



**FCC CFR47 PART 15 SUBPART C
ISED CANADA RSS-210 ISSUE 10**

TEST REPORT

FOR

IN-WALL CONTROLLER

MODEL NUMBER: PNE-DV

**FCC ID: JPZ0131
IC: 2851A-JPZ0131**

REPORT NUMBER: R13488995-E1

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Prepared for
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Revision History

Rev.	Issue Date	Revisions	Revised By
1	11/04/20	Initial Issue	Mike Antola
2	11/12/20	Misc. editorial updates	Mike Antola

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: In-Wall Controller

MODEL: PNE-DV

SERIAL NUMBER: 02EFF09E / 02EFF0A1

SAMPLE RECEIVE DATE: 2020-10-26

DATE TESTED: 2020-10-26 to 2020-10-28

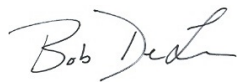
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Complies
ISED CANADA RSS-210 Issue 10, Annex A	Complies
ISED CANADA RSS-GEN Issue 5	Complies

UL LLC tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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, or any agency of the U.S. government.

Approved & Released For
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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 5 + A1, RSS-210 Issue 10 and KDB 414788 D01 Radiated Test Site v01r01.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, North Carolina, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, North Carolina, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

12 Laboratory Dr.		2800 Perimeter Park Dr.	
☐	Chamber A (ISED:2180C-1)	☐	Chamber North (ISED:2180C-3)
☐	Chamber C (ISED:2180C-2)	☒	Chamber South (ISED:2180C-4)

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0.

4. DECISION RULES AND MEASUREMENT UNCERTAINTY

4.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

4.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U _{Lab}
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.4 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.84 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Occupied Bandwidth	1.22 %

Uncertainty figures are valid to a confidence level of 95%.

4.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

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

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\begin{aligned}\text{Final Voltage (dBuV)} &= \text{Measured Voltage (dBuV)} + \text{Cable Loss (dB)} + \text{Limiter Factor} \\ &\text{(dB)} + \text{LISN Insertion Loss.} \\ 36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} &= 46.6 \text{ dBuV}\end{aligned}$$

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is a In-Wall Controller which contains a 433MHz periodic operator transmitter.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a loop antenna, with a maximum gain of 10 dBi.

5.3. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 0799143, V8.00.

The EUT driver software installed during testing was 0799142, V8.01.

The test utility software used during testing was 070000.250.12.

5.4. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 30MHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Radiated emissions between 30MHz and 5GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels

The EUT operates in a single orientation; therefore, all final radiated testing was performed with the EUT in the upright orientation.

5.5. MODIFICATIONS

No modifications were made during testing.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Light Bulb Load	Phillips	50W	NA	NA

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC In	1	IEC	Mains	< 3M	None
2	AC Out	1	IEC	Mains	< 3M	None

TEST SETUP

The EUT is a stand-alone device. Test software exercised the radio.

SETUP DIAGRAM FOR TESTS

Please refer to R13488995-EP1 for details.

6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
	0.009-30MHz	(Loop Ant.)			
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2020-08-20	2021-08-20
	30-1000 MHz				
AT0081	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2019-11-20	2020-11-20
	1-18 GHz				
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-04-28	2021-04-28
	Gain-Loss Chains				
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2020-07-10	2021-07-10
S-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-07-10	2021-07-10
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-07-06	2021-07-06
	Receiver & Software				
SA0025	Spectrum Analyzer	Agilent	N9030A	2020-03-17	2021-03-17
SOFTEMI	EMI Software	UL	Version 9.5 (2020-07-07)		
	Additional Equipment used				
s/n 200037635	Environmental Meter	Fisher Scientific	06-662-4	2020-01-22	2022-01-22
ATA176 (in S-SAC)	10dB, DC-18GHz, 5W	Mini-Circuits	BW-N10W5	2020-08-29	2021-08-29
HPF018	600MHz high-pass filter, 2W, F _{high} =12GHz	Micro-Tronics	HPM19984	2020-07-15	2021-07-15
HPF012	1GHz high-pass filter, 2W, F _{high} =18GHz	Micro-Tronics	HPM18129	2020-02-19	2021-02-19

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
CBL087	Coax cable, RG223, N-male to BNC-male, 20-ft.	Pasternack	PE3W06143-240	2020-03-26	2021-03-26
HI0091	Environmental Meter	Fisher Scientific	14-650-118	2020-06-26	2021-06-26
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2020-08-18	2021-08-18
75141	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2020-08-18	2021-08-18
ATA222	Transient Limiter, 0.009-100MHz	Electro-Metrics	EM-7600	2020-03-26	2021-03-26
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5 (2020-07-07)		

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
T177 (PRE0079253)	Spectrum Analyzer	Agilent Technologies	E4446A	2020-04-30	2021-04-30
SA007 (PRE0126407)	Spectrum Analyzer	Keysight Technologies	N9030A	2020-06-10	2021-06-10
HI0091	Environmental Meter	Fisher Scientific	15-077-963	2020-06-26	2021-06-26

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 A1.3

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 & 99% Bandwidth: The RBW is set to 1% to 5% of the 20dB / 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

RESULTS

No non-compliance noted:

20dB Bandwidth

Frequency (MHz)	20dB Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
431.5	144.0	1078.75	-934.75
433.6	144.8	1084	-939.2
436.6	145.3	1091.5	-946.2

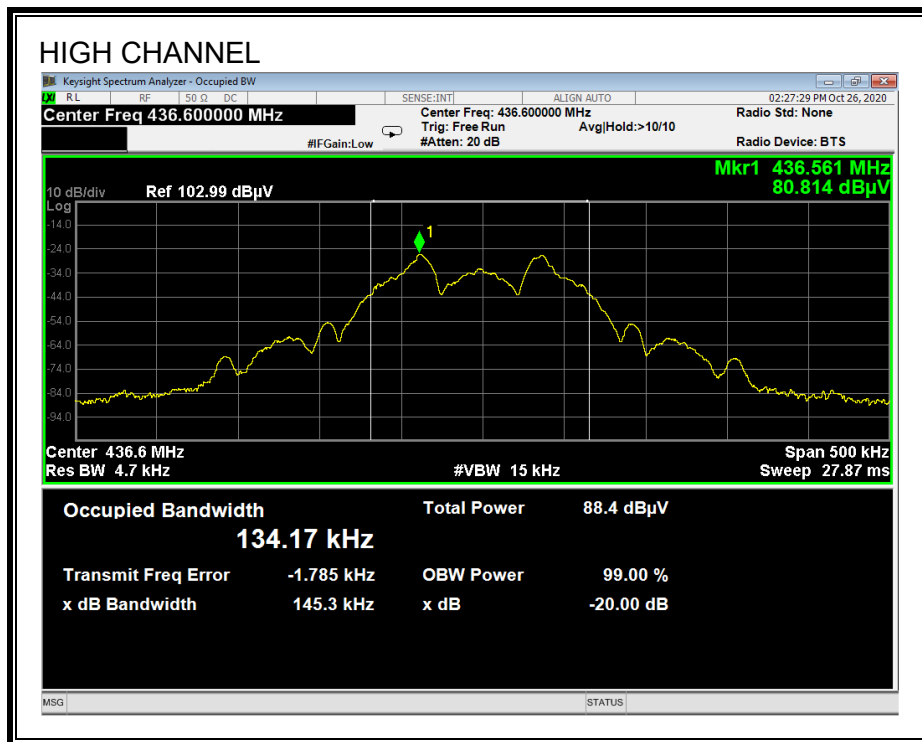
99% Bandwidth

Frequency (MHz)	99% Bandwidth (kHz)	Limit (kHz)	Margin (kHz)
431.5	134.00	1078.75	-944.75
433.6	134.31	1084	-949.69
436.6	134.17	1091.5	-957.33

