



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

CERTIFICATION TEST REPORT

FOR

PLUG-IN DIMMER

MODEL NUMBER: 3PCL

**FCC ID: JPZ0099
IC: 2851A-JPZ0099**

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Prepared for
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NVLAP LAB CODE 100255-0

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	2014-08-18	Initial Issue	B. DeLisi
1	2014-08-25	Updated modification section to clarify change in power settings.	B. DeLisi

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Plug-in Dimmer

MODEL: 3PCL

SERIAL NUMBER: Non-serialized production unit

DATE TESTED: 2014-08-12 through 2014-08-18

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

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

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

Approved & Released For UL By:

Tested By:



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WiSE Project Lead
UL LLC

Bob DeLisi
Program Manager
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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:

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

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 a direct plug-in lighting control with a transceiver that operates from 431-437MHz. It is intended for external lighting devices to be plugged in and controlled.

The model shown in the report, PD-3PCL, is the finished goods model (plastic covers and colors). The model for the purposes of RF circuitry and design is 3PCL which was represented by the PD-3PCL.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral antenna.

5.3. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was MmwPid_0795102_0.42.sap.

The test utility software used during testing was MmwPid_FCC_CODESET_C4_PID.sap.

5.4. WORST-CASE CONFIGURATION AND MODE

Testing was conducted at the lowest and highest channels for all tests but duty cycle and transmission time where tests were conducted at the center channel. The orientation was checked in the two orientations that installation under normal use conditions would apply. The worst case orientation for radiated emissions was the X orientation. Below 30MHz the channel with the highest field strength at the fundamental was tested (high channel).

5.5. MODIFICATIONS

The software power setting was reduced in the software from C2 to C4. This is factory set and cannot be performed by the end user. This change was a result of the field strength exceeding the peak limit due to the changes made to the product as part of the C2PC and not part of the planned C2PC.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Lamp	GE	100W	NA	NA

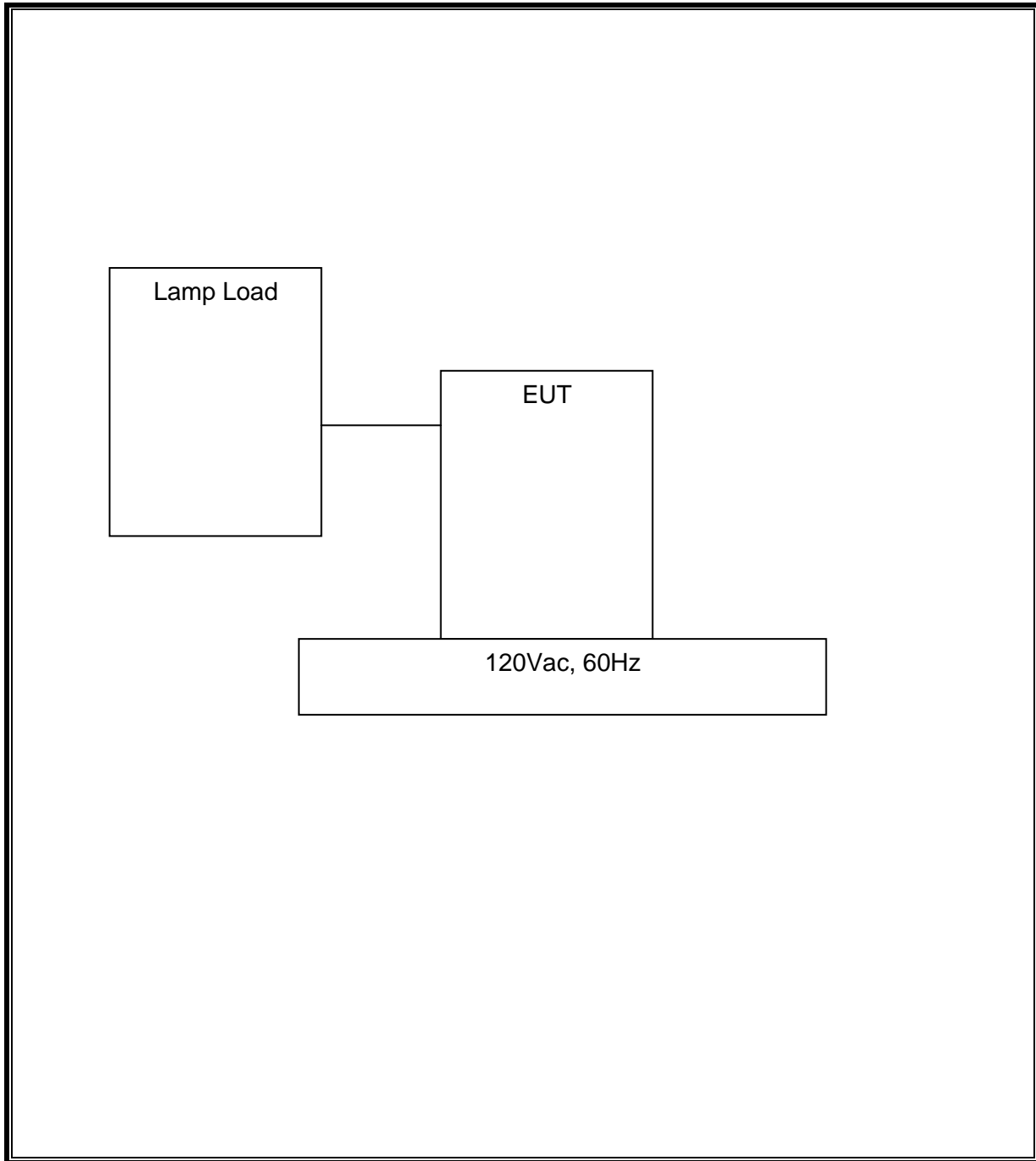
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	IEC	Unshielded	<3m	None

TEST SETUP

The EUT is a stand-alone direct plug-in device. There are auxiliary AC outputs for lamps to be connected.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Radiated Emissions					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
9kHz-30MHz					
EMI Receiver	Rohde & Schwarz	ESCI7	75141	2014-01-30	2015-01-31
Active Loop Antenna	EMCO	6507	ME5A-288	2013-12-02	2014-12-02
Switch Driver	HP	11713A	ME7A-627	N/A	N/A
System Controller	Sunol Sciences	SC99V	44396	N/A	N/A
Camera Controller	Panasonic	WV-CU254	44395	N/A	N/A
RF Switch Box	UL	1	44398	N/A	N/A
Measurement Software	UL	Version 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2012-12-21	2014-12-21
Multimeter	Fluke	83III	ME5B-305	2014-01-28	2015-01-31
30-1000MHz					
EMI Receiver	Rohde & Schwarz	ESCI7	75141	2014-01-29	2015-01-31
Hybrid Antenna	Sunol	JB-1	84106	2014-02-19	2015-02-19
Switch Driver	HP	11713A	ME7A-627	N/A	N/A
System Controller	Sunol Sciences	SC99V	44396	N/A	N/A
Camera Controller	Panasonic	WV-CU254	44395	N/A	N/A
RF Switch Box	UL	1	44398	N/A	N/A
Measurement Software	UL	Version 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2012-12-22	2014-12-22
Multimeter	Fluke	83III	ME5B-305	2014-01-28	2015-01-31
Above 1GHz (Band Optimized System)					
Spectrum Analyzer	Agilent	E4446A	72823	2014-06-13	2015-06-13
Horn Antenna (2-4 GHz)	ETS	3161-02 (22°)**	48107	2007-09-27	See * below
Horn Antenna (4-8 GHz)	ETS	3161-03 (22°)**	48106	2007-09-27	See * below
Horn Antenna	EMCO	3115	ME5-565	2013-09-05	2014-09-05
Signal Path Controller	HP	11713A	50250	N/A	N/A
Gain Controller	HP	11713A	50251	N/A	N/A
RF Switch / Preamp Fixture	UL	BOMS1	50249	N/A	N/A
System Controller	UL	BOMS2	50252	N/A	N/A
Measurement Software	UL	Version 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2012-12-22	2014-12-22
Multimeter	Fluke	83III	ME5B-305	2014-01-28	2015-01-31
* - 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. ** - Number in parentheses denotes antenna beam width.					

Conducted Emissions					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Conducted Emissions – GP 1					
EMI Receiver	Rohde & Schwarz	ESIB 40	34968	2014-04-09	2015-04-09
LISN	Solar	9252-50-R-24-BNC	ME5A-636	2014-01-28	2015-01-31
Switch Driver	HP	11713A	44397	N/A	N/A
RF Switch Box	UL	4	44404	N/A	N/A
Measurement Software	UL	Version 9.5	44736	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	43734	2014-03-24	2016-03-24
Multimeter	Fluke	83III	ME5B-305	2014-01-28	2015-01-31

Bench Tests					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
EMI Receiver	Rohde & Schwarz	ESIB 40	34968	2014-04-09	2015-04-09
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	43734	2014-03-24	2016-03-24
DiPole Antenna	EMCO	3121C	DB4	2014-01-10	2015-01-10
Multimeter	Fluke	83III	ME5B-305	2014-01-28	2015-01-31

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 C63.10

The transmitter output is connected to the spectrum analyzer.

20dB Bandwidth: The RBW is set to 10 KHz. The VBW is set to 30 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:

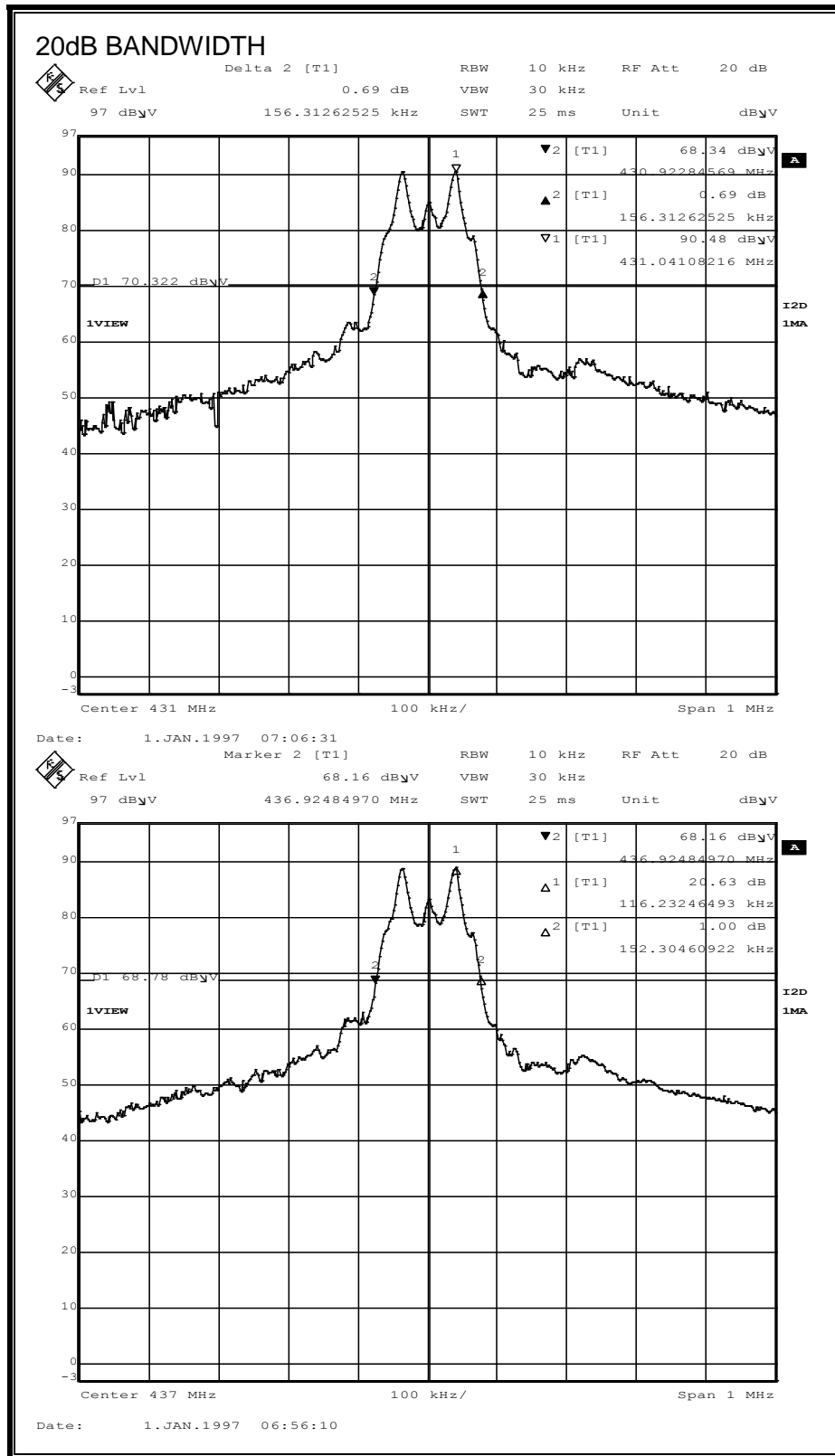
20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
431	156.3	1077.5	-921.2
437	152.3	1092.5	-940.2

