CERTIFICATION TEST REPORT

Report Number. : R12897344-E1

Applicant	:	Resideo 2 Corporate Center Dr., Melville, NY 11747 United States
Model	:	PROSIXLCDKP
FCC ID	:	CFS8DLPROSIXLCDKP
IC	:	573F-PROSIXLCDKP
EUT Description	:	Touchpad
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5

Date Of Issue:
2019-09-05

Prepared by:
UL LLC
12 Laboratory Dr.
Research Triangle Park, NC 27709 U.S.A.
TEL: (919) 549-1400

NVLAP Lab code: 200246-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
--	--	Initial Issue	--
v2	2019-09-05	Updated equipment list	Niklas Haydon

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL: (919) 549-1400

TABLE OF CONTENTS

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL: (919) 549-1400

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Resideo
2 Corporate Center Drive
Melville, NY, 11749-3265
United States

EUT DESCRIPTION: Touchpad

MODEL: PROSIXLCDKP

SERIAL NUMBER: MEL-719, MEL-720

DATE TESTED: 2019-08-21 to 2019-08-27

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED 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.

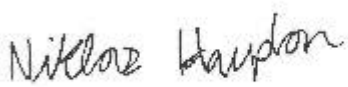
The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. 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
UL LLC By:

Jeffrey Moser
Operations Leader
Consumer Technology Division
UL LLC

Prepared By:



Niklas Haydon
Engineer
Consumer Technology Division
UL LLC

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, RSS-GEN Issue 5, and RSS-247 Issue 2.

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., Suite B
ISED Site Code: 2180C	
☐ Chamber A RTP	☒ North Chamber
☐ Chamber C RTP	☒ South Chamber

The above test sites and facilities are covered under FCC Test Firm Registration # 703469. Chambers above are covered under Industry Canada company address and respective code.

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

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

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:
Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:
Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.
36.5 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Radio Frequency (Spectrum Analyzer)	141.2 Hz
Occupied Channel Bandwidth	2.00%
RF output power, conducted	1.3 dB (PK) 0.45 dB (AV)
Power Spectral Density, conducted	2.47 dB
Unwanted Emissions, conducted	2.50 dB
All emissions, radiated	4.88 dB
Temperature	2.26°C
Humidity	6.79%
DC Supply voltages	1.70%
Time	3.39%

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

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL: (919) 549-1400

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a wireless alpha touchpad that is used in conjunction with the PROH8 and QS7AIO-2 control panels. The touchpad used 802.15.4.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2405 - 2475	802.15.4	22.22	166.72

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an two inverted F PCB trace antennas, with a maximum gain of 4.71dBi for antenna 1 and 4.98dBi for antenna 2.

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was RF micro, ver. 3.3.14.
The firmware installed in the EUT during testing was Main micro, ver. 022001_003700.

5.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel and antenna with highest output power and power spectral density as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

EUT contains two antenna for diversity. Both antenna were tested for radiated emissions. The antenna port with the higher power and power spectral density, antenna 2, was tested for conducted emissions.

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL: (919) 549-1400

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop PC (RF6 RF test program)	Dell	M4800	3GRYXZ1	N/A
AC adapter (for EUT)	Honeywell	300-07332US-CRD	N/A	N/A

I/O CABLES

I/O Cable List						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
None						

TEST SETUP

The EUT is connected to a test laptop during the tests. Test software exercised the radio card.

SETUP DIAGRAMS

Please refer to R12897344-EP1 for setup diagrams

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL: (919) 549-1400

6. MEASUREMENT METHOD

On Time and Duty Cycle: ANSI C63.10 Section 11.6

6 dB BW: ANSI C63.10 Subclause 11.8.1

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Output Power: ANSI C63.10 Subclause 11.9.1.3 (PKPM1)

PSD: ANSI C63.10 Subclause 11.10.2 (Peak PSD)

Out-of-band emissions in non-restricted bands: ANSI C63.10-2013 Section 11.11 & 6.10.4

Out-of-band emissions in restricted bands: ANSI C63.10-2013 Section 11.12.1, 6.10.5 and KDB 558074 D01 15.247 Section 11. FAQ 3c

General Radiated Emissions: ANSI C63.10:2013 Sections 6.3 – 6.6

AC Line Conducted Emissions: ANSI C63.10:2013 Sections 6.2

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL: (919) 549-1400

7. 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 - North Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2019-03-22	2020-03-22
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2019-03-15	2020-03-15
SA0026	Spectrum Analyzer	Agilent	N9030A	2019-03-19	2020-03-19
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
s/n 181474341	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27

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

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2019-08-08	2020-08-08
AT0066	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB1	2018-12-11	2019-12-11
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2018-11-08	2019-11-08
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2019-05-02	2020-05-02
S-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2019-05-02	2020-05-02
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2018-09-30	2019-09-30
SA0025	Spectrum Analyzer	Agilent	N9030A	2019-02-28	2020-02-28
SA0027 (18-40GHz RSE)	Spectrum Analyzer	Agilent	N9030A	2019-05-15	2020-05-15
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
s/n 181474409	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27
LPF008	DC-1000MHz low-pass filter	Pasternack	PE8720	2019-03-08	2020-03-08

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
PWM001	RF Power Meter	Keysight Technologies	N1912A	2019-05-06	2020-05-006
PWS001	Peak and Avg Power Sensor, 50MHz to 18GHz	Keysight Technologies	N1921A	2019-06-14	2020-06-14
s/n 181474409	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27
T177	PSA Signal Analyzer	Keysight Technologies	E4446A	2019-04-22	2020-04-22
HI0090	Environmental Meter	Fisher Scientific	17-E670X-80-1	2019-06-17	2020-06-17
Antenna Port	Antenna Port Software	Antenna	Version 10.0.1	NA	NA

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	2019-05-29	2020-05-29
s/n 181562858	Environmental Meter	Fisher Scientific	14-650-118	2018-09-04	2020-09-04
LISN003	LISN, 50-ohm/50-uH, 2-conductor, 25A	Fischer Custom Com.	FCC-LISN-50-25-2-01-550V	2019-08-19	2020-08-19
75141 (PRE0101521)	EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESCI 7	2019-08-20	2020-08-20
TL001	Transient Limiter, 0.009-30MHz	Com-Power	LIT-930A	2019-05-29	2020-05-29
PS214	AC Power Source	Elgar	CW2501M (s/n 1523A02396)	NA	NA
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

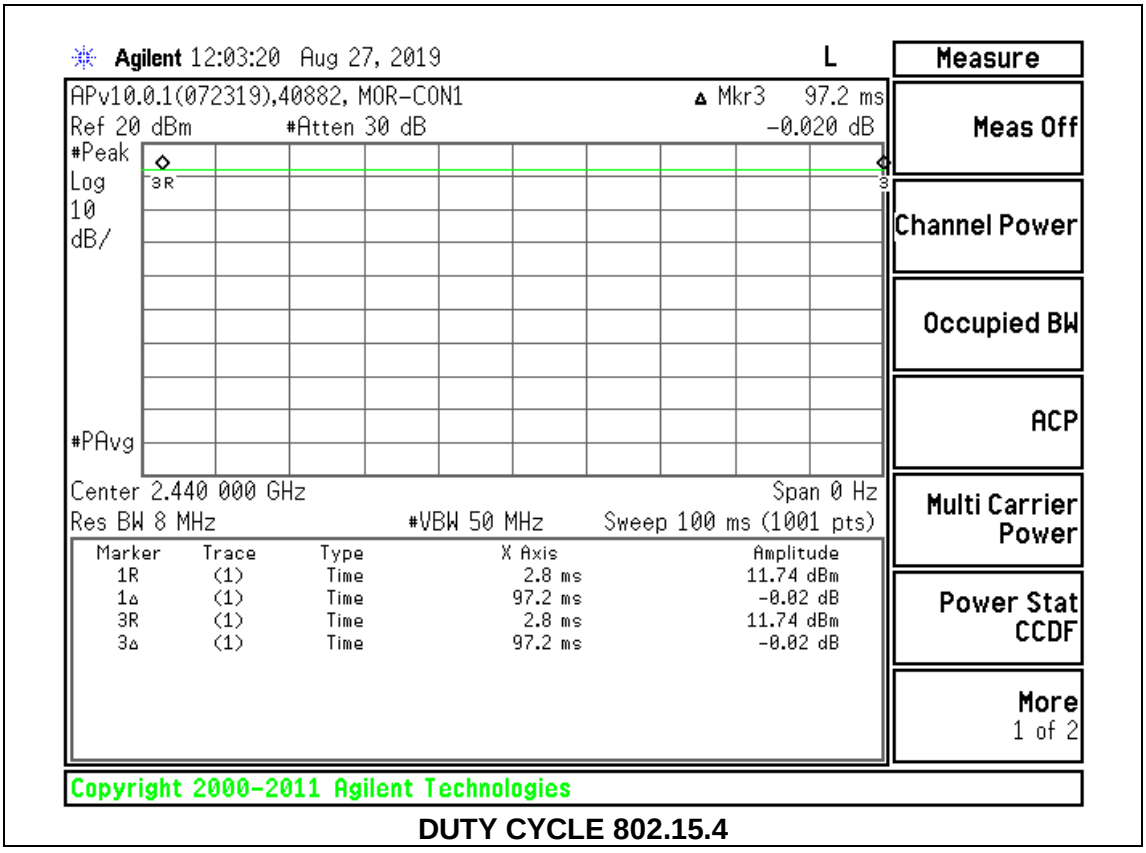
KDB 558074 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Note: Duty cycle below shows how sample operated during testing. Real life worst-case duty cycle is protocol limited to 7.136%.

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
802.15.4	97.200	97.200	1.000	100.00%	0.00	0.010

DUTY CYCLE PLOTS



DUTY CYCLE 802.15.4

8.2. 99% BANDWIDTH

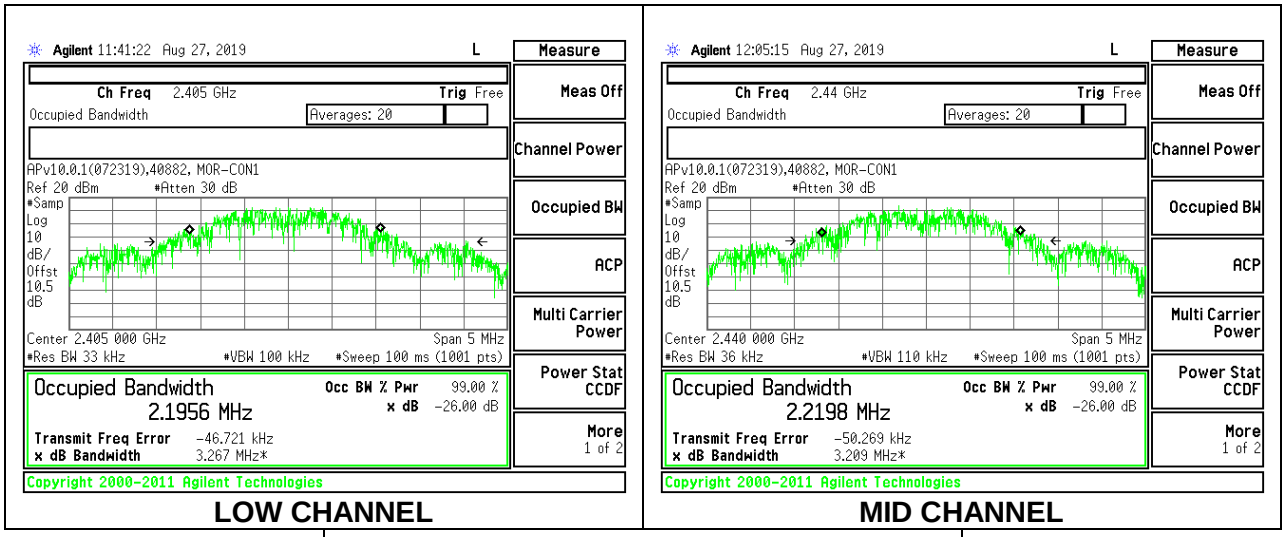
LIMITS

None; for reporting purposes only.