20dB / 99% BANDWIDTH



20dB / 99% BANDWIDTH (CONT)



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 300 kHz 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

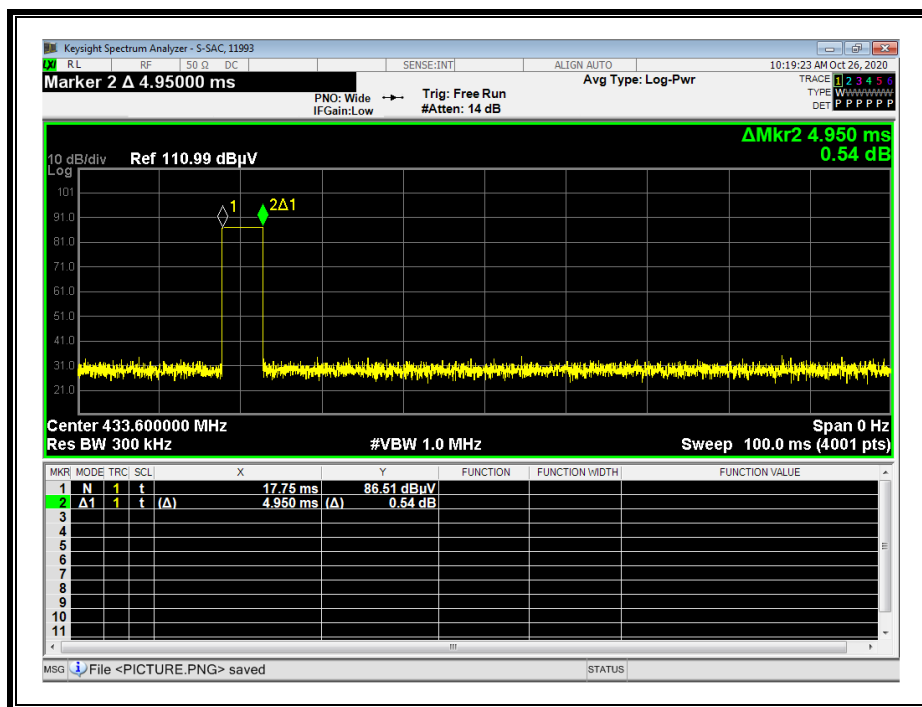
Average Reading = Peak Reading (dBuV/m) + 20log (Duty Cycle), Where Duty Cycle is $(\# \text{ of long pulses} * \text{long pulse width}) + (\# \text{ of short pulses} * \text{short pulse width}) / 100$ or T

RESULTS

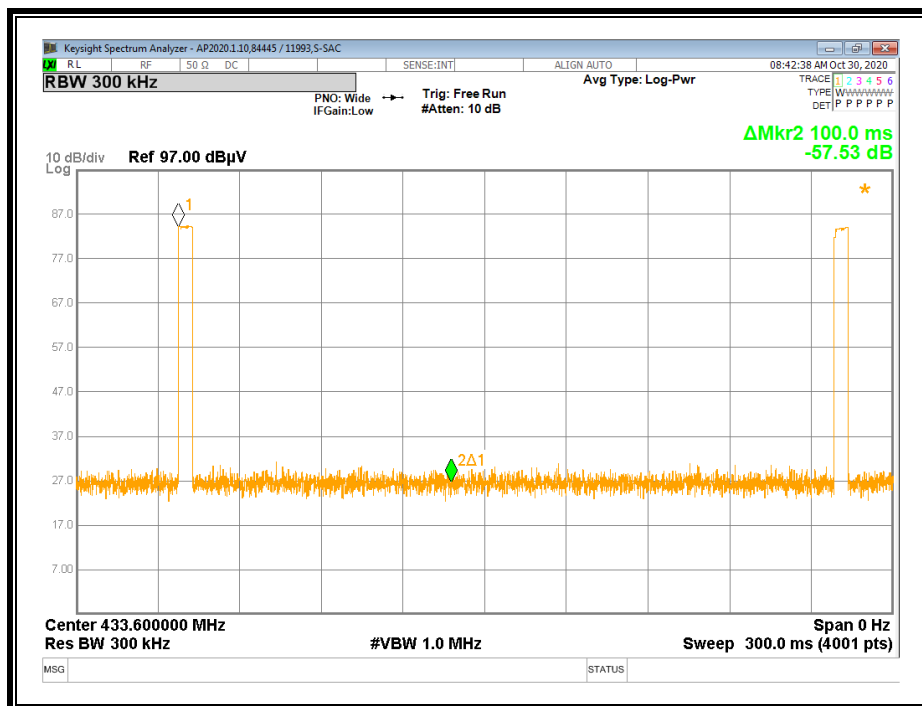
No non-compliance noted:

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	0.00	0	0.050	-26.11

PULSE WIDTH



NUMBER OF PULSES IN 100MS WINDOW



7.3. TRANSMISSION TIME

LIMITS

FCC §15.231 (a) (2)

IC A1.1

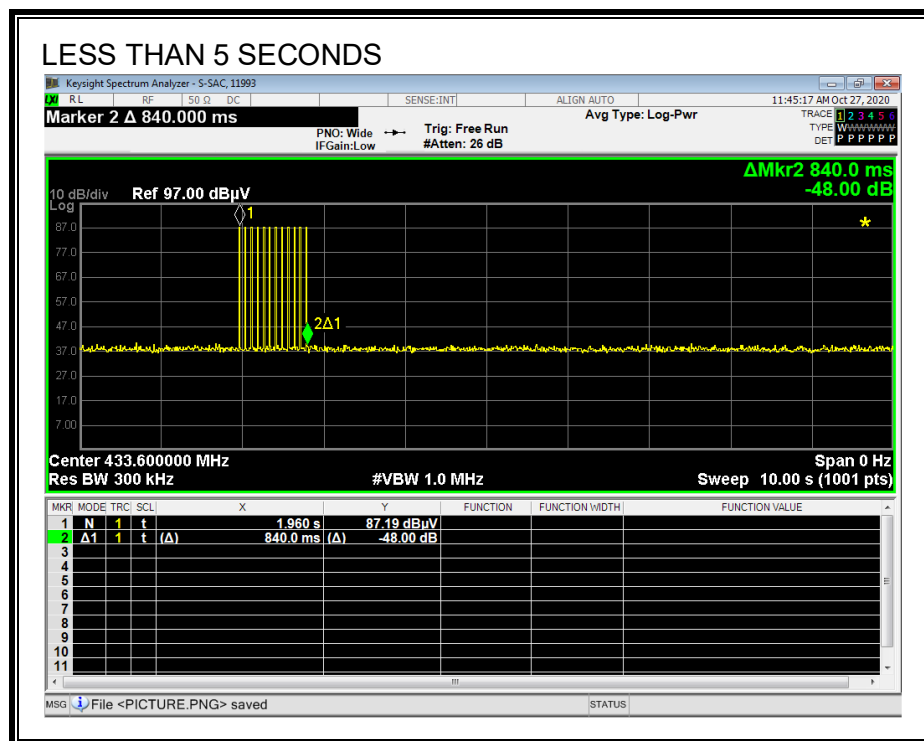
A transmitter activated automatically shall cease transmission within 5 seconds after activation.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer or radiated field strength. The RBW is set to 300 kHz 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 A1.2

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.

KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification

OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

Note: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as report in the table) using free space impedance of 377 Ohms. For example, the measurement at frequency 15.04 kHz resulted in a level of -18.32 dBuV/m, which is equivalent to $-18.32-51.5 = -62.38$ dBuA/m, which has the same margin, -46.45 dB to the corresponding RSS-Gen Table 6 limit as it has to 15.209(a) limit.