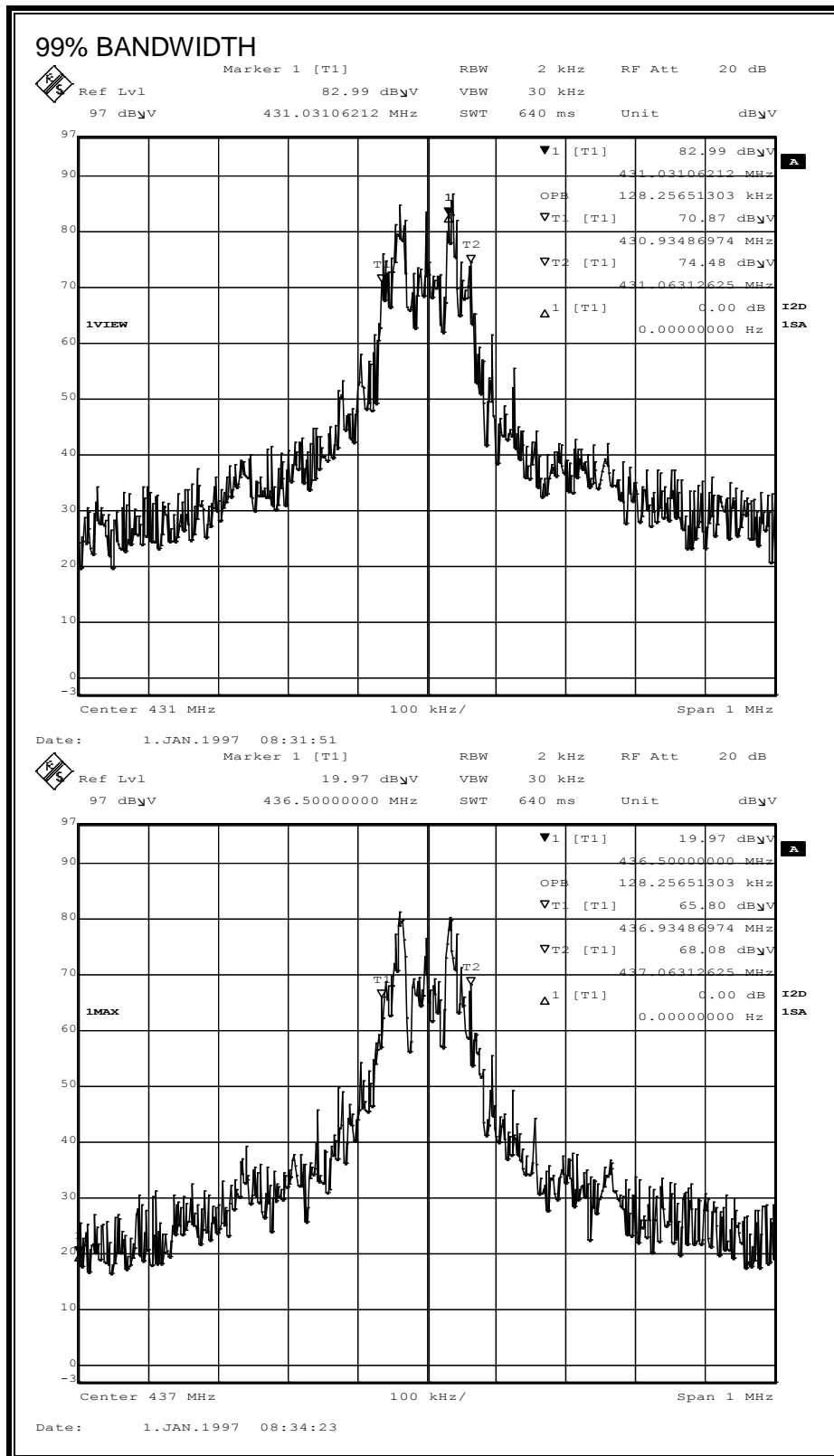
99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
431	128.3	1077.5	-949.2
437	128.3	1092.5	-964.2

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

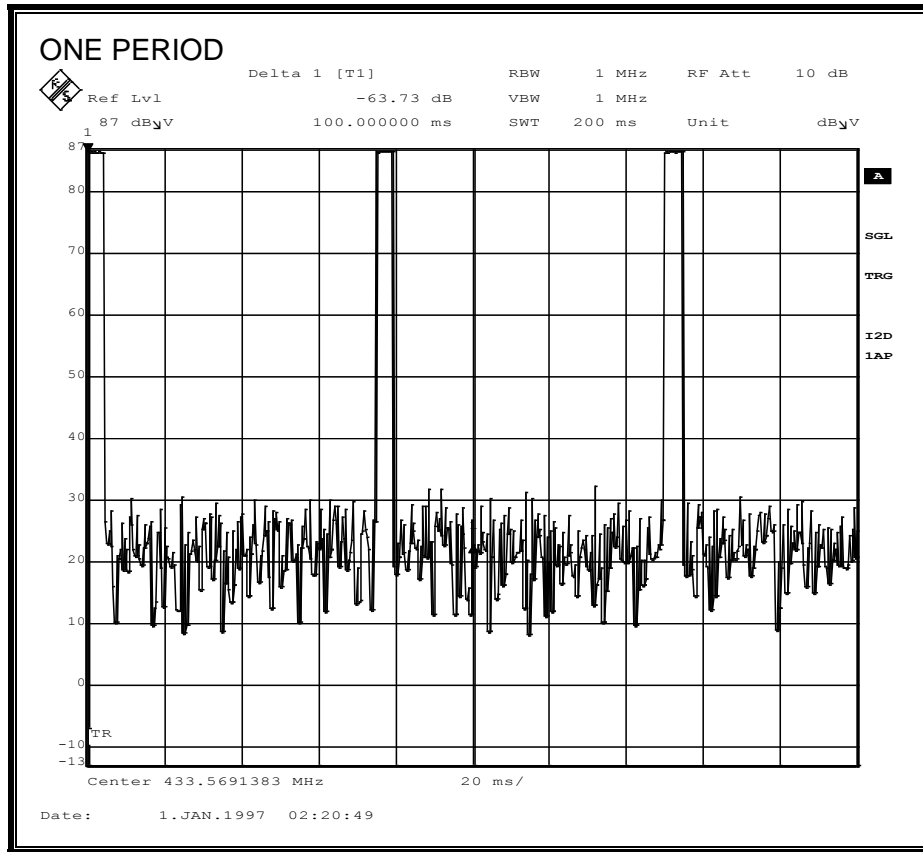
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is (# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

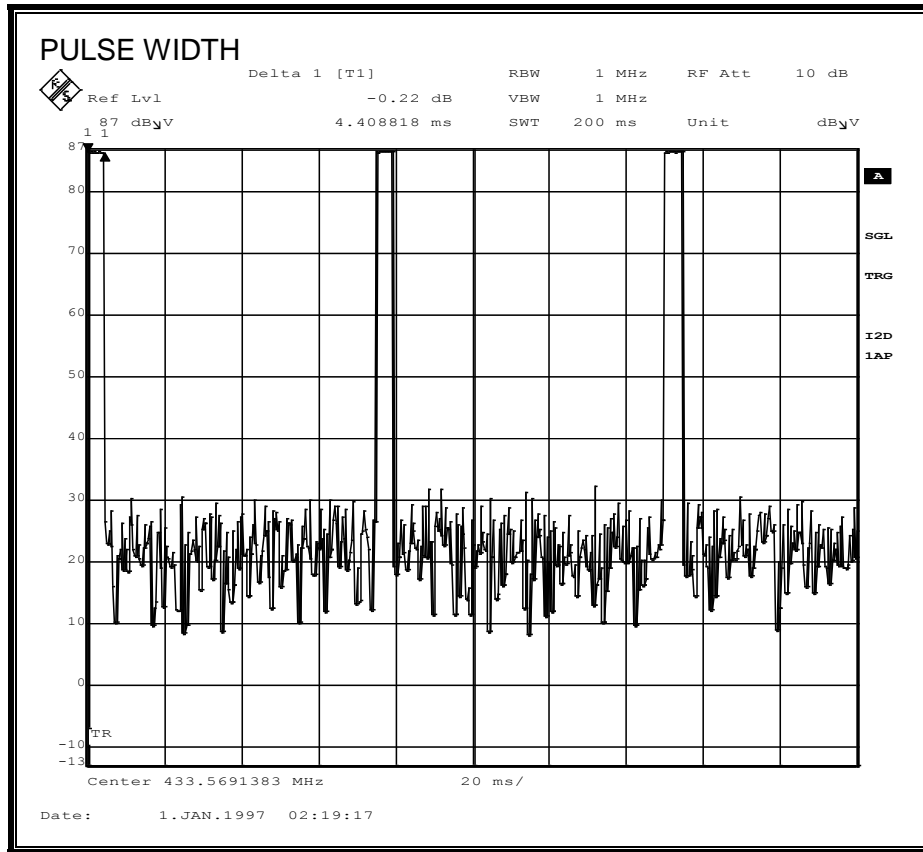
No non-compliance noted:

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	4.4	2	0.00	0	0.088	-21.11

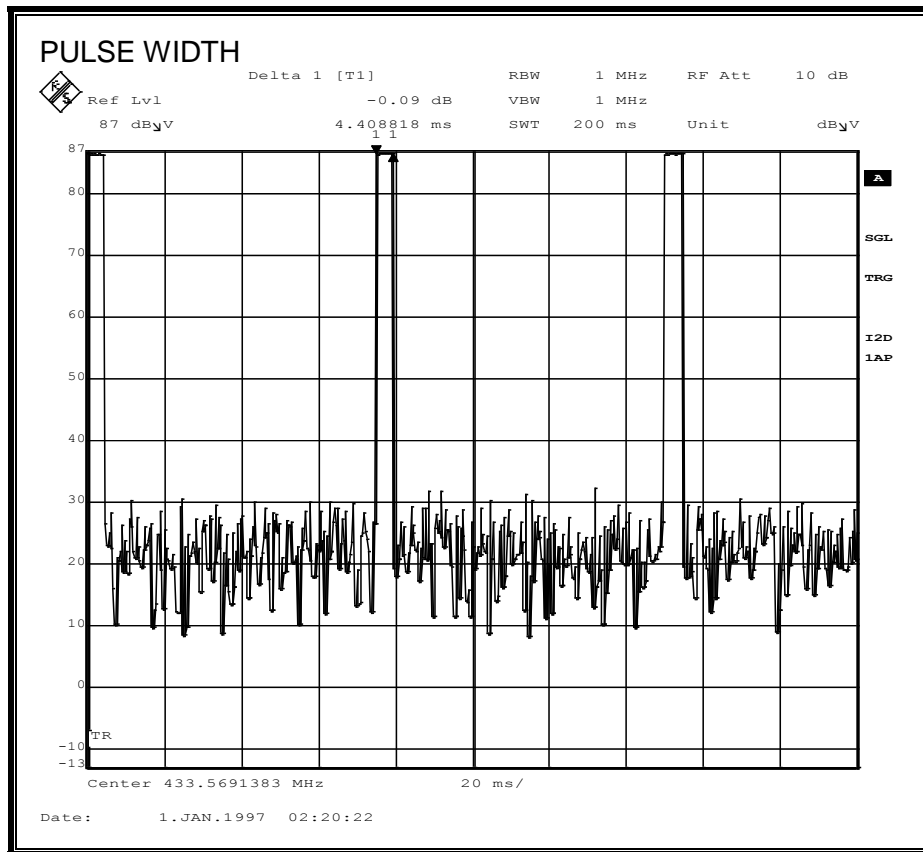
ONE PERIOD



PULSE WIDTH



PULSE WIDTH



7.3. TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)

IC A1.1.1 (b)

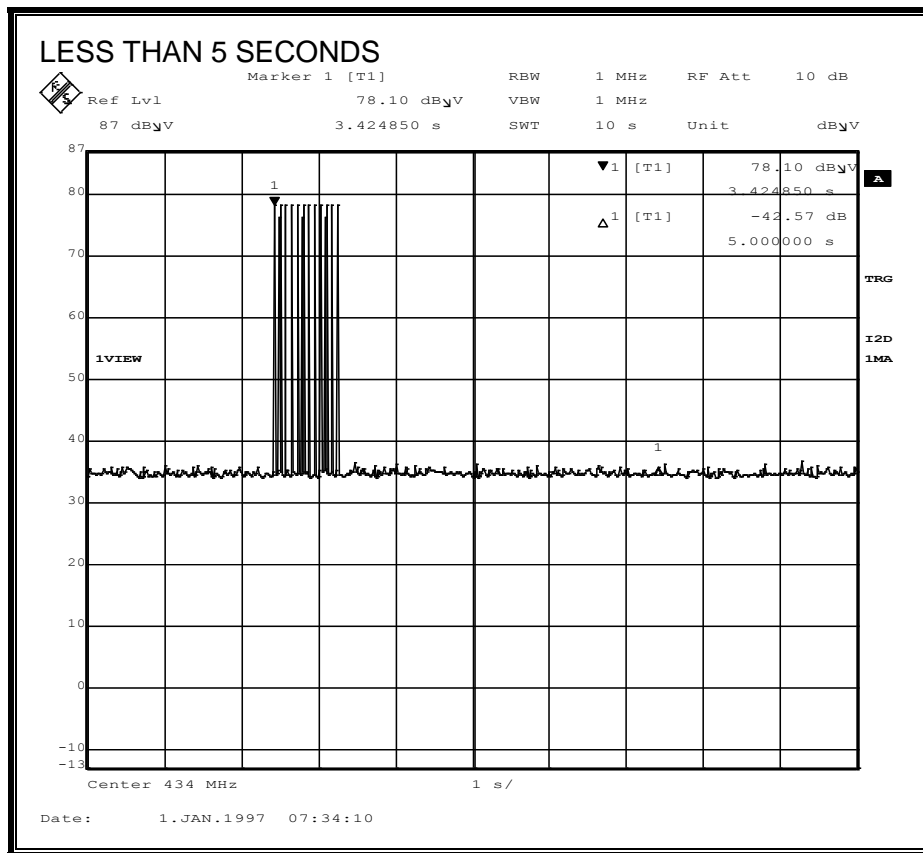
A transmitter activated automatically shall cease transmission within 5 seconds after activation.

