



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

CERTIFICATION TEST REPORT

FOR

IN-WALL DIMMER

MODEL NUMBER: GT-RF

**FCC ID: JPZ0107
IC: 2851A-JPZ0107**

REPORT NUMBER: 10281417

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Prepared for
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NVLAP LAB CODE 100255-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	2014-06-	Initial Issue	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: In-wall dimmer

MODEL: GT-RF

SERIAL NUMBER: Non-serialized production unit

DATE TESTED: 2014-06-18 through 2014-06-19

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:



Michael Antola
Project Lead
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Bob DeLisi
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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:

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

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 dimmer switch intended for lighting applications. It contains a periodic transceiver that operates on a single channel between 431MHz and 437MHz.

Throughout the report the term Grafik T was used for the model number. This is a generic model and the actual model represented by the data is GT-RF.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an intergral antenna that is not user accessible or configurable.

5.3. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was RadioRa2 (image ID = "66ea3e").

The test utility software used during testing was FCC Emergency 1-0xC6.

5.4. WORST-CASE CONFIGURATION AND MODE

Testing was conducted for Radiated and Conducted emissions on the lowest (431MHz) and the highest (437MHz) channels. Occupied BW was tested on the channel with the highest fundamental field strength and all other tests were conducted at the center channel.

5.5. MODIFICATIONS

The power was lowered by 1.2dB in order for the 3rd harmonic to comply with the limits. This is a software change that is incorporated into the build number noted in section 5.3.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Not Applicable

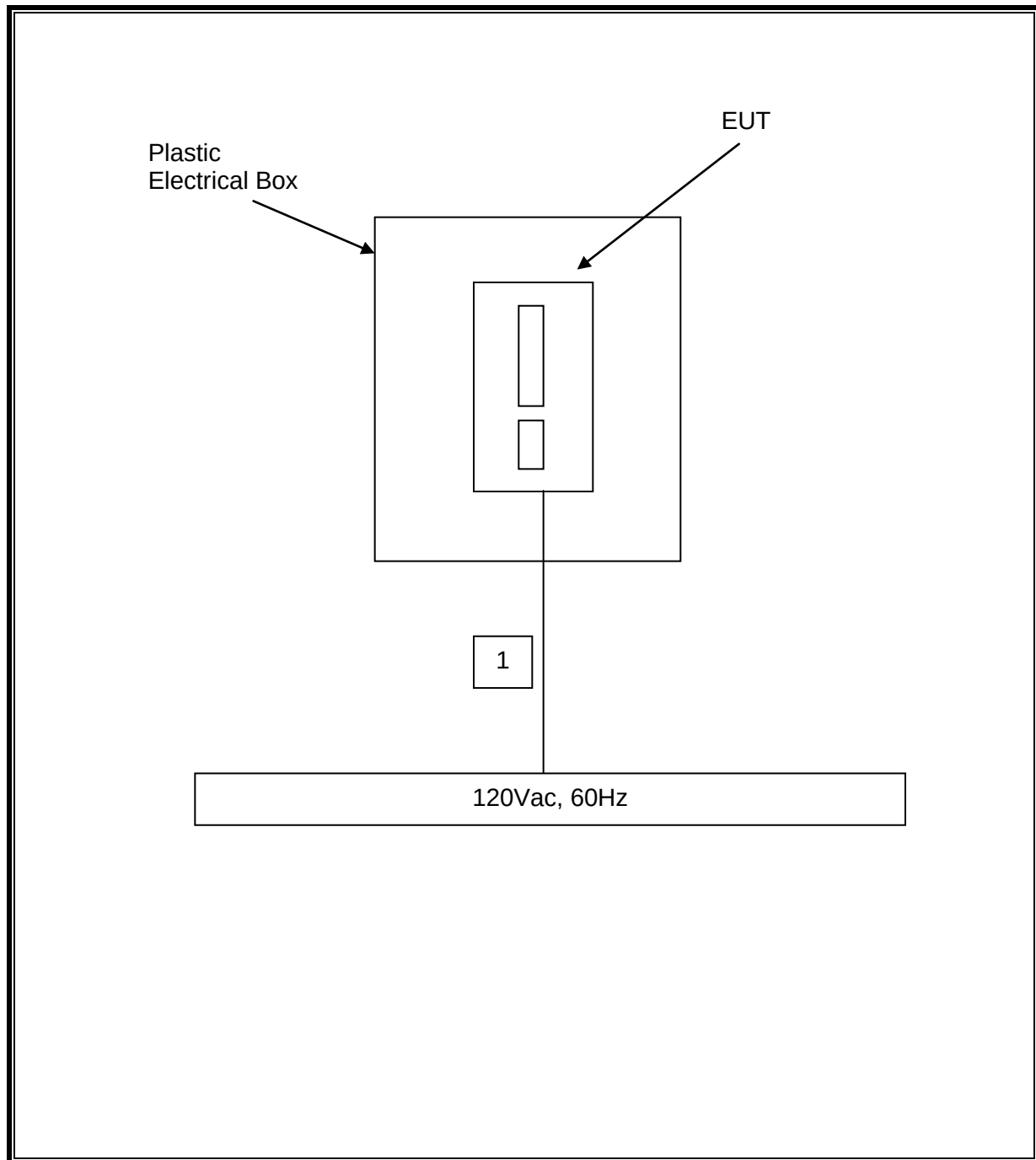
I/O CABLES

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

TEST SETUP

The EUT was tested in a plastic electrical box as a stand-alone device.

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
60Hz-30MHz					
EMI Receiver	Rohde & Schwarz	ESCI7	75141	2014-01-29	2015-01-31
Loop Antenna	EMCO	6507	5A-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
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
Multimeter	Fluke	83III	ME5B-305	2014-01-28	2015-01-31
Above 1GHz (Band Optimized System)					
EMI Receiver	Rohde & Schwarz	ESIB40	34968	2014-04-09	2015-04-09
Horn Antenna (2-4 GHz)	ETS	3161-02 (22°)**	48107	2007-09-27	See * below
Horn Antenna (4-8 GHz)	ETS	3161-03 (22°)**	48106	2007-09-27	See * below
Signal Path Controller	HP	11713A	50250	N/A	N/A
Gain Controller	HP	11713A	50251	N/A	N/A
RF Switch / Preamp Fixture	UL	BOMS1	50249	N/A	N/A
System Controller	UL	BOMS2	50252	N/A	N/A
Measurement Software	UL	Version 9.5	44740	N/A	N/A
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2012-12-22	2014-12-22
Multimeter	Fluke	83III	ME5B-305	2014-01-28	2015-01-31

Radiated Emissions					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
* - 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	ESIB26	ME5B-081	2014-01-28	2015-01-31
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	87V	44547	2014-01-29	2015-01-31

Antenna Port Tests (Occupied BWs, Duty Cycle, and Transmission Time)					
Description	Manufacturer	Model	Identifier	Cal Date	Cal Due Date
Spectrum Analyzer	R&S	ESCI7	75141	2014-01-29	2015-01-31
Dipole Antenna	EMCO	3121C	3359	2014-01-18	2015-01-18
Temp/Humidity/Pressure Meter	Cole Parmer	99760-00	4268	2012-12-22	2014-12-22
Measurement Software	UL	Version 9.5	44740		
Multimeter	Fluke	83III	ME5B-305	2014-01-28	2015-01-31
Hybrid Antenna	Sunol	JB-1	84106	2014-02-19	2015-02-19

6.1. 20 dB AND 99% BW

LIMITS

FCC §15.231 (c)

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

IC A1.1.3

For the purpose of Section A1.1, the 99% Bandwidth shall be no wider than 0.25% of the center frequency for devices operating between 70-900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

TEST PROCEDURE

ANSI C63.10

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:

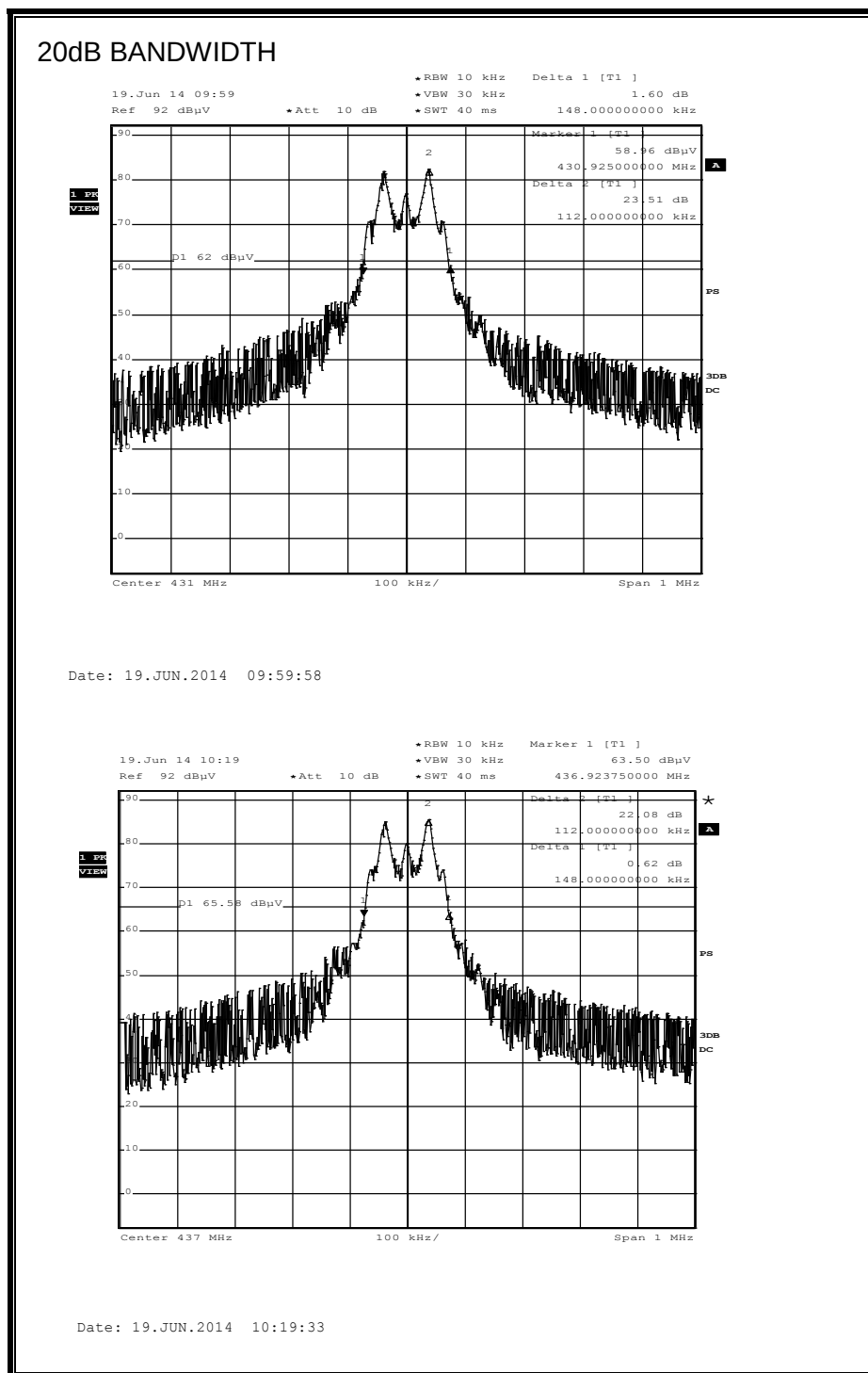
20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
431	148	1077.5	-929.5
437	148	1092.5	-944.5

