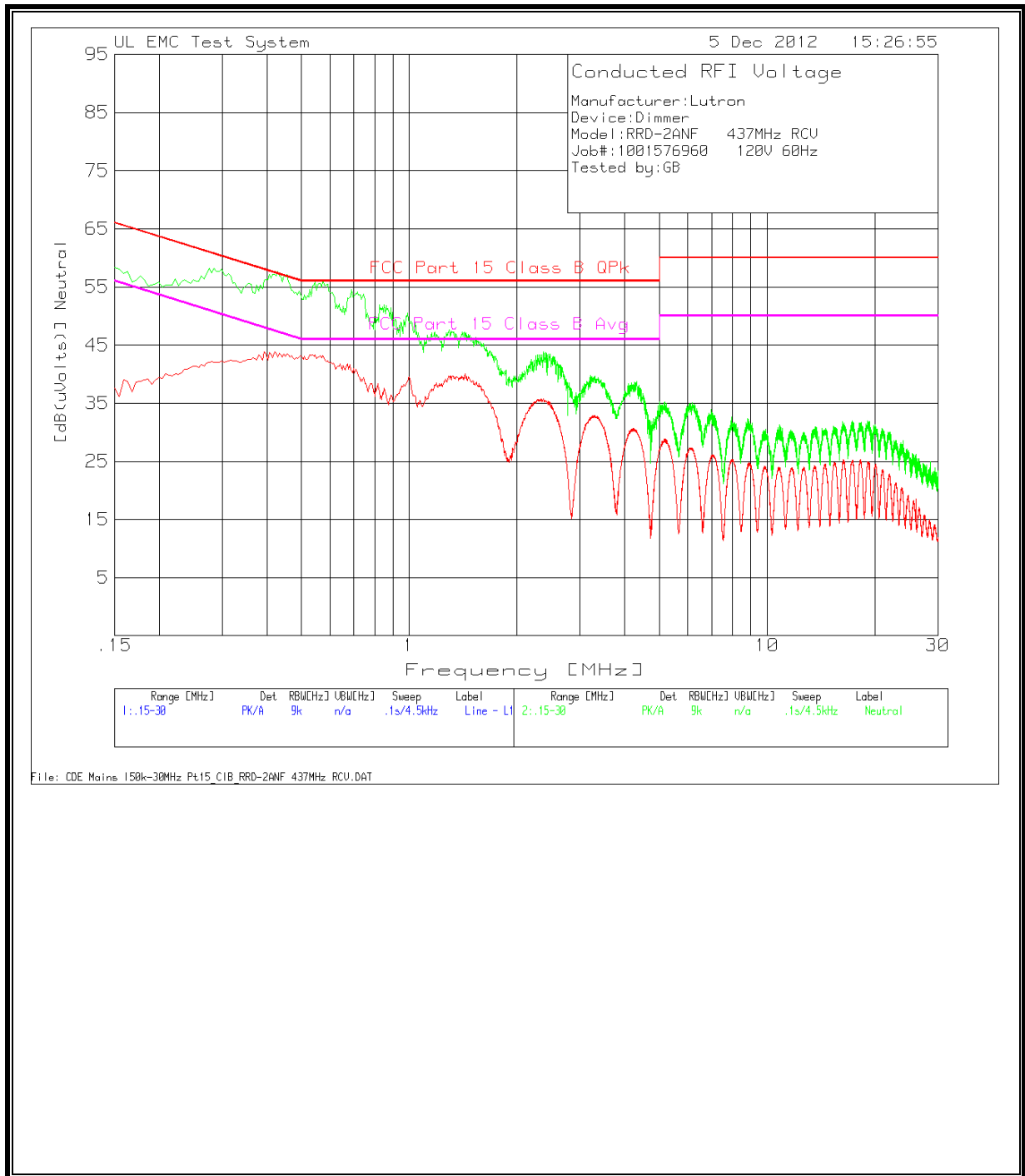
Manufacturer:Lutron									
Device:Dimmer									
Model:RRD-2ANF 437MHz RCV									
Job#:1001576960 120V 60Hz									
Tested by:GB									
LISN 5A636									
Line 1 Cab									
Test	Meter		L1 SW TL	[dB(uVol	FCC Part		FCC Part		
Frequency	Reading	Detector	[dB]	ts])	15 Class B	Margin	15 Class B	Margin	
Line - L1 .15 - 30MHz									
0.2805	47.81	PK	10	57.81	60.8	-2.99	50.8	7.01	
0.4155	47.43	PK	10.1	57.53	57.5	0.03	47.5	10.03	
0.4335	46.91	PK	10.1	57.01	57.2	-0.19	47.2	9.81	
0.555	46.11	PK	10.1	56.21	56	0.21	46	10.21	
0.717	43.84	PK	10.1	53.94	56	-2.06	46	7.94	
0.852	41.57	PK	10.1	51.67	56	-4.33	46	5.67	
0.2805	31.48	Av	10	41.48	60.8	-19.32	50.8	-9.32	
0.4155	32.03	Av	10.1	42.13	57.5	-15.37	47.5	-5.37	
0.4335	32.48	Av	10.1	42.58	57.2	-14.62	47.2	-4.62	
0.555	32.03	Av	10.1	42.13	56	-13.87	46	-3.87	
0.717	29.46	Av	10.1	39.56	56	-16.44	46	-6.44	
0.852	26.56	Av	10.1	36.66	56	-19.34	46	-9.34	
Neutral .15 - 30MHz									
0.276	48.24	PK	10	58.24	60.9	-2.66	50.9	7.34	
0.429	47.52	PK	10.1	57.62	57.3	0.32	47.3	10.32	
0.573	46.05	PK	10.1	56.15	56	0.15	46	10.15	
0.69	44.39	PK	10.1	54.49	56	-1.51	46	8.49	
0.852	41.83	PK	10.1	51.93	56	-4.07	46	5.93	
0.987	40.41	PK	10.1	50.51	56	-5.49	46	4.51	
0.276	31.97	Av	10	41.97	60.9	-18.93	50.9	-8.93	
0.429	32.9	Av	10.1	43	57.3	-14.3	47.3	-4.3	
0.573	33.07	Av	10.1	43.17	56	-12.83	46	-2.83	
0.69	30.55	Av	10.1	40.65	56	-15.35	46	-5.35	
0.852	27.46	Av	10.1	37.56	56	-18.44	46	-8.44	
0.987	28.66	Av	10.1	38.76	56	-17.24	46	-7.24	
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									