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)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
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 C63.10. 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.

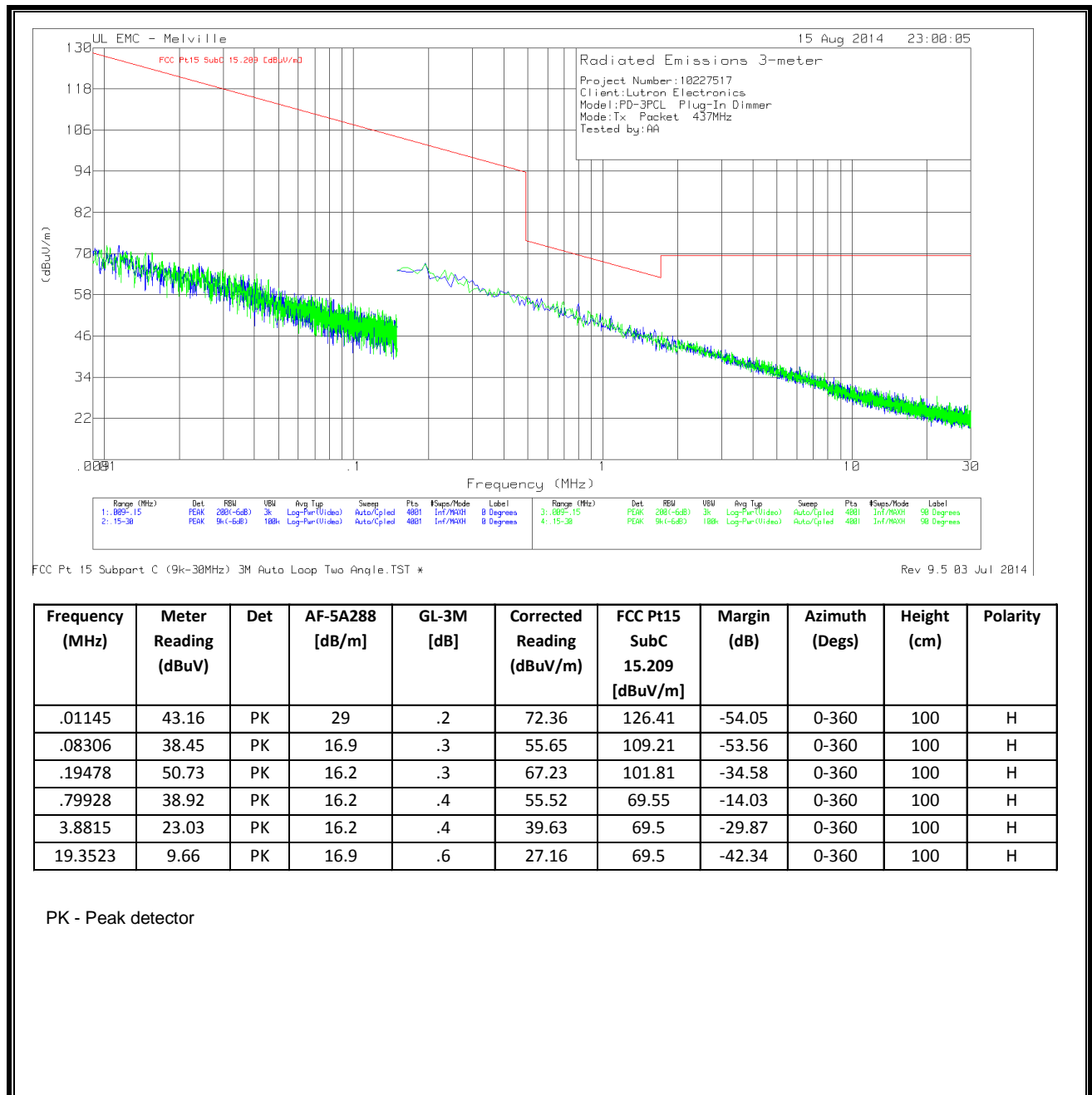
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements. Average values are determined by applying the duty cycle correction factor to the peak measurement.

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.

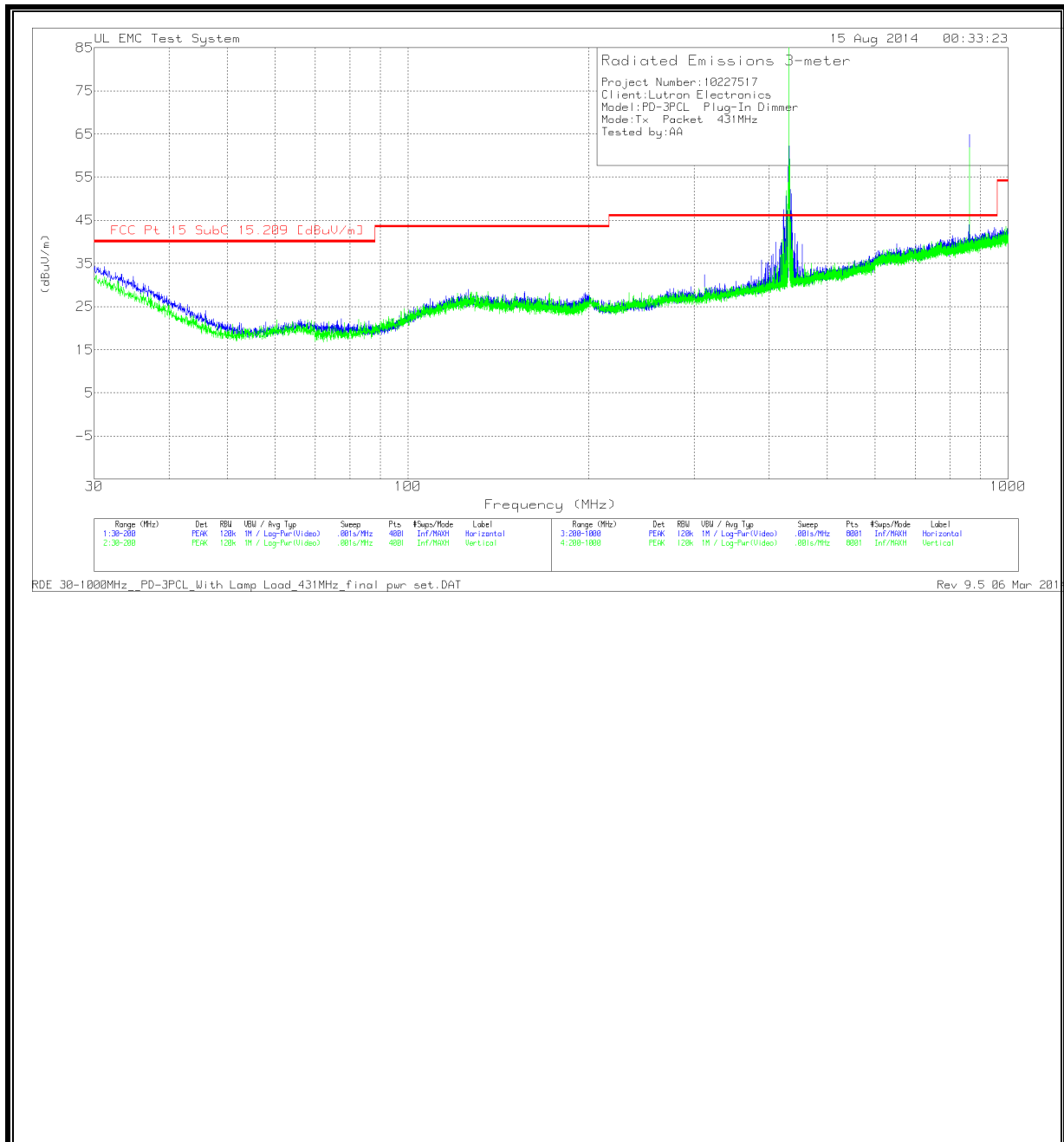
RESULTS

No non-compliance noted:

SPURIOUS EMISSION (9kHz - 30MHz)



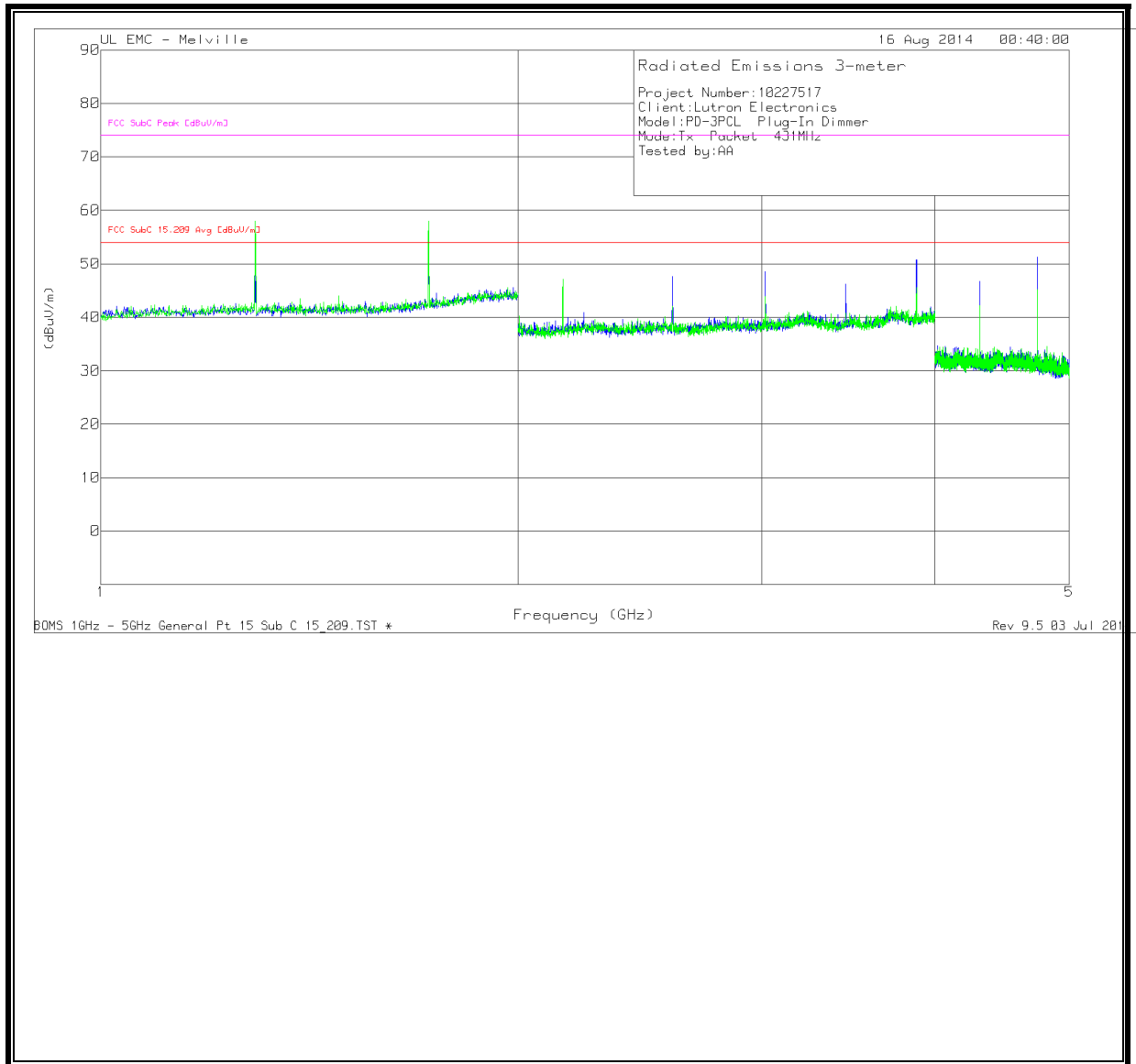
FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz) – Low Channel