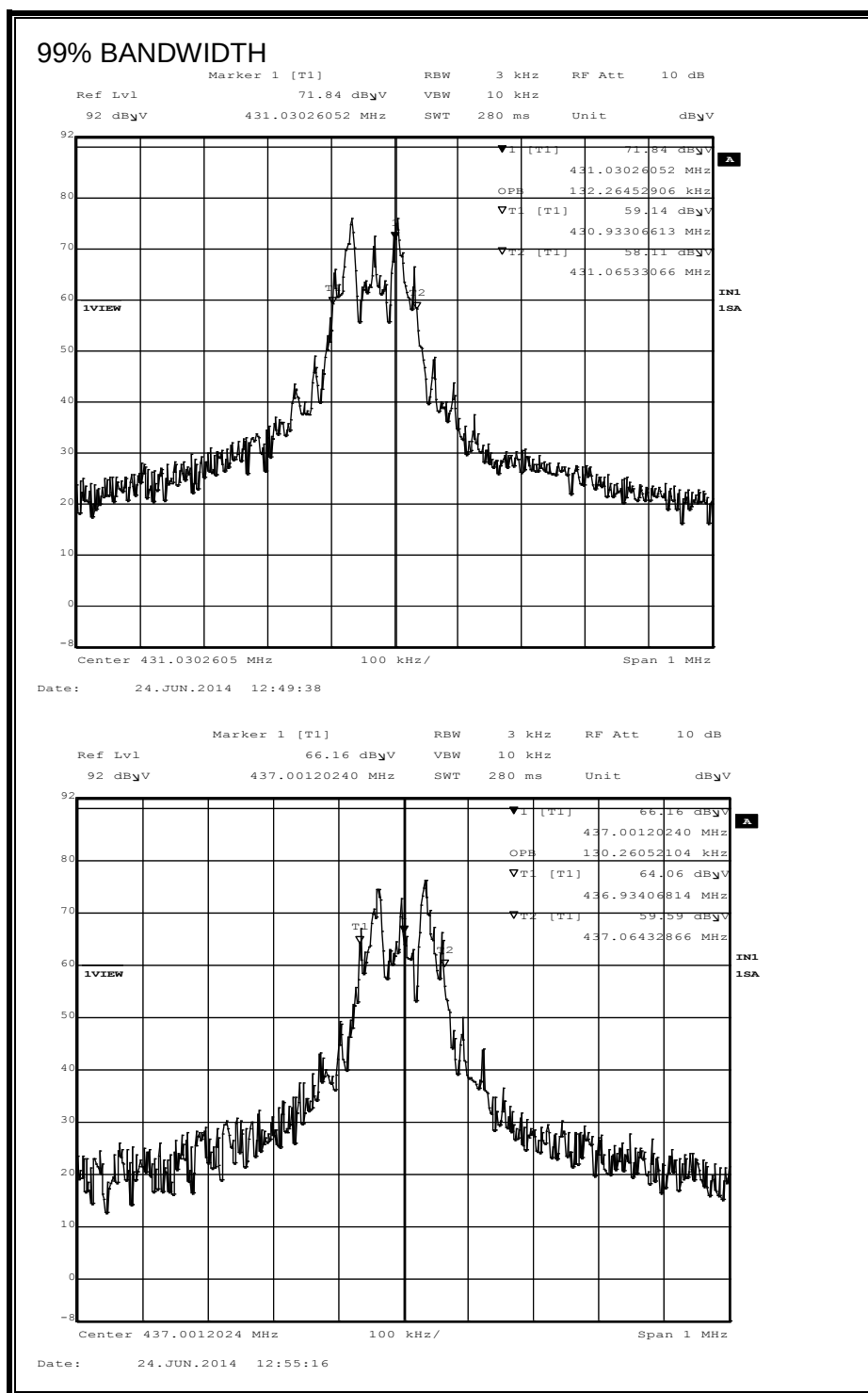
99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
431	132.3	1077.5	-945.2
437	130.2	1092.5	-962.3

20dB BANDWIDTH



99% BANDWIDTH



6.2. DUTY CYCLE

LIMITS

FCC §15.35 (c)

The measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 1 MHz and the VBW is set to 1 MHz. The sweep time is coupled and the span is set to 0 Hz. The number of pulses is measured and calculated in a 100 ms scan.

CALCULATION

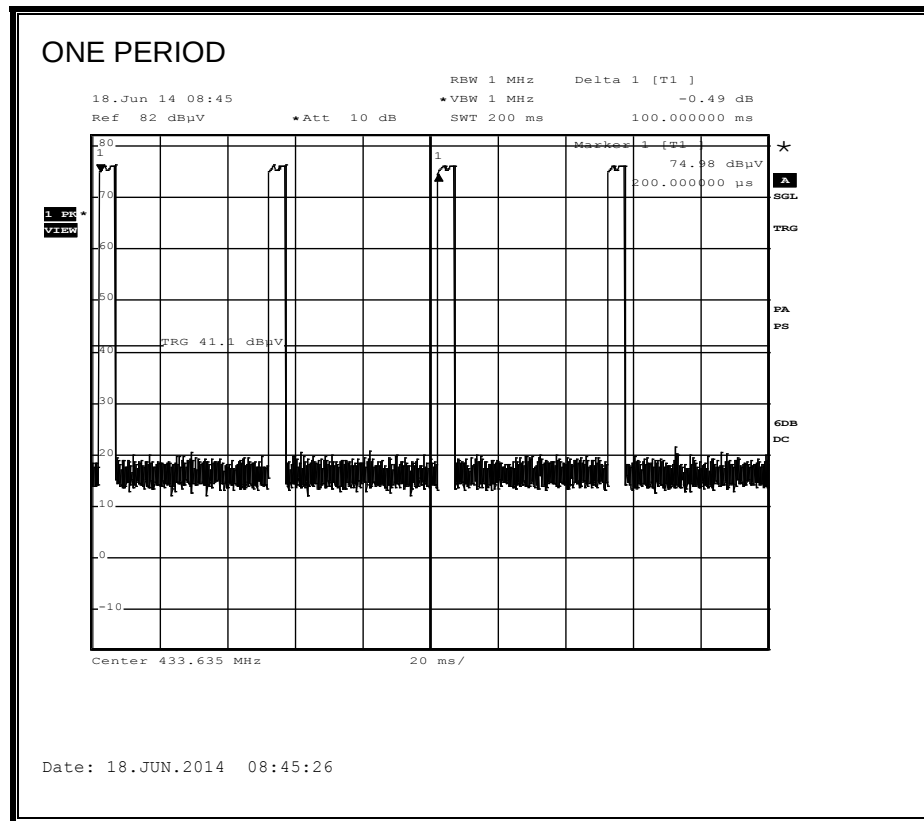
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is (# of long pulses * long pulse width) + (# of short pulses * short pulse width) / 100 or T

RESULTS

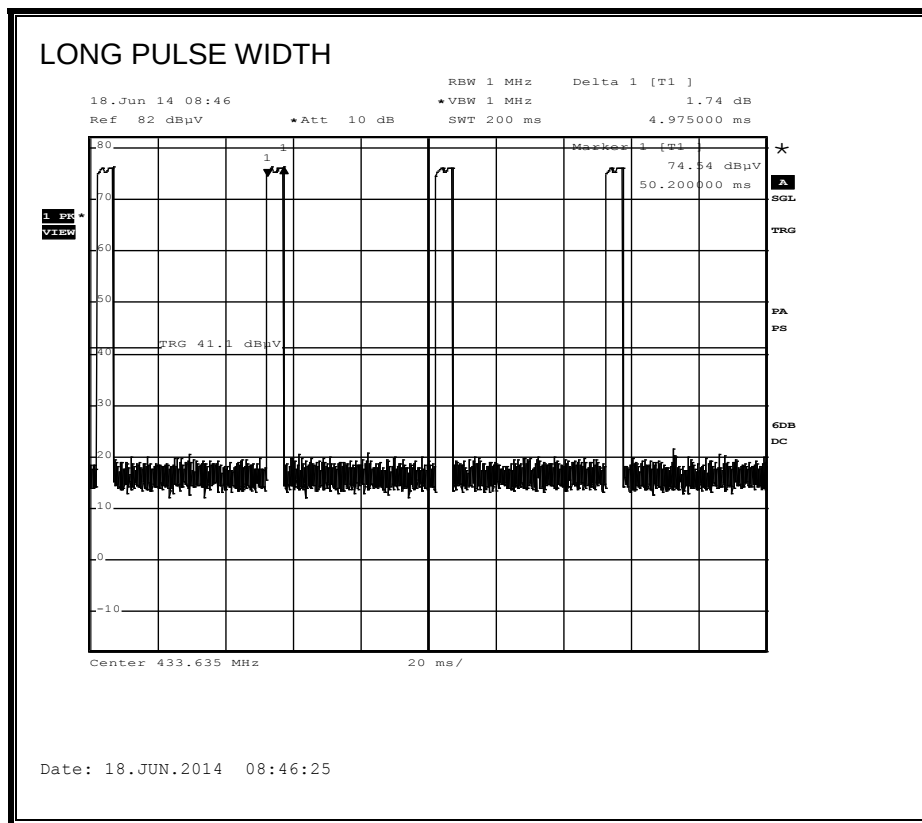
No non-compliance noted:

One Period (ms)	Long Pulse Width (ms)	# of Long Pulses	Short Width (ms)	# of Short Pulses	Duty Cycle	20*Log Duty Cycle (dB)
100	4.95	1	4.80	1	0.098	-20.22

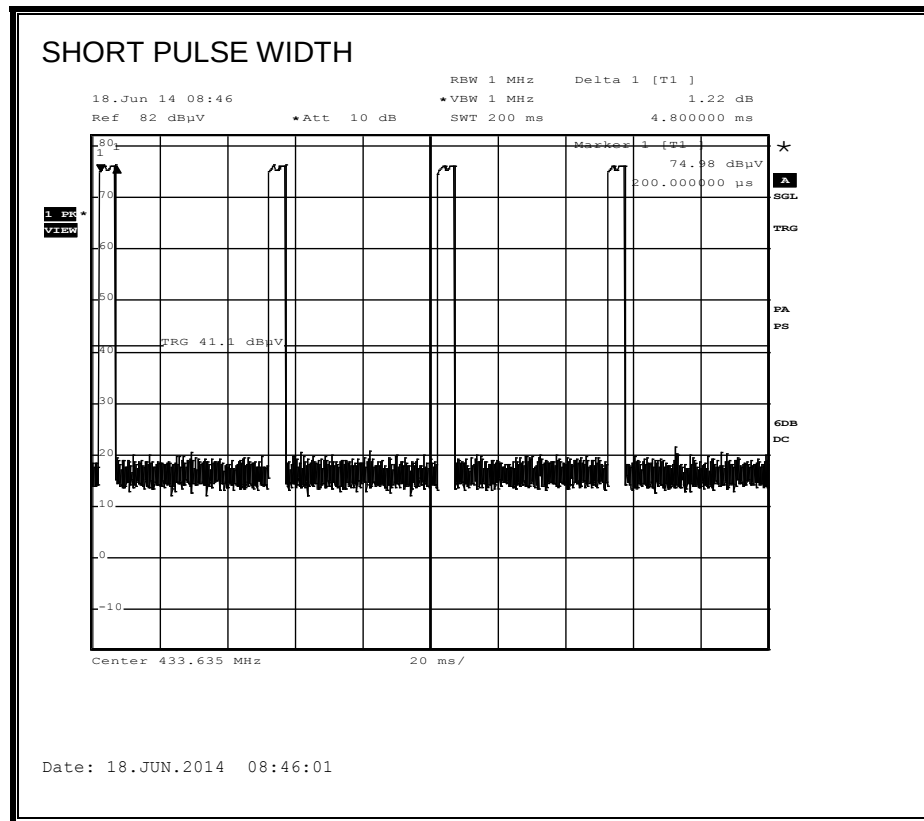
ONE PERIOD



LONG PULSE WIDTH



SHORT PULSE WIDTH



6.3. TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)

IC A1.1.1 (b)

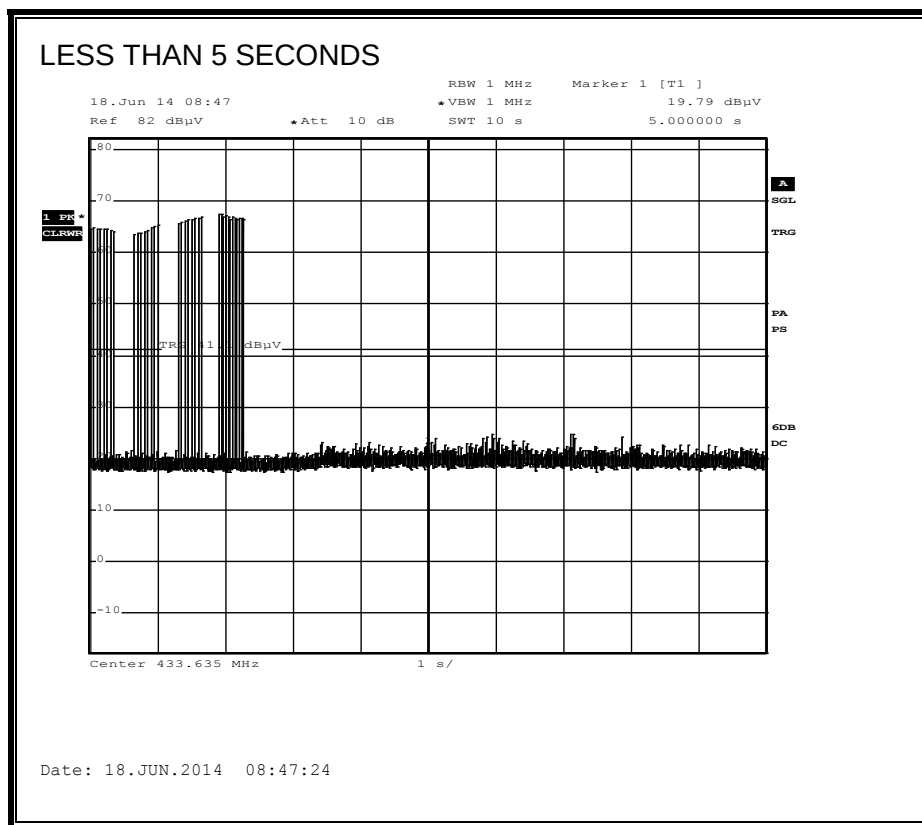
A transmitter activated automatically shall cease transmission within 5 seconds after activation.