RESULTS

8.2.1. 802.15.4

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2405	2.1956
Middle	2440	2.2198
High	2475	2.2555



8.3. 6 dB BANDWIDTH

LIMITS

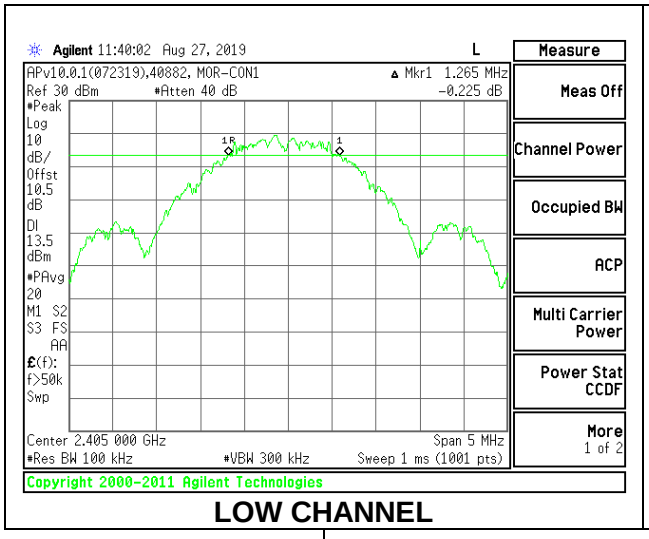
FCC §15.247 (a) (2)
RSS-247 5.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

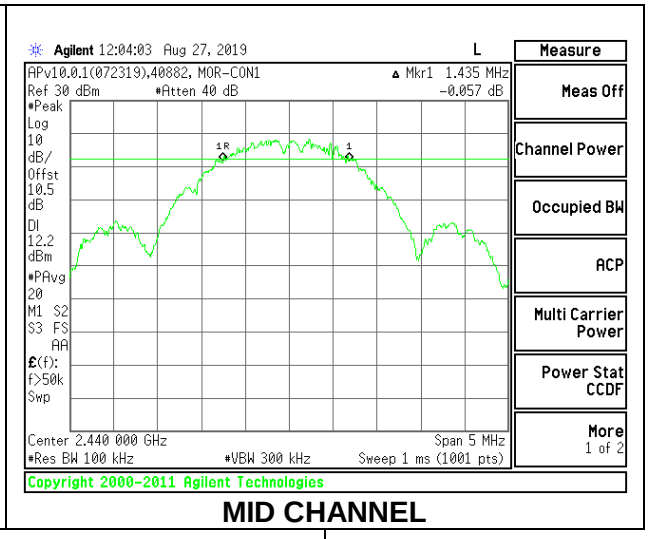
RESULTS

8.3.1. 802.15.4

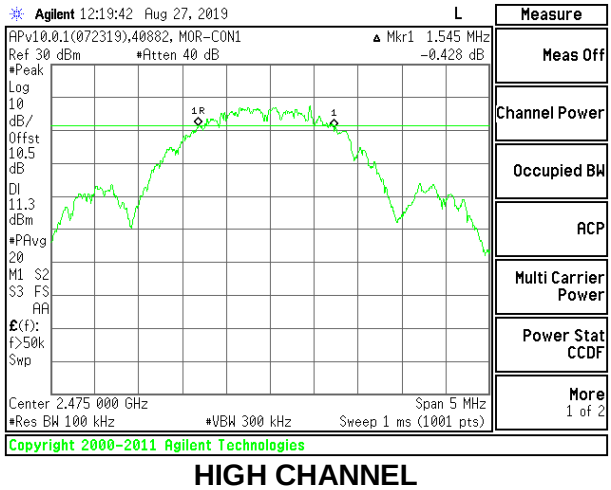
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2405	1.2650	0.5
Middle	2440	1.4350	0.5
High	2475	1.5450	0.5



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)
RSS-247 5.4 (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

8.4.1. 802.15.4

Antenna 1

Tested By:	17051
Date:	2019-08-26

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2405	20.54	30	-9.46
Middle	2440	20.15	30	-9.85
High	2475	19.91	30	-10.09

Antenna 2

Tested By:	17051
Date:	2019-08-26

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2405	22.22	30	-7.78
Middle	2440	21.70	30	-8.30
High	2475	21.13	30	-8.87

8.5. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

8.5.1. 802.15.4

Antenna 1

Tested By:	17051
Date:	2019-08-26

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	20.43
Middle	2440	20.06
High	2480	19.79

Antenna 2

Tested By:	17051
Date:	2019-08-26

Channel	Frequency (MHz)	AV power (dBm)
Low	2402	22.14
Middle	2440	21.62
High	2480	21.04

8.6. POWER SPECTRAL DENSITY

LIMITS

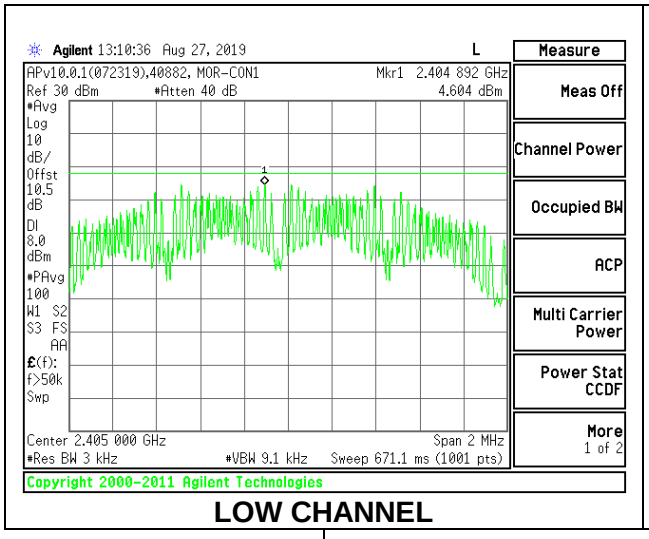
FCC §15.247 (e)
RSS-247 (5.2) (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

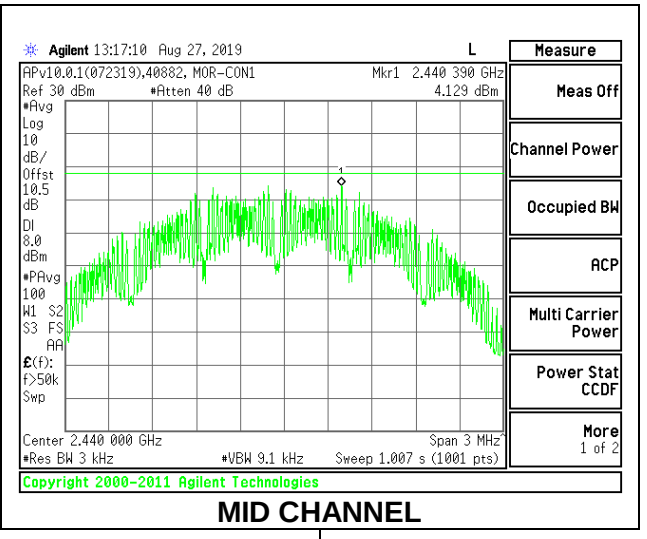
RESULTS

8.6.1. 802.15.4

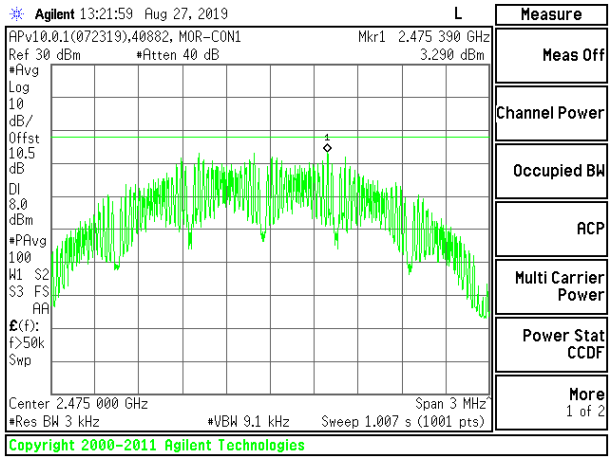
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2402	4.604	8	-3.40
Middle	2440	4.129	8	-3.87
High	2480	3.290	8	-4.71



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

8.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

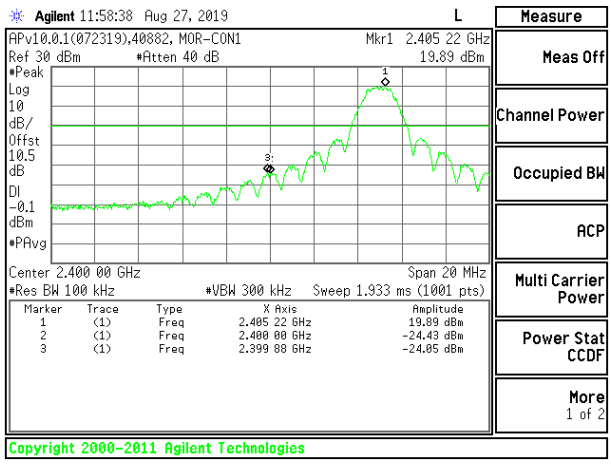
FCC §15.247 (d)

RSS-247 5.5

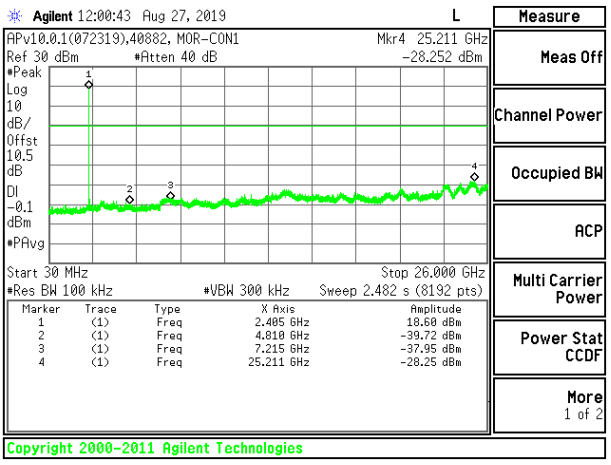
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

RESULTS

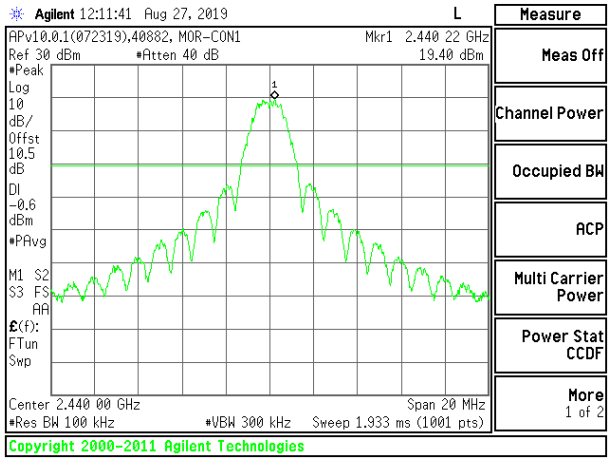
8.7.1. 802.15.4



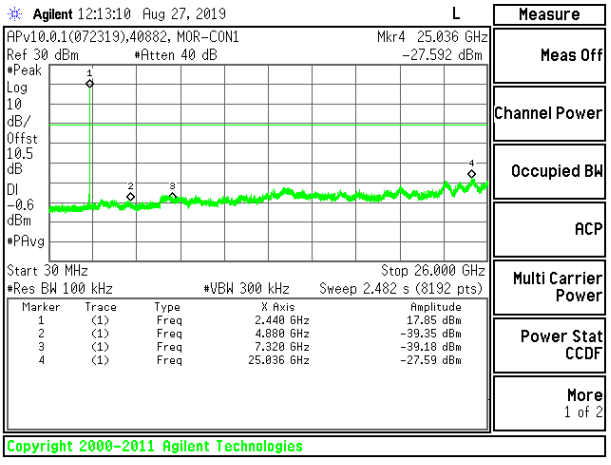
LOW CHANNEL BANDEDGE



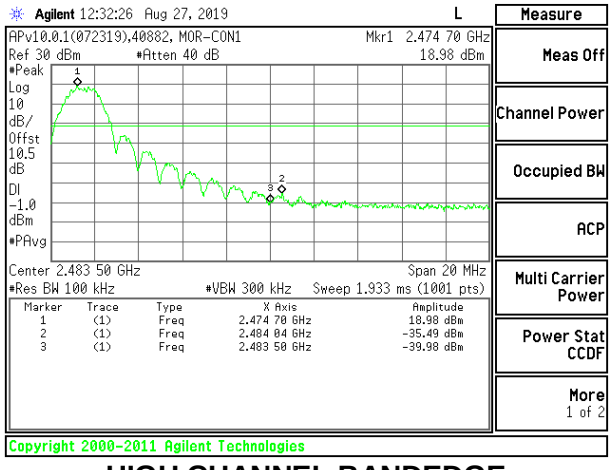
OUT-OF-BAND LOW CHANNEL



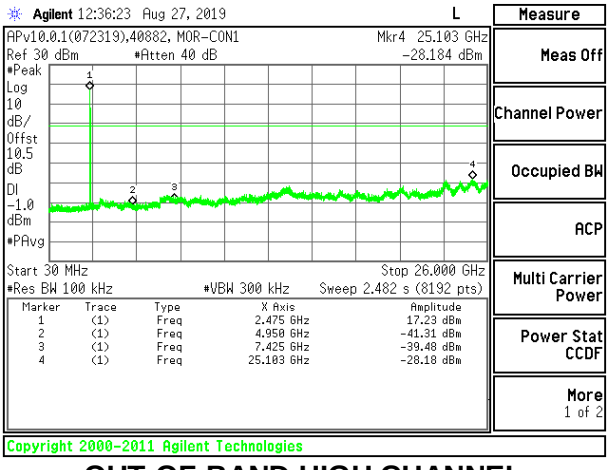
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209
RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurements below 1GHz; 1.5 m above the ground plane for measurements above 1GHz. 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 120 kHz for peak and/or quasi-peak detection measurements in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The particular averaging method used for this test program was voltage and duty cycle correction per KDB 558074 D01 15.247 V05r02, FAQ Answer 3c).

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power and PSD was tested.

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.

3D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel).

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

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

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

KDB 558074 D01 15.247 Meas Guidance V05r02

11. Frequently Asked Questions; Answer 3: c)

A voltage averaging measurement was taken in accordance to ANSI C63.10. The average measurement was corrected down based on the protocol-limited worst-case duty cycle of 7.136% provided by the manufacturer. The calculation of 20*log(1/0.07136) leads to a 22.93dB correction factor that is subtracted from the average measurement.