Frequency	Meter	Det	AF-84106 [dB/m]	GL [dB]	Corrected		Corrected	FCC Pt 15 SubC 15.209 [dBuV/m]	Margin	FCC Pt 15 SubC Peak [dBuV/m]	Margin	Azimuth (Degs)	Height (cm)	Polarity
(MHz)	Reading (dBuV)				Reading (dBuV/m)	DCF (dB)	Average Reading (dBuV/m)		(dB)	(dB)				
431	77.22	PK	16.8	3.1	97.12	-21.1	76.02	80.9	-4.88	100.9	-3.78	76	228	H
431	76.56	PK	16.8	3.1	96.46	-21.1	75.36	80.9	-5.54	100.9	-4.44	221	197	V
862.0812	41.91	PK	21.7	4.8	68.41	-21.1	47.31	60.9	-13.59	80.9	-12.49	299	129	V
861.92	42.91	PK	22.3	4.8	70.01	-21.1	48.91	60.9	-11.99	80.9	-10.89	132	105	H
422.2	2.89	QP	16.7	3.1	22.69	-	-	46	-23.31	-	-	284	215	H
422.5	7.5	QP	16.7	3.1	27.3	-	-	46	-18.7	-	-	318	216	H
423.3	4.6	QP	16.7	3.1	24.4	-	-	46	-21.6	-	-	337	205	H
423.7	8.07	QP	16.7	3.1	27.87	-	-	46	-18.13	-	-	308	216	H
424.7	8.87	QP	16.7	3.1	28.67	-	-	46	-17.33	-	-	300	218	H
426.3	11.3	QP	16.7	3.1	31.1	-	-	46	-14.9	-	-	289	222	H
426.6	10.66	QP	16.7	3.1	30.46	-	-	46	-15.54	-	-	306	217	H
428	15.27	QP	16.8	3.1	35.17	-	-	46	-10.83	-	-	298	207	H
435.4	14.06	QP	17	3.2	34.26	-	-	46	-11.74	-	-	299	226	H
435.7	17.37	QP	17	3.2	37.57	-	-	46	-8.43	-	-	293	231	H
436.1	17.21	QP	17	3.2	37.41	-	-	46	-8.59	-	-	292	217	H
436.343	11.79	QP	17	3.2	31.99	-	-	46	-14.01	-	-	299	228	H
437.1	9.93	QP	17	3.2	30.13	-	-	46	-15.87	-	-	291	216	H
440.7	7.28	QP	17.1	3.2	27.58	-	-	46	-18.42	-	-	311	186	H
423.4	2.15	QP	16.7	3.1	21.95	-	-	46	-24.05	-	-	298	206	H
445.4	8.32	QP	17	3.2	28.52	-	-	46	-17.48	-	-	312	218	H
446	7.92	QP	17	3.2	28.12	-	-	46	-17.88	-	-	295	209	H
450.1	13.86	QP	17	3.2	34.06	-	-	46	-11.94	-	-	308	202	H
452.8	7.15	QP	17.1	3.2	27.45	-	-	46	-18.55	-	-	296	194	H
457	-0.27	QP	17.2	3.2	20.13	-	-	46	-25.87	-	-	296	186	H
421.6	3.1	QP	16.2	3.1	22.4	-	-	46	-23.6	-	-	14	124	V
427.2	10.18	QP	16.3	3.1	29.58	-	-	46	-16.42	-	-	38	178	V
427.6	11.07	QP	16.4	3.1	30.57	-	-	46	-15.43	-	-	8	202	V
425.7	2.12	QP	16.3	3.1	21.52	-	-	46	-24.48	-	-	206	185	V
427.6	7.52	QP	16.4	3.1	27.02	-	-	46	-18.98	-	-	3	213	V
430.9	8.82	QP	16.4	3.1	28.32	-	-	46	-17.68	-	-	212	173	V
432	9.6	QP	16.5	3.2	29.3	-	-	46	-16.7	-	-	213	156	V
434	13.2	QP	16.6	3.2	33	-	-	46	-13	-	-	211	170	V
433.4	11.58	QP	16.5	3.2	31.28	-	-	46	-14.72	-	-	218	166	V
434.4	14.27	QP	16.6	3.2	34.07	-	-	46	-11.93	-	-	211	164	V
439.8	16.04	QP	16.8	3.2	36.04	-	-	46	-9.96	-	-	205	169	V
440.2	14.78	QP	16.8	3.2	34.78	-	-	46	-11.22	-	-	203	169	V
441.5	10.73	QP	16.8	3.2	30.73	-	-	46	-15.27	-	-	198	164	V
442.1	9.34	QP	16.8	3.2	29.34	-	-	46	-16.66	-	-	210	184	V

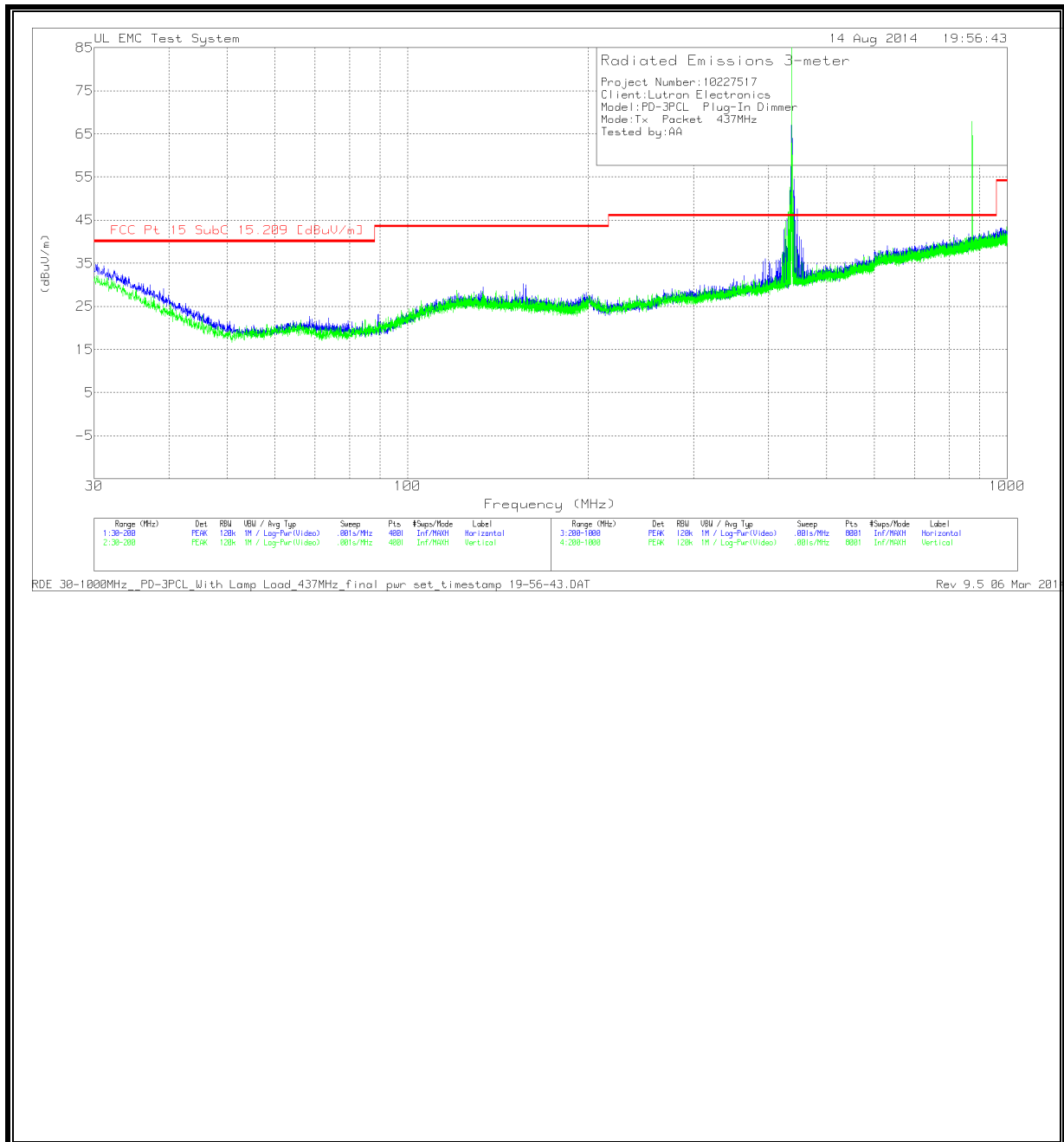
PK - Peak detector
 QP - Quasi-Peak detector

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz – Low Channel



Frequency (GHz)	Meter Reading (dBuV)	Det	AF [dB/m]	Gain/Loss (dB)	Corrected Reading (dBuV/m)	DCF (dB)	Corrected Average Reading (dBuV/m)	FCC SubC 15.209 Avg [dBuV/m]	Margin (dB)	FCC SubC Peak [dBuV/m]	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
*1293	68.8	PK	25.1	-44.56	48.72	-211	27.62	54	-26.38	74	-25.28	208	193	H
*1293	73.84	PK	25.1	-44.56	54.38	-211	33.28	54	-20.72	74	-19.62	103	217	V
1724	77.94	PK	26.1	-44.2	59.84	-211	38.74	54	-15.26	74	-14.16	48	212	V
1724	75.12	PK	26.1	-44.2	57.02	-211	35.92	54	-18.08	74	-16.98	171	220	H
2.55	70.7	PK	214	-42.76	49.34	-211	28.24	54	-25.76	74	-24.66	0	220	H
2.55	66.36	PK	214	-42.76	45	-211	23.9	54	-30.1	74	-29	4	262	V
2.586	67.38	PK	213	-41.75	46.93	-211	25.83	54	-28.17	74	-27.07	213	345	V
2.586	72.03	PK	213	-41.75	51.58	-211	30.48	54	-23.52	74	-22.42	186	279	H
3.07	716	PK	215	-40.74	52.36	-211	31.26	54	-22.74	74	-21.64	319	269	H
3.07	68.19	PK	215	-40.74	48.95	-211	27.85	54	-26.15	74	-25.05	345	219	V
3.448	66.8	PK	22.1	-40.7	48.2	-211	27.1	54	-26.9	74	-25.8	206	379	V
3.448	67.71	PK	22.1	-40.7	49.11	-211	28.01	54	-25.99	74	-24.89	133	373	H
*3.879	72.92	PK	22.6	-40.9	54.62	-211	33.52	54	-20.48	74	-19.38	269	377	H
*3.879	71.66	PK	22.6	-40.9	53.36	-211	32.26	54	-21.74	74	-20.64	350	353	V
*4.31	71.53	PK	27.7	-52.78	46.45	-211	25.35	54	-28.65	74	-27.55	34	237	V
*4.31	72.15	PK	27.7	-52.78	47.07	-211	25.97	54	-28.03	74	-26.93	320	203	H
*4.741	79.18	PK	27.2	-53.38	53	-211	31.9	54	-22.1	74	-21	299	197	H
*4.741	74.53	PK	27.2	-53.38	48.35	-211	27.25	54	-26.75	74	-25.65	48	202	V
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band														
PK - Peak detector														