TEST PROCEDURE

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

RESULTS

No non-compliance noted:



7. RADIATED EMISSION TEST RESULTS

7.1. TX RADIATED SPURIOUS EMISSION

LIMITS

FCC §15.231 (b)

IC A1.1.2

In addition to the provisions of § 15.205, the field strength of emissions from Intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental Frequency (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66 - 40.70	2,250	225
70 - 130	1,250	125
130 - 174	1,250 to 3,750 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.

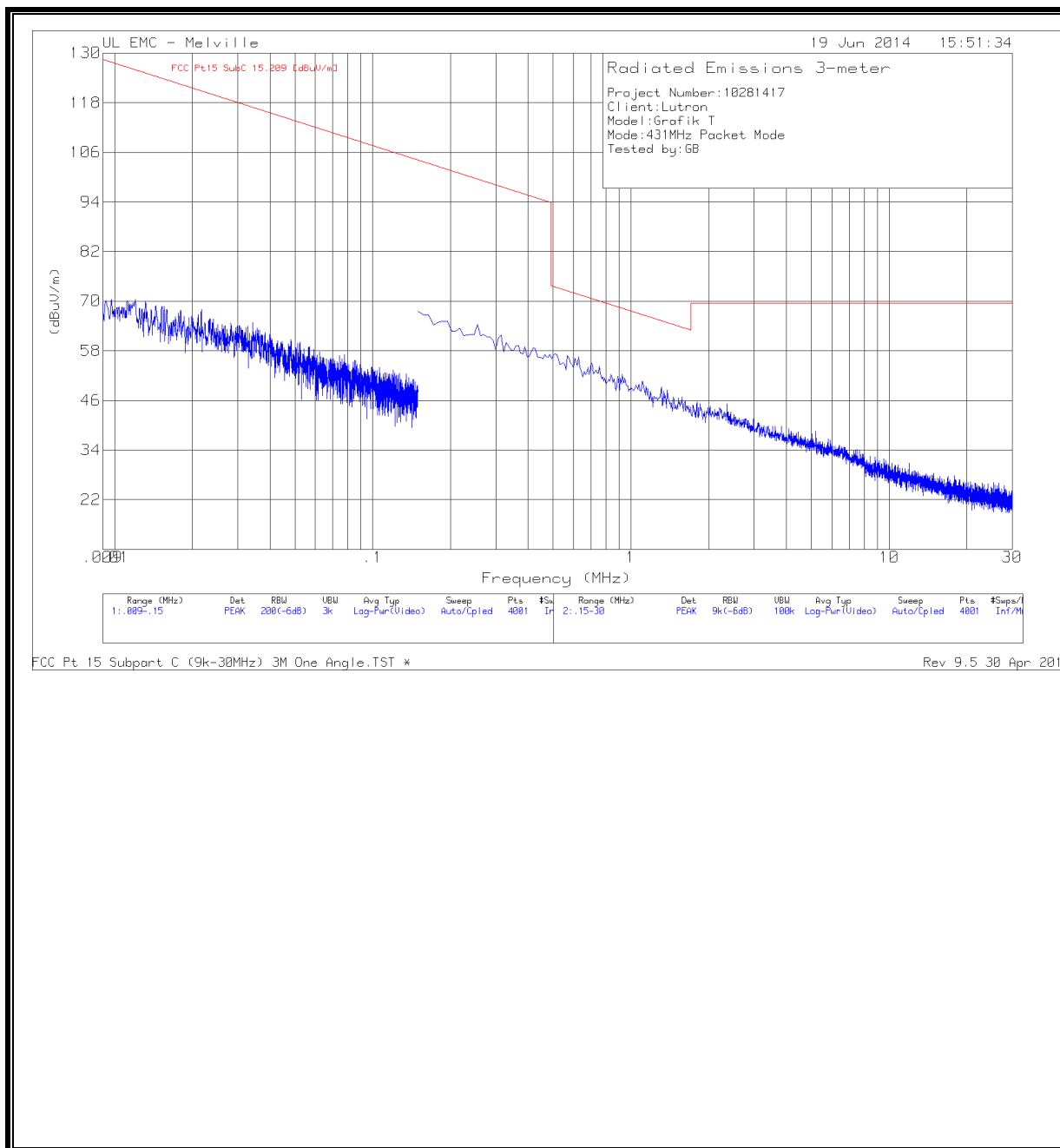
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements.

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:

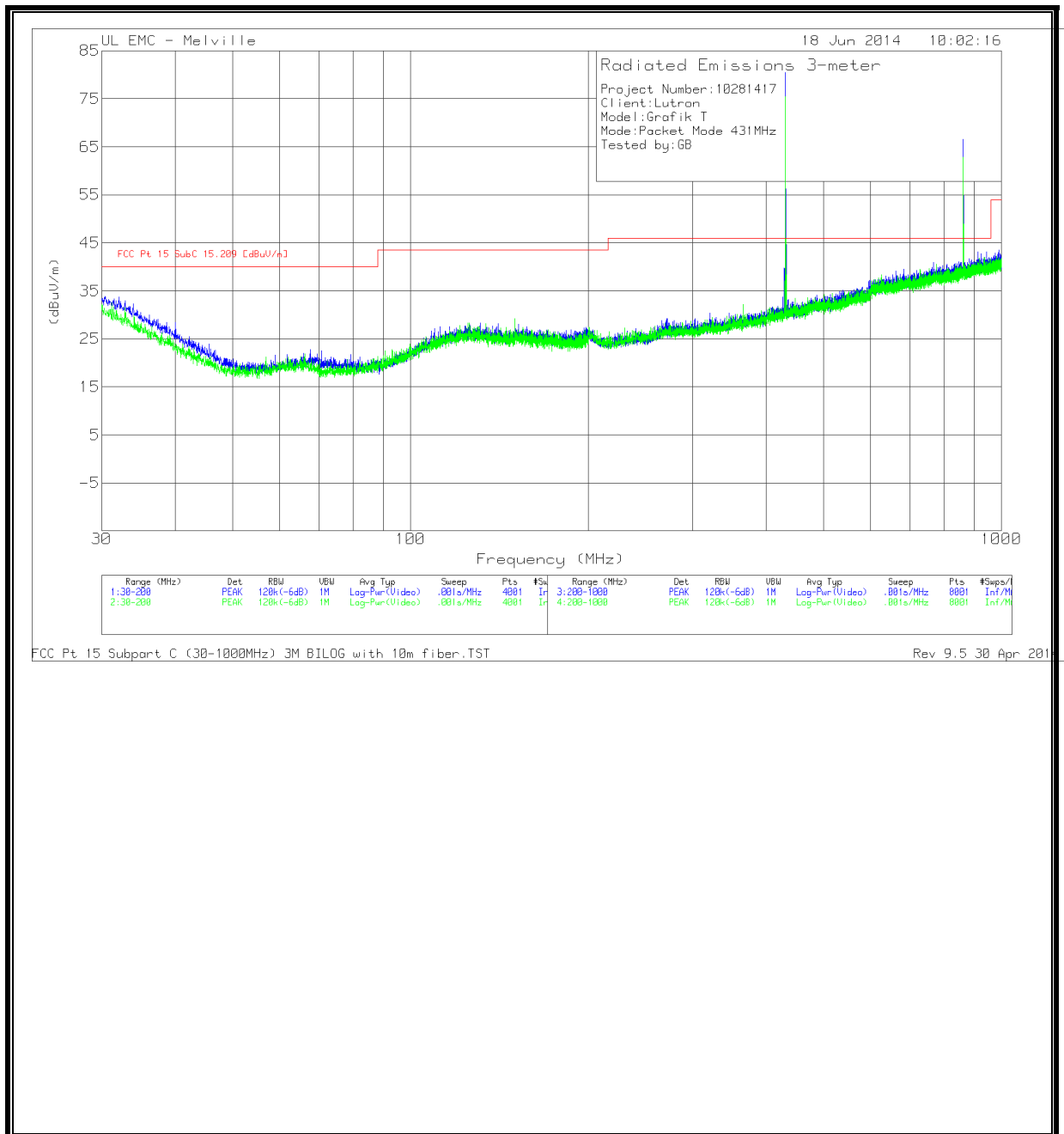
TX SPURIOUS EMISSION (9kHz – 30 MHz) (Worst case)



Frequency (MHz)	Meter Reading (dBuV)	Det	AF-5A288 [dB/m]	GL-3M [dB]	Corrected Reading (dBuV/m)	FCC Pt15 SubC 15.209 [dBuV/m]	Margin (dB)	Azimuth (Degs)
.012045	41.58	PK	28.7	.2	70.48	125.97	-55.49	0-360
.021705	43.74	PK	24	.2	67.94	120.86	-52.92	0-360
.03434	42.99	PK	21.6	.2	64.79	116.88	-52.09	0-360
.25448	47.86	PK	16.2	.3	64.36	99.49	-35.13	0-360
.62763	40	PK	16.2	.3	56.5	71.65	-15.15	0-360
.70226	38.58	PK	16.2	.4	55.18	70.67	-15.49	0-360