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL: (919) 549-1400

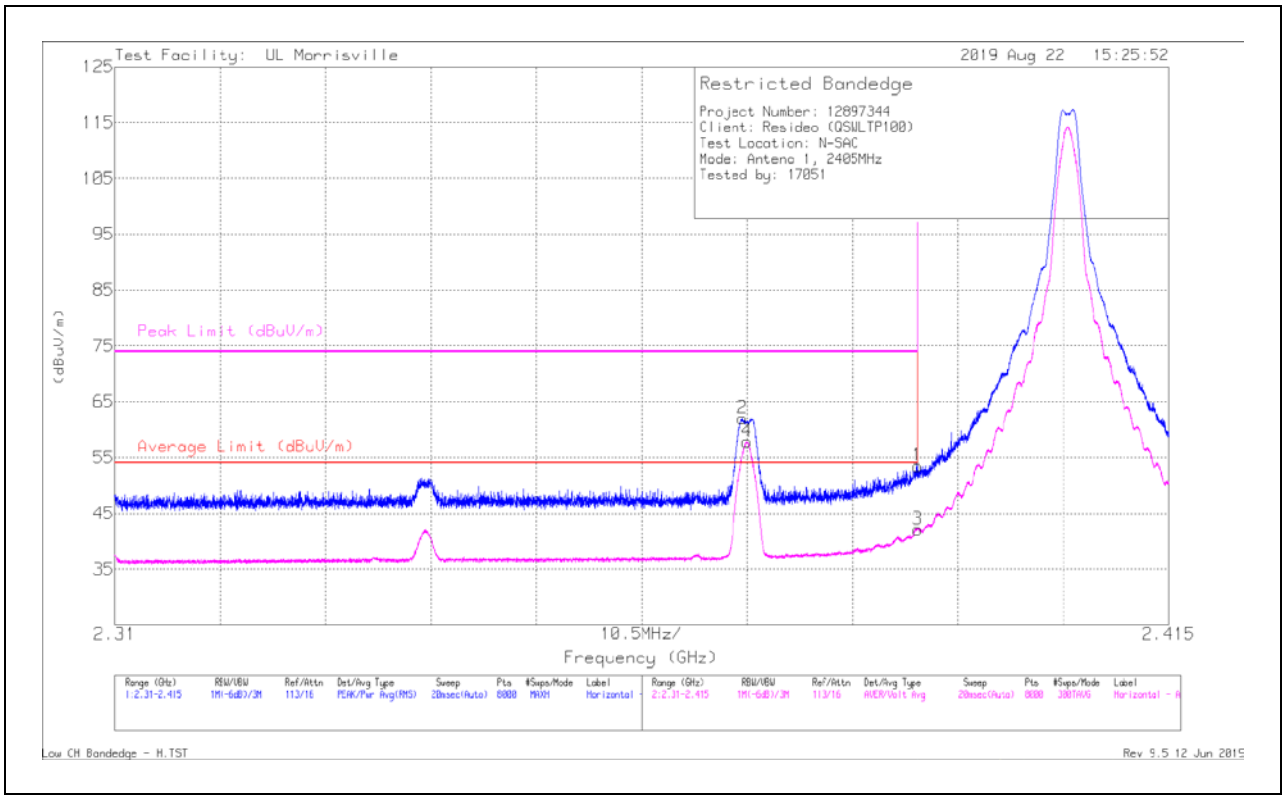
9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. 802.15.4

Antenna 1

BANDEDGE (LOW CHANNEL)

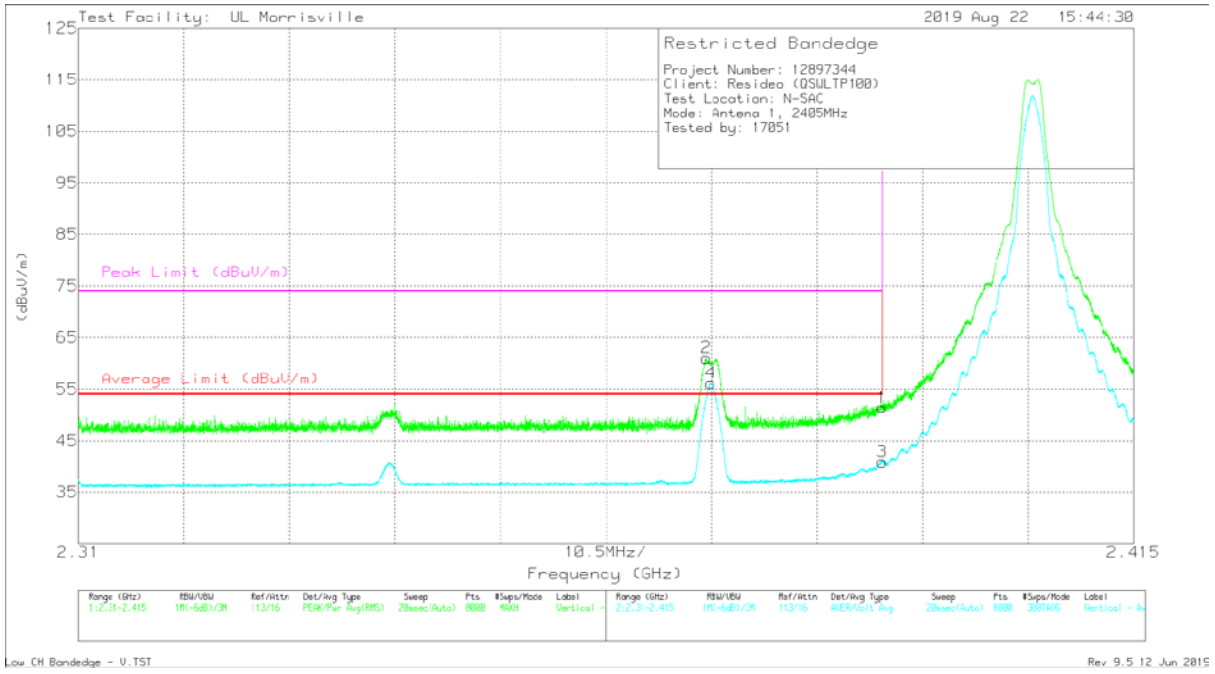
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 2.37254	54.63	Pk	31.9	-24.5	0	62.03	-	-	74	-11.97	295	106	H
4	* 2.373	50.31	Av	31.9	-24.4	-22.93	34.88	54	-19.12	-	-	295	106	H
1	* 2.39	45.89	Pk	32	-24.4	0	53.49	-	-	74	-20.51	295	106	H
3	* 2.39	34.52	Av	32	-24.4	-22.93	19.19	54	-34.81	-	-	295	106	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Average detection

VERTICAL RESULT

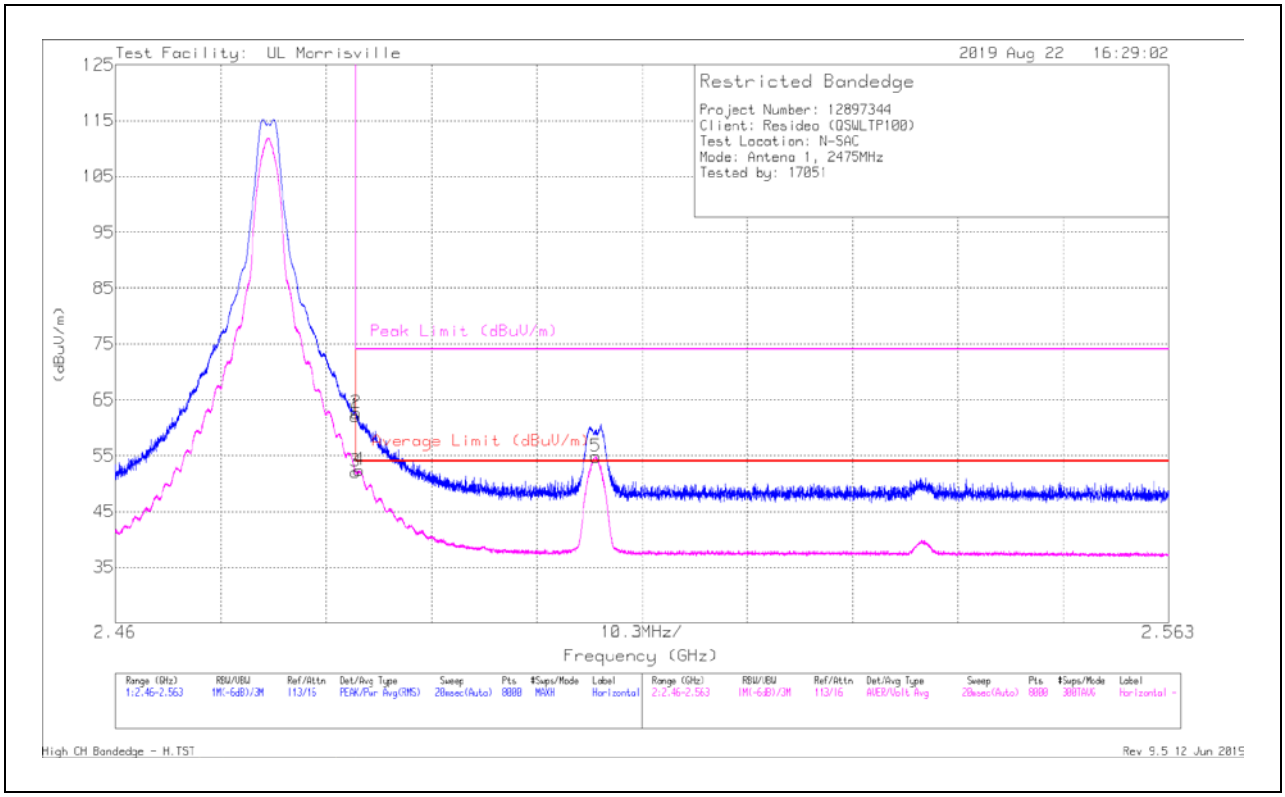


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	43.82	Pk	32	-24.4	0	51.42	-	-	74	-22.58	224	326	V
2	* 2.37247	53.63	Pk	31.9	-24.5	0	61.03	-	-	74	-12.97	224	326	V
3	* 2.39	33.27	Av	32	-24.4	-22.93	17.94	54	-36.06	-	-	224	326	V
4	* 2.37294	48.64	Av	31.9	-24.4	-22.93	33.21	54	-20.79	-	-	224	326	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Average detection

BANDEDGE (HIGH CHANNEL)

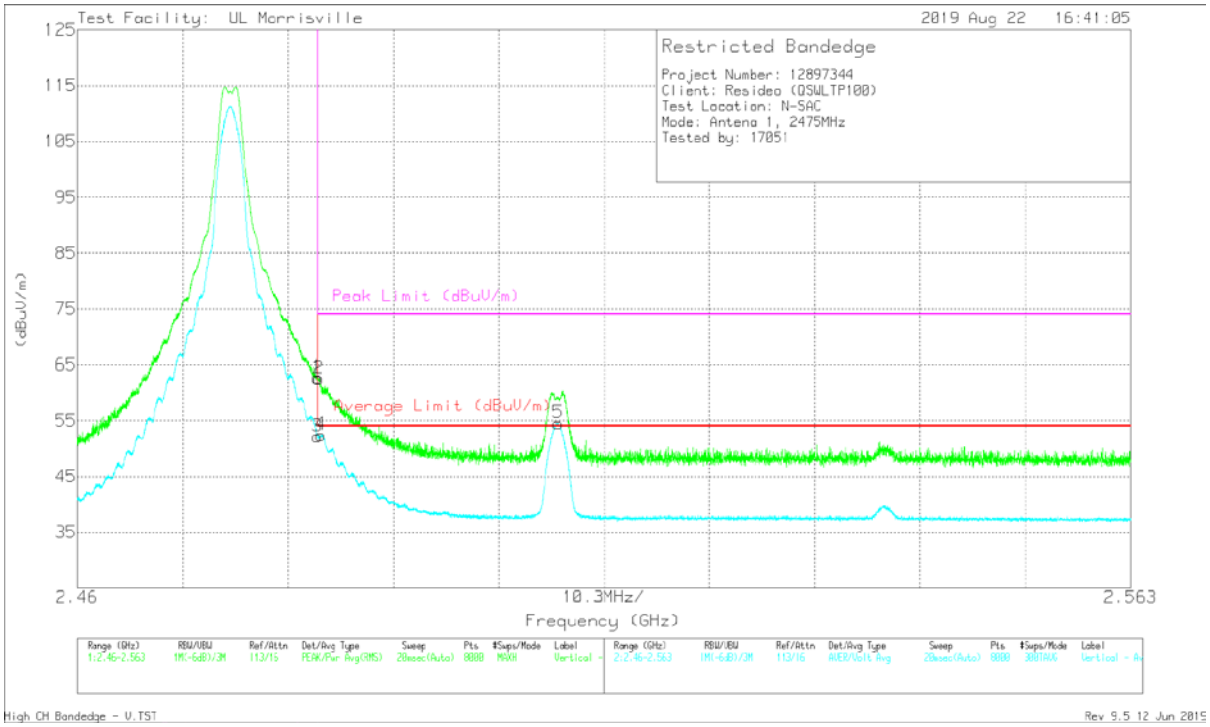
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	53.99	Pk	32.4	-24.3	0	62.09	-	-	74	-11.91	174	161	H
2	* 2.48355	54.55	Pk	32.4	-24.3	0	62.65	-	-	74	-11.35	174	161	H
3	* 2.4835	44	Av	32.4	-24.3	-22.93	29.17	54	-24.83	-	-	174	161	H
4	* 2.48384	44.29	Av	32.4	-24.3	-22.93	29.46	54	-24.54	-	-	174	161	H
5	2.507	46.61	Av	32.5	-24.3	-22.93	31.88	-	-	-	-	174	161	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Average detection