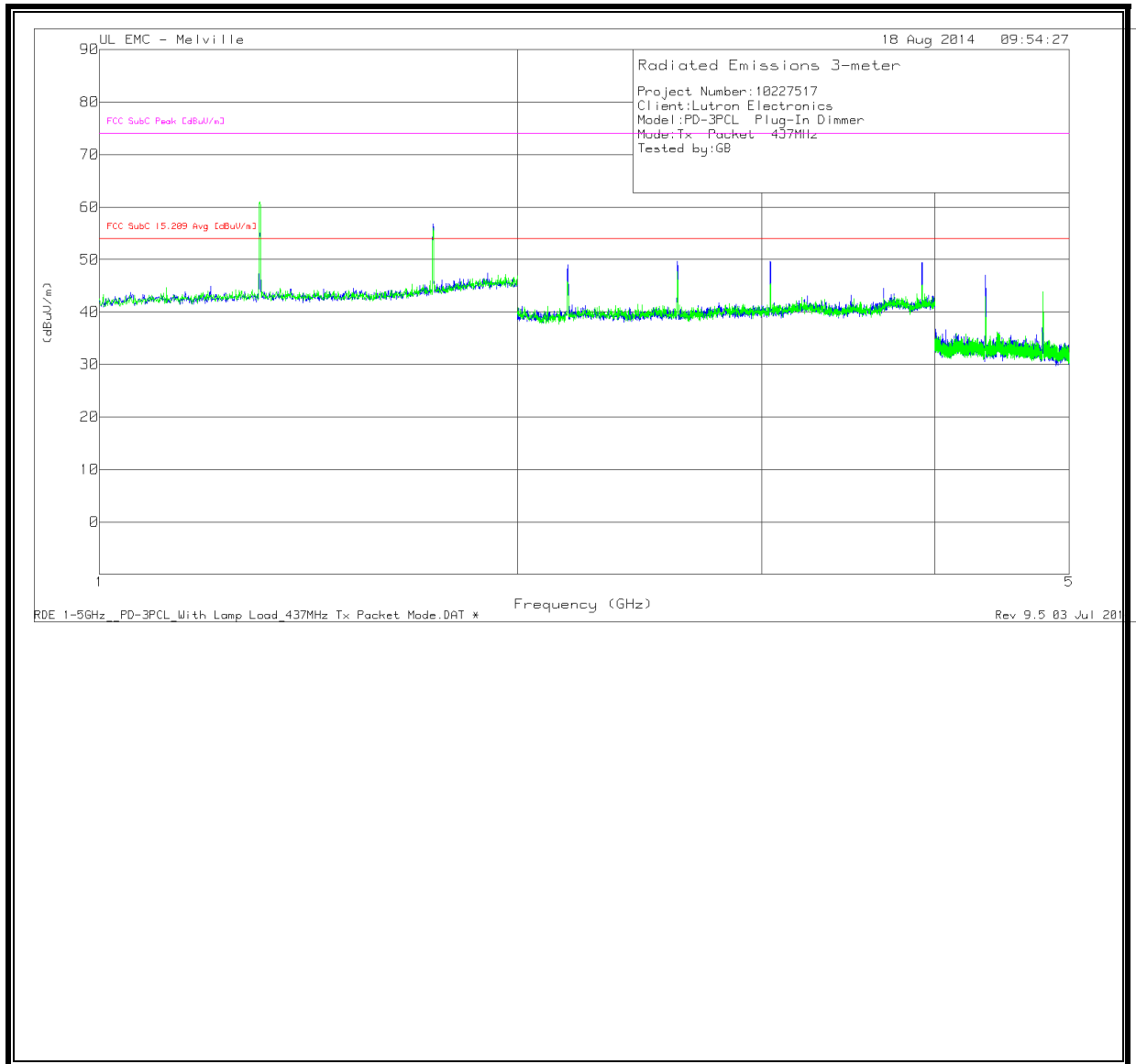
FUNDAMENTAL, HARMONICS AND TX SPURIOUS EMISSION (30 – 1000 MHz) – High Channel



Frequency (MHz)	Meter Reading (dBuV)	Det	AF- 84106 [dB/m]	GL [dB]	Corrected Reading (dBuV/m)	DCF (dB)	Corrected Average Reading (dBuV/m)	FCC Pt 15 SubC 15.209 [dBuV/m]	Margin (dB)	FCC Pt 15 SubC Peak [dBuV/m]	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
437	80.32	PK	17	3.2	100.52	-21.1	79.42	80.9	-1.48	100.9	-0.38	304	204	H
437	76.01	PK	17	3.2	96.21	-21.1	75.11	80.9	-5.79	100.9	-4.69	210	158	V
873.9255	47.08	PK	22.5	4.8	74.38	-21.1	53.28	60.9	-7.62	80.9	-6.52	116	100	H
874.0805	48.05	PK	22.5	4.8	75.35	-21.1	54.25	60.9	-6.65	80.9	-5.55	337	120	V
428.8	8.05	QP	16.8	3.1	27.95	-	-	46	-18.05	-	-	295	220	H
427.2	6.07	QP	16.7	3.1	25.87	-	-	46	-20.13	-	-	288	216	H
431	10.51	QP	16.8	3.1	30.41	-	-	46	-15.59	-	-	312	215	H
431.7	12.11	QP	16.9	3.1	32.11	-	-	46	-13.89	-	-	306	200	H
432.7	17.47	QP	16.9	3.2	37.57	-	-	46	-8.43	-	-	303	200	H
434.8	19.23	QP	17	3.2	39.43	-	-	46	-6.57	-	-	302	217	H
426.3	5.32	QP	16.7	3.1	25.12	-	-	46	-20.88	-	-	293	211	H
435.1	20.59	QP	17	3.2	40.79	-	-	46	-5.21	-	-	303	208	H
427.7	6.75	QP	16.8	3.1	26.65	-	-	46	-19.35	-	-	285	226	H
440.3	18.58	QP	17.1	3.2	38.88	-	-	46	-7.12	-	-	310	200	H
440.8	17.09	QP	17.1	3.2	37.39	-	-	46	-8.61	-	-	297	203	H
441.4	17.7	QP	17.1	3.2	38	-	-	46	-8	-	-	307	205	H
442.1	13.57	QP	17.1	3.2	33.87	-	-	46	-12.13	-	-	307	212	H
442.7	12.35	QP	17	3.2	32.55	-	-	46	-13.45	-	-	302	211	H
443	17.24	QP	17	3.2	37.44	-	-	46	-8.56	-	-	299	211	H
423.4	2.15	QP	16.7	3.1	21.95	-	-	46	-24.05	-	-	298	206	H
445.4	8.32	QP	17	3.2	28.52	-	-	46	-17.48	-	-	312	218	H
446	7.92	QP	17	3.2	28.12	-	-	46	-17.88	-	-	295	209	H
450.1	13.86	QP	17	3.2	34.06	-	-	46	-11.94	-	-	308	202	H
452.8	7.15	QP	17.1	3.2	27.45	-	-	46	-18.55	-	-	296	194	H
457	-0.27	QP	17.2	3.2	20.13	-	-	46	-25.87	-	-	296	186	H
425.7	2.12	QP	16.3	3.1	21.52	-	-	46	-24.48	-	-	206	185	V
427.6	7.52	QP	16.4	3.1	27.02	-	-	46	-18.98	-	-	3	213	V
430.9	8.82	QP	16.4	3.1	28.32	-	-	46	-17.68	-	-	212	173	V
432	9.6	QP	16.5	3.2	29.3	-	-	46	-16.7	-	-	213	156	V
434	13.2	QP	16.6	3.2	33	-	-	46	-13	-	-	211	170	V
433.4	11.58	QP	16.5	3.2	31.28	-	-	46	-14.72	-	-	218	166	V
434.4	14.27	QP	16.6	3.2	34.07	-	-	46	-11.93	-	-	211	164	V
439.8	16.04	QP	16.8	3.2	36.04	-	-	46	-9.96	-	-	205	169	V
440.2	14.78	QP	16.8	3.2	34.78	-	-	46	-11.22	-	-	203	169	V
441.5	10.73	QP	16.8	3.2	30.73	-	-	46	-15.27	-	-	198	164	V
442.1	9.34	QP	16.8	3.2	29.34	-	-	46	-16.66	-	-	210	184	V

PK - Peak detector
 QP - Quasi-Peak detector

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz – High Channel



Frequency	Meter	Det	AF [dB/m]	Gain/Loss (dB)	Corrected	DCF	Corrected	FCC SubC 15.209 Avg [dBuV/m]	Margin	FCC SubC Peak [dBuV/m]	PK Margin	Azimuth (Degs)	Height (cm)	Polarity
(GHz)	Reading (dBuV)				Reading (dBuV/m)		Average Reading (dBuV/m)		(dB)		(dB)			
*1311	79.81	PK	25.1	-44.44	60.47	-211	39.37	54	-14.63	74	-13.53	134	104	V
*1311	7193	PK	25.1	-44.44	52.59	-211	3149	54	-22.51	74	-2141	158	165	H
1748	74.75	PK	26.3	-44.1	56.95	-211	35.85	54	-18.5	74	-17.05	48	118	V
1748	74.8	PK	26.3	-44.1	57	-211	35.9	54	-18.1	74	-17	22	126	H
2.185	7131	PK	215	-42.22	50.59	-211	29.49	54	-24.51	74	-23.41	171	180	H
2.185	67.8	PK	215	-42.22	46.46	-211	25.36	54	-28.64	74	-27.54	119	371	V
2.622	716	PK	214	-417	513	-211	30.2	54	-23.8	74	-22.7	187	234	V
3.059	69.66	PK	216	-4103	50.23	-211	29.13	54	-24.87	74	-23.77	49	250	V
3.059	7185	PK	216	-4103	52.42	-211	3132	54	-22.68	74	-2158	153	163	H
3.496	63.23	PK	22.2	-40.55	44.88	-211	23.78	54	-30.22	74	-29.12	171	210	H
3.496	6187	PK	22.2	-40.55	43.52	-211	22.42	54	-31.58	74	-30.48	349	286	V
2.622	7109	PK	214	-417	50.79	-211	29.69	54	-24.31	74	-23.21	267	298	H
*3.933	62.51	PK	22.7	-40.87	44.34	-211	23.24	54	-30.76	74	-29.66	325	292	V
*3.933	70.26	PK	22.7	-40.87	52.09	-211	30.99	54	-23.01	74	-2191	180	172	H
*4.37	74.98	PK	27.6	-52.98	49.6	-211	28.5	54	-25.5	74	-24.4	294	140	H
*4.37	70.9	PK	27.6	-52.98	45.52	-211	24.42	54	-29.58	74	-28.48	360	347	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

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 C63.10

RESULTS

No non-compliance noted:

6 WORST EMISSIONS – Low Channel

Frequency (MHz)	Meter Reading (dBuV)	Det	Line 1 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
.15511	51.88	PK	10	61.88	65.72	-3.84	-	-
.16703	51.62	PK	10	61.62	65.11	-3.49	-	-
.2011	49.38	PK	10	59.38	63.57	-4.19	-	-
.2488	47.99	PK	10	57.99	61.8	-3.81	-	-
.28798	45.72	PK	10	55.72	60.58	-4.86	-	-
.33738	43.59	PK	10	53.59	59.27	-5.68	-	-
.38507	43.7	PK	10	53.7	58.17	-4.47	-	-
.4515	40.36	PK	10	50.36	56.85	-6.49	-	-
.5009	38.55	PK	10	48.55	56	-7.45	-	-
.55711	36.2	PK	10	46.2	56	-9.8	-	-

PK - Peak detector

Frequency (MHz)	Meter Reading (dBuV)	Det	Line 2 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
.15511	53.28	PK	10.1	63.38	65.72	-2.34	-	-
.17214	52.98	PK	10	62.98	64.86	-1.88	-	-
.19429	51.24	PK	10	61.24	63.85	-2.61	-	-
.23858	49.68	PK	10	59.68	62.15	-2.47	-	-
.27946	48.14	PK	10	58.14	60.83	-2.69	-	-
.34078	45.99	PK	10	55.99	59.18	-3.19	-	-
.38848	45.72	PK	10	55.72	58.1	-2.38	-	-
.42766	44.1	PK	10	54.1	57.3	-3.2	-	-
.47705	41.96	PK	10	51.96	56.39	-4.43	-	-
.52134	39.65	PK	10.1	49.75	56	-6.25	-	-
.57926	36.11	PK	10.1	46.21	56	-9.79	-	-