PK - Peak detector

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

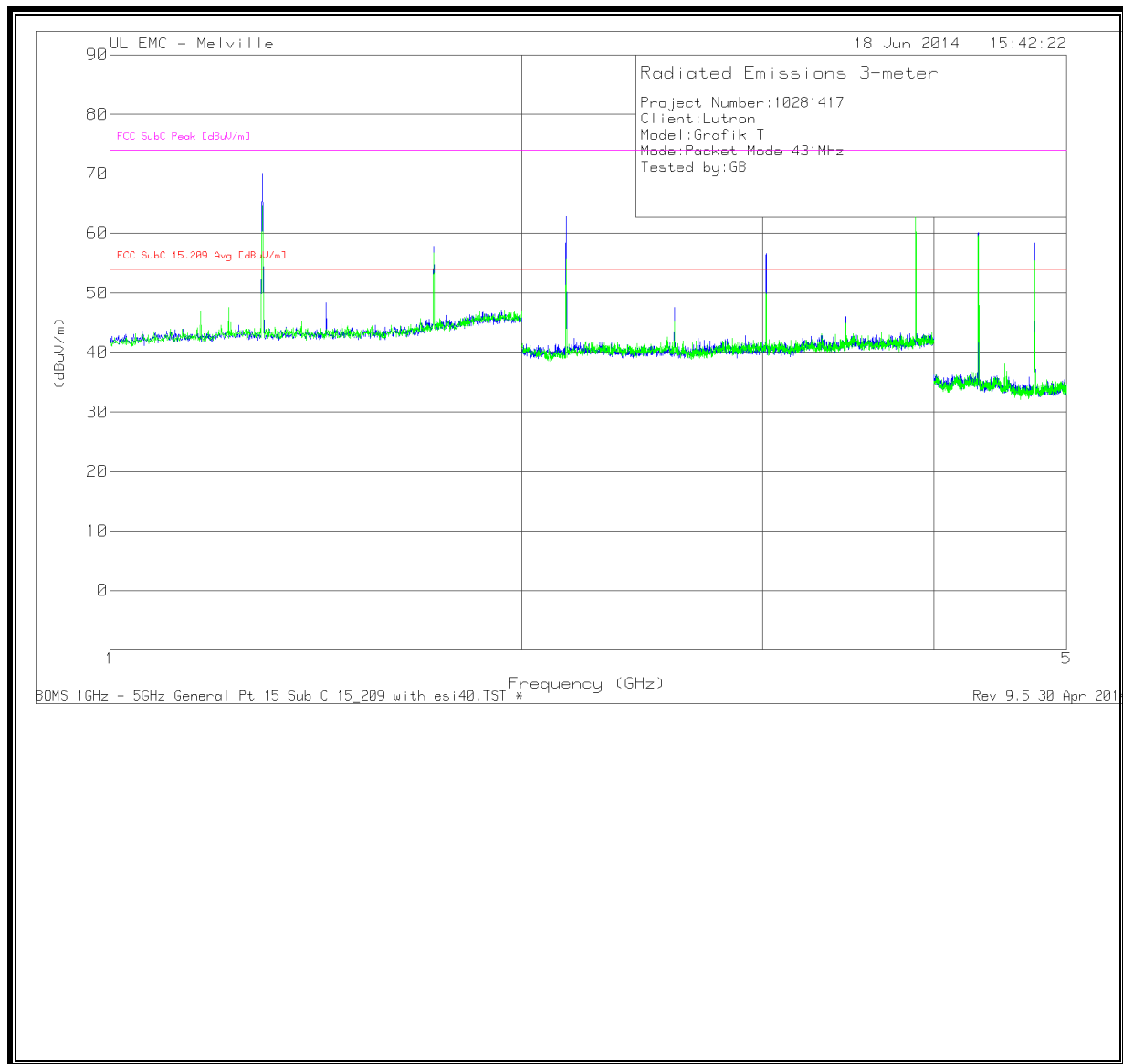


Frequency (MHz)	Meter Reading (dBuV)	Det	AF-84106 [dB/m]	GL [dB]	Corrected Reading (dBuV/m)	DCF (dB)	Corrected Average Reading (dBuV/m)	FCC Pt 15.231 (dBuV/m)	Margin (dB)	Pt 15 Peak (dBuV/m)	Margin (dB)	FCC Pt 15 SubC 15.209 [dBuV/m]	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
431.0375	61.15	PK	16.8	3.1	81.05	-20.22	60.83	80.7	-19.87	100.7	-19.65	-	-	348	187	H
862.0744	47.55	PK	22.3	4.8	74.65	-20.22	54.43	60.7	-6.27	80.7	-6.05	-	-	102	159	H
430.9504	58.59	PK	16.4	3.1	78.09	-20.22	57.87	80.7	-22.83	100.7	-22.61	-	-	36	136	V
861.9129	45.6	PK	21.7	4.8	72.1	-20.22	51.88	60.7	-8.82	80.7	-8.6	-	-	336	164	V
912.445	-1.54	QP	23	4.8	26.26	-	-	-	-	-	-	46	-19.74	241	125	H

PK - Peak detector

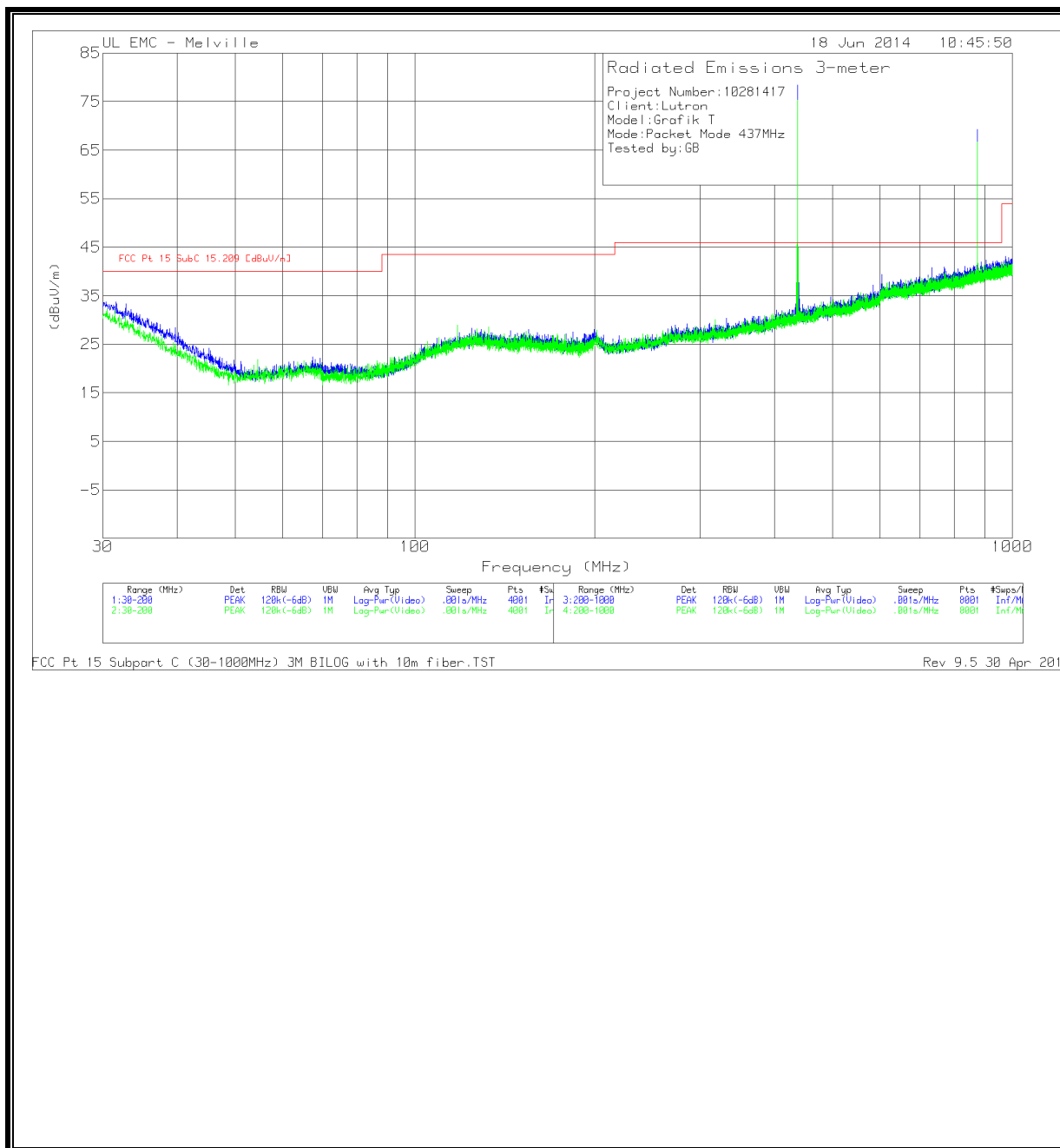
QP - Quasi-Peak
detector

HARMONICS AND TX SPURIOUS EMISSIONS ABOVE 1GHz– Low Channel



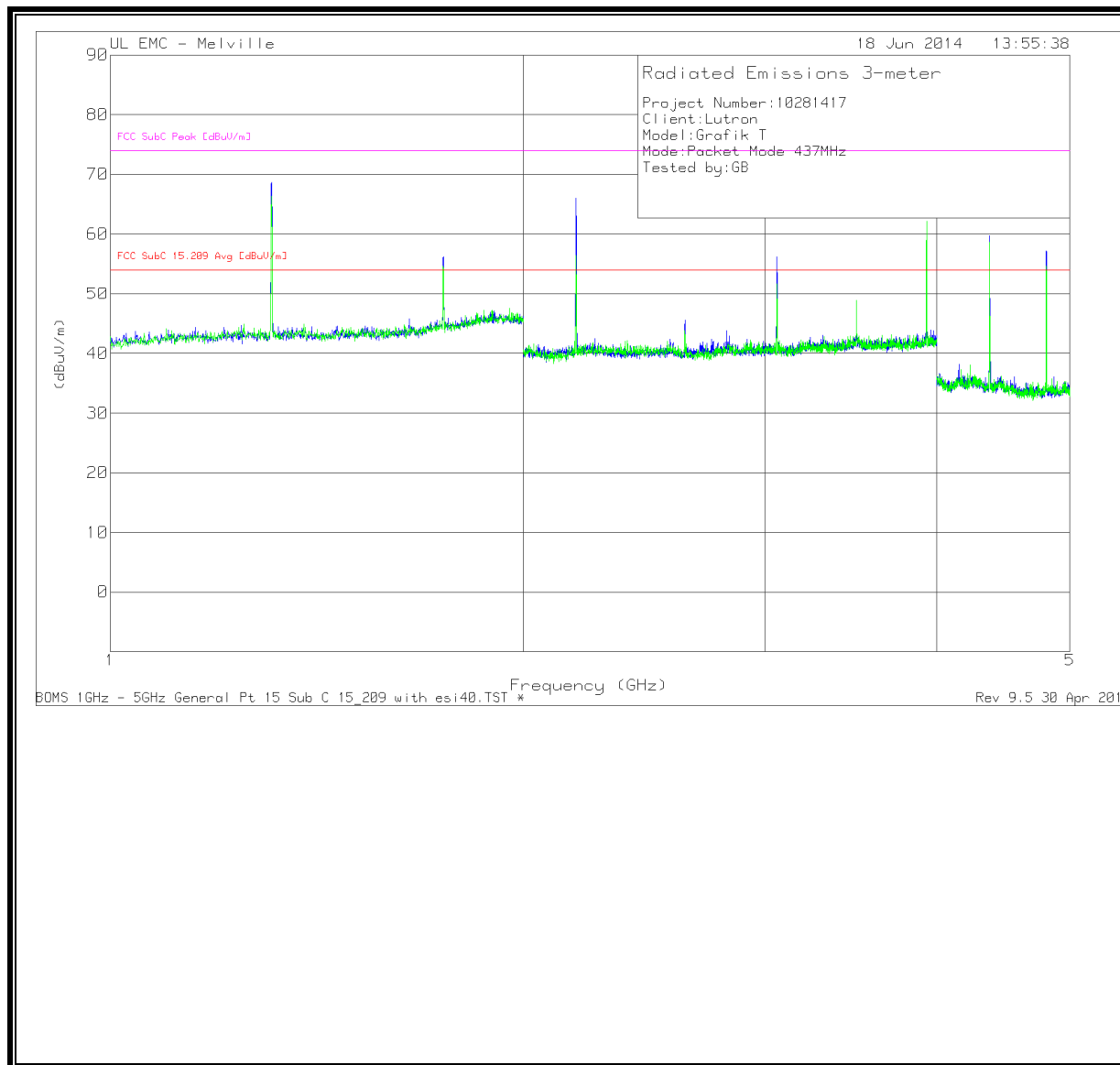
Frequency	Meter	Det	AF [dB/m]	Gain/Loss (dB)	Corrected		Corrected	FCC SubC 15.209 Avg [dBuV/m]	Margin	FCC SubC Peak [dBuV/m]	PK Margin	Azimuth	Height	Polarity
(GHz)	Reading				Reading	DCF	Average Reading		(dB)		(dB)	(Degs)	(cm)	
	(dBuV)				(dBuV/m)	(dB)	(dBuV/m)							
*1293	90.93	PK	25.1	-44.55	7148	-20.22	5126	54	-2.74	74	-2.52	337	158	H
1724	82.18	PK	26.1	-44.2	6408	-20.22	43.86	54	-10.14	74	-9.92	12	389	H
*1439	63.41	PK	25	-44.54	43.87	-20.22	23.65	54	-30.35	74	-30.13	136	140	H
2.155	85.2	PK	214	-42.76	63.84	-20.22	43.62	54	-10.38	74	-10.16	32	162	H
2.586	70.25	PK	213	-41.75	49.8	-20.22	29.58	54	-24.42	74	-24.2	167	109	H
3.017	77.87	PK	215	-40.75	58.62	-20.22	38.4	54	-15.6	74	-15.38	61	309	H
3.448	65.49	PK	22.1	-40.7	46.89	-20.22	26.67	54	-27.33	74	-27.11	349	304	H
*3.879	75.75	PK	22.6	-40.91	57.44	-20.22	37.22	54	-16.78	74	-16.56	2	387	H
*4.741	85.12	PK	27.2	-53.39	58.93	-20.22	38.71	54	-15.29	74	-15.07	296	185	H
*4.31	86.21	PK	27.7	-52.77	61.14	-20.22	40.92	54	-13.08	74	-12.86	296	100	H
*1293	87.67	PK	25.3	-44.56	68.41	-20.22	48.19	54	-5.81	74	-5.59	142	151	V
1724	79.21	PK	26.1	-44.2	61.11	-20.22	40.89	54	-13.11	74	-12.89	137	144	V
2.155	78.42	PK	21	-42.76	56.66	-20.22	36.44	54	-17.56	74	-17.34	53	261	V
2.586	69.77	PK	215	-41.76	49.51	-20.22	29.29	54	-24.71	74	-24.49	192	225	V
3.017	80.11	PK	217	-40.74	6107	-20.22	40.85	54	-13.15	74	-12.93	1	288	V
3.448	71.68	PK	22.2	-40.71	53.17	-20.22	32.95	54	-21.05	74	-20.83	348	265	V
*3.879	84	PK	22.6	-40.91	65.69	-20.22	45.47	54	-8.53	74	-8.31	9	202	V
*4.31	88.52	PK	27.8	-52.77	63.55	-20.22	43.33	54	-10.67	74	-10.45	305	182	V
*4.741	88.59	PK	27.1	-53.38	62.31	-20.22	42.09	54	-11.91	74	-11.69	360	256	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	Meter	Det	AF-84106 [dB/m]	GL [dB]	Corrected		Corrected		Margin		Margin	FCC Pt 15 SubC 15.209 [dBuV/m]	Margin	Azimuth	Height	
(MHz)	Reading				Reading	DCF	Average Reading	FCC Pt 15.231	(dB)	Pt 15 Peak	(dB)		(dB)	(Degs)	(cm)	Polarity
	(dBuV)				(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)		(dBuV/m)						
436.9503	59.5	PK	17	3.2	79.7	-20.22	59.48	80.9	-21.42	100.9	-21.2	-	-	308	190	H
874.085	46.16	PK	22.5	4.8	73.46	-20.22	53.24	60.9	-7.66	80.9	-7.44	-	-	117	181	H
436.9481	54.98	PK	16.7	3.2	74.88	-20.22	54.66	80.9	-26.24	100.9	-26.02	-	-	211	122	V
874.0341	50.5	PK	21.9	4.8	77.2	-20.22	56.98	60.9	-3.92	80.9	-3.7	-	-	195	108	V
904.399	-1.62	QP	23	4.8	26.18	-	-	-	-	-	-	46	-19.82	3	290	H
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 (dB)	FCC SubC Peak [dBuV/m]	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
(GHz)	Reading (dBuV)				Reading (dBuV/m)		Average Reading (dBuV/m)							
*1311	86.88	PK	25.1	-44.44	67.54	-20.22	47.32	54	-6.68	74	-6.46	22	223	V
*1311	89.37	PK	25.1	-44.44	70.03	-20.22	49.81	54	-4.19	74	-3.97	350	154	H
2.185	87.91	PK	215	-42.22	67.19	-20.22	46.97	54	-7.03	74	-6.81	319	149	H
3.059	78.65	PK	216	-4103	59.22	-20.22	39	54	-15	74	-14.78	75	216	H
3.496	69.62	PK	22.2	-40.55	51.27	-20.22	31.05	54	-22.95	74	-22.73	49	139	H
*3.933	74.34	PK	22.7	-40.85	56.19	-20.22	35.97	54	-18.03	74	-17.81	49	139	H
*4.37	86.23	PK	27.6	-52.98	60.85	-20.22	40.63	54	-13.37	74	-13.15	302	100	H
*4.807	85.23	PK	27.1	-53.81	58.52	-20.22	38.3	54	-15.7	74	-15.48	290	270	H
1748	77.57	PK	26.3	-44.1	59.77	-20.22	39.55	54	-14.45	74	-14.23	143	141	V
1748	78.75	PK	26.3	-44.1	60.95	-20.22	40.73	54	-13.27	74	-13.05	142	280	H
2.185	80.79	PK	212	-42.22	59.77	-20.22	39.55	54	-14.45	74	-14.23	146	336	V
2.622	69.23	PK	214	-4169	48.94	-20.22	28.72	54	-25.28	74	-25.06	287	332	V
3.059	80.47	PK	218	-4104	61.23	-20.22	41.01	54	-12.99	74	-12.77	360	333	V
3.496	72.86	PK	22.4	-40.55	54.71	-20.22	34.49	54	-19.51	74	-19.29	338	252	V
*3.933	83.92	PK	22.7	-40.87	65.75	-20.22	45.53	54	-8.47	74	-8.25	14	202	V
*4.37	86.42	PK	27.7	-52.98	61.14	-20.22	40.92	54	-13.08	74	-12.86	296	201	V
*4.807	87.44	PK	27.3	-53.81	60.93	-20.22	40.71	54	-13.29	74	-13.07	3	252	V
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band														
PK - Peak detector														