RESULTS

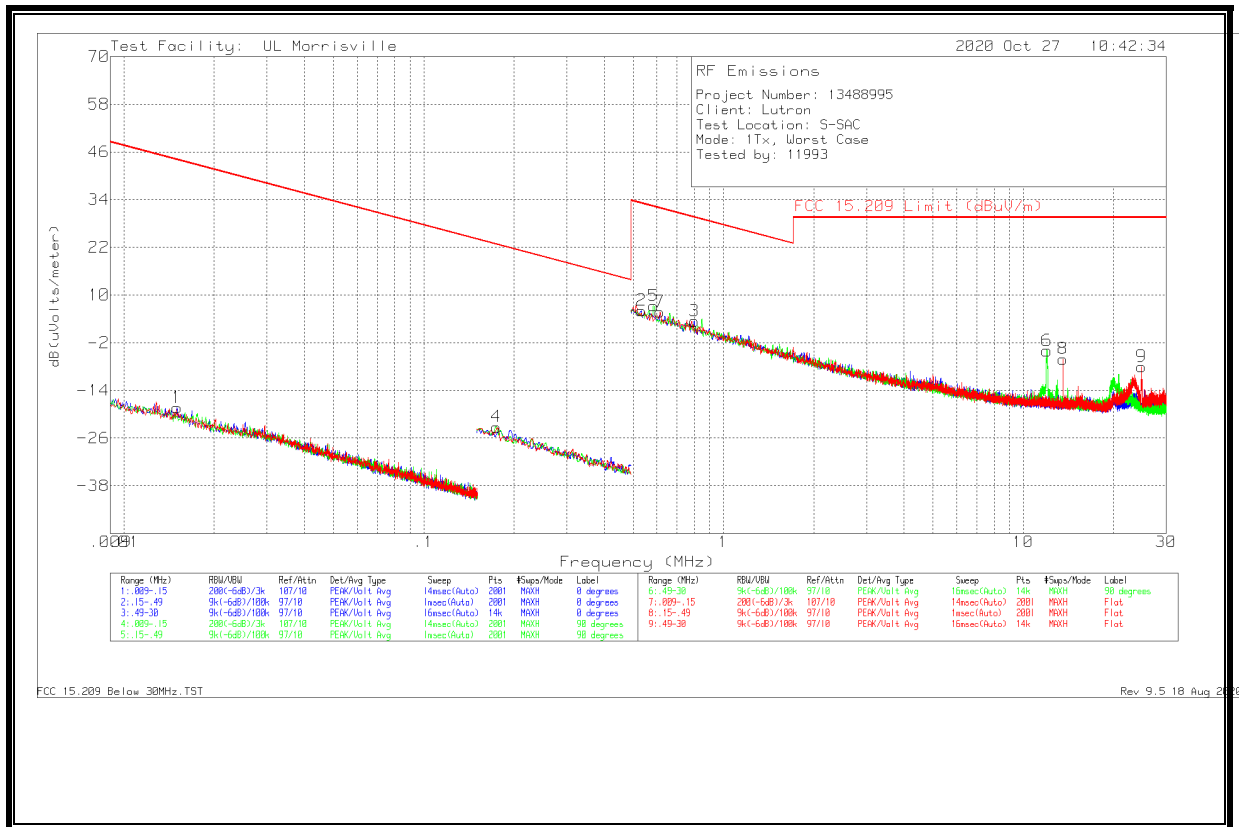
FUNDAMENTAL EMISSIONS

Project Number: 13482894
Client: Lutron
Test Location: S-SAC
Mode: Fc Measurements
Tested by: 11993

Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 AF (dB/m)	Cbl/Amp (dB)	Pad (dB)	DC Corr (dB)	Pk Corrected Reading (dBuV/m)	Pk Limit (dBuV/m)	Margin (dB)	Avg Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
Low CH															
431.536	84.77	Pk	22.6	-27.8	10.1	0	89.67	100.75	-11.08	-	-	-	243	343	H
431.536	84.77	Pk	22.6	-27.8	10.1	-26.11	-	-	-	63.56	80.75	-17.19	243	343	H
431.539	92.78	Pk	22.6	-27.8	10.1	0	97.68	100.75	-3.07	-	-	-	168	126	V
431.539	92.78	Pk	22.6	-27.8	10.1	-26.11	-	-	-	71.57	80.75	-9.18	168	126	V
Middle CH															
433.637	87.58	Pk	22.6	-27.7	10.1	0	92.58	100.81	-8.23	-	-	-	240	342	H
433.637	87.58	Pk	22.6	-27.7	10.1	-26.11	-	-	-	66.47	80.81	-14.34	240	342	H
433.636	95.77	Pk	22.6	-27.7	10.1	0	100.77	100.81	-0.04	-	-	-	162	126	V
433.636	95.77	Pk	22.6	-27.7	10.1	-26.11	-	-	-	74.66	80.81	-6.15	162	126	V
High CH															
436.5626	83.4	Pk	22.7	-27.6	10.1	0	88.6	100.91	-12.31	-	-	-	248	339	H
436.5626	83.4	Pk	22.7	-27.6	10.1	-26.11	-	-	-	62.49	80.91	-18.42	248	339	H
436.5586	91.33	Pk	22.7	-27.6	10.1	0	96.53	100.91	-4.38	-	-	-	157	131	V
436.5586	91.33	Pk	22.7	-27.6	10.1	-26.11	-	-	-	70.42	80.91	-10.49	157	131	V

Pk - Peak detector

HARMONICS AND TX SPURIOUS EMISSION (9kHz - 30 MHz)