PK - Peak detector

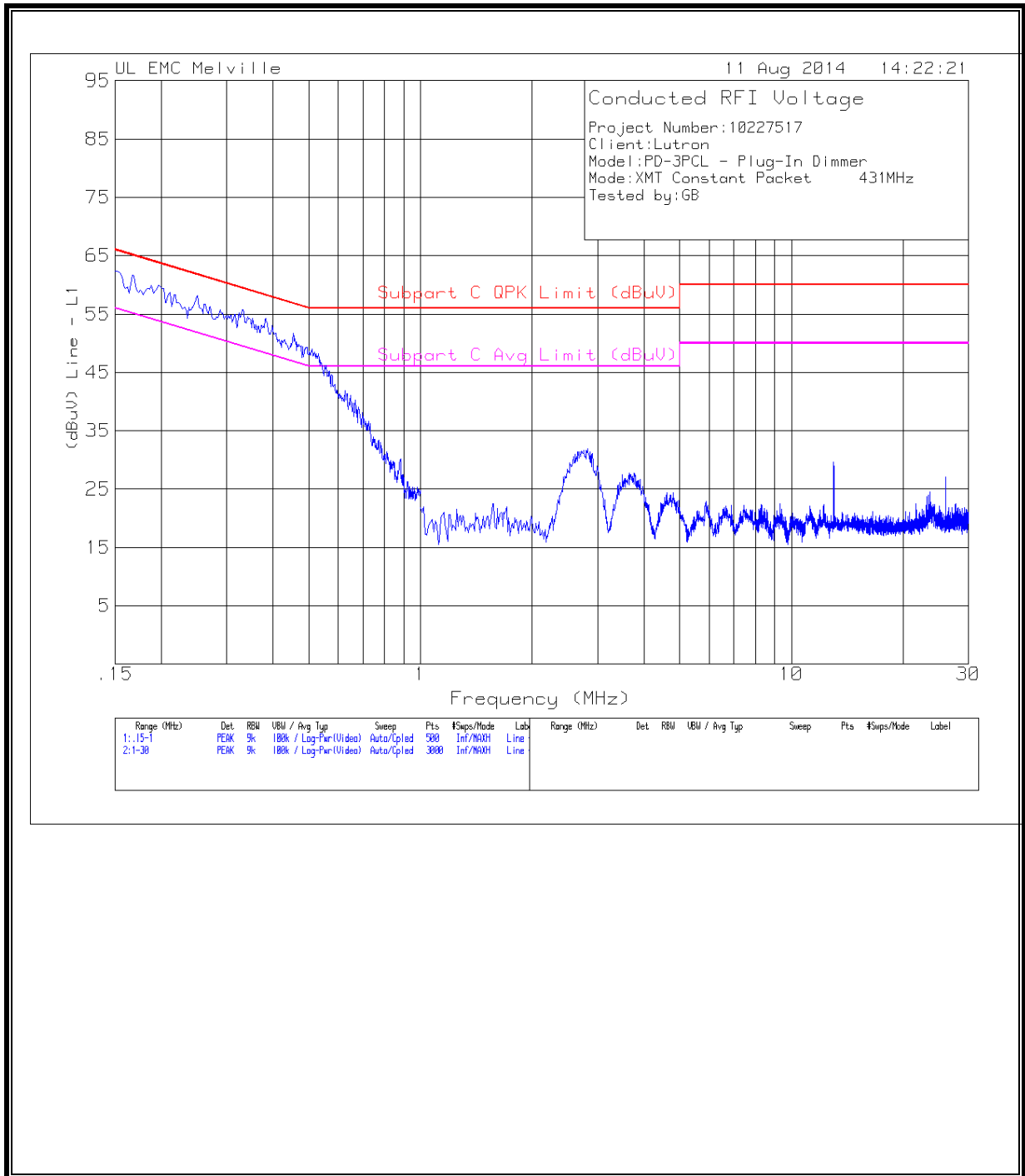
Frequency (MHz)	Meter Reading (dBuV)	Det	Line 1 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
.15596	28.89	CAV	10	38.89	-	-	55.68	-16.79
.16569	29.13	CAV	10	39.13	-	-	55.17	-16.04
.19774	28.6	CAV	10	38.6	-	-	53.7	-15.1
.24587	26.73	CAV	10	36.73	-	-	51.9	-15.17
.28682	25.85	CAV	10	35.85	-	-	50.62	-14.77
.33851	25.22	CAV	10	35.22	-	-	49.24	-14.02
.38143	24.15	CAV	10	34.15	-	-	48.25	-14.1
.45296	23.03	CAV	10	33.03	-	-	46.82	-13.79
.49957	21.74	CAV	10	31.74	-	-	46.01	-14.27
.55495	20.1	CAV	10	30.1	-	-	46	-15.9

CAV - CISPR average detection

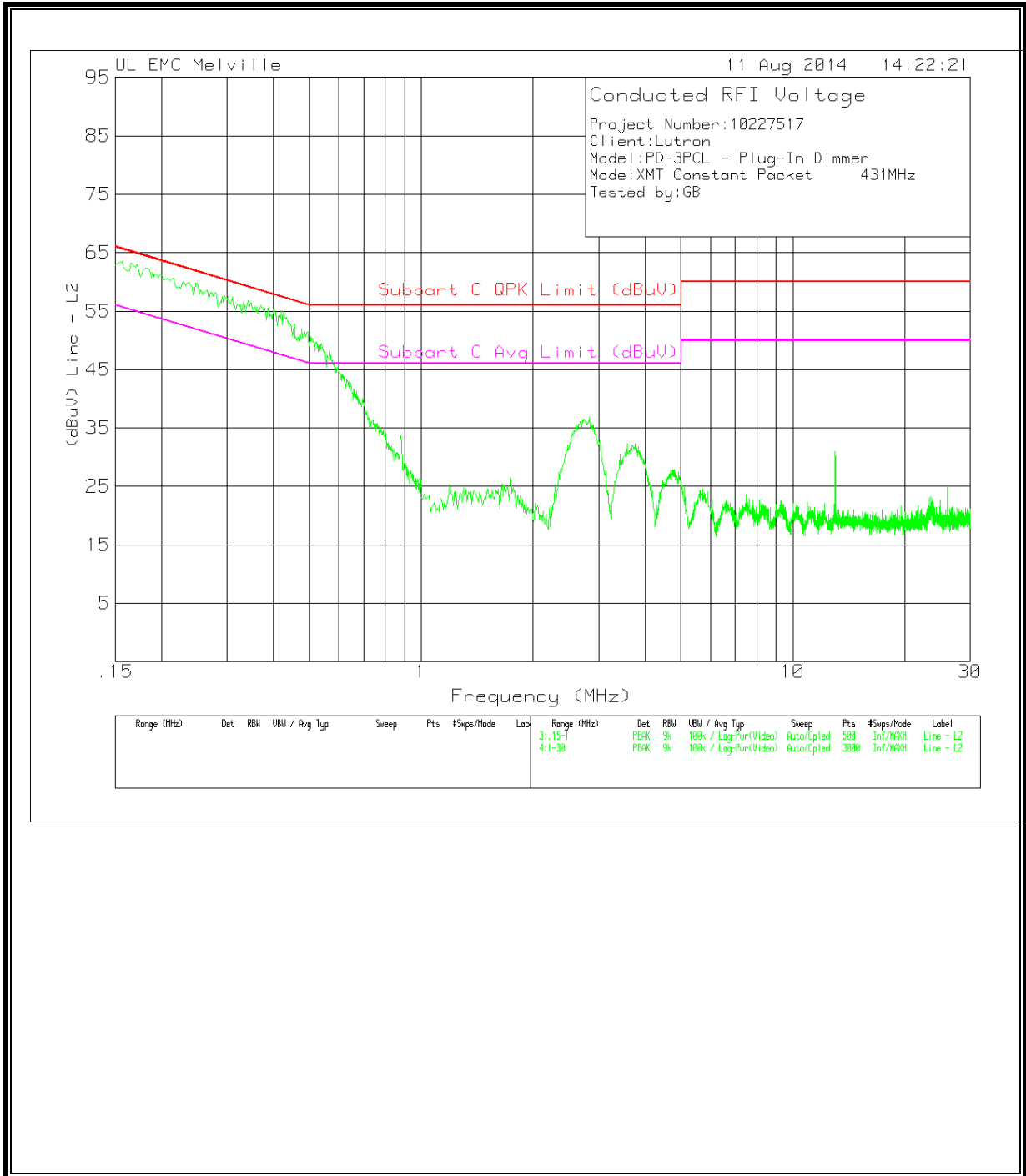
Frequency (MHz)	Meter Reading (dBuV)	Det	Line 2 G/L (dB)	Corrected Reading (dBuV)	Subpart C QPK Limit (dBuV)	Margin (dB)	Subpart C Avg Limit (dBuV)	Margin (dB)
.15485	28.43	CAV	10.1	38.53	-	-	55.74	-17.21
.16951	28.4	CAV	10	38.4	-	-	54.98	-16.58
.19407	27.58	CAV	10	37.58	-	-	53.86	-16.28
.23864	26.39	CAV	10	36.39	-	-	52.14	-15.75
.27897	25.54	CAV	10	35.54	-	-	50.85	-15.31
.34123	24.86	CAV	10	34.86	-	-	49.17	-14.31
.38701	24.21	CAV	10	34.21	-	-	48.13	-13.92
.42932	23.65	CAV	10	33.65	-	-	47.27	-13.62
.47662	23.06	CAV	10	33.06	-	-	46.4	-13.34
.52025	20.8	CAV	10.1	30.9	-	-	46	-15.1
.57769	19.92	CAV	10.1	30.02	-	-	46	-15.98

CAV - CISPR average detection

LINE 1 RESULTS



LINE 2 RESULTS



6 WORST EMISSIONS – High Channel

Frequency (MHz)	Meter Reading (dBuV)	Det	Line 1 G/L (dB)	Corrected Reading (dBuV)	Class B QPK Limit (dBuV)	Margin (dB)	Class B Avg Limit (dBuV)	Margin (dB)
.15511	53.52	PK	10	63.52	65.72	-2.2	-	-
.17555	49.67	PK	10	59.67	64.69	-5.02	-	-
.20451	50.12	PK	10	60.12	63.43	-3.31	-	-
.24028	47.67	PK	10	57.67	62.09	-4.42	-	-
.26243	47.59	PK	10	57.59	61.35	-3.76	-	-
.28627	47.88	PK	10	57.88	60.63	-2.75	-	-
.31523	45.8	PK	10	55.8	59.83	-4.03	-	-
.33567	46.21	PK	10	56.21	59.31	-3.1	-	-
.37996	44.91	PK	10	54.91	58.28	-3.37	-	-
.44128	42.47	PK	10	52.47	57.04	-4.57	-	-
.5009	40.15	PK	10	50.15	56	-5.85	-	-
.54349	37.66	PK	10	47.66	56	-8.34	-	-

PK - Peak detector

Frequency (MHz)	Meter Reading (dBuV)	Det	Line 2 G/L (dB)	Corrected Reading (dBuV)	Class B QPK Limit (dBuV)	Margin (dB)	Class B Avg Limit (dBuV)	Margin (dB)
.15341	52.38	PK	10.1	62.48	65.81	-3.33	-	-
.16703	51.54	PK	10	61.54	65.11	-3.57	-	-
.2011	50.03	PK	10	60.03	63.57	-3.54	-	-
.22325	49.04	PK	10	59.04	62.7	-3.66	-	-
.2488	48.31	PK	10	58.31	61.8	-3.49	-	-
.29479	46.27	PK	10	56.27	60.39	-4.12	-	-
.32715	45.6	PK	10	55.6	59.52	-3.92	-	-
.35441	45.27	PK	10	55.27	58.86	-3.59	-	-
.38677	42.94	PK	10	52.94	58.13	-5.19	-	-
.40892	42.8	PK	10	52.8	57.67	-4.87	-	-
.45321	43.2	PK	10	53.2	56.82	-3.62	-	-
.5009	38.85	PK	10	48.85	56	-7.15	-	-

PK - Peak detector

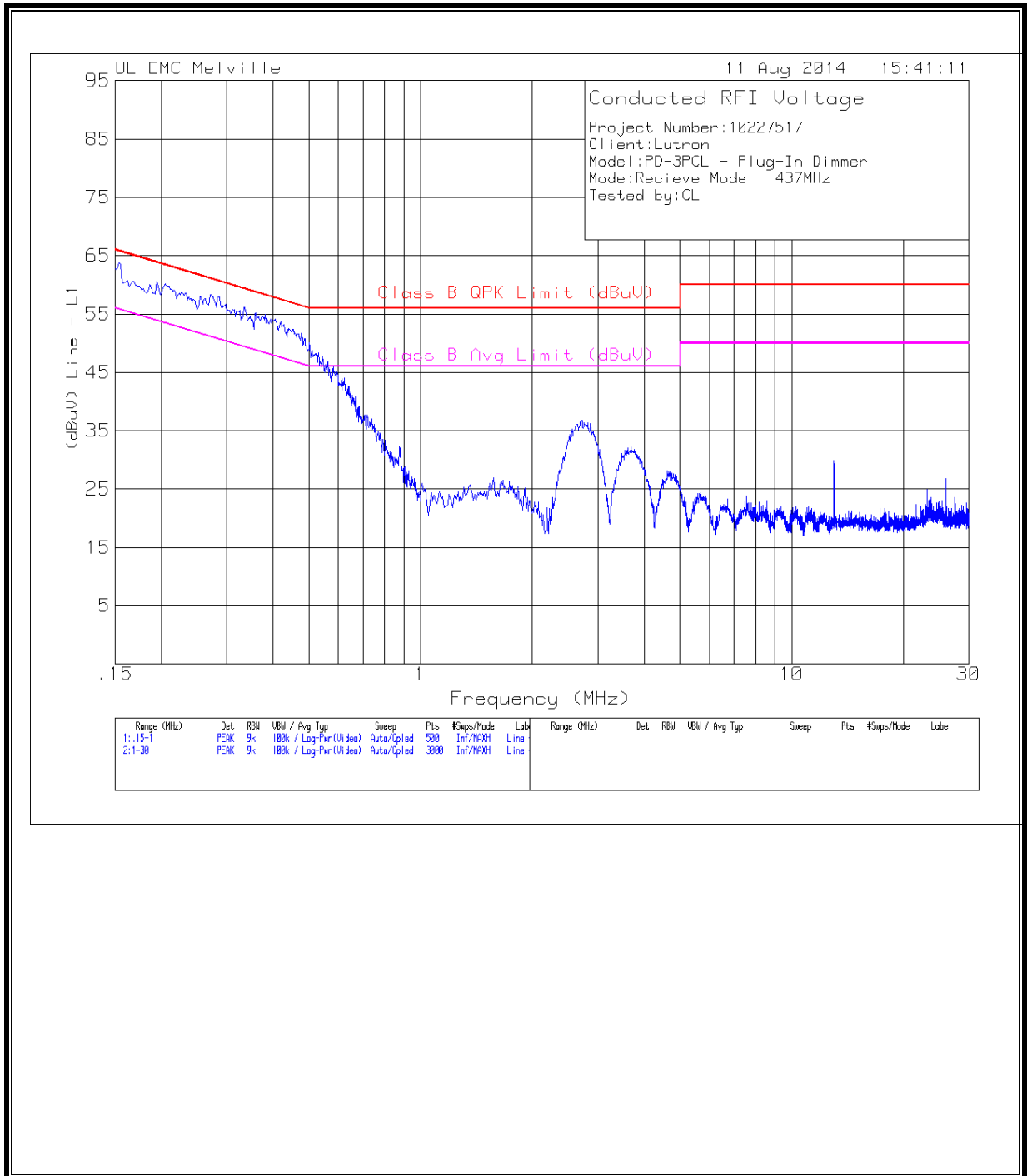
Frequency (MHz)	Meter Reading (dBuV)	Det	Line 1 G/L (dB)	Corrected Reading (dBuV)	Class B QPK Limit (dBuV)	Margin (dB)	Class B Avg Limit (dBuV)	Margin (dB)
.15262	27.65	CAV	10	37.65	-	-	55.86	-18.21
.17572	27.93	CAV	10	37.93	-	-	54.69	-16.76
.20442	27.71	CAV	10	37.71	-	-	53.43	-15.72
.24162	26.39	CAV	10	36.39	-	-	52.04	-15.65
.26127	25.44	CAV	10	35.44	-	-	51.39	-15.95
.28559	25.12	CAV	10	35.12	-	-	50.65	-15.53
.31612	24.99	CAV	10	34.99	-	-	49.81	-14.82
.33567	24.43	CAV	10	34.43	-	-	49.31	-14.88
.3773	23.95	CAV	10	33.95	-	-	48.34	-14.39
.43879	22.96	CAV	10	32.96	-	-	47.08	-14.12
.50061	21.63	CAV	10	31.63	-	-	46	-14.37
.54195	20.19	CAV	10	30.19	-	-	46	-15.81