7.2. 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:

EMISSIONS – Low 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)
.26924	42.36	PK	10	52.36	61.14	-8.78	-	-
.29309	42.41	PK	10	52.41	60.44	-8.03	-	-
.33056	42.93	PK	10	52.93	59.44	-6.51	-	-
.37826	41.49	PK	10	51.49	58.32	-6.83	-	-
.40892	42.22	PK	10	52.22	57.67	-5.45	-	-
.4481	40.68	PK	10	50.68	56.91	-6.23	-	-
.47705	40.92	PK	10	50.92	56.39	-5.47	-	-
.52305	40.01	PK	10	50.01	56	-5.99	-	-
.55711	40.08	PK	10	50.08	56	-5.92	-	-
.59118	39.04	PK	10	49.04	56	-6.96	-	-
.6491	39.82	PK	10	49.82	56	-6.18	-	-
.6985	39.05	PK	10	49.05	56	-6.95	-	-
.72916	40.55	PK	10	50.55	56	-5.45	-	-
.79218	37.69	PK	10	47.69	56	-8.31	-	-
.8501	37.26	PK	10	47.26	56	-8.74	-	-
.90461	37.75	PK	10	47.75	56	-8.25	-	-
.94634	38.77	PK	10	48.77	56	-7.23	-	-
.75641	38.15	PK	10	48.15	56	-7.85	-	-
.39529	41.66	PK	10	51.66	57.95	-6.29	-	-
.24709	42.05	PK	10	52.05	61.85	-9.8	-	-
.96253	36.46	PK	10	46.46	56	-9.54	-	-

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)
.27094	42.77	PK	10	52.77	61.09	-8.32	-	-
.28627	42.77	PK	10	52.77	60.63	-7.86	-	-
.30501	41.75	PK	10	51.75	60.11	-8.36	-	-
.32545	42.32	PK	10	52.32	59.57	-7.25	-	-
.3493	41.58	PK	10	51.58	58.98	-7.4	-	-
.36974	41.88	PK	10	51.88	58.51	-6.63	-	-
.39188	42.69	PK	10	52.69	58.02	-5.33	-	-
.42084	41.6	PK	10	51.6	57.43	-5.83	-	-
.45491	41.54	PK	10	51.54	56.78	-5.24	-	-
.49239	40.43	PK	10.1	50.53	56.13	-5.6	-	-
.52475	41.12	PK	10.1	51.22	56	-4.78	-	-
.55711	39.89	PK	10.1	49.99	56	-6.01	-	-
.58607	40.65	PK	10.1	50.75	56	-5.25	-	-
.60481	40.06	PK	10.1	50.16	56	-5.84	-	-
.62695	39.27	PK	10.1	49.37	56	-6.63	-	-
.65762	40.36	PK	10.1	50.46	56	-5.54	-	-
.68998	39.77	PK	10.1	49.87	56	-6.13	-	-
.71383	39.36	PK	10.1	49.46	56	-6.54	-	-
.72746	40.06	PK	10.1	50.16	56	-5.84	-	-

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)
.75812	38.1	PK	10.1	48.2	56	-7.8	-	-
.80752	39.37	PK	10.1	49.47	56	-6.53	-	-
.85691	38.54	PK	10.1	48.64	56	-7.36	-	-
.92846	38.35	PK	10.1	48.45	56	-7.55	-	-
.94549	38.71	PK	10.1	48.81	56	-7.19	-	-
.98637	36.72	PK	10.1	46.82	56	-9.18	-	-
.88417	37.75	PK	10.1	47.85	56	-8.15	-	-

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)
.26707	21.93	CAV	10	31.93	-	-	51.21	-19.28
.29451	22.6	CAV	10	32.6	-	-	50.4	-17.8
.3309	22.73	CAV	10	32.73	-	-	49.43	-16.7
.37504	24.29	CAV	10	34.29	-	-	48.39	-14.1
.40573	24.32	CAV	10	34.32	-	-	47.74	-13.42
.45017	24.56	CAV	10	34.56	-	-	46.87	-12.31
.47369	25.24	CAV	10	35.24	-	-	46.45	-11.21
.52	25.22	CAV	10	35.22	-	-	46	-10.78
.55667	25.39	CAV	10	35.39	-	-	46	-10.61
.58994	25.68	CAV	10	35.68	-	-	46	-10.32
.64802	25.7	CAV	10	35.7	-	-	46	-10.3
.69706	26.39	CAV	10	36.39	-	-	46	-9.61
.72949	26.67	CAV	10	36.67	-	-	46	-9.33
.79358	26.48	CAV	10	36.48	-	-	46	-9.52
.8506	27.04	CAV	10	37.04	-	-	46	-8.96
.90634	26.56	CAV	10	36.56	-	-	46	-9.44
.94567	30.32	CAV	10	40.32	-	-	46	-5.68
.75791	29.61	CAV	10	39.61	-	-	46	-6.39
.39163	25.66	CAV	10	35.66	-	-	48.03	-12.37
.24557	23.77	CAV	10	33.77	-	-	51.91	-18.14
.95931	24.75	CAV	10	34.75	-	-	46	-11.25

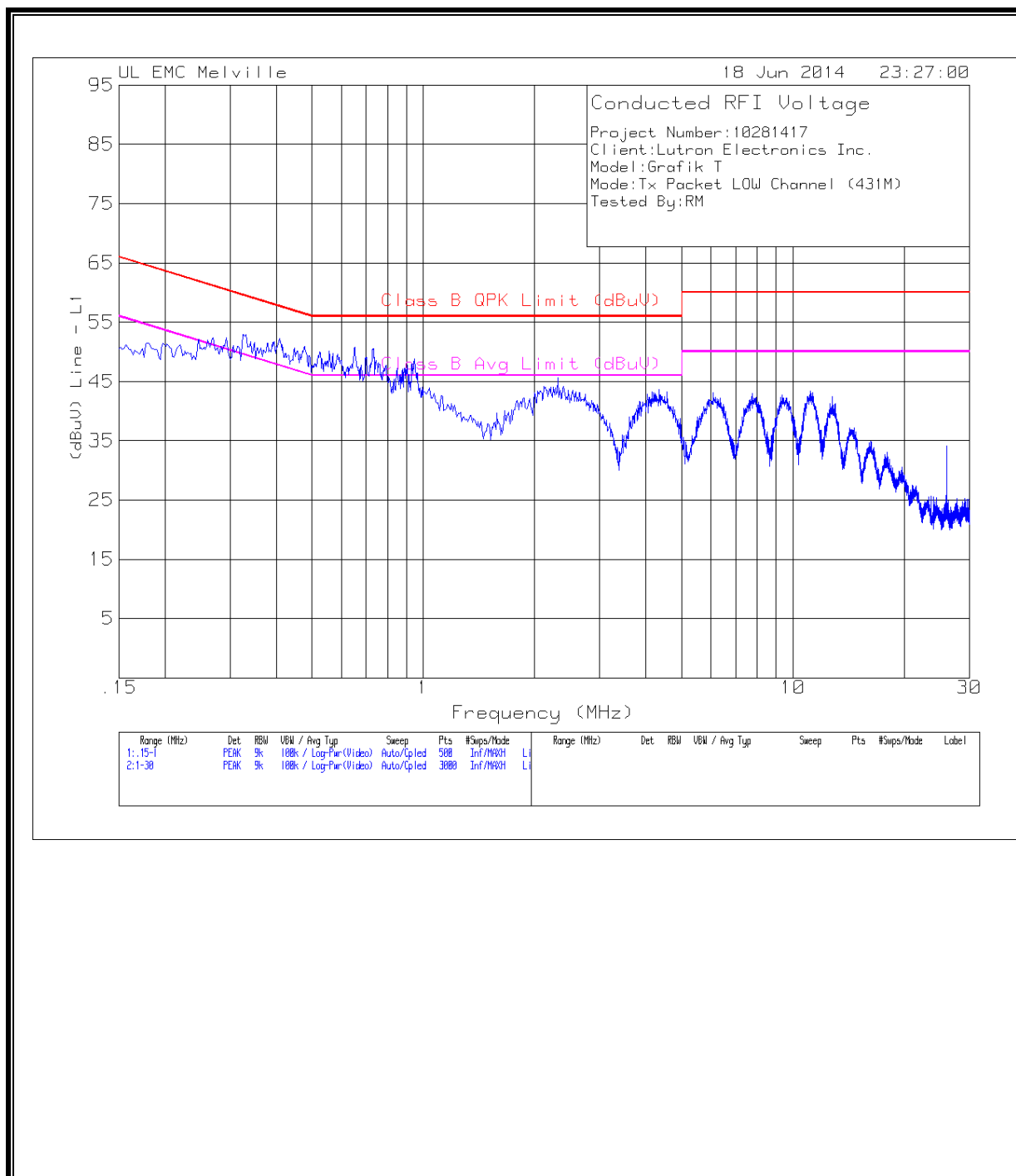
CAV - CISPR average detection

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)
.26838	17.04	CAV	10	27.04	-	-	51.17	-24.13
.28602	17.17	CAV	10	27.17	-	-	50.64	-23.47
.30774	17.11	CAV	10	27.11	-	-	50.03	-22.92
.32352	16.98	CAV	10	26.98	-	-	49.62	-22.64
.34959	16.85	CAV	10	26.85	-	-	48.97	-22.12
.36931	16.02	CAV	10	26.02	-	-	48.52	-22.5
.39002	16.51	CAV	10	26.51	-	-	48.06	-21.55
.41948	16.23	CAV	10	26.23	-	-	47.46	-21.23
.45445	16.23	CAV	10	26.23	-	-	46.79	-20.56
.48998	15.95	CAV	10.1	26.05	-	-	46.17	-20.12