VERTICAL RESULT

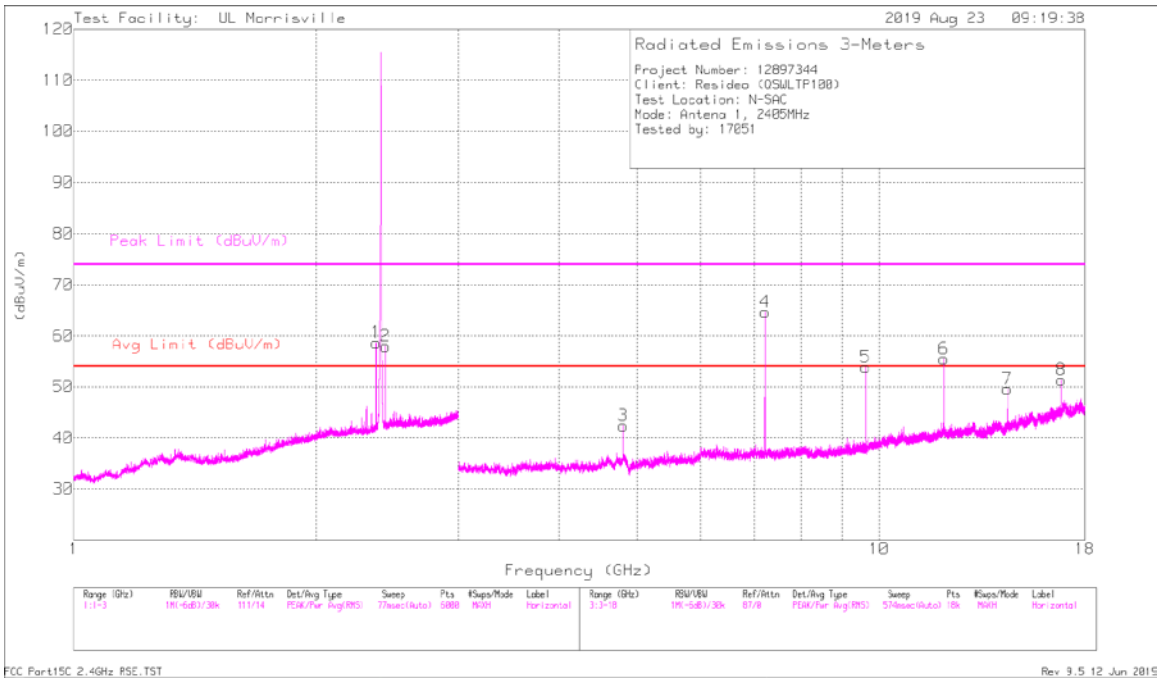


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	54.58	Pk	32.4	-24.3	0	62.68	-	-	74	-11.32	225	280	V
2	* 2.48364	54.44	Pk	32.4	-24.3	0	62.54	-	-	74	-11.46	225	280	V
3	* 2.4835	44.06	Av	32.4	-24.3	-22.93	29.23	54	-24.77	-	-	225	280	V
4	* 2.4838	44.34	Av	32.4	-24.3	-22.93	29.51	54	-24.49	-	-	225	280	V
5	2.50703	46.34	Av	32.5	-24.3	-22.93	31.61	-	-	-	-	225	280	V

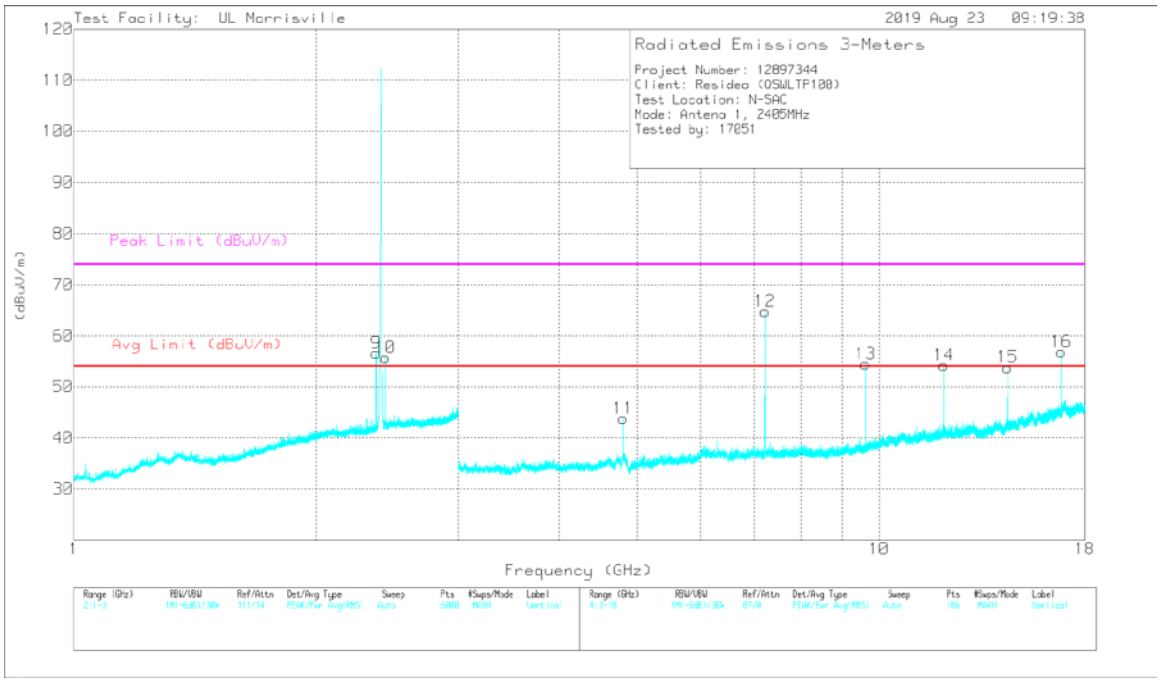
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Average detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



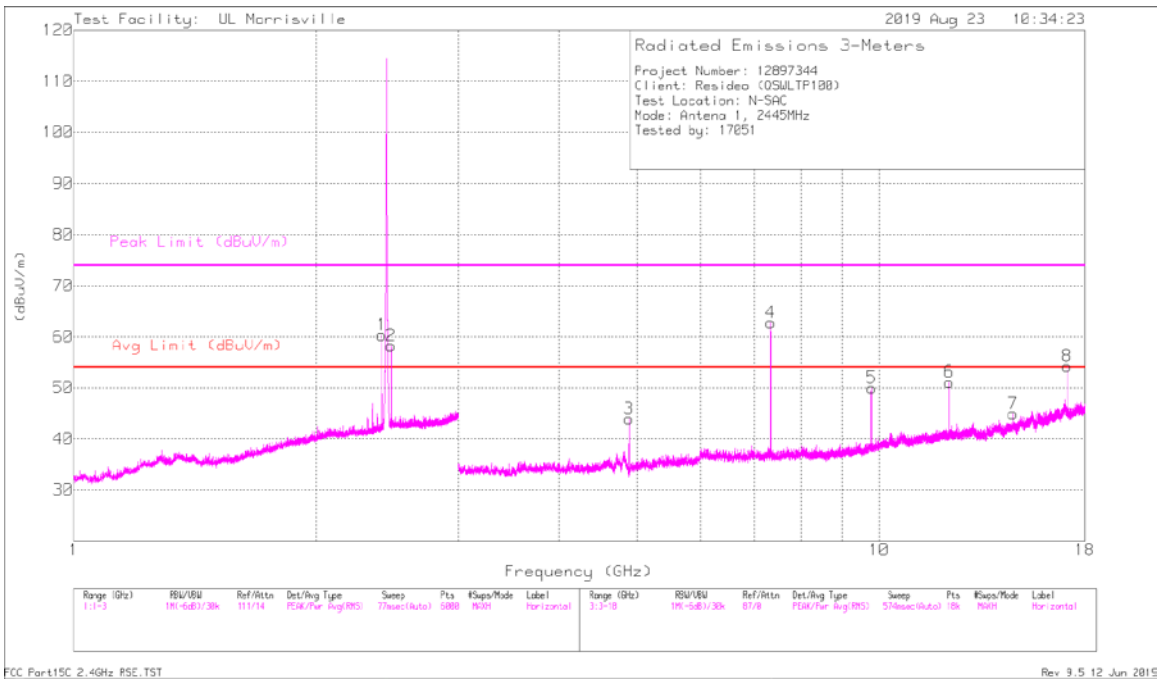
VERTICAL

RADIATED EMISSIONS

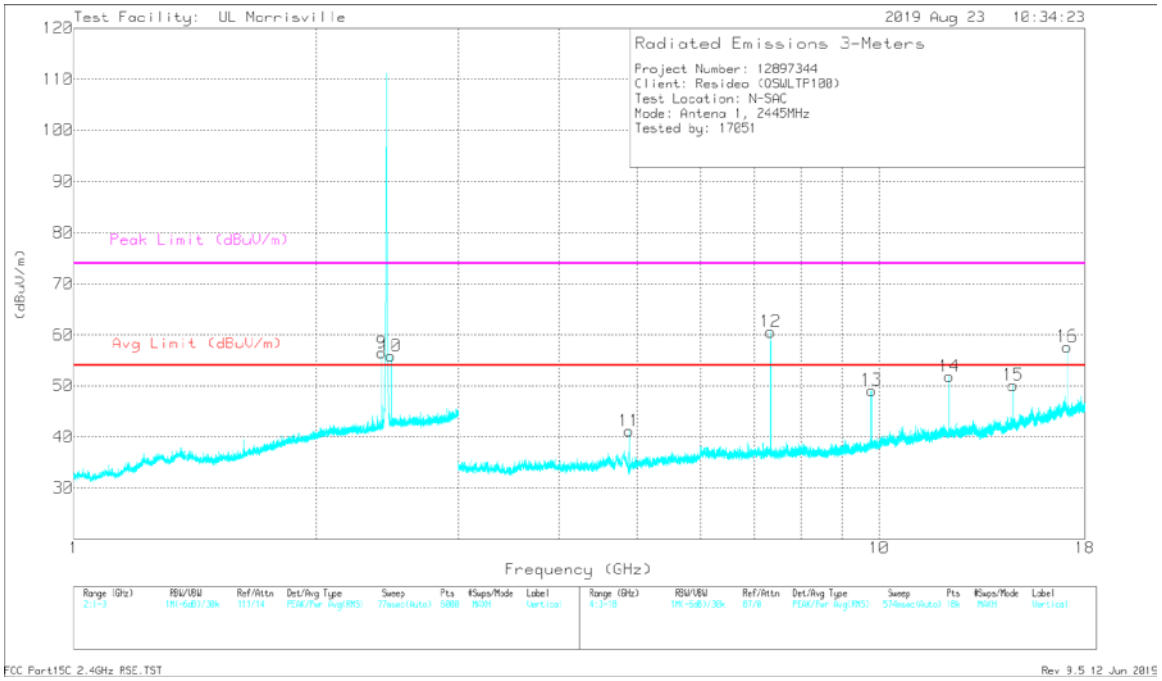
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1[(a)]	* 2.37323	51.18	Pk	31.9	-24.4	0	58.68	-	-	74	-15.32	0-360	98	H
9[(a)]	* 2.37323	49.1	Pk	31.9	-24.4	0	56.6	-	-	74	-17.4	0-360	199	V
3	* 4.80879	47.25	PK-U	34.1	-31.6	0	49.75	-	-	74	-24.25	152	206	H
	* 4.80893	37.91	ADV	34.1	-31.6	-22.93	17.48	54	-36.52	-	-	152	206	H
6	* 12.02235	47.14	PK-U	38.7	-25.5	0	60.34	-	-	74	-13.66	101	123	H
	* 12.02255	39.38	ADV	38.7	-25.5	-22.93	29.65	54	-24.35	-	-	101	123	H
11	* 4.80874	47.68	PK-U	34.1	-31.6	0	50.18	-	-	74	-23.82	100	106	V
	* 4.809	38.45	ADV	34.1	-31.6	-22.93	18.02	54	-35.98	-	-	100	106	V
14	* 12.02226	46.21	PK-U	38.7	-25.5	0	59.41	-	-	74	-14.59	158	137	V
	* 12.02253	38.35	ADV	38.7	-25.5	-22.93	28.62	54	-25.38	-	-	158	137	V
2	2.43724	50.05	Pk	32.3	-24.4	0	57.95	-	-	-	-	0-360	98	H
10	2.43724	47.84	Pk	32.3	-24.4	0	55.74	-	-	-	-	0-360	199	V
12	7.21274	59.06	Pk	35.6	-29.9	0	64.76	-	-	-	-	0-360	102	V
4	7.21357	58.86	Pk	35.6	-29.8	0	64.66	-	-	-	-	0-360	100	H
5	9.61787	45.38	Pk	36.6	-28.1	0	53.88	-	-	-	-	0-360	100	H
13	9.61787	45.98	Pk	36.6	-28.1	0	54.48	-	-	-	-	0-360	102	V
7	14.42731	37.46	Pk	39.2	-27.1	0	49.56	-	-	-	-	0-360	100	H
15	14.43314	41.79	Pk	39.2	-27.2	0	53.79	-	-	-	-	0-360	102	V
8	16.83744	34.67	Pk	41.3	-24.6	0	51.37	-	-	-	-	0-360	199	H
16	16.83828	40.19	Pk	41.3	-24.6	0	56.89	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
ADV: AD primary method, Linear Voltage Average
Note (a): See Antenna-1 low-channel band-edge data.