CAV - CISPR average detection

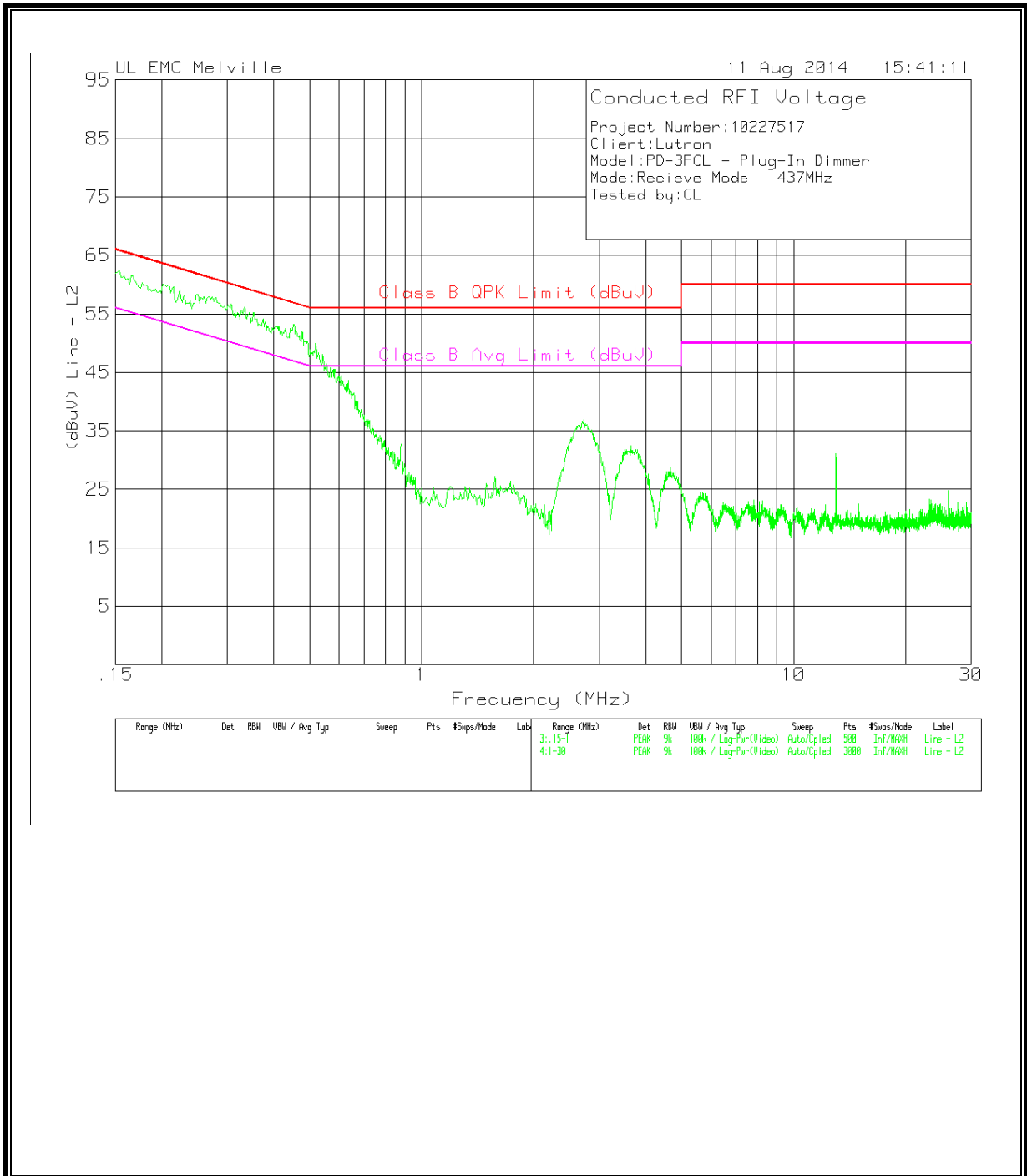
Frequency (MHz)	Meter Reading (dBuV)	Det	Line 2 G/L (dB)	Corrected Reading (dBuV)	Class B QPK Limit (dBuV)	Margin (dB)	Class B Avg Limit (dBuV)	Margin (dB)
.15516	28.41	CAV	10.1	38.51	-	-	55.72	-17.21
.1665	28.5	CAV	10	38.5	-	-	55.13	-16.63
.19965	28.19	CAV	10	38.19	-	-	53.63	-15.44
.22501	26.52	CAV	10	36.52	-	-	52.63	-16.11
.2477	26.03	CAV	10	36.03	-	-	51.83	-15.8
.29683	25.63	CAV	10	35.63	-	-	50.33	-14.7
.32831	25.32	CAV	10	35.32	-	-	49.49	-14.17
.35364	24.73	CAV	10	34.73	-	-	48.88	-14.15
.38533	23.86	CAV	10	33.86	-	-	48.16	-14.3
.41171	23.62	CAV	10	33.62	-	-	47.61	-13.99
.45385	23.13	CAV	10	33.13	-	-	46.8	-13.67
.49935	22.22	CAV	10	32.22	-	-	46.01	-13.79