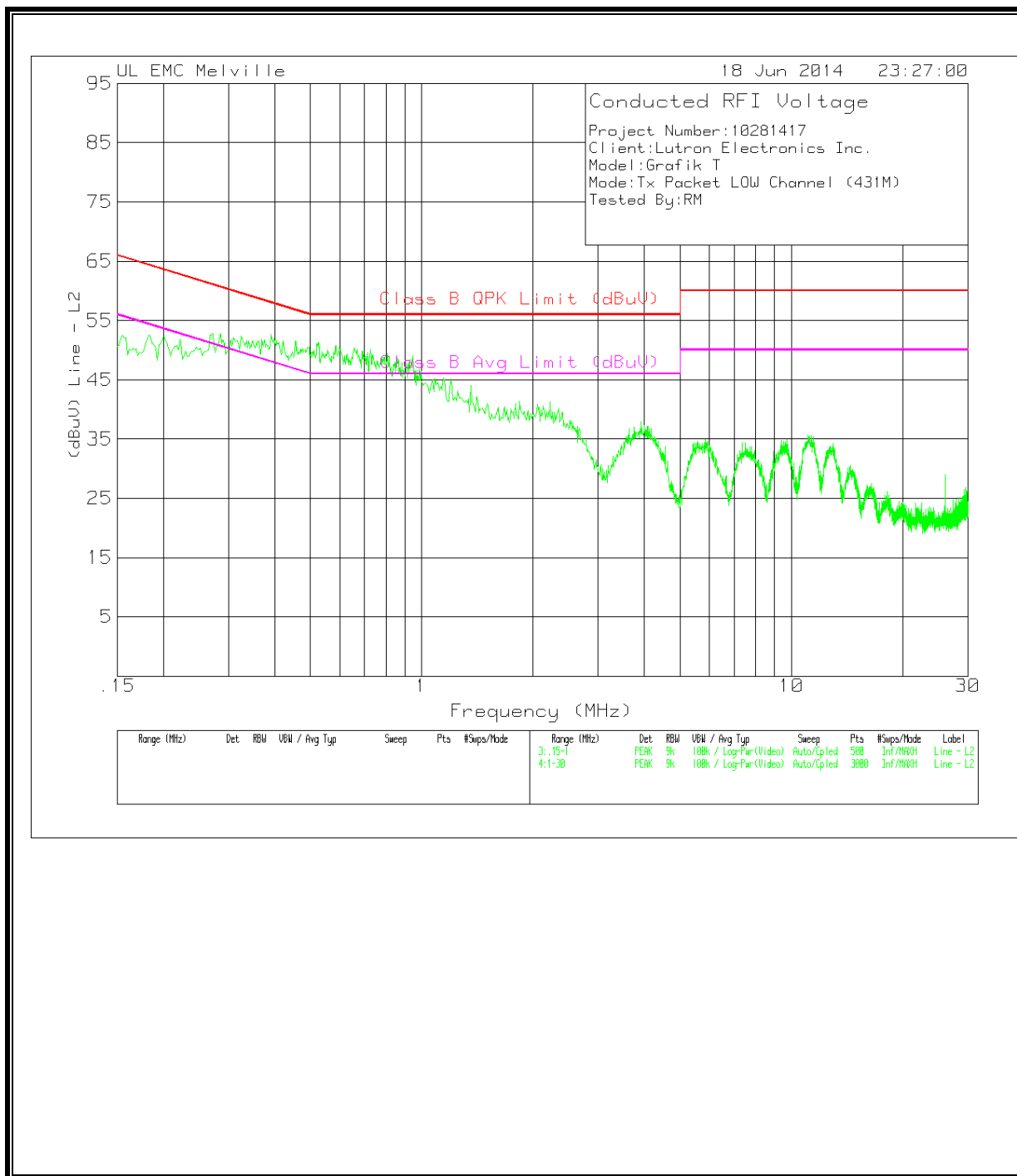
Frequency (MHz)	Meter Reading (dBuV)	Det	Line 2 G/L (dB)	Corrected Reading (dBuV)	Class B QPK Limit (dBuV)	Margin (dB)	Class B Avg Limit (dBuV)	Margin (dB)
.52129	15.18	CAV	10.1	25.28	-	-	46	-20.72
.55659	14.94	CAV	10.1	25.04	-	-	46	-20.96
.585	14.61	CAV	10.1	24.71	-	-	46	-21.29
.60525	14.52	CAV	10.1	24.62	-	-	46	-21.38
.62756	14.26	CAV	10.1	24.36	-	-	46	-21.64
.65785	14.08	CAV	10.1	24.18	-	-	46	-21.82
.69164	13.9	CAV	10.1	24	-	-	46	-22
.71182	14.26	CAV	10.1	24.36	-	-	46	-21.64
.72738	13.99	CAV	10.1	24.09	-	-	46	-21.91
.75877	13.8	CAV	10.1	23.9	-	-	46	-22.1
.80918	13.52	CAV	10.1	23.62	-	-	46	-22.38
.85848	13.02	CAV	10.1	23.12	-	-	46	-22.88
.92925	13.8	CAV	10.1	23.9	-	-	46	-22.1
.94292	13.62	CAV	10.1	23.72	-	-	46	-22.28
.98845	13.12	CAV	10.1	23.22	-	-	46	-22.78
.88028	13.23	CAV	10.1	23.33	-	-	46	-22.67

CAV - CISPR average detection

LINE 1 RESULTS



LINE 2 RESULTS



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)
.23176	44.41	PK	10	54.41	62.39	-7.98	-	-
.32886	42.91	PK	10	52.91	59.48	-6.57	-	-
.37655	42.3	PK	10	52.3	58.36	-6.06	-	-
.42595	43.38	PK	10	53.38	57.33	-3.95	-	-
.45832	40.94	PK	10	50.94	56.72	-5.78	-	-
.51794	43.52	PK	10	53.52	56	-2.48	-	-
.57074	40.18	PK	10	50.18	56	-5.82	-	-
.60992	39.93	PK	10	49.93	56	-6.07	-	-
.64058	39.59	PK	10	49.59	56	-6.41	-	-
.70872	40.18	PK	10	50.18	56	-5.82	-	-
.71894	40.84	PK	10	50.84	56	-5.16	-	-
.78878	38.54	PK	10	48.54	56	-7.46	-	-
.83477	37.27	PK	10	47.27	56	-8.73	-	-
.88076	36.01	PK	10	46.01	56	-9.99	-	-
.91313	37.68	PK	10	47.68	56	-8.32	-	-
.95401	40.07	PK	10	50.07	56	-5.93	-	-
.48557	39.69	PK	10	49.69	56.24	-6.55	-	-
.54349	39.08	PK	10	49.08	56	-6.92	-	-
.58778	39.01	PK	10	49.01	56	-6.99	-	-
.65762	38.44	PK	10	48.44	56	-7.56	-	-
.68146	37.6	PK	10	47.6	56	-8.4	-	-
.98978	36.03	PK	10	46.03	56	-9.97	-	-
1.07736	35.81	PK	10	45.81	56	-10.19	-	-
1.12571	35.46	PK	10	45.46	56	-10.54	-	-
2.15072	35.52	PK	10.1	45.62	56	-10.38	-	-
2.24742	35.86	PK	10.1	45.96	56	-10.04	-	-
2.34412	35.75	PK	10.1	45.85	56	-10.15	-	-
2.45048	35.67	PK	10.1	45.77	56	-10.23	-	-

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)
.20621	44.76	PK	10	54.76	63.36	-8.6	-	-
.24369	42.86	PK	10	52.86	61.97	-9.11	-	-
.29479	44.45	PK	10	54.45	60.39	-5.94	-	-
.35782	42.95	PK	10	52.95	58.78	-5.83	-	-
.42766	44.43	PK	10	54.43	57.3	-2.87	-	-
.48557	42.01	PK	10.1	52.11	56.24	-4.13	-	-
.54689	43.03	PK	10	53.03	56	-2.97	-	-
.61673	41.15	PK	10.1	51.25	56	-4.75	-	-
.66443	41.46	PK	10.1	51.56	56	-4.44	-	-
.71383	39.47	PK	10.1	49.57	56	-6.43	-	-
.77685	41.84	PK	10.1	51.94	56	-4.06	-	-
.8518	41.95	PK	10.1	52.05	56	-3.95	-	-

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)
.90802	40.23	PK	10.1	50.33	56	-5.67	-	-
.98637	36.61	PK	10.1	46.71	56	-9.29	-	-
.33908	42.26	PK	10	52.26	59.23	-6.97	-	-
.37485	41.25	PK	10	51.25	58.39	-7.14	-	-
.46002	40.42	PK	10	50.42	56.69	-6.27	-	-
.82285	39.85	PK	10.1	49.95	56	-6.05	-	-
1.25142	35.18	PK	10.1	45.28	56	-10.72	-	-
2.05402	34.03	PK	10.1	44.13	56	-11.87	-	-