Manufacturer:Lutron									
Device:Dimmer									
Model:RRD-2ANF 437MHz RCV									
Job#:1001576960 120V 60Hz									
Tested by:GB									
LISN 5A636									
Line 1 Cab									
Test	Meter		L1 SW TL	[dB(uVol	FCC Part		FCC Part		
Frequency	Reading	Detector	[dB]	ts)]	15 Class B	Margin	15 Class B		
					QPk		Avg	Margin	
Line - L1 .15 - 30MHz									
0.2832	42.17	QP	10	52.17	60.72	-8.55	50.72	1.45	
0.4128	40.59	QP	10.1	50.69	57.59	-6.9	47.59	3.1	
0.4371	40.69	QP	10.1	50.79	57.12	-6.33	47.12	3.67	
0.5577	38.85	QP	10.1	48.95	56	-7.05	46	2.95	
0.7161	36.76	QP	10.1	46.86	56	-9.14	46	0.86	
0.8475	34.24	QP	10.1	44.34	56	-11.66	46	-1.66	
Neutral .15 - 30MHz									
0.2724	42.23	QP	10	52.23	61.04	-8.81	51.04	1.19	
0.4299	40.95	QP	10.1	51.05	57.25	-6.2	47.25	3.8	
0.5775	39.3	QP	10.1	49.4	56	-6.6	46	3.4	
0.6855	37.24	QP	10.1	47.34	56	-8.66	46	1.34	
0.8511	35.23	QP	10.1	45.33	56	-10.67	46	-0.67	
0.9897	34.16	QP	10.1	44.26	56	-11.74	46	-1.74	
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