MID CHANNEL RESULTS



HORIZONTAL



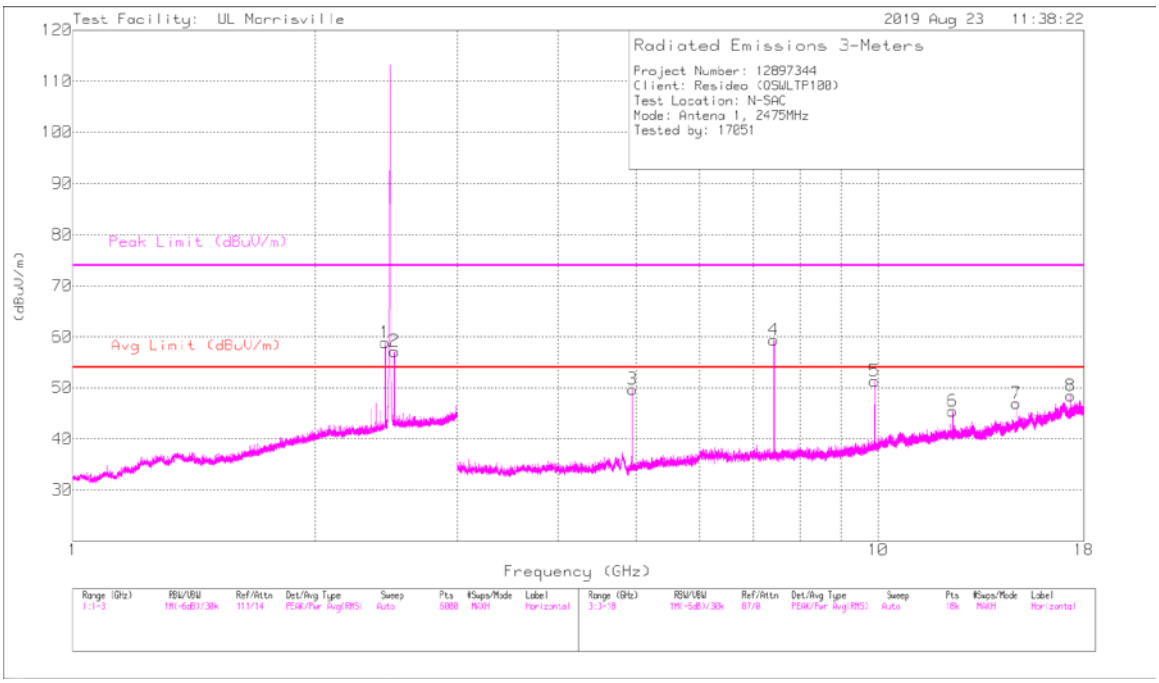
VERTICAL

RADIATED EMISSIONS

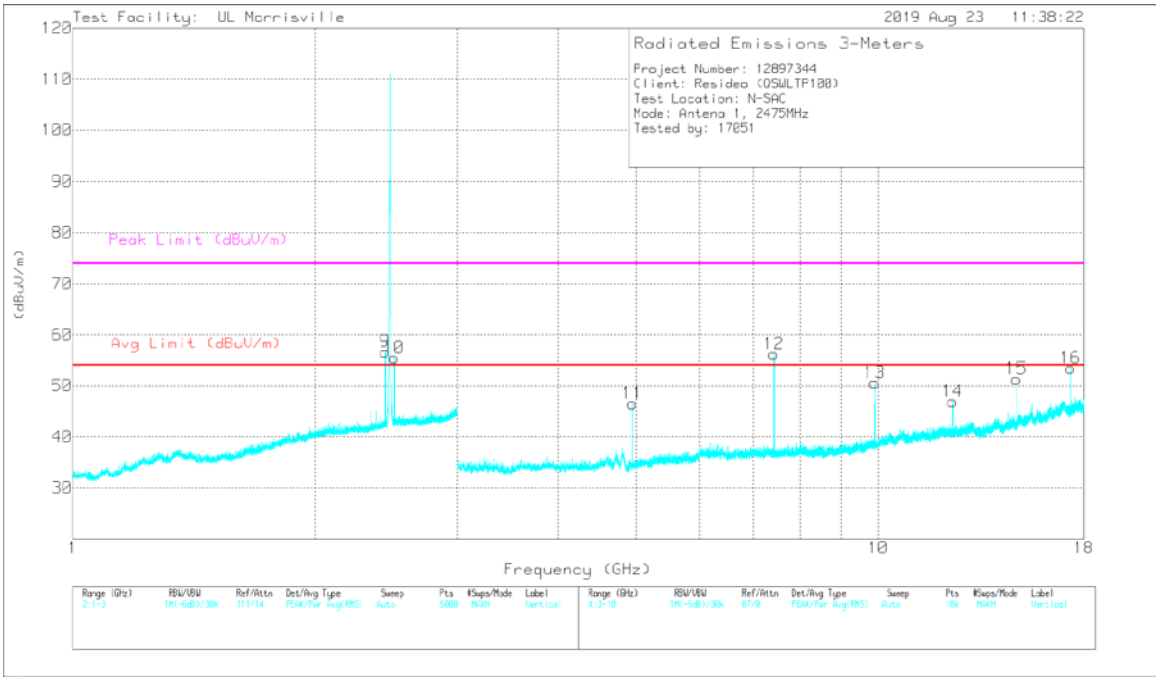
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.89094	47.84	PK-U	33.9	-31.4	0	50.34	-	-	74	-23.66	96	201	H
	* 4.88894	39.41	ADV	33.9	-31.4	-22.93	18.98	54	-35.02	-	-	96	201	H
4	* 7.3333	60.71	PK-U	35.6	-29.1	0	67.21	-	-	74	-6.79	229	227	H
	* 7.33351	54.12	ADV	35.6	-29.1	-22.93	37.69	54	-16.31	-	-	229	227	H
6	* 12.22232	43.87	PK-U	38.8	-26.2	0	56.47	-	-	74	-17.53	103	106	H
	* 12.22243	35.43	ADV	38.8	-26.2	-22.93	25.1	54	-28.9	-	-	103	106	H
11	* 4.89091	44.96	PK-U	33.9	-31.4	0	47.46	-	-	74	-26.54	81	109	V
	* 4.89081	36.27	ADV	33.9	-31.4	-22.93	15.84	54	-38.16	-	-	81	109	V
12	* 7.33634	57.97	PK-U	35.6	-29.1	0	64.47	-	-	74	-9.53	157	100	V
	* 7.33344	51.23	ADV	35.6	-29.1	-22.93	34.8	54	-19.2	-	-	157	100	V
14	* 12.22226	43.5	PK-U	38.8	-26.2	0	56.1	-	-	74	-17.9	154	129	V
	* 12.22236	34.98	ADV	38.8	-26.2	-22.93	24.65	54	-29.35	-	-	154	129	V
9	2.4129	48.87	Pk	32	-24.4	0	56.47	-	-	-	-	0-360	199	V
1	2.41357	52.74	Pk	32	-24.4	0	60.34	-	-	-	-	0-360	102	H
10	2.47658	47.72	Pk	32.4	-24.3	0	55.82	-	-	-	-	0-360	199	V
2	2.47725	50.16	Pk	32.4	-24.3	0	58.26	-	-	-	-	0-360	102	H
5	9.78121	40.39	Pk	36.8	-27.2	0	49.99	-	-	-	-	0-360	199	H
13	9.78121	39.53	Pk	36.8	-27.2	0	49.13	-	-	-	-	0-360	102	V
7	14.66649	31.33	Pk	39.4	-25.8	0	44.93	-	-	-	-	0-360	102	H
15	14.66732	36.53	Pk	39.4	-25.8	0	50.13	-	-	-	-	0-360	102	V
8	17.11162	37.54	Pk	41.2	-24.5	0	54.24	-	-	-	-	0-360	102	H
16	17.11829	40.87	Pk	41.2	-24.4	0	57.67	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
ADV: AD primary method, Linear Voltage Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

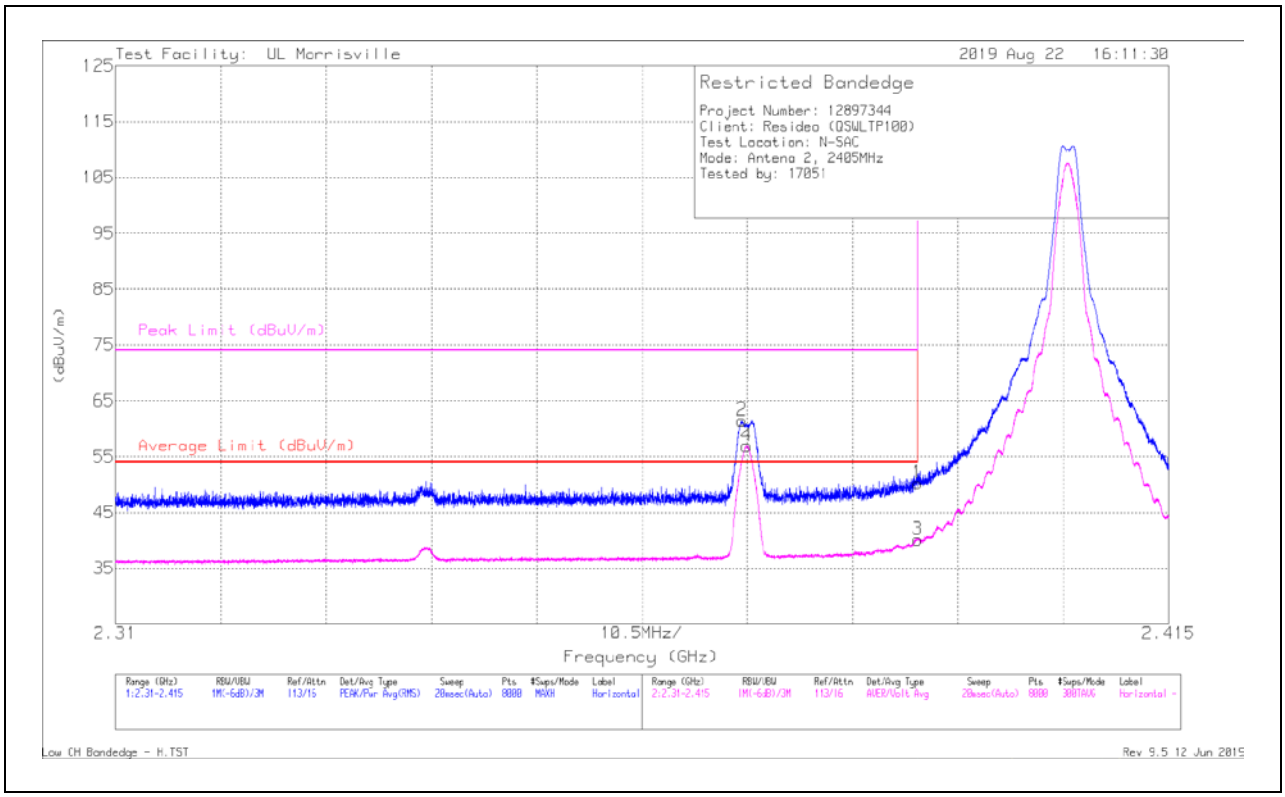
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.94882	51.08	PK-U	33.9	-32.1	0	52.88	-	-	74	-21.12	95	218	H
	* 4.94893	44.01	ADV	33.9	-32.1	-22.93	22.88	54	-31.12	-	-	95	218	H
4	* 7.42633	57.43	PK-U	35.6	-29.2	0	63.83	-	-	74	-10.17	226	215	H
	* 7.42348	50.61	ADV	35.6	-29.2	-22.93	34.08	54	-19.92	-	-	226	215	H
6	* 12.37716	38.5	PK-U	38.8	-26.3	0	51	-	-	74	-23	186	324	H
	* 12.37237	28.65	ADV	38.8	-26.3	-22.93	18.22	54	-35.78	-	-	186	324	H
11	* 4.94896	46.72	PK-U	33.9	-32.1	0	48.52	-	-	74	-25.48	90	159	V
	* 4.94895	38.74	ADV	33.9	-32.1	-22.93	17.61	54	-36.39	-	-	90	159	V
12	* 7.42334	53.37	PK-U	35.6	-29.2	0	59.77	-	-	74	-14.23	159	108	V
	* 7.42346	46.26	ADV	35.6	-29.2	-22.93	29.73	54	-24.27	-	-	159	108	V
14	* 12.37208	40.65	PK-U	38.8	-26.3	0	53.15	-	-	74	-20.85	155	128	V
	* 12.37226	30.6	ADV	38.8	-26.3	-22.93	20.17	54	-33.83	-	-	155	128	V
1	2.44291	50.99	Pk	32.3	-24.4	0	58.89	-	-	-	-	0-360	100	H
9	2.44324	48.78	Pk	32.3	-24.4	0	56.68	-	-	-	-	0-360	200	V
10	2.50659	47.27	Pk	32.5	-24.3	0	55.47	-	-	-	-	0-360	200	V
2	2.50725	48.97	Pk	32.5	-24.3	0	57.17	-	-	-	-	0-360	100	H
13	9.89705	41.18	Pk	37	-27.6	0	50.58	-	-	-	-	0-360	102	V
5	9.89789	41.95	Pk	37	-27.6	0	51.35	-	-	-	-	0-360	102	H
7	14.85233	34.44	Pk	39.7	-27.2	0	46.94	-	-	-	-	0-360	102	H
15	14.85316	38.88	Pk	39.7	-27.2	0	51.38	-	-	-	-	0-360	102	V
16	17.32164	37.19	Pk	41	-24.7	0	53.49	-	-	-	-	0-360	199	V
8	17.3283	32.16	Pk	41	-24.7	0	48.46	-	-	-	-	0-360	102	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
ADV: AD primary method, Linear Voltage Average

Antenna 2

BANDEDGE (LOW CHANNEL)