PK - Peak detector

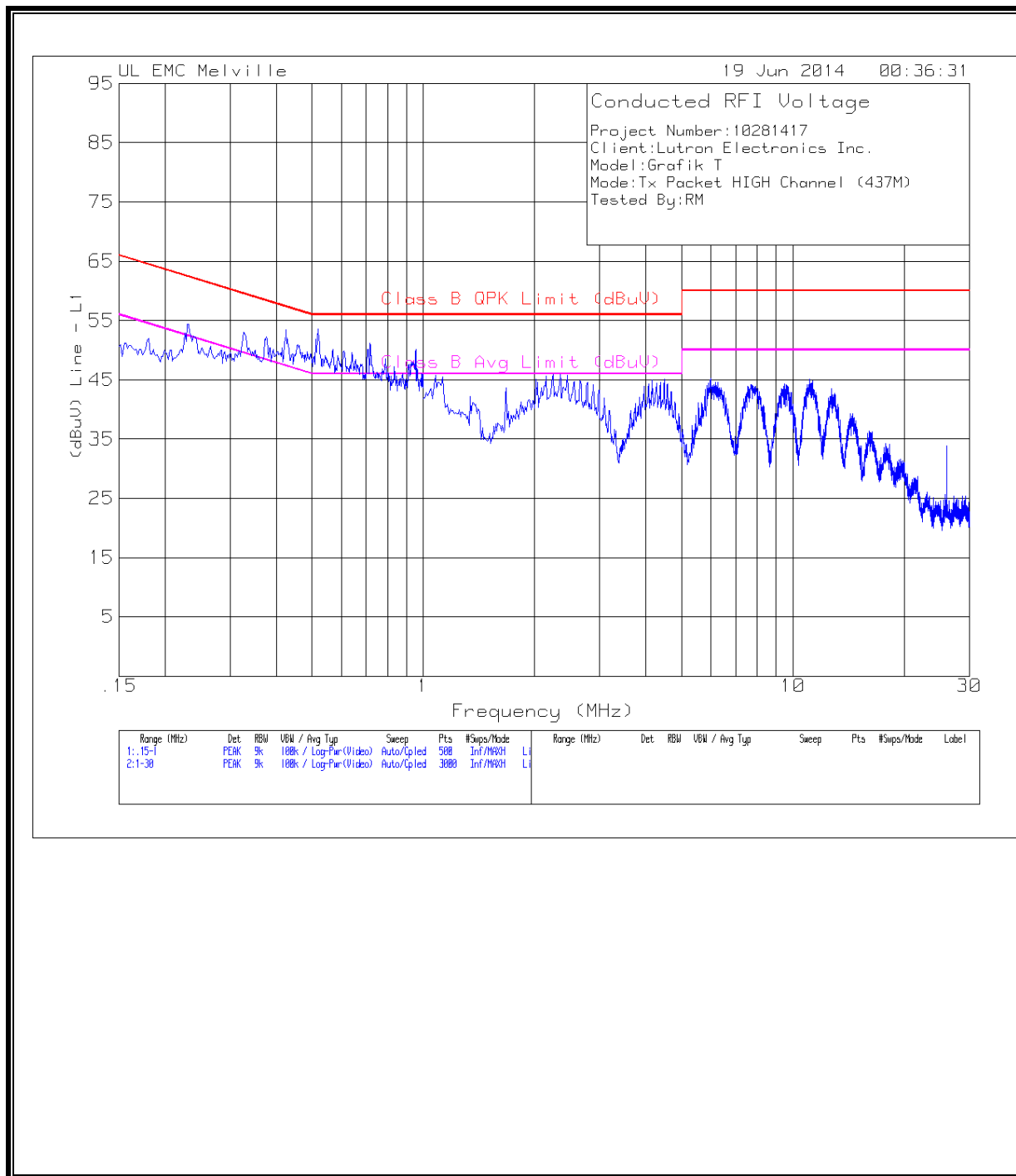
Frequency (MHz)	Meter Reading (dBuV)	Det	Line 1 G/L (dB)	Corrected Reading (dBuV)	Class B QPK Limit (dBuV)	Margin (dB)	Class B Avg Limit (dBuV)	Margin (dB)
.23124	22.07	CAV	10	32.07	-	-	52.41	-20.34
.3255	23.86	CAV	10	33.86	-	-	49.57	-15.71
.37461	24.32	CAV	10	34.32	-	-	48.4	-14.08
.42432	24.26	CAV	10	34.26	-	-	47.36	-13.1
.45672	25.32	CAV	10	35.32	-	-	46.75	-11.43
.51831	25.27	CAV	10	35.27	-	-	46	-10.73
.56934	25.87	CAV	10	35.87	-	-	46	-10.13
.6083	26.19	CAV	10	36.19	-	-	46	-9.81
.64048	25.98	CAV	10	35.98	-	-	46	-10.02
.70968	26.77	CAV	10	36.77	-	-	46	-9.23
.71776	26.67	CAV	10	36.67	-	-	46	-9.33
.78918	26.32	CAV	10	36.32	-	-	46	-9.68
.8362	27.1	CAV	10	37.1	-	-	46	-8.9
.87906	26.75	CAV	10	36.75	-	-	46	-9.25
.91403	26.41	CAV	10	36.41	-	-	46	-9.59
.95064	28.7	CAV	10	38.7	-	-	46	-7.3
.48653	28.13	CAV	10	38.13	-	-	46.23	-8.1
.54212	25.46	CAV	10	35.46	-	-	46	-10.54
.58635	25.85	CAV	10	35.85	-	-	46	-10.15
.65852	25.73	CAV	10	35.73	-	-	46	-10.27
.68187	25.8	CAV	10	35.8	-	-	46	-10.2
.9919	25.87	CAV	10	35.87	-	-	46	-10.13
1.06553	25.68	CAV	10	35.68	-	-	46	-10.32
1.14116	25.24	CAV	10	35.24	-	-	46	-10.76
2.16538	24.67	CAV	10.1	34.77	-	-	46	-11.23
2.24581	23.13	CAV	10.1	33.23	-	-	46	-12.77
2.34147	25.09	CAV	10.1	35.19	-	-	46	-10.81
2.44325	25.06	CAV	10.1	35.16	-	-	46	-10.84

CAV - CISPR average detection

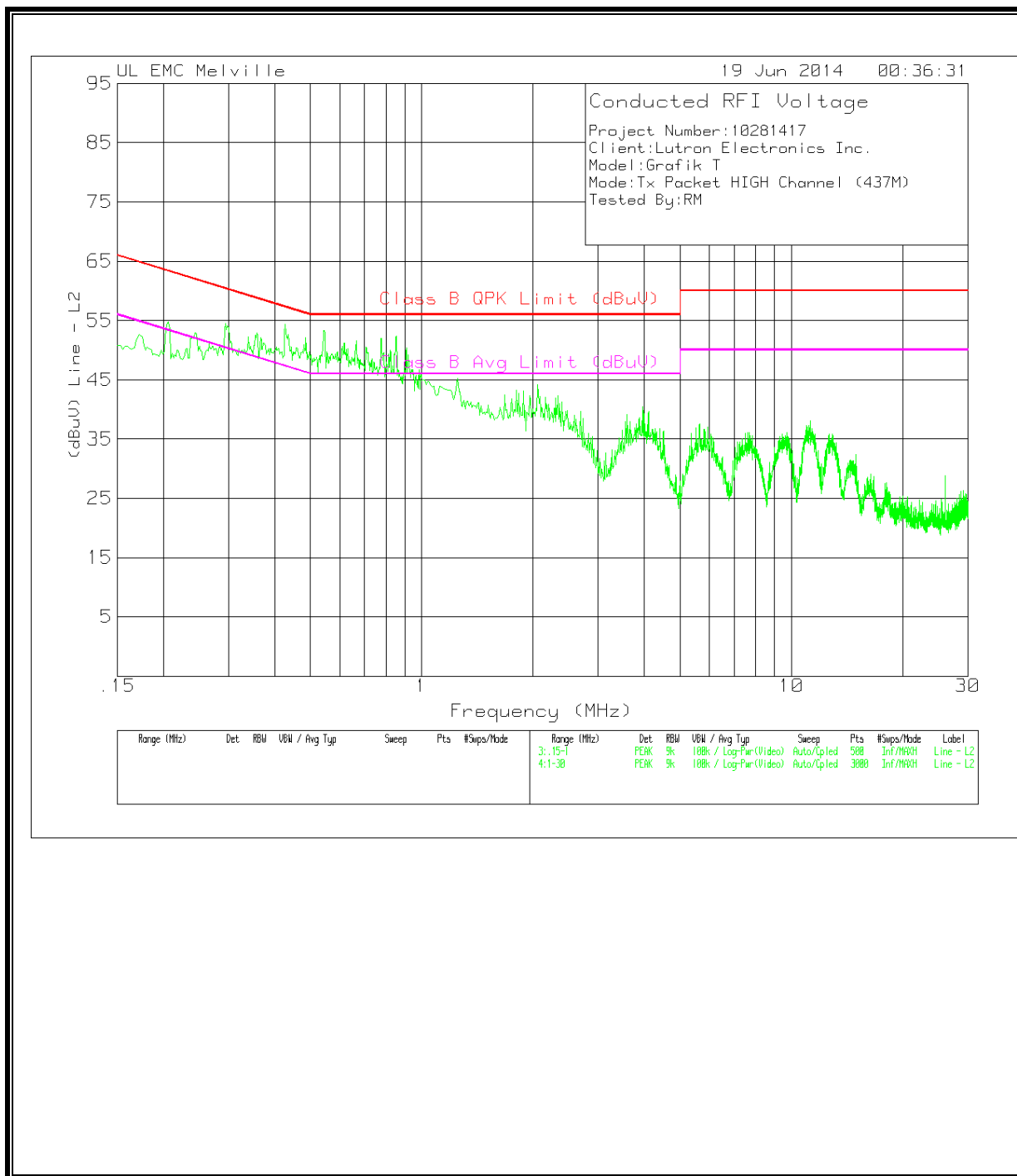
Frequency (MHz)	Meter Reading (dBuV)	Det	Line 2 G/L (dB)	Corrected Reading (dBuV)	Class B QPK Limit (dBuV)	Margin (dB)	Class B Avg Limit (dBuV)	Margin (dB)
.20209	18.89	CAV	10	28.89	-	-	53.52	-24.63
.24388	18.73	CAV	10	28.73	-	-	51.96	-23.23
.29471	17.84	CAV	10	27.84	-	-	50.39	-22.55
.35903	17.36	CAV	10	27.36	-	-	48.75	-21.39
.42861	16.16	CAV	10	26.16	-	-	47.28	-21.12
.48587	15.72	CAV	10.1	25.82	-	-	46.24	-20.42
.54584	15.02	CAV	10	25.02	-	-	46	-20.98
.61933	14.52	CAV	10.1	24.62	-	-	46	-21.38
.66379	14.43	CAV	10.1	24.53	-	-	46	-21.47
.71269	14.52	CAV	10.1	24.62	-	-	46	-21.38
.77605	14.26	CAV	10.1	24.36	-	-	46	-21.64
.85175	13.52	CAV	10.1	23.62	-	-	46	-22.38
.90765	13.02	CAV	10.1	23.12	-	-	46	-22.88
.98764	12.71	CAV	10.1	22.81	-	-	46	-23.19
.33794	16.98	CAV	10	26.98	-	-	49.25	-22.27
.37571	16.78	CAV	10	26.78	-	-	48.37	-21.59
.45732	16.23	CAV	10	26.23	-	-	46.74	-20.51
.82315	15.1	CAV	10.1	25.2	-	-	46	-20.8
1.2541	12.92	CAV	10.1	23.02	-	-	46	-22.98
2.06285	9.55	CAV	10.1	19.65	-	-	46	-26.35