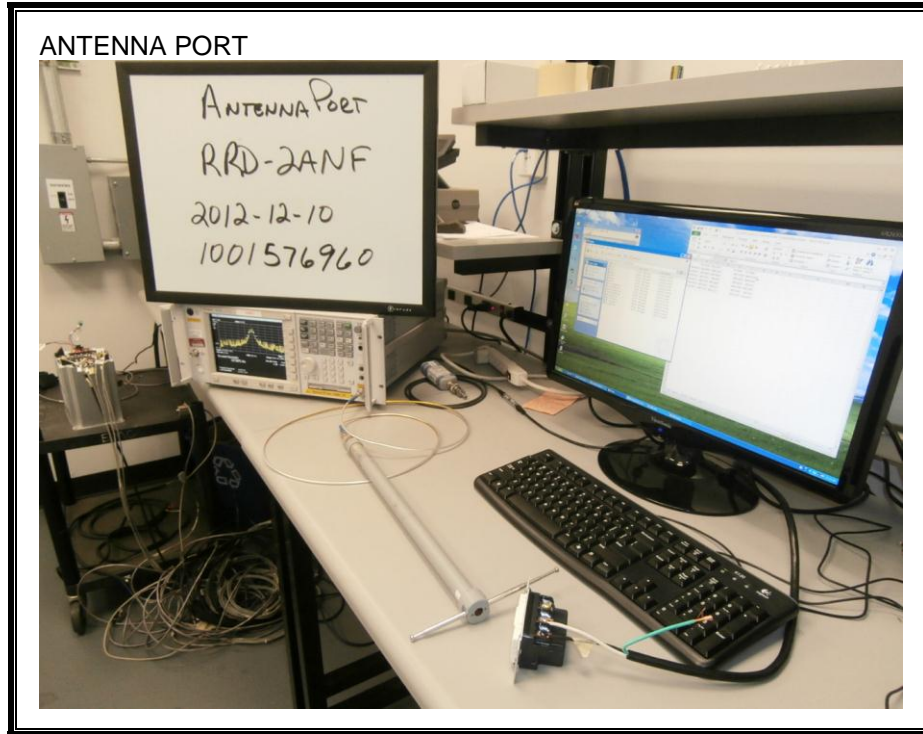


LINE 2 RESULTS

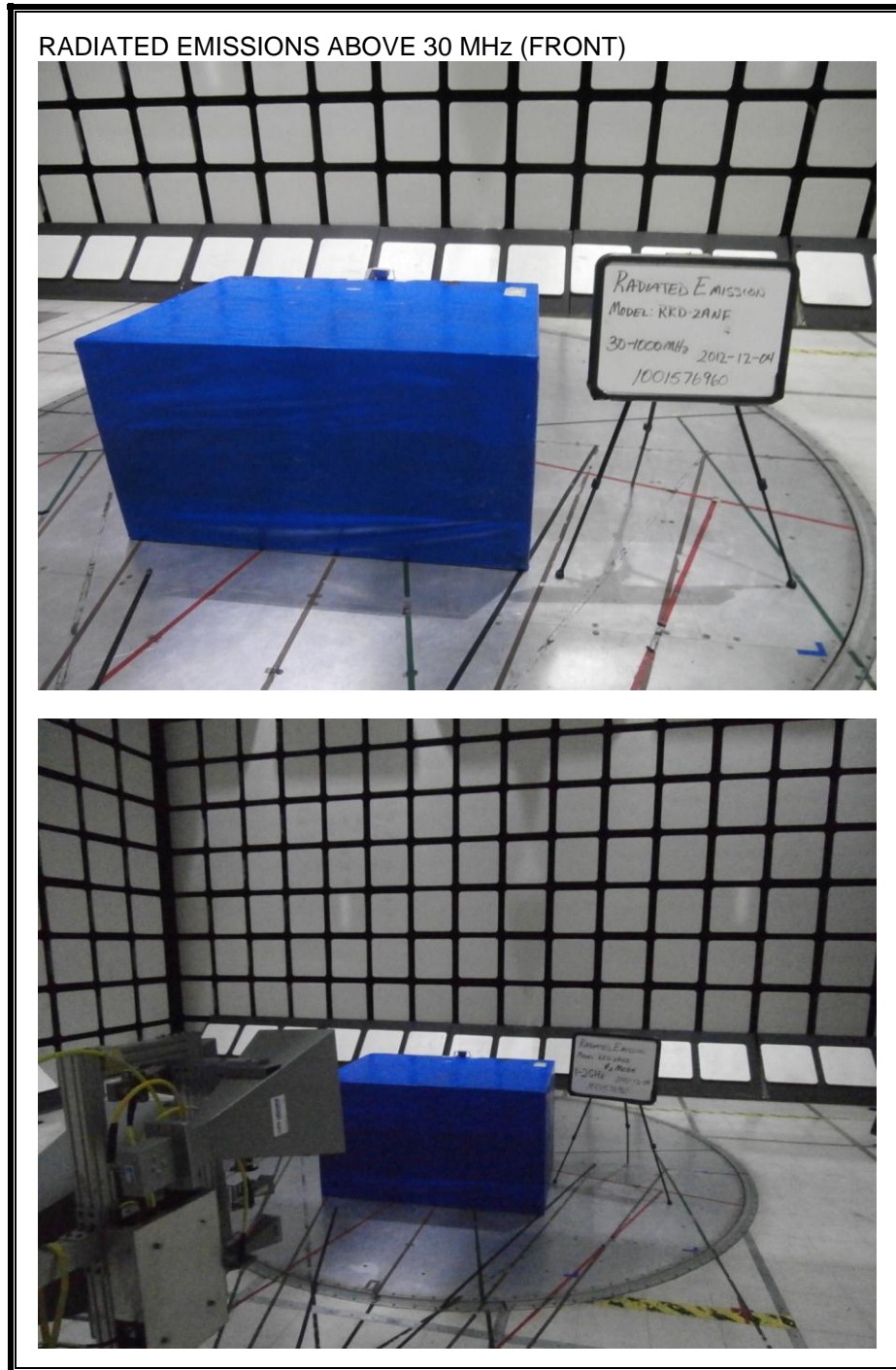