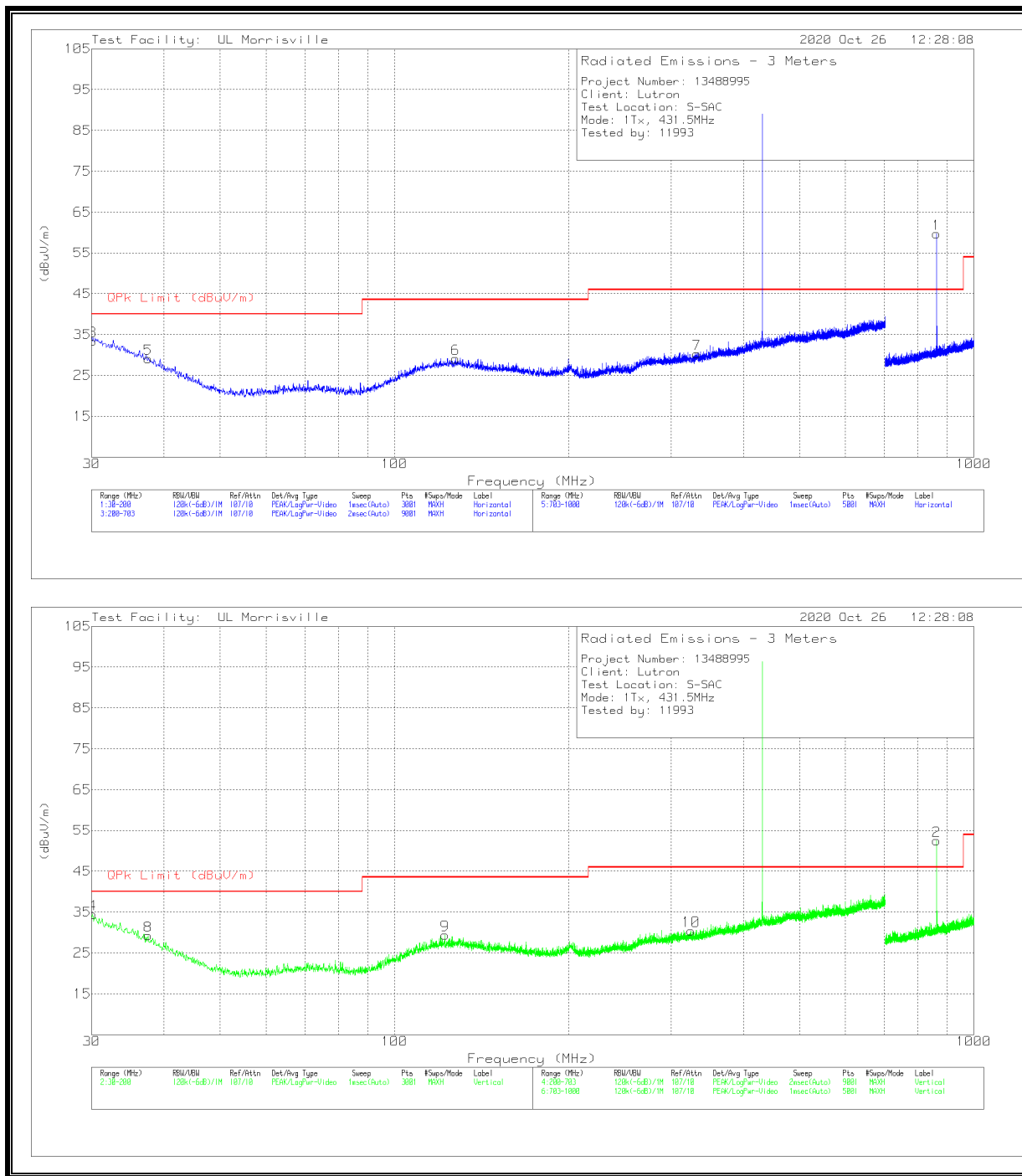


Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 Qp/Av Limit (dBuV/m)	FCC 15.209 Pk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Antenna Face
1	.01504	45.78	Pk	15.8	.1	-80	-18.32	44.06	64.06	-62.38	0-360	On
2	.53216	35.21	Pk	10.8	.1	-40	6.11	33.08	-	-26.97	0-360	On
3	.79988	32.43	Pk	10.8	.2	-40	3.43	29.54	-	-26.11	0-360	On
4	.17465	45.93	Pk	10.8	.1	-80	-23.17	22.76	42.76	-45.93	0-360	Off
5	.58486	36.38	Pk	10.8	.1	-40	7.28	32.26	-	-24.98	0-360	Off
6	12.00811	24.81	Pk	10.5	.7	-40	-3.99	29.54	-	-33.53	0-360	Off
7	.61437	34.75	Pk	10.8	.2	-40	5.75	31.84	-	-26.09	0-360	Flat
8	13.5596	22.82	Pk	10.4	.7	-40	-6.08	29.54	-	-35.62	0-360	Flat
9	24.8374	21.87	Pk	9.1	1	-40	-8.03	29.54	-	-37.57	0-360	Flat

Pk - Peak detector

HARMONICS AND TX SPURIOUS EMISSION (30 - 1000 MHz, LOW CHANNEL)



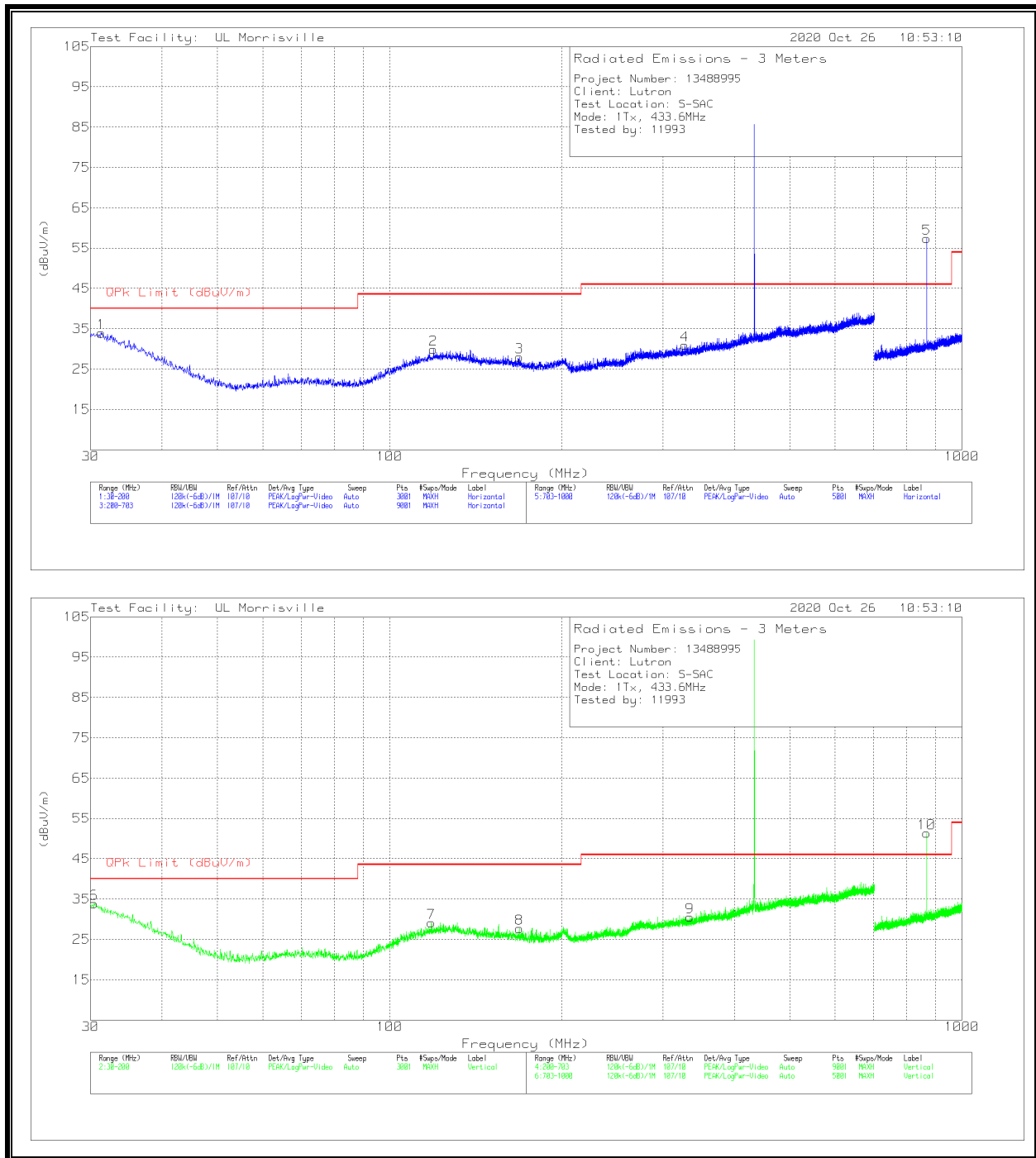
Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0081 AF (dB/m)	Amp/Cbl (dB)	Pad (dB)	Filter (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 37.5934	28.71	Pk	21.9	-31.4	9.9	0	29.11	40	-10.89	0-360	400	H
6	* 127.4106	28.96	Pk	20.1	-30	10	0	29.06	43.52	-14.46	0-360	299	H
7	* 332.7923	28.47	Pk	20.1	-28.4	10.1	0	30.27	46.02	-15.75	0-360	101	H
3	30.1133	28.21	Pk	26.8	-31.5	9.9	0	33.41	60.75	-27.34	0-360	299	H
1	862.9595	53.23	Qp	28	-25.7	0	.7	56.23	60.75	-4.52	62	102	H
8	* 37.5934	28.82	Pk	21.9	-31.4	9.9	0	29.22	40	-10.78	0-360	101	V
9	* 122.1972	29.41	Pk	20.1	-30.1	10	0	29.41	43.52	-14.11	0-360	101	V
10	* 325.1355	28.84	Pk	20	-28.5	10.1	0	30.44	46.02	-15.58	0-360	101	V
4	30.2463	23.97	Qp	26.7	-31.5	9.9	0	29.07	60.75	-31.68	195	316	V
2	863.0694	48.27	Qp	28	-25.7	0	.7	51.27	60.75	-9.48	198	106	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