CAV - CISPR average detection

LINE 1 RESULTS

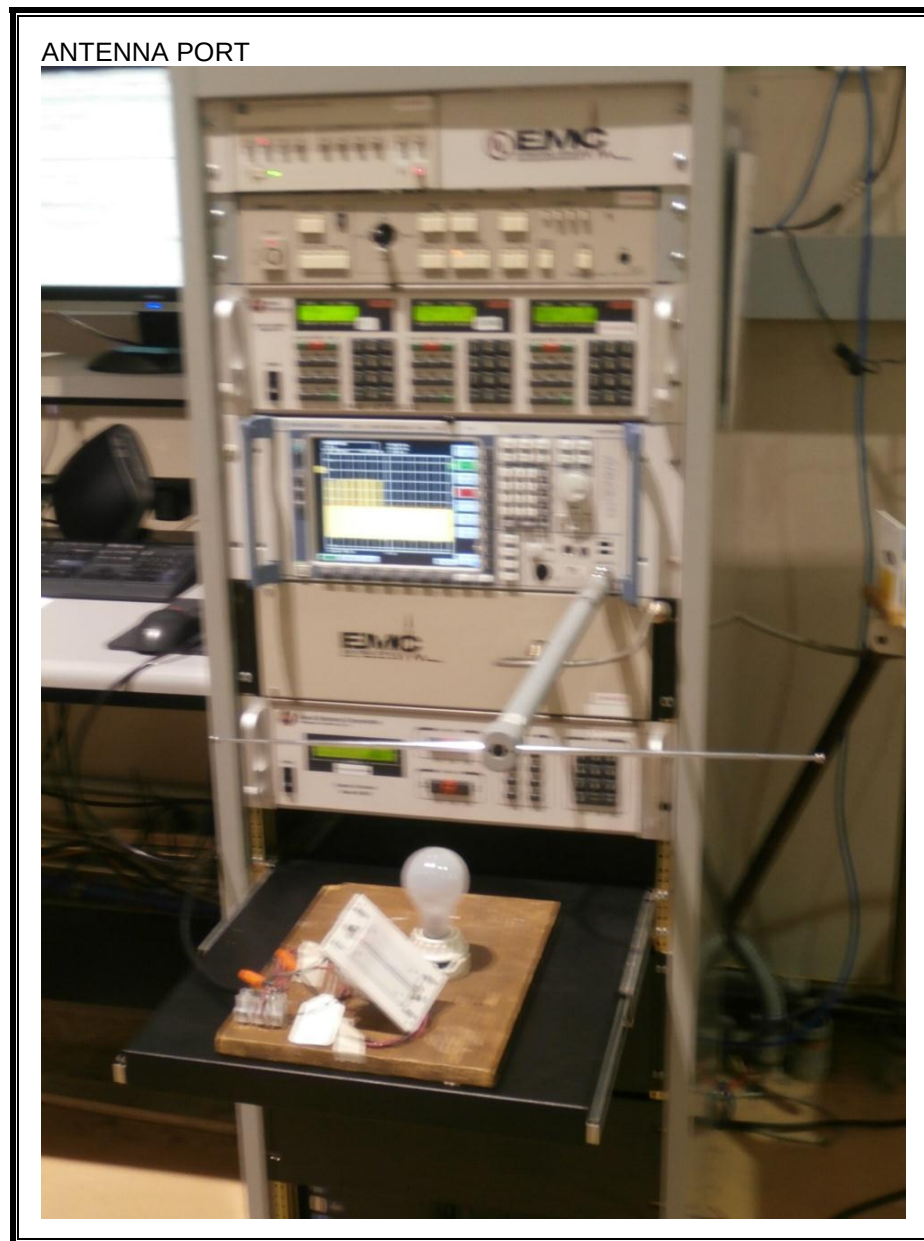


LINE 2 RESULTS

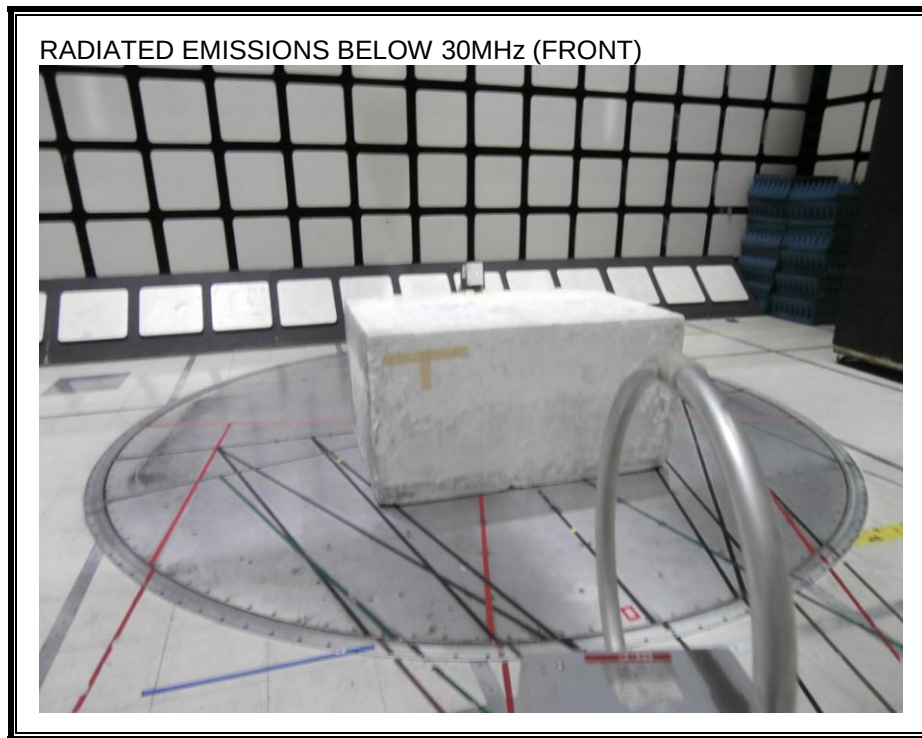


8. SETUP PHOTOS

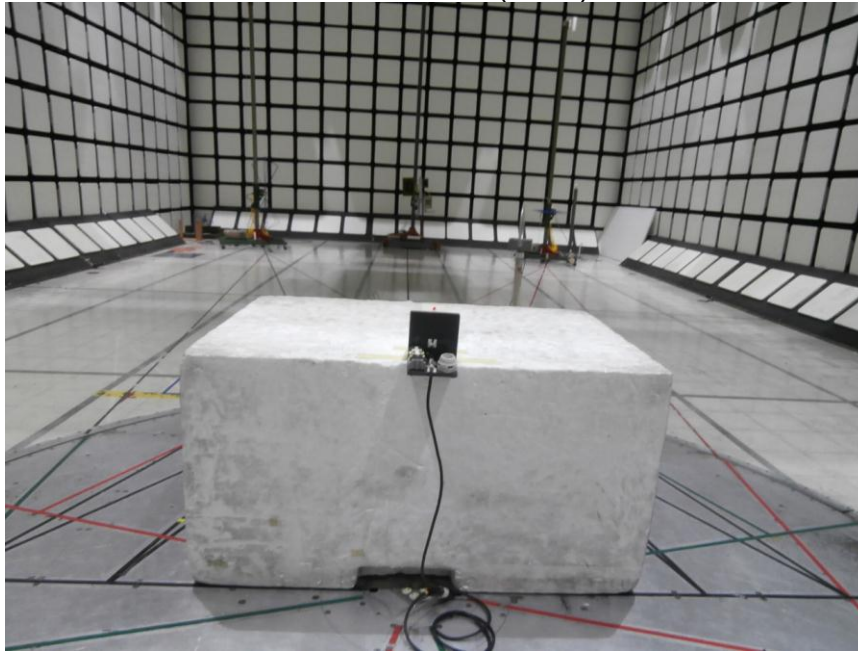
ANTENNA PORT



RADIATED EMISSION BELOW 30 MHz

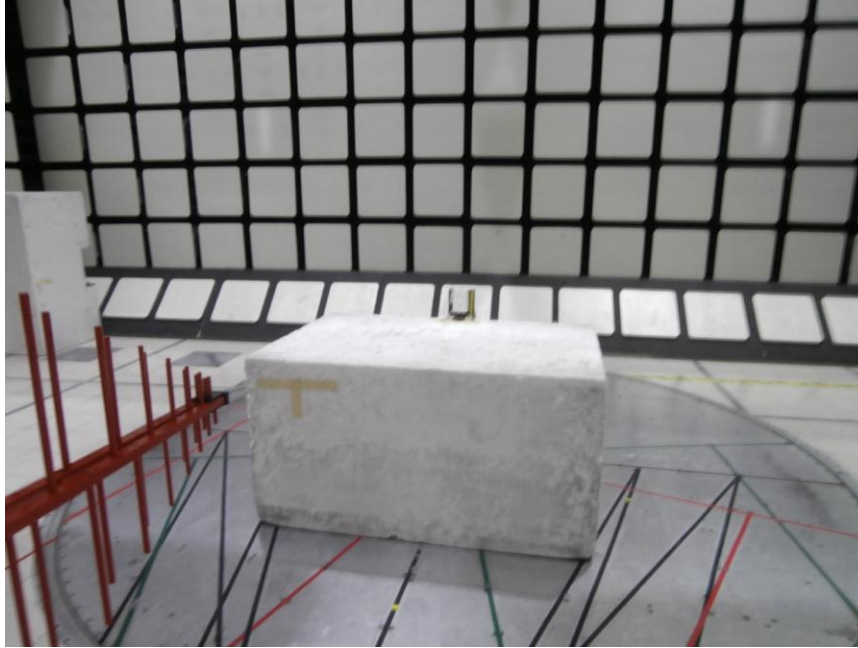


RADIATED EMISSIONS BELOW 30MHz (BACK)

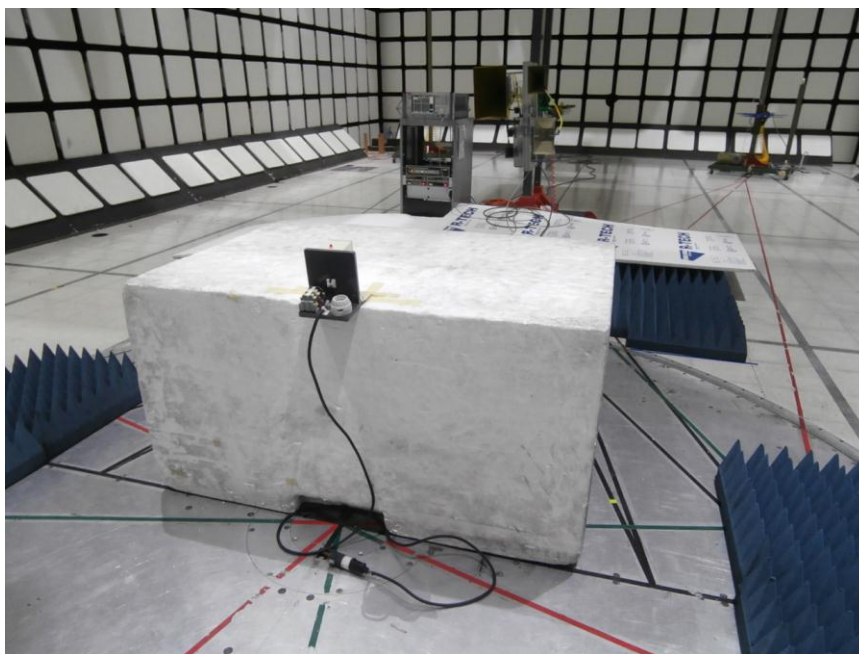
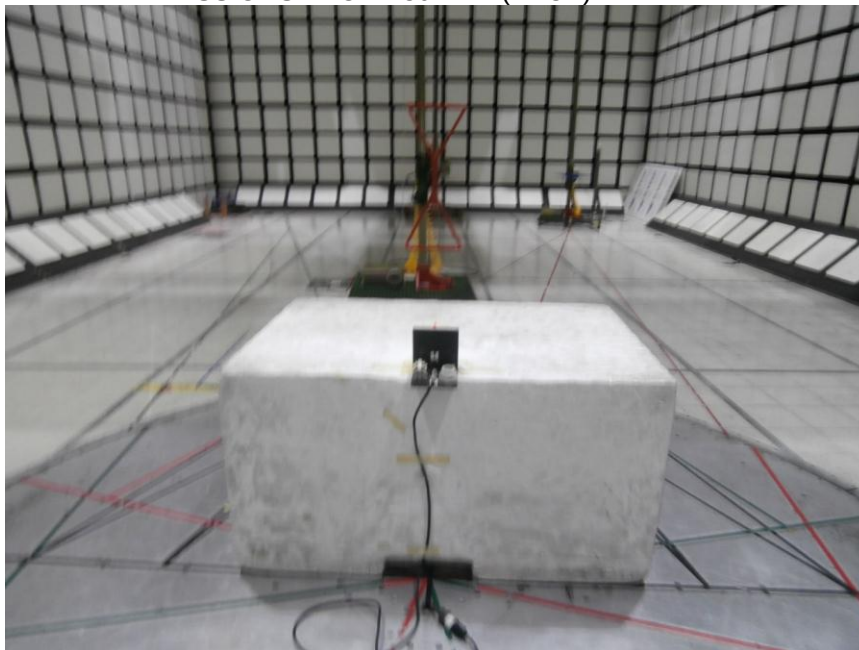


RADIATED EMISSION ABOVE 30 MHz

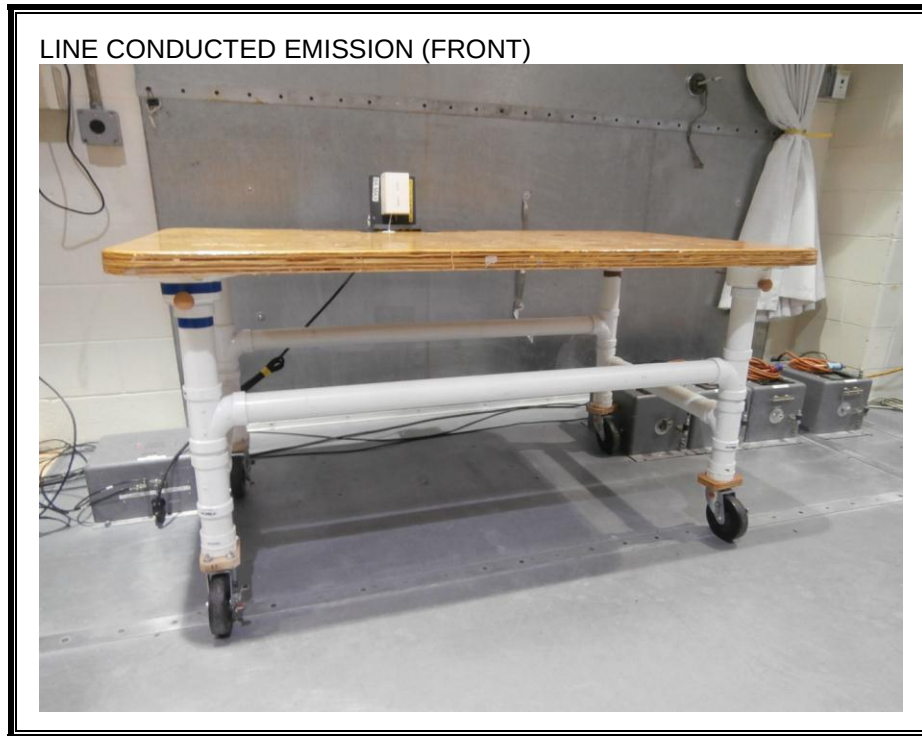
RADIATED EMISSIONS ABOVE 30 MHz (FRONT)



RADIATED EMISSIONS ABOVE 30 MHz (BACK)



AC MAINS LINE CONDUCTED EMISSION



LINE CONDUCTED EMISSION (BACK)



END OF REPORT