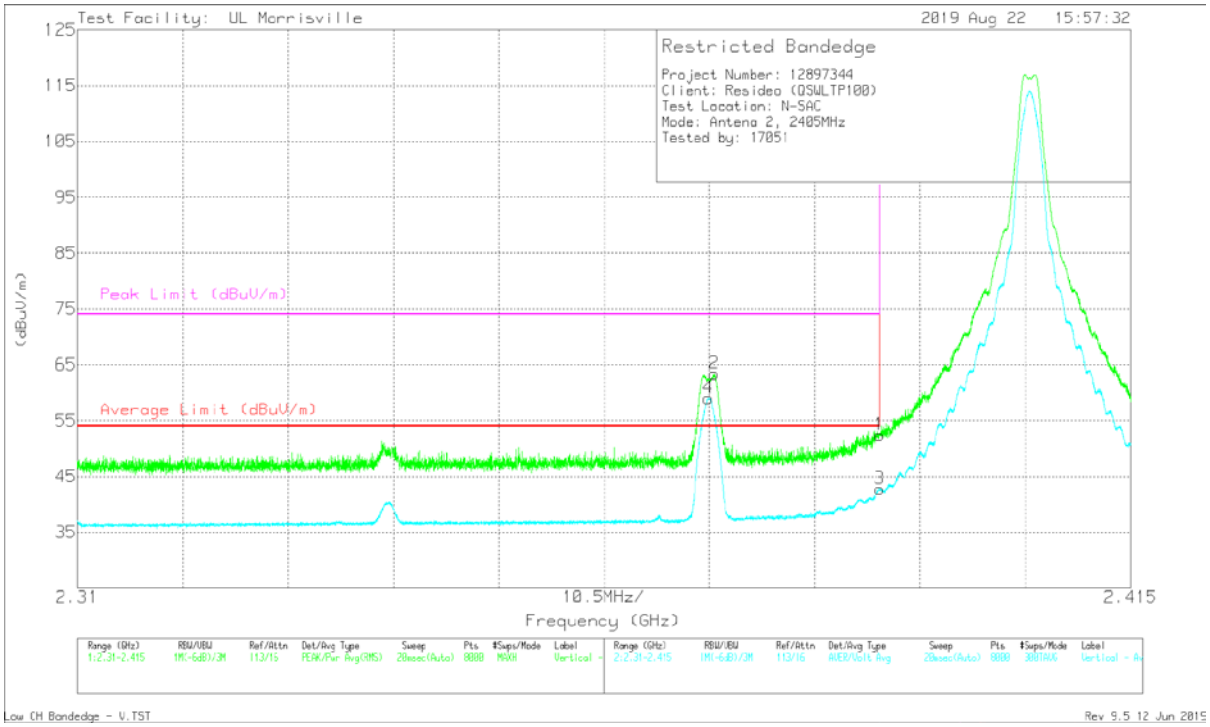
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.63	Pk	32	-24.4	0	50.23	-	-	74	-23.77	298	369	H
2	* 2.37246	54.07	Pk	31.9	-24.5	0	61.47	-	-	74	-12.53	298	369	H
3	* 2.39	32.55	Av	32	-24.4	-22.93	17.22	54	-36.78	-	-	298	369	H
4	* 2.37294	49.42	Av	31.9	-24.4	-22.93	33.99	54	-20.01	-	-	298	369	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Average detection

VERTICAL RESULT

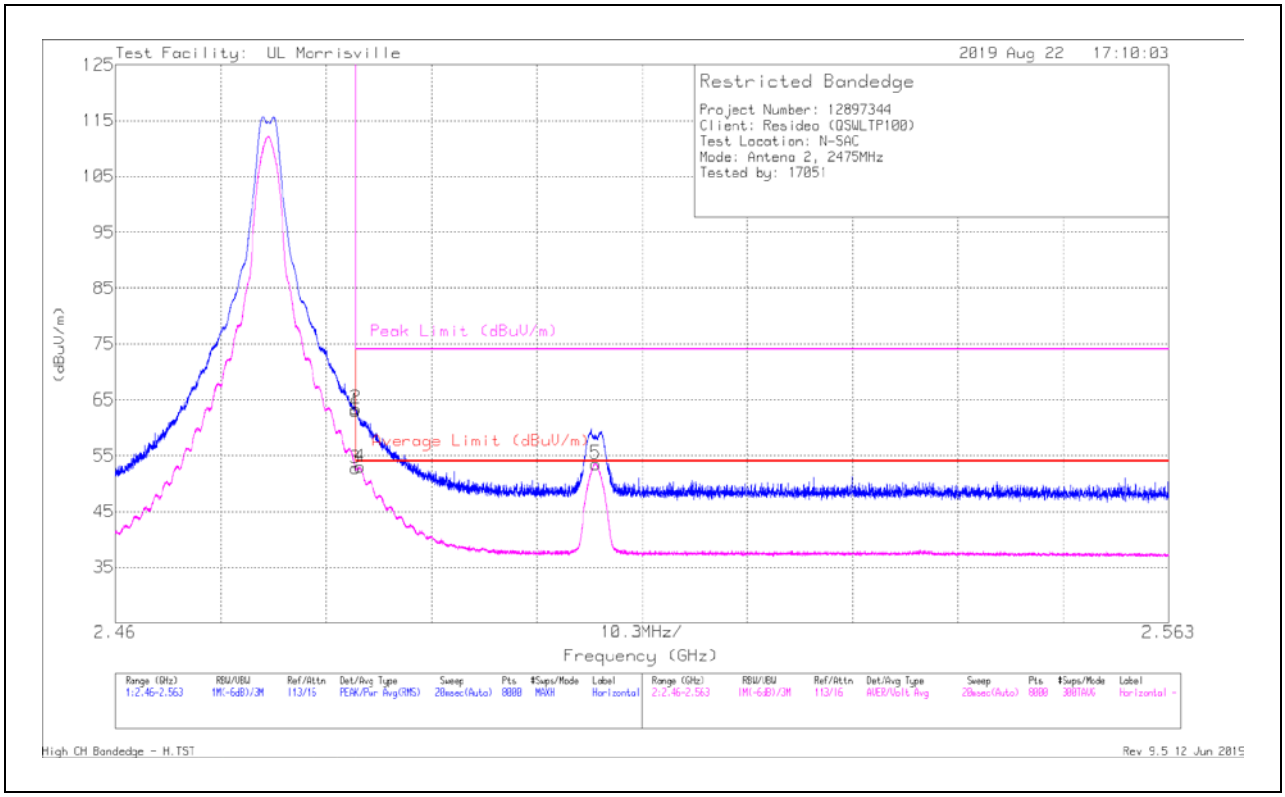


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	44.8	Pk	32	-24.4	0	52.4	-	-	74	-21.6	93	295	V
2	* 2.3735	55.87	Pk	31.9	-24.4	0	63.37	-	-	74	-10.63	93	295	V
3	* 2.39	35.12	Av	32	-24.4	-22.93	19.79	54	-34.21	-	-	93	295	V
4	* 2.37293	51.51	Av	31.9	-24.4	-22.93	36.08	54	-17.92	-	-	93	295	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Average detection

BANDEDGE (HIGH CHANNEL)

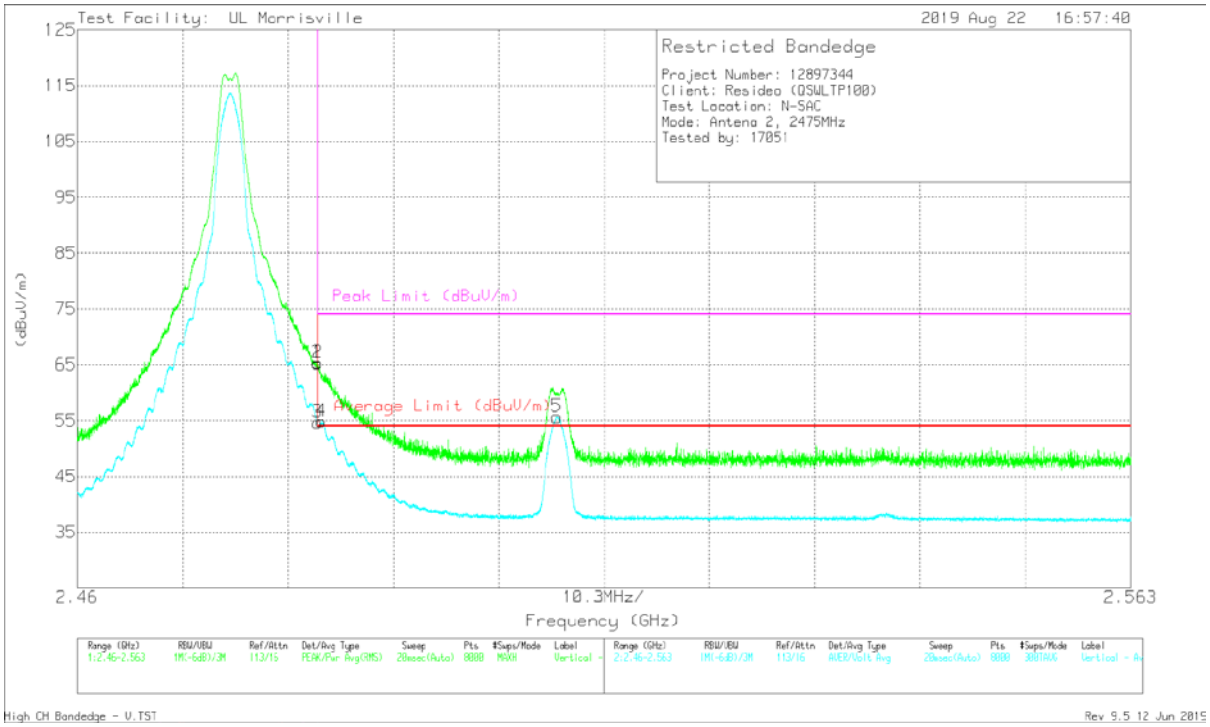
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	54.93	Pk	32.4	-24.3	0	63.03	-	-	74	-10.97	296	373	H
2	* 2.48353	55.35	Pk	32.4	-24.3	0	63.45	-	-	74	-10.55	296	373	H
3	* 2.4835	44.66	Av	32.4	-24.3	-22.93	29.83	54	-24.17	-	-	296	373	H
4	* 2.48393	44.9	Av	32.4	-24.3	-22.93	30.07	54	-23.93	-	-	296	373	H
5	2.50699	45.33	Av	32.5	-24.3	-22.93	30.6	-	-	-	-	296	373	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Average detection

VERTICAL RESULT

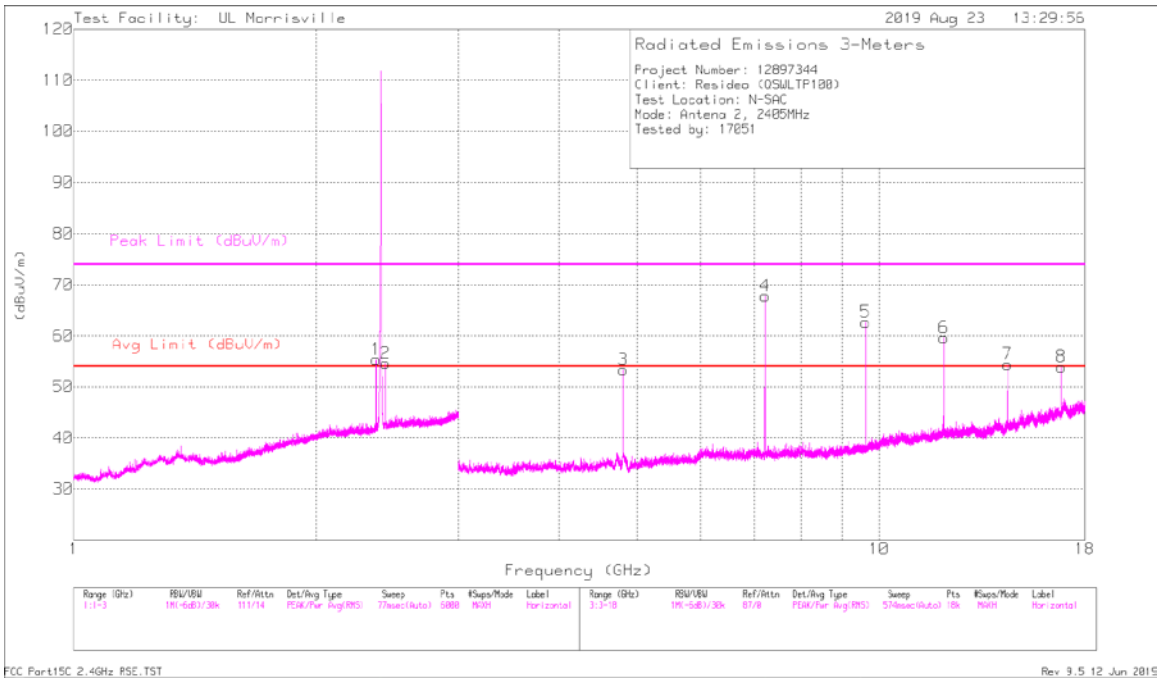


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	57.16	Pk	32.4	-24.3	0	65.26	-	-	74	-8.74	84	378	V
2	* 2.48351	57.25	Pk	32.4	-24.3	0	65.35	-	-	74	-8.65	84	378	V
3	* 2.4835	46.57	Av	32.4	-24.3	-22.93	31.74	54	-22.26	-	-	84	378	V
4	* 2.48387	46.75	Av	32.4	-24.3	-22.93	31.92	54	-22.08	-	-	84	378	V
5	2.5069	47.45	Av	32.5	-24.3	-22.93	32.72	-	-	-	-	84	378	V