HARMONICS AND TX SPURIOUS EMISSION (30 - 1000 MHz, MID CHANNEL)

Below 1GHz Data

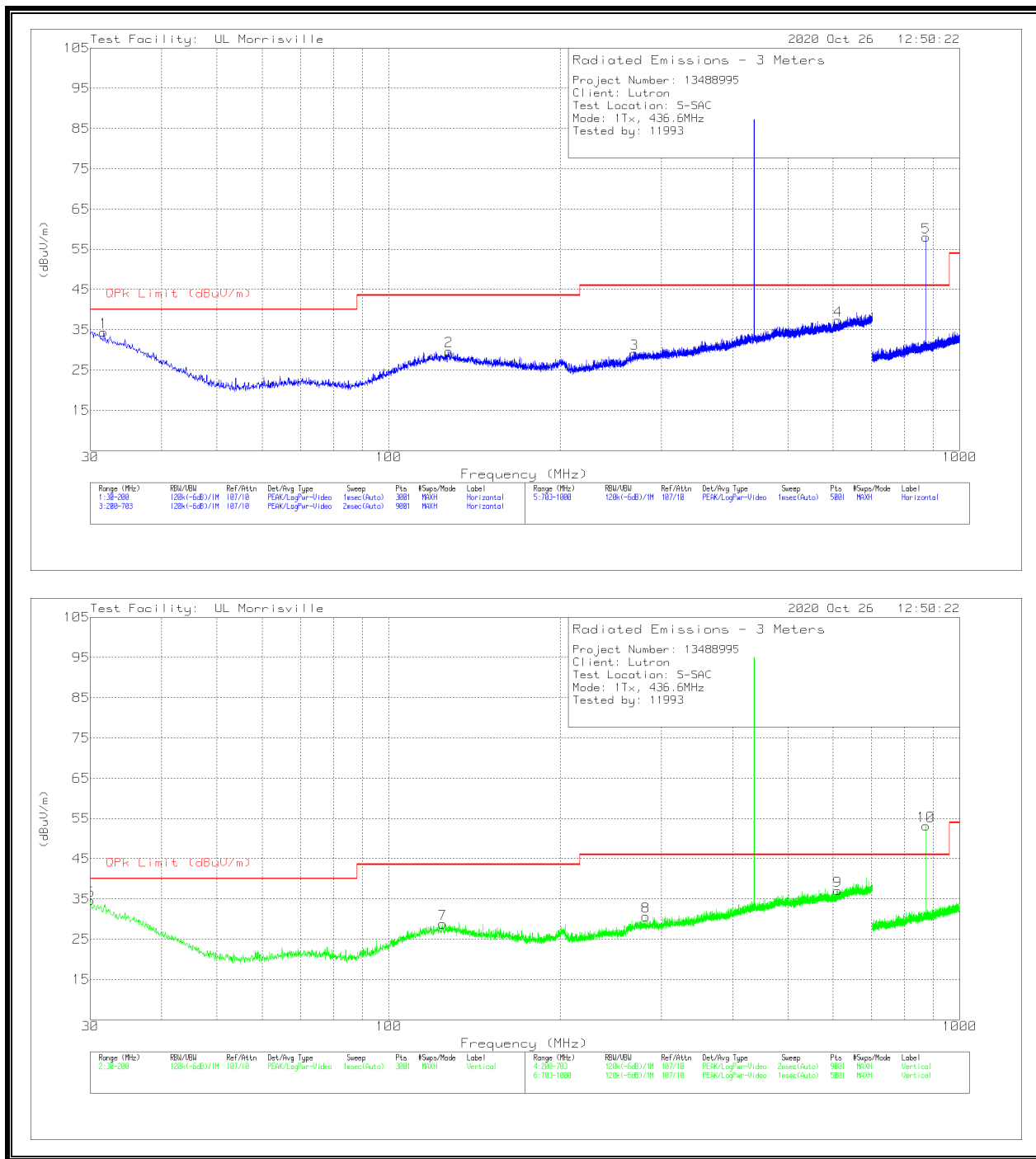
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0081 AF (dB/m)	Amp/Cbl (dB)	Pad (dB)	Filter (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 119.1939	30.09	Pk	19.9	-30.1	10	0	29.89	43.52	-13.63	0-360	99	H
3	* 168.4375	29.76	Pk	17.9	-29.7	10	0	27.96	43.52	-15.56	0-360	300	H
4	* 327.9299	29.21	Pk	20.1	-28.5	10.1	0	30.91	46.02	-15.11	0-360	101	H
1	31.3033	29.35	Pk	26.2	-31.5	9.9	0	33.95	60.81	-26.86	0-360	199	H
5	867.1942	51.53	Qp	28	-25.5	0	.7	54.73	60.81	-6.08	56	113	H
7	* 118.3439	29.37	Pk	19.8	-30.1	10	0	29.07	43.52	-14.45	0-360	101	V
8	* 168.5508	29.52	Pk	17.9	-29.7	10	0	27.72	43.52	-15.8	0-360	101	V
9	* 334.5807	28.71	Pk	20.1	-28.4	10.1	0	30.51	46.02	-15.51	0-360	101	V
6	30.4533	28.88	Pk	26.6	-31.5	9.9	0	33.88	60.81	-26.93	0-360	101	V
10	867.1275	46.23	Qp	28	-25.5	0	.7	49.43	60.81	-11.38	82	110	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

HARMONICS AND TX SPURIOUS EMISSION (30 - 1000 MHz, HIGH CHANNEL)