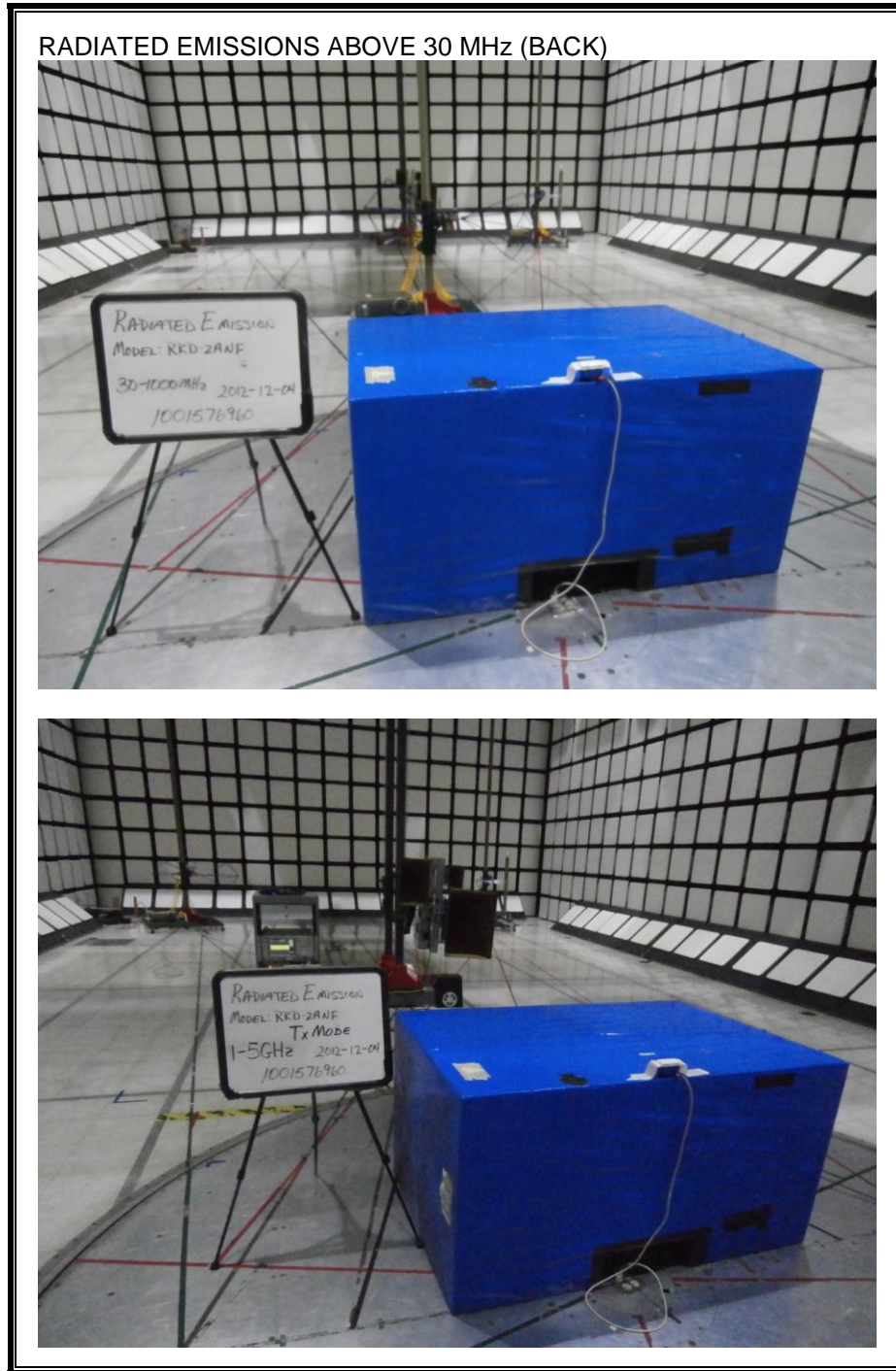
10. SETUP PHOTOS

ANTENNA PORT

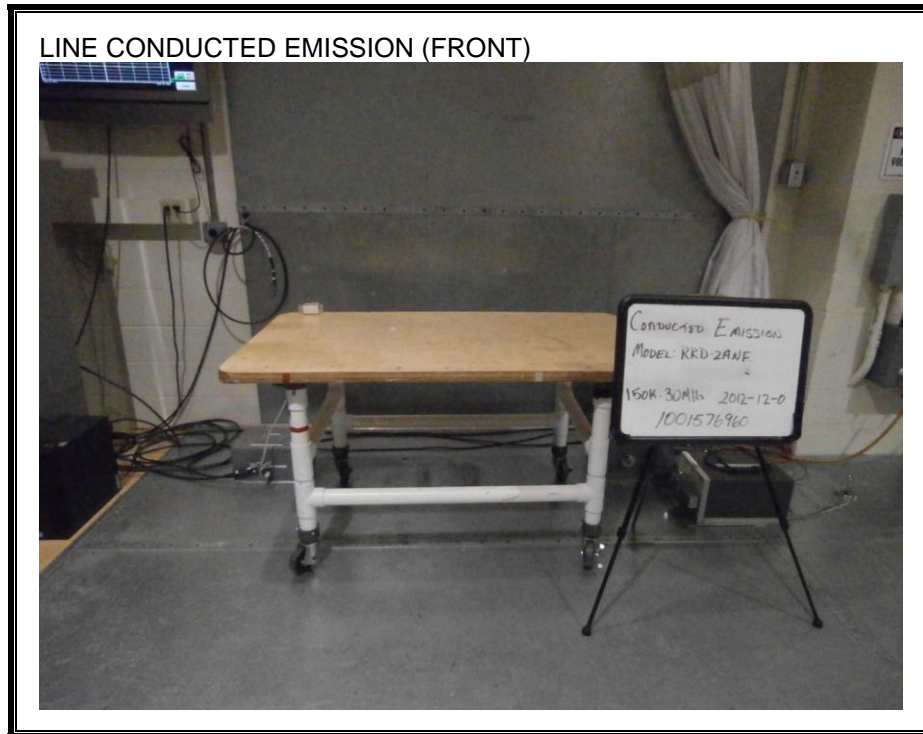


RADIATED EMISSION ABOVE 30 MHz





AC MAINS LINE CONDUCTED EMISSION





END OF REPORT