CAV - CISPR average detection

LINE 1 RESULTS

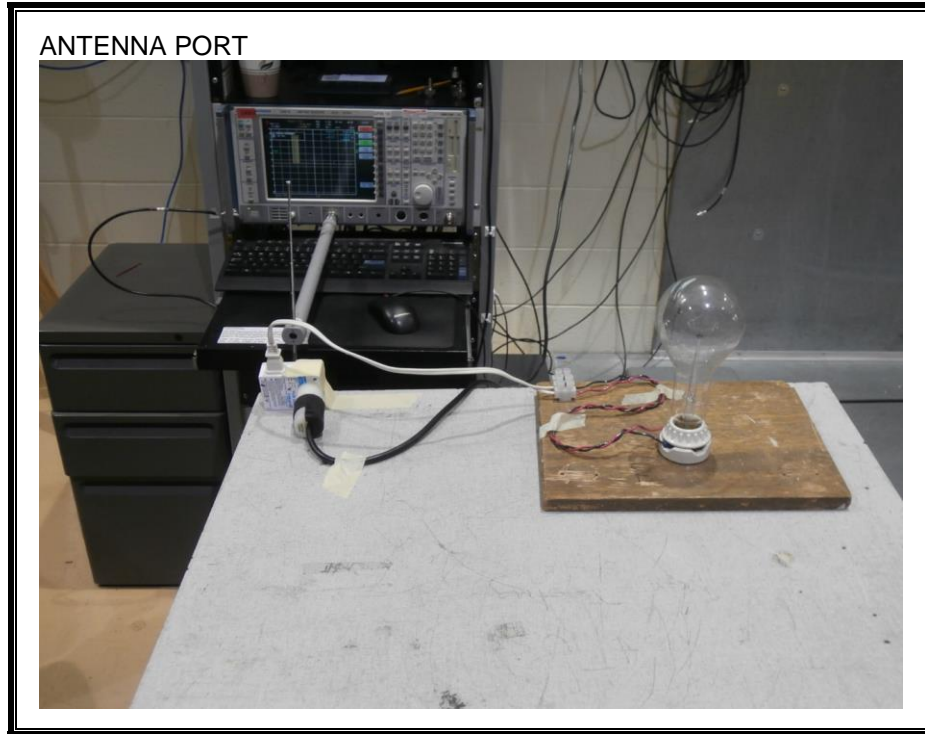


LINE 2 RESULTS

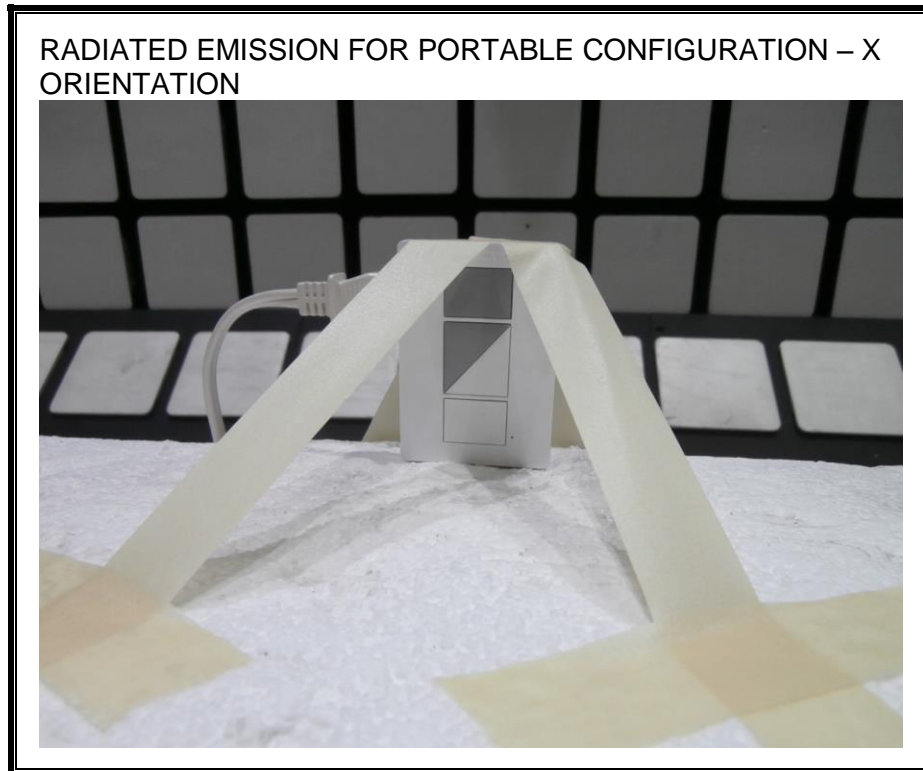


10. SETUP PHOTOS

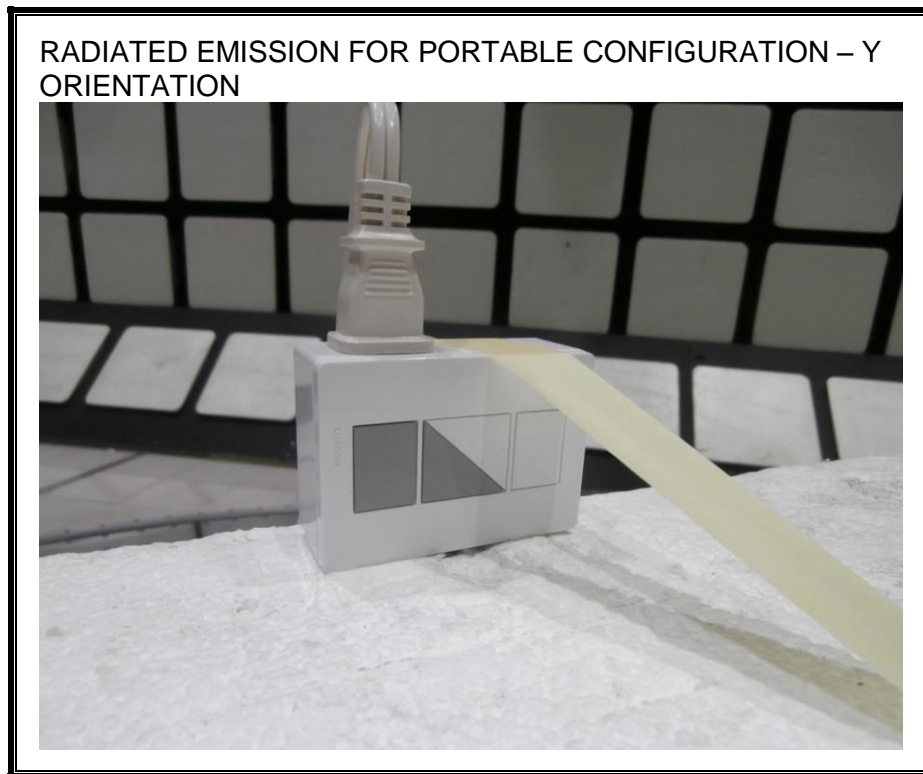
ANTENNA PORT



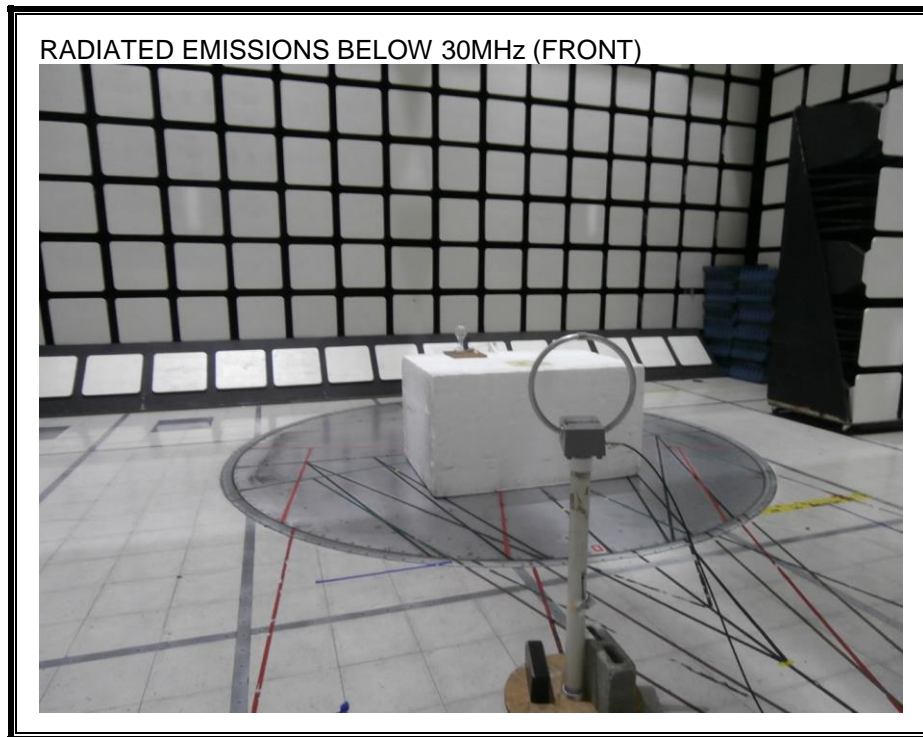
RADIATED EMISSION FOR PORTABLE CONFIGURATION – X ORIENTATION



RADIATED EMISSION FOR PORTABLE CONFIGURATION – Y ORIENTATION

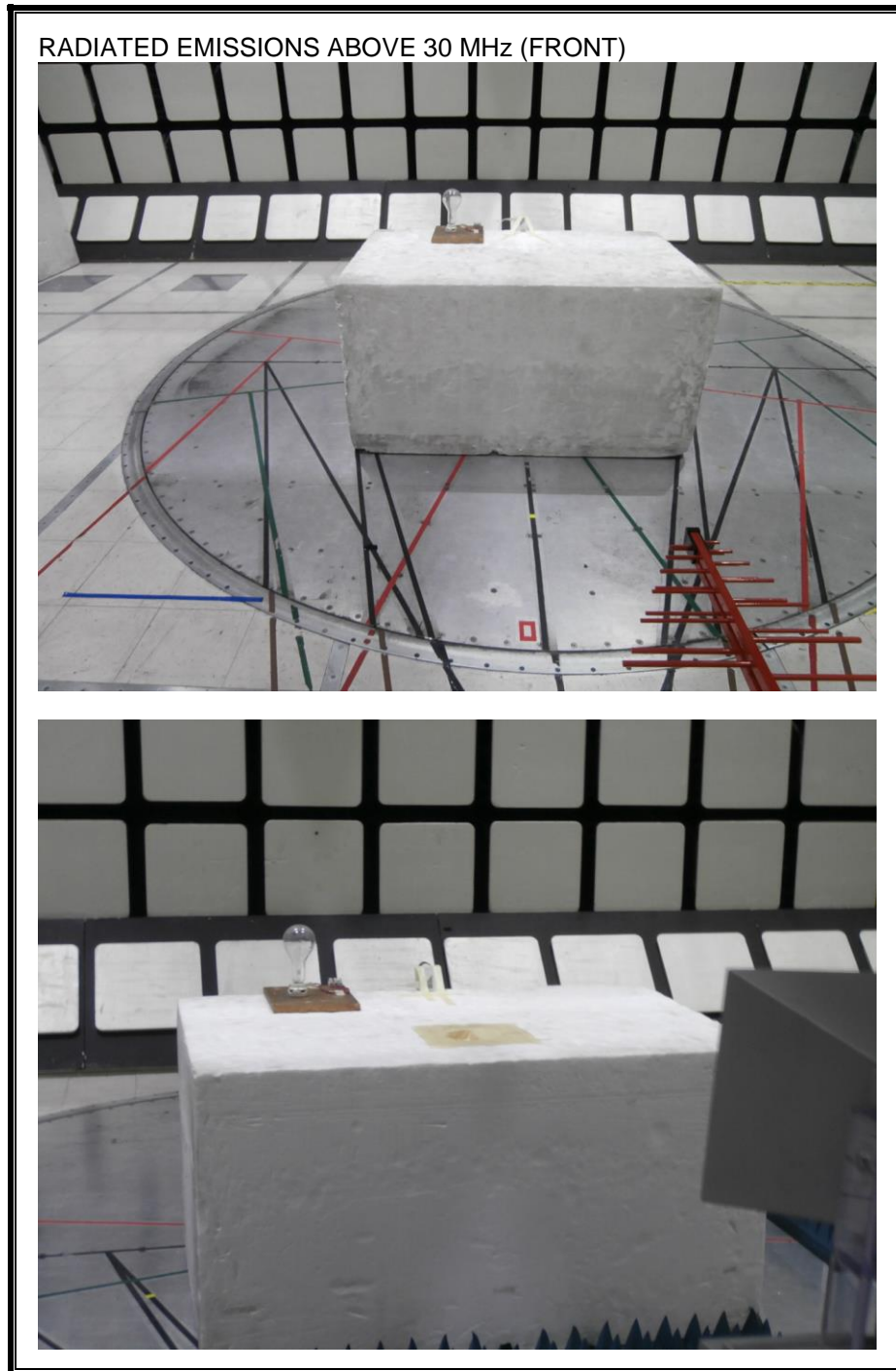


RADIATED EMISSION BELOW 30 MHz

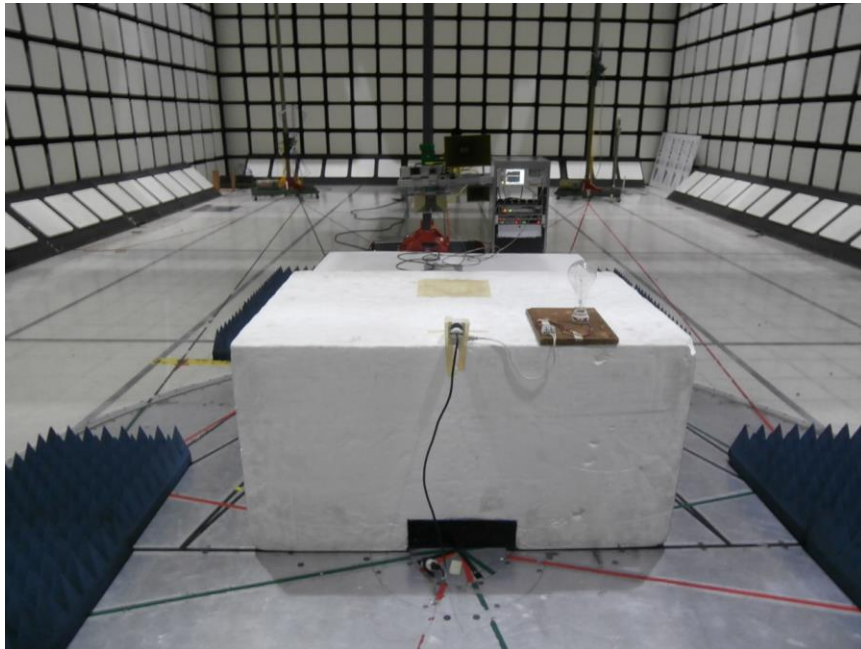
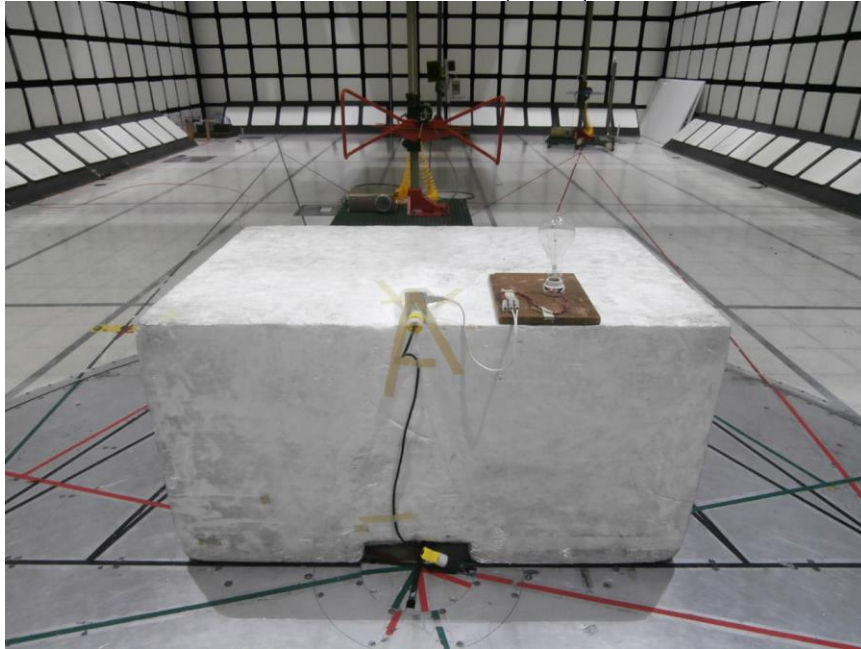




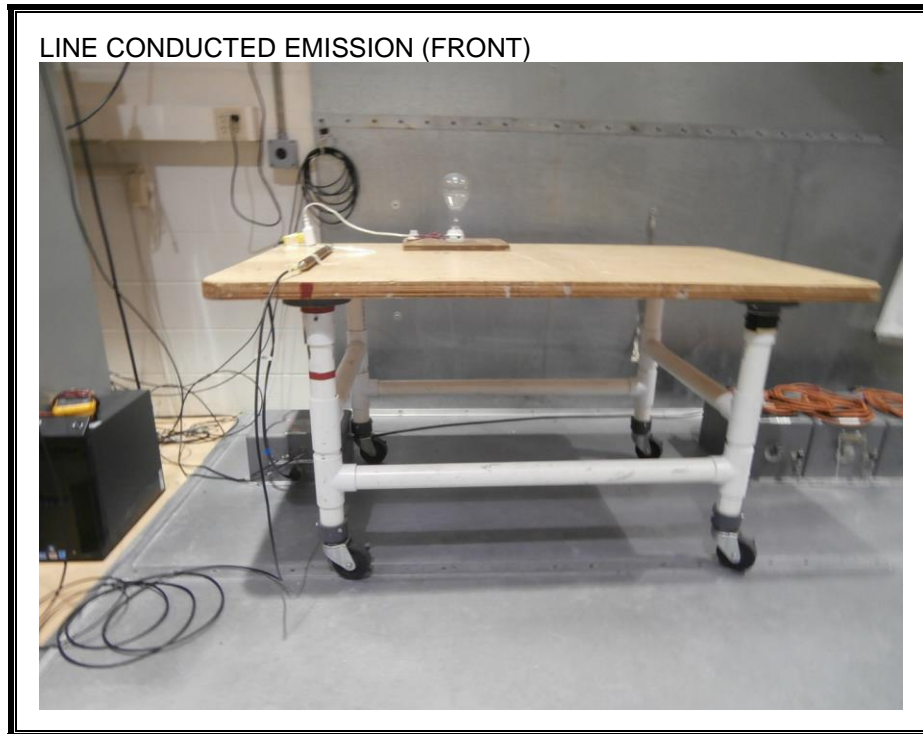
RADIATED EMISSION ABOVE 30 MHz



RADIATED EMISSIONS ABOVE 30 MHz (BACK)



AC MAINS LINE CONDUCTED EMISSION





END OF REPORT