Below 1GHz Data

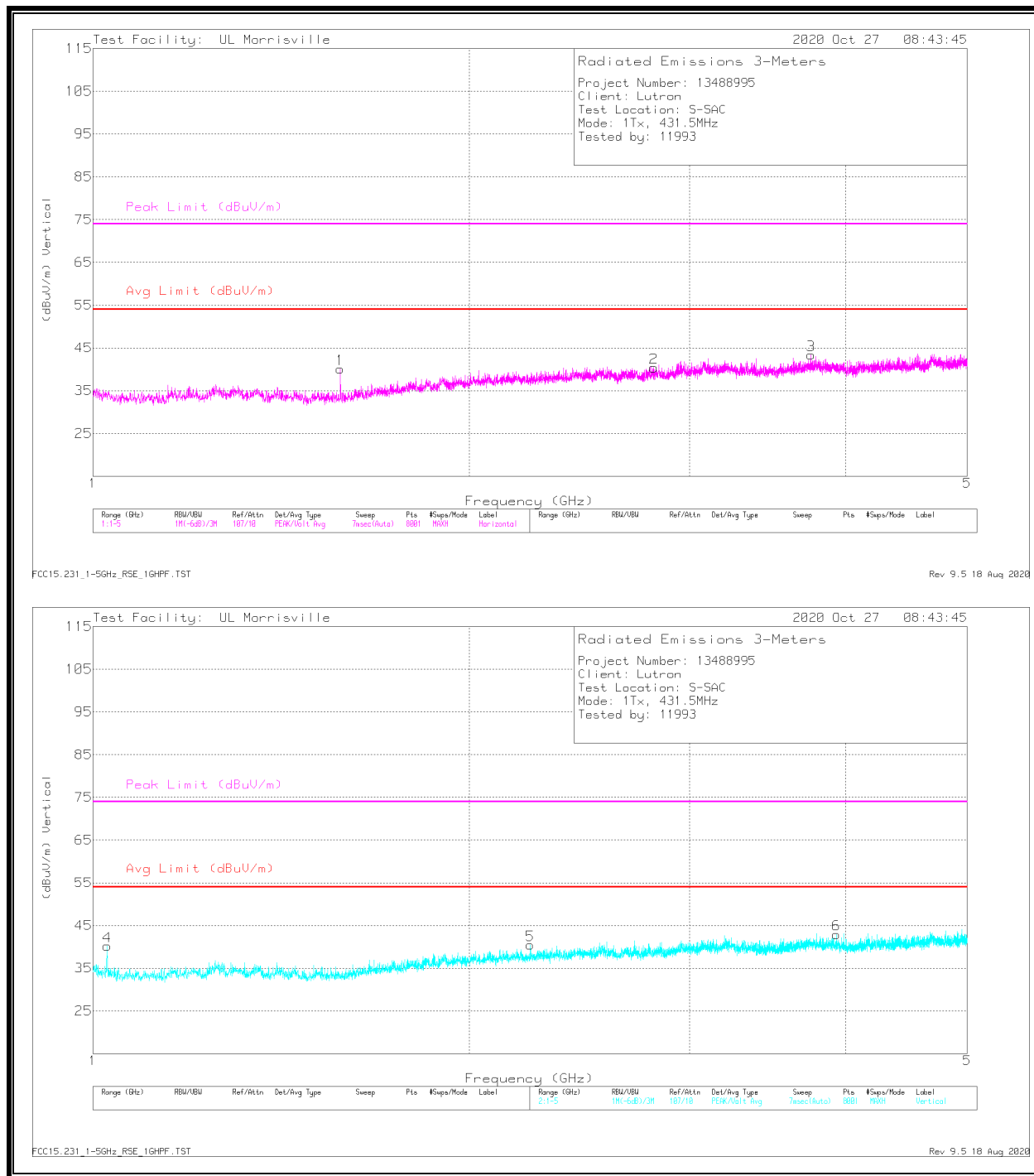
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0081 AF (dB/m)	Amp/Cbl (dB)	Pad (dB)	Filter (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 127.4106	29.59	Pk	20.1	-30	10	0	29.69	43.52	-13.83	0-360	200	H
3	* 269.3582	28.6	Pk	19.2	-28.8	10.1	0	29.1	46.02	-16.92	0-360	400	H
4	* 612.4049	29.2	Pk	24.9	-27	10.2	0	37.3	46.02	-8.72	0-360	400	H
1	31.4393	23.92	Qp	26	-31.5	9.9	0	28.32	60.91	-32.59	115	388	H
5	873.1257	52.98	Qp	28	-25.5	0	.7	56.18	60.91	-4.73	39	102	H
7	* 124.3506	28.81	Pk	20.1	-30.1	10	0	28.81	43.52	-14.71	0-360	101	V
8	* 281.9333	29.7	Pk	19.4	-28.6	10.1	0	30.6	46.02	-15.42	0-360	201	V
9	* 611.0636	29.01	Pk	24.9	-27	10.2	0	37.11	46.02	-8.91	0-360	201	V
6	30.1065	24	Qp	26.8	-31.5	9.9	0	29.2	60.91	-31.71	355	257	V
10	873.2686	48.46	Qp	28	-25.5	0	.7	51.66	60.91	-9.25	183	182	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

HARMONICS AND TX SPURIOUS EMISSION (1 - 5 GHz, LOW CHANNEL)



Above 1GHz Data

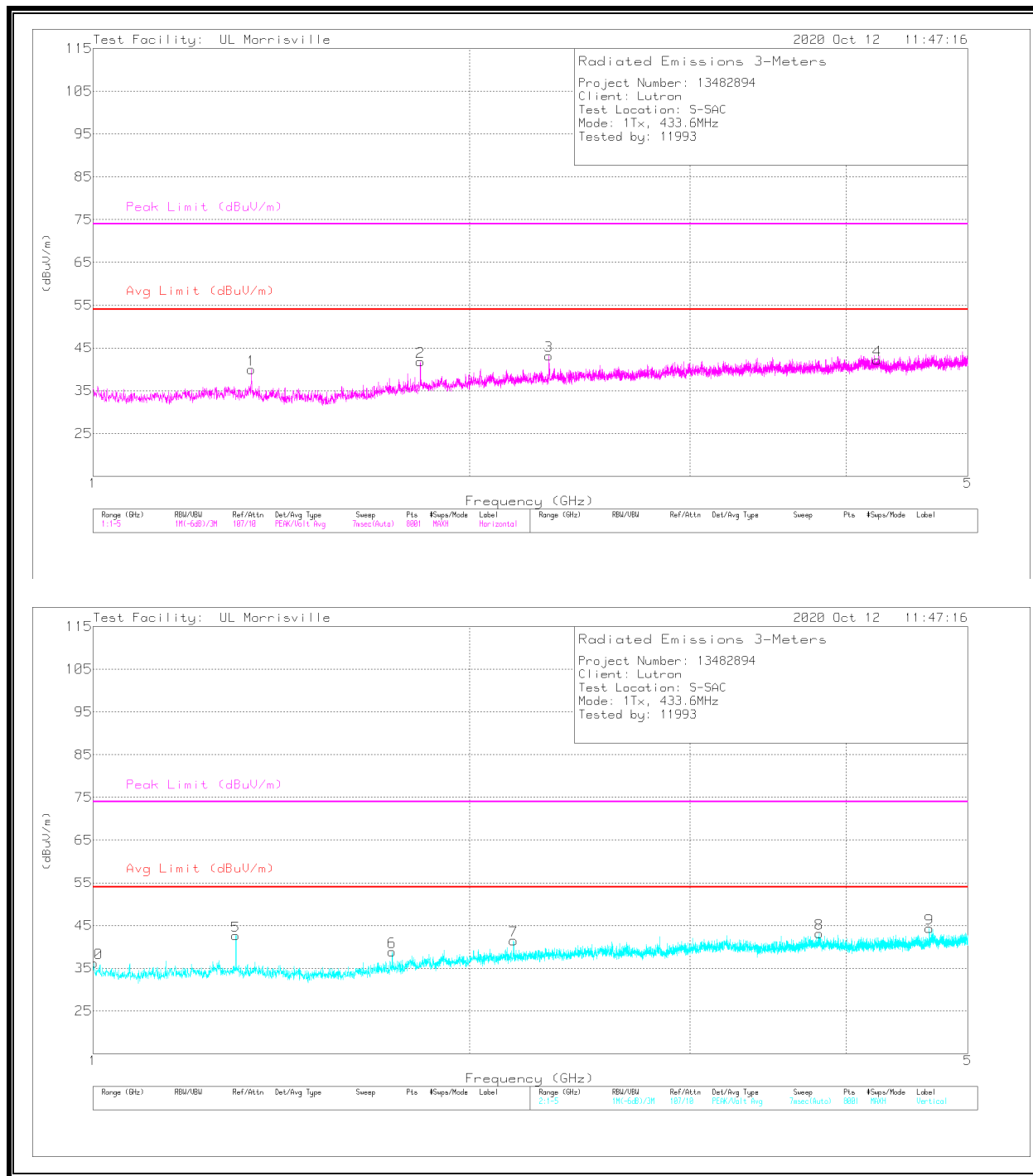
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.577	46.19	Pk	28.2	-34.9	.6	40.09	54	-13.91	74	-33.91	0-360	200	H
2	* ** 2.8085	41.4	Pk	32.4	-33.9	.5	40.4	54	-13.6	74	-33.6	0-360	101	H
3	* ** 3.7515	42.77	Pk	33.2	-33	.4	43.37	54	-10.63	74	-30.63	0-360	200	H
4	* ** 1.0265	46.39	Pk	27.7	-35.7	1.8	40.19	54	-13.81	74	-33.81	0-360	101	V
5	* ** 2.237	42.45	Pk	32	-34.4	.4	40.45	54	-13.55	74	-33.55	0-360	399	V
6	* ** 3.9305	41.83	Pk	33.4	-32.7	.4	42.93	54	-11.07	74	-31.07	0-360	399	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