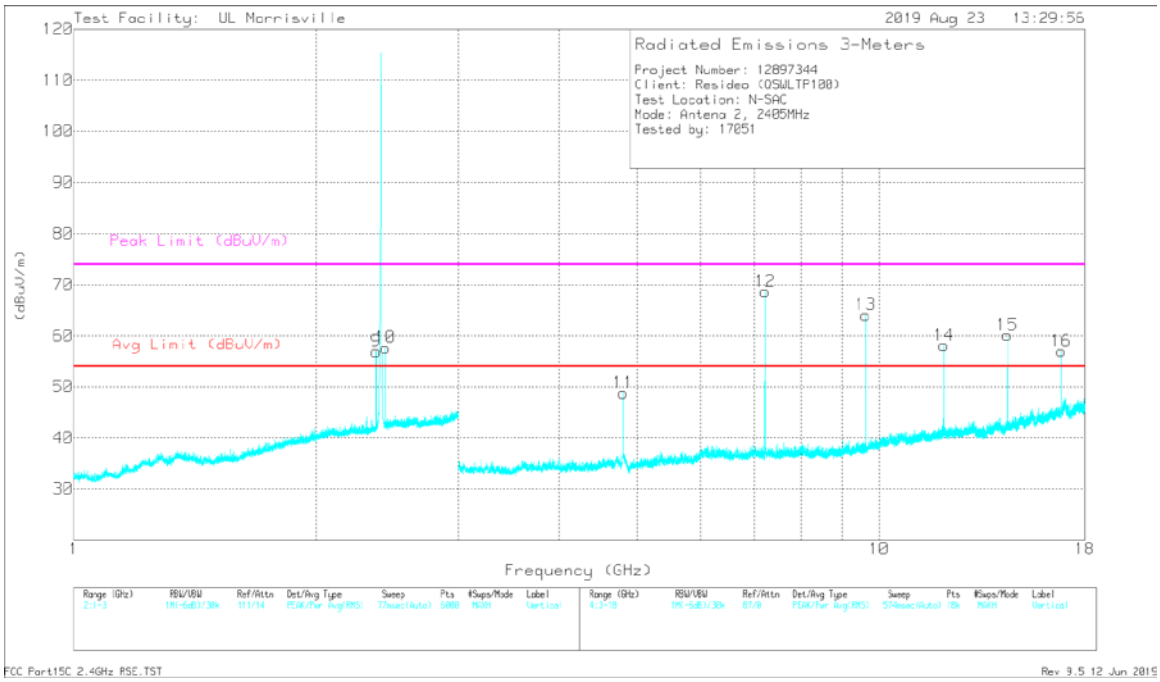
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
Av - Average detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



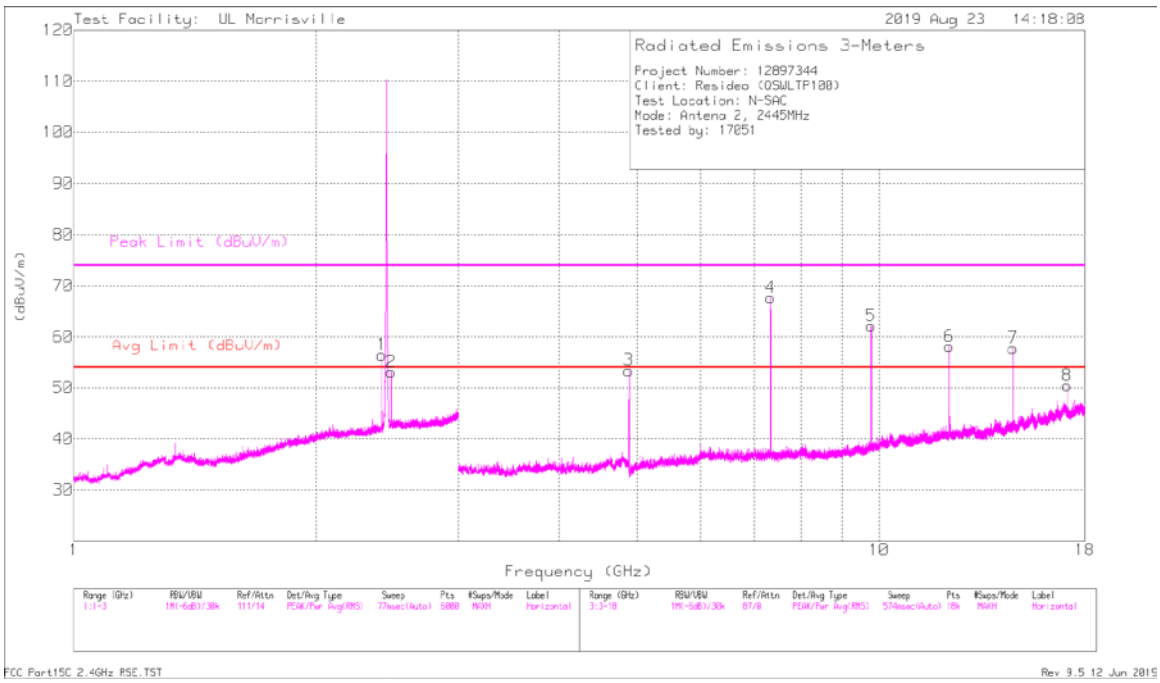
VERTICAL

RADIATED EMISSIONS

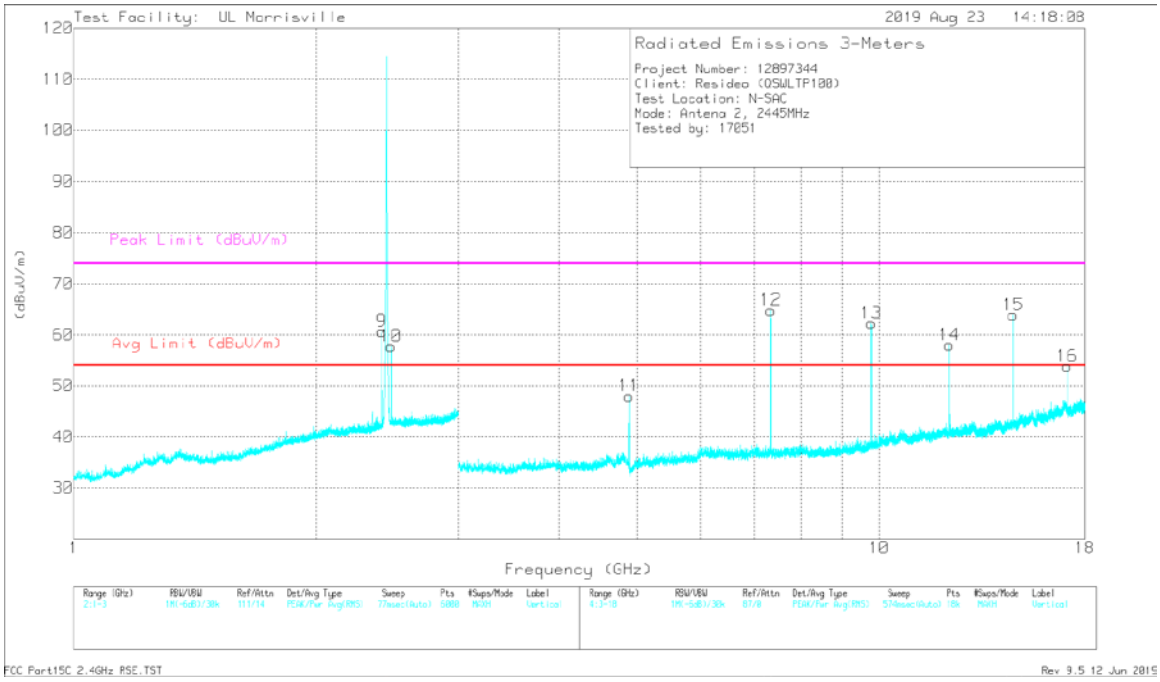
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1[(a)]	* 2.37323	47.87	Pk	31.9	-24.4	0	55.37	-	-	74	-18.63	0-360	100	H
9[(a)]	* 2.37323	49.44	Pk	31.9	-24.4	0	56.94	-	-	74	-17.06	0-360	198	V
3	* 4.81098	56.39	PK-U	34.1	-31.6	0	58.89	-	-	74	-15.11	187	297	H
	* 4.81081	49.21	ADV	34.1	-31.6	-22.93	28.78	54	-25.22	-	-	187	297	H
6	* 12.02215	50.74	PK-U	38.7	-25.5	0	63.94	-	-	74	-10.06	105	109	H
	* 12.02248	43.24	ADV	38.7	-25.5	-22.93	33.51	54	-20.49	-	-	105	109	H
11	* 4.81091	52.13	PK-U	34.1	-31.6	0	54.63	-	-	74	-19.37	48	123	V
	* 4.81085	43.78	ADV	34.1	-31.6	-22.93	23.35	54	-30.65	-	-	48	123	V
14	* 12.0272	50.45	PK-U	38.7	-25.5	0	63.65	-	-	74	-10.35	157	135	V
	* 12.02258	43.11	ADV	38.7	-25.5	-22.93	33.38	54	-20.62	-	-	157	135	V
2	2.43691	46.7	Pk	32.3	-24.4	0	54.6	-	-	-	-	0-360	100	H
10	2.43724	49.78	Pk	32.3	-24.4	0	57.68	-	-	-	-	0-360	198	V
4	7.21607	61.99	Pk	35.6	-29.8	0	67.79	-	-	-	-	0-360	102	H
12	7.21607	62.87	Pk	35.6	-29.8	0	68.67	-	-	-	-	0-360	102	V
13	9.61704	55.59	Pk	36.6	-28.1	0	64.09	-	-	-	-	0-360	102	V
5	9.6212	54.18	Pk	36.6	-28.1	0	62.68	-	-	-	-	0-360	199	H
15	14.42731	48	Pk	39.2	-27.1	0	60.1	-	-	-	-	0-360	102	V
7	14.43314	42.42	Pk	39.2	-27.2	0	54.42	-	-	-	-	0-360	102	H
16	16.83161	40.41	Pk	41.3	-24.7	0	57.01	-	-	-	-	0-360	199	V
8	16.83828	37.2	Pk	41.3	-24.6	0	53.9	-	-	-	-	0-360	199	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
ADV: AD primary method, Linear Voltage Average
Note (a): See Antenna-2 low-channel band-edge data.