HARMONICS AND TX SPURIOUS EMISSION (1 - 5 GHz, MID CHANNEL)



Above 1GHz Data

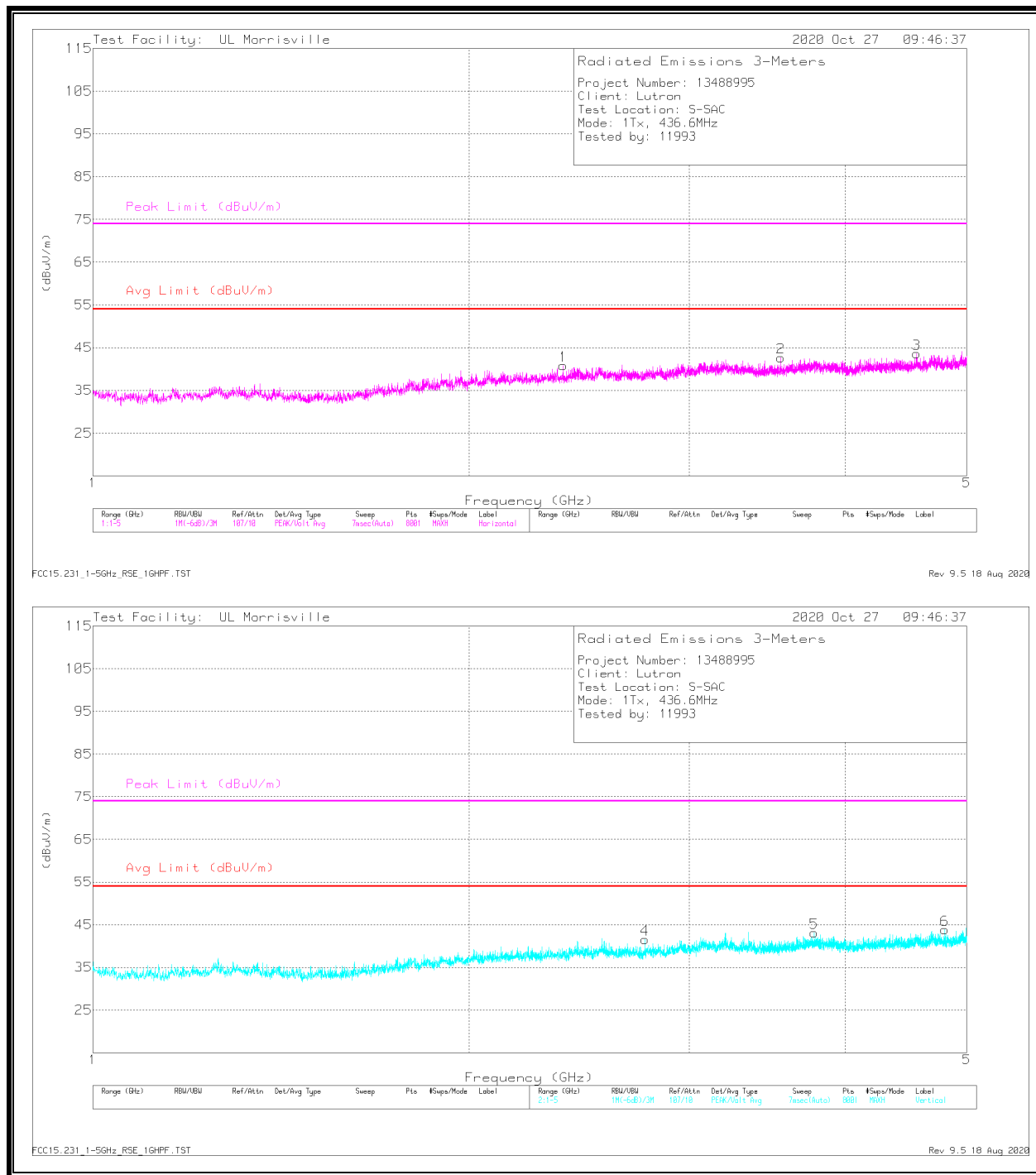
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 1.359	42.33	Pk	28.9	-35.2	.8	36.83	54	-17.17	74	-37.17	0-360	400	H
2	* ** 2.836	42.58	Pk	32.5	-34	.5	41.58	54	-12.42	74	-32.42	0-360	200	H
3	* ** 3.7995	42.22	Pk	33.3	-32.7	.4	43.22	54	-10.78	74	-30.78	0-360	101	H
4	* 1.258	41.94	Pk	29.2	-35.2	1	36.94	54	-17.06	74	-37.06	0-360	200	V
5	* ** 3.9215	42.41	Pk	33.4	-32.6	.4	43.61	54	-10.39	74	-30.39	0-360	200	V
6	* ** 4.7235	41.52	Pk	34.1	-31.8	.3	44.12	54	-9.88	74	-29.88	0-360	300	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

HARMONICS AND TX SPURIOUS EMISSION (1 - 5 GHz, HIGH CHANNEL)



Above 1GHz Data

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Filter (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.3775	42.51	Pk	32.2	-34.3	.4	40.81	54	-13.19	74	-33.19	0-360	200	H
2	* ** 3.55	42.39	Pk	32.9	-33.1	.5	42.69	54	-11.31	74	-31.31	0-360	399	H
3	* ** 4.5615	41.39	Pk	34	-32.1	.3	43.59	54	-10.41	74	-30.41	0-360	399	H
4	* ** 2.7645	42.57	Pk	32.4	-33.9	.5	41.57	54	-12.43	74	-32.43	0-360	300	V
5	* ** 3.7755	42.36	Pk	33.2	-32.8	.4	43.16	54	-10.84	74	-30.84	0-360	101	V
6	* ** 4.802	41.14	Pk	34	-31.6	.3	43.84	54	-10.16	74	-30.16	0-360	101	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

** - indicates frequency in Taiwan NCC LP0002 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:

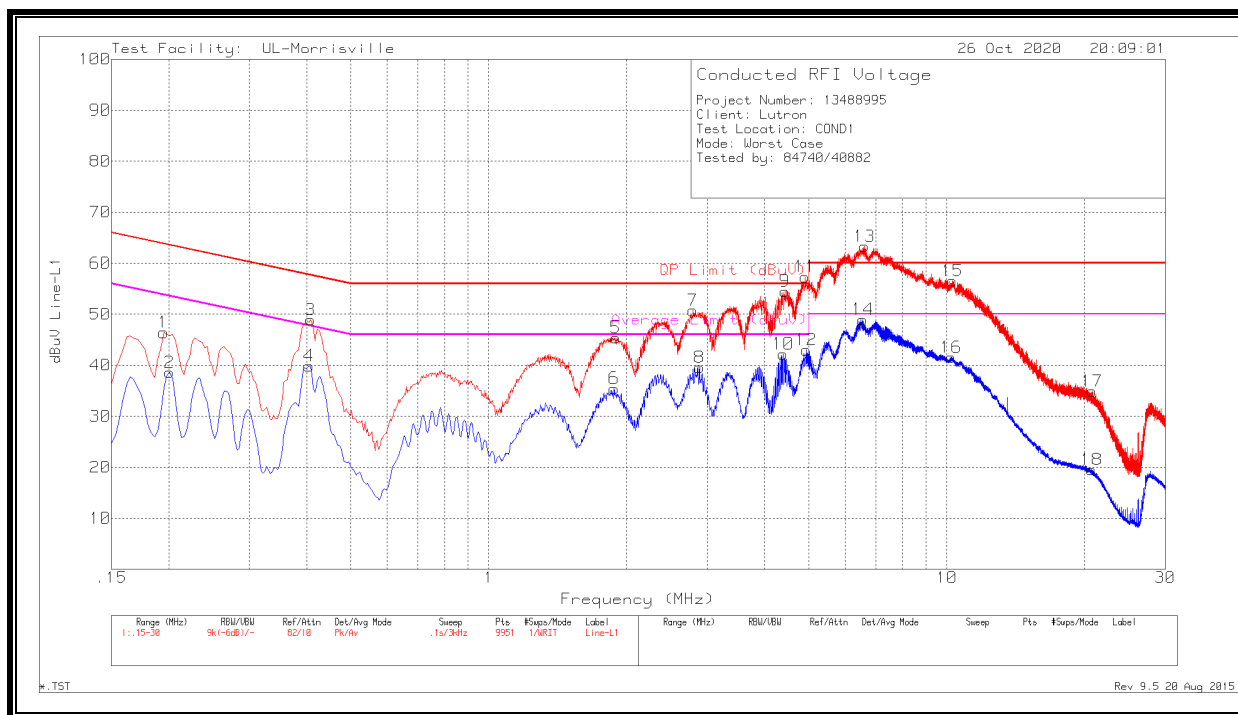
6 WORST EMISSIONS

Range 1: Line-L1 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
1	.195	36.53	Pk	.2	9.7	46.43	63.82	-17.39	-	-
2	.201	28.79	Av	.1	9.7	38.59	-	-	53.57	-14.98
3	.408	39.1	Pk	.1	9.7	48.9	57.69	-8.79	-	-
4	.405	30.09	Av	.1	9.7	39.89	-	-	47.75	-7.86
5	1.893	35.61	Pk	0	9.8	45.41	56	-10.59	-	-
6	1.878	25.67	Av	0	9.8	35.47	-	-	46	-10.53
7	2.793	40.94	Pk	0	9.8	50.74	56	-5.26	-	-
8	2.883	29.81	Av	0	9.8	39.61	-	-	46	-6.39
9	4.428	44.62	Pk	0	9.9	54.52	56	-1.48	-	-
10	4.389	32.33	Av	0	9.9	42.23	-	-	46	-3.77
11	4.905	41.86	Qp	0	9.9	51.76	56	-4.24	-	-
12	4.935	33.09	Av	0	9.9	42.99	-	-	46	-3.01
13	6.6086	27.17	Qp	.1	9.9	37.17	60	-22.83	-	-
14	6.558	38.98	Av	.1	9.9	48.98	-	-	50	-1.02
15	10.272	46.47	Pk	.1	10	56.57	60	-3.43	-	-
16	10.212	31.47	Av	.1	10	41.57	-	-	50	-8.43
17	20.766	24.64	Pk	.2	10.1	34.94	60	-25.06	-	-
18	20.709	9.24	Av	.2	10.1	19.54	-	-	50	-30.46

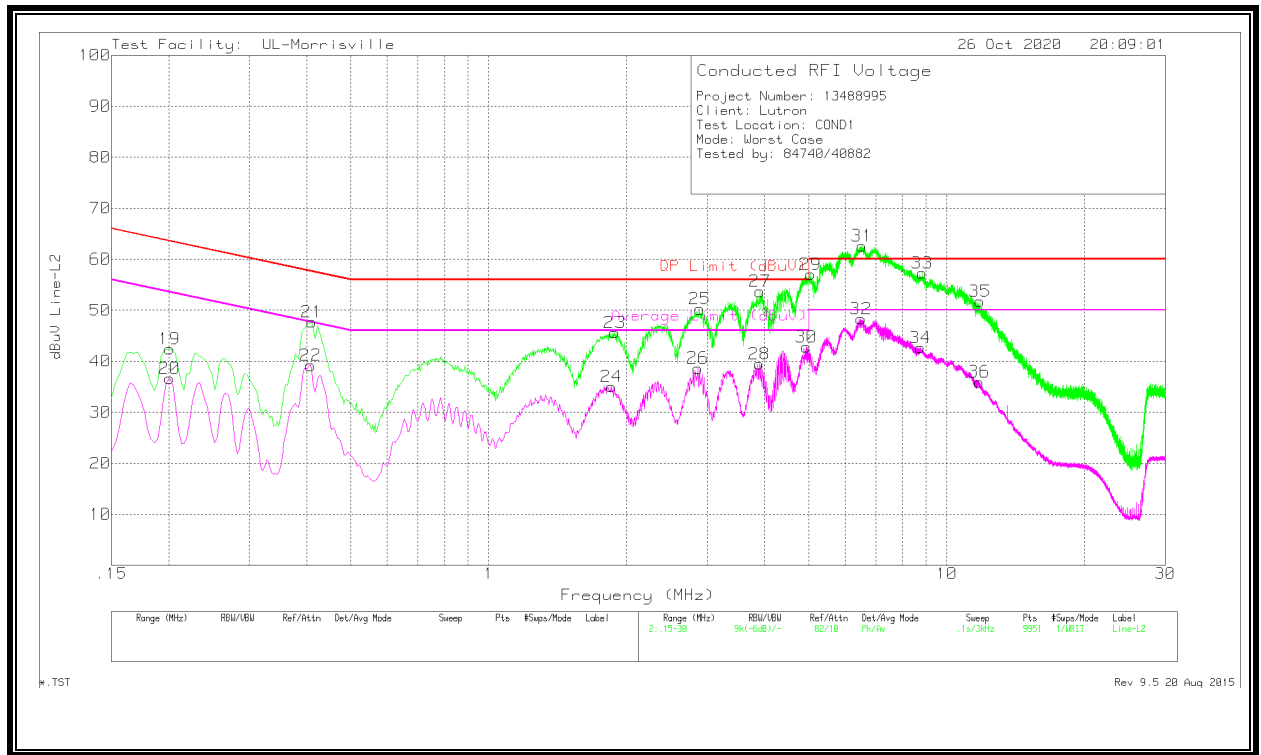
Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
19	.201	32.5	Pk	.2	9.7	42.4	63.57	-21.17	-	-
20	.201	26.73	Av	.2	9.7	36.63	-	-	53.57	-16.94
21	.411	37.91	Pk	.1	9.7	47.71	57.63	-9.92	-	-
22	.408	29.38	Av	.1	9.7	39.18	-	-	47.69	-8.51
23	1.884	35.83	Pk	0	9.8	45.63	56	-10.37	-	-
24	1.851	25.23	Av	0	9.8	35.03	-	-	46	-10.97
25	2.889	40.44	Pk	0	9.8	50.24	56	-5.76	-	-
26	2.859	28.87	Av	0	9.8	38.67	-	-	46	-7.33
27	3.912	43.79	Pk	0	9.9	53.69	56	-2.31	-	-
28	3.894	29.58	Av	0	9.9	39.48	-	-	46	-6.52
29	5.037	47.04	Pk	.1	9.9	57.04	60	-2.96	-	-
30	4.938	32.77	Av	.1	9.9	42.77	-	-	46	-3.23
31	6.5276	26.51	Qp	.1	9.9	36.51	60	-23.49	-	-
32	6.498	38.3	Av	.1	9.9	48.3	-	-	50	-1.7
33	8.832	47.18	Pk	.1	10	57.28	60	-2.72	-	-
34	8.754	32.59	Av	.1	10	42.69	-	-	50	-7.31
35	11.82	41.68	Pk	.1	10	51.78	60	-8.22	-	-
36	11.775	25.87	Av	.1	10	35.97	-	-	50	-14.03

Pk - Peak detector
Av - Average detection

LINE 1 RESULTS



LINE 2 RESULTS



10. SETUP PHOTOS

Please refer to R13488995-EP1 for setup photos

END OF TEST REPORT