MID CHANNEL RESULTS



HORIZONTAL



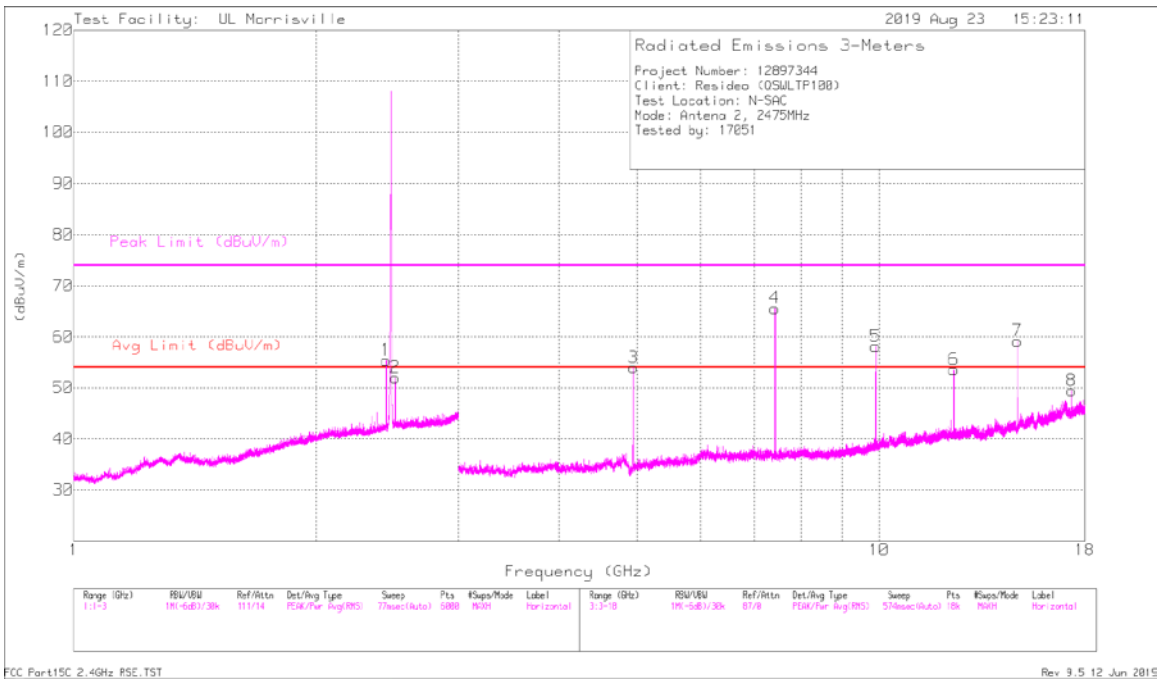
VERTICAL

RADIATED EMISSIONS

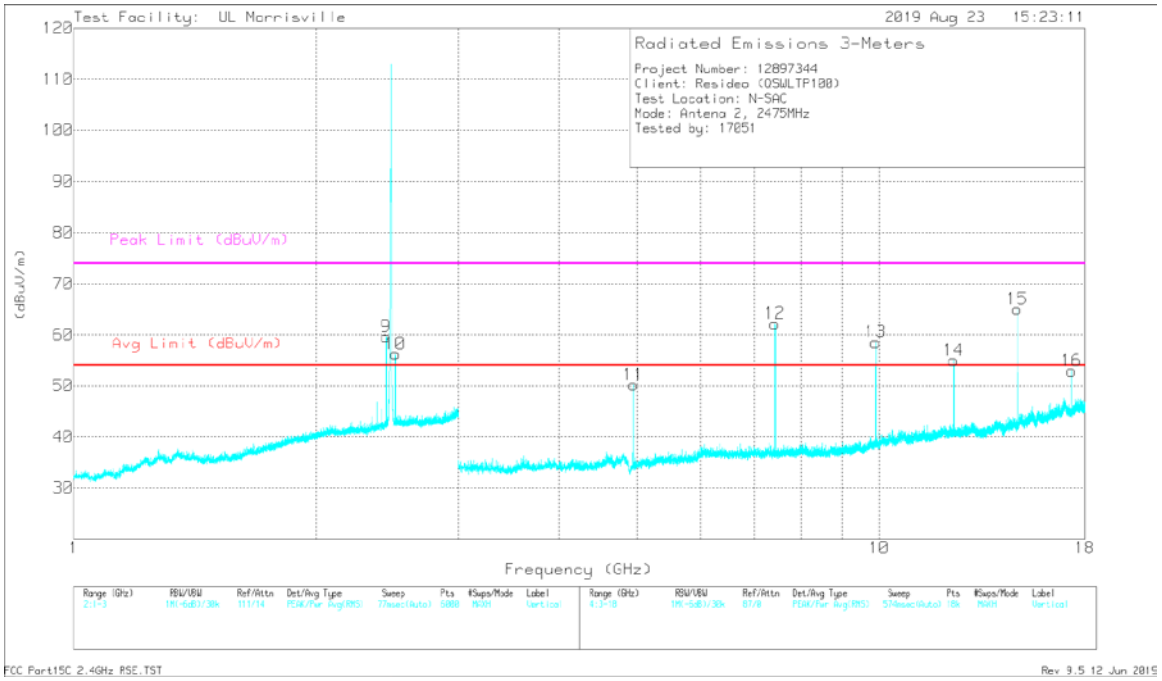
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.88886	55.63	PK-U	33.9	-31.4	0	58.13	-	-	74	-15.87	194	249	H
	* 4.88895	49.05	ADV	33.9	-31.4	-22.93	28.62	54	-25.38	-	-	194	249	H
4	* 7.3333	65.1	PK-U	35.6	-29.1	0	71.6	-	-	74	-2.4	227	219	H
	* 7.33344	58.67	ADV	35.6	-29.1	-22.93	42.24	54	-11.76	-	-	227	219	H
6	* 12.22228	49.78	PK-U	38.8	-26.2	0	62.38	-	-	74	-11.62	104	115	H
	* 12.22239	42.47	ADV	38.8	-26.2	-22.93	32.14	54	-21.86	-	-	104	115	H
11	* 4.88897	50.55	PK-U	33.9	-31.4	0	53.05	-	-	74	-20.95	47	105	V
	* 4.889	43.14	ADV	33.9	-31.4	-22.93	22.71	54	-31.29	-	-	47	105	V
12	* 7.33334	61.75	PK-U	35.6	-29.1	0	68.25	-	-	74	-5.75	268	207	V
	* 7.33349	55.2	ADV	35.6	-29.1	-22.93	38.77	54	-15.23	-	-	268	207	V
14	* 12.22229	50	PK-U	38.8	-26.2	0	62.6	-	-	74	-11.4	159	135	V
	* 12.22237	42.51	ADV	38.8	-26.2	-22.93	32.18	54	-21.82	-	-	159	135	V
9	2.41257	53.08	Pk	32	-24.4	0	60.68	-	-	-	-	0-360	199	V
1	2.41324	48.84	Pk	32	-24.4	0	56.44	-	-	-	-	0-360	98	H
10	2.47725	49.65	Pk	32.4	-24.3	0	57.75	-	-	-	-	0-360	199	V
2	2.47758	44.98	Pk	32.4	-24.3	0	53.08	-	-	-	-	0-360	199	H
5	9.77705	52.43	Pk	36.8	-27.1	0	62.13	-	-	-	-	0-360	199	H
13	9.77788	52.55	Pk	36.8	-27.1	0	62.25	-	-	-	-	0-360	102	V
7	14.67315	44.1	Pk	39.5	-25.8	0	57.8	-	-	-	-	0-360	102	H
15	14.67315	50.2	Pk	39.5	-25.8	0	63.9	-	-	-	-	0-360	102	V
16	17.11162	37.13	Pk	41.2	-24.5	0	53.83	-	-	-	-	0-360	199	V
8	17.11829	33.62	Pk	41.2	-24.4	0	50.42	-	-	-	-	0-360	102	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK: Maximum Peak
ADV: AD primary method, Linear Voltage Average

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 4.9509	56.22	PK-U	33.9	-32.1	0	58.02	-	-	74	-15.98	193	240	H
	* 4.95088	49.61	ADV	33.9	-32.1	-22.93	28.48	54	-25.52	-	-	193	240	H
4	* 7.4264	62.89	PK-U	35.6	-29.2	0	69.29	-	-	74	-4.71	226	215	H
	* 7.4235	56.25	ADV	35.6	-29.2	-22.93	39.72	54	-14.28	-	-	226	215	H
6	* 12.3722	46.1	PK-U	38.8	-26.3	0	58.6	-	-	74	-15.4	103	102	H
	* 12.3724	38.03	ADV	38.8	-26.3	-22.93	27.6	54	-26.4	-	-	103	102	H
11	* 4.95086	52	PK-U	33.9	-32.1	0	53.8	-	-	74	-20.2	139	207	V
	* 4.95091	44.79	ADV	33.9	-32.1	-22.93	23.66	54	-30.34	-	-	139	207	V
12	* 7.42339	59.28	PK-U	35.6	-29.2	0	65.68	-	-	74	-8.32	158	100	V
	* 7.42342	52.48	ADV	35.6	-29.2	-22.93	35.95	54	-18.05	-	-	158	100	V
14	* 12.37218	47.09	PK-U	38.8	-26.3	0	59.59	-	-	74	-14.41	160	203	V
	* 12.37233	39.33	ADV	38.8	-26.3	-22.93	28.9	54	-25.1	-	-	160	203	V
1	2.44324	47.51	Pk	32.3	-24.4	0	55.41	-	-	-	-	0-360	199	H
9	2.44324	51.69	Pk	32.3	-24.4	0	59.59	-	-	-	-	0-360	199	V
2	2.50692	43.82	Pk	32.5	-24.3	0	52.02	-	-	-	-	0-360	199	H
10	2.50725	48.05	Pk	32.5	-24.3	0	56.25	-	-	-	-	0-360	199	V
5	9.89705	48.7	Pk	37	-27.6	0	58.1	-	-	-	-	0-360	199	H
13	9.89705	49.16	Pk	37	-27.6	0	58.56	-	-	-	-	0-360	102	V
15	14.8465	52.6	Pk	39.7	-27.3	0	65	-	-	-	-	0-360	102	V
7	14.85316	46.69	Pk	39.7	-27.2	0	59.19	-	-	-	-	0-360	102	H
16	17.32164	36.62	Pk	41	-24.7	0	52.92	-	-	-	-	0-360	199	V
8	17.3283	33.18	Pk	41	-24.7	0	49.48	-	-	-	-	0-360	102	H

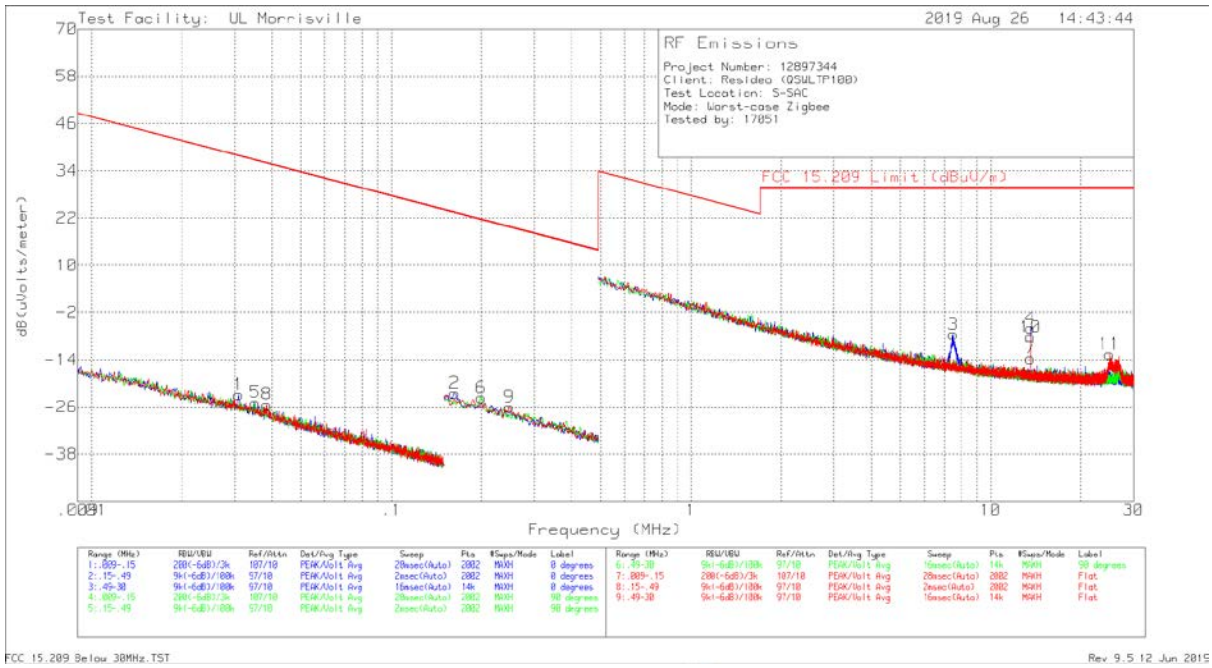
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
Pk - Peak detector
PK-U: Maximum Peak
ADV: primary method, Linear Voltage Average

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL: (919) 549-1400

9.3. WORST CASE BELOW 30MHZ

SPURIOUS EMISSIONS BELOW 30 MHz (WORST-CASE CONFIGURATION)

Note: All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (test distance / specification distance).



ANTENNA- THREE ORIENTATIONS

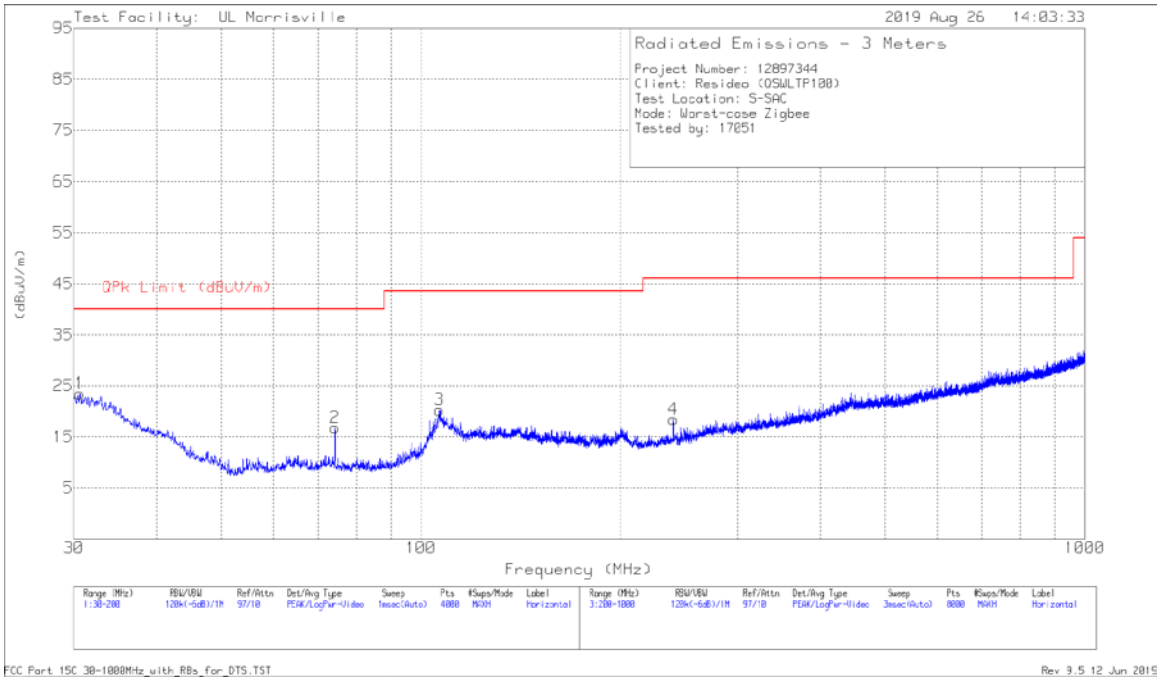
Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uVolts/meter)	FCC 15.209 Av and QP Limit (dBuV/m)	FCC 15.209 Pk Limit (dBuV/m)	Worst-Case Margin (dB)	Azimuth (Degs)
	Loop antenna @ 0 degrees.										
1	.03098	43.98	Pk	13.1	.1	-80	-22.82	37.78	57.78	-60.6	0-360
2	.1625	46.4	Pk	11	.1	-80	-22.5	23.39	43.39	-45.89	0-360
3	7.48751	21.49	Pk	10.6	.4	-40	-7.51	29.54	-	-37.05	0-360
4	13.56171	23.43	Pk	10	.6	-40	-5.97	29.54	-	-35.51	0-360
	Loop antenna @ 90 degrees.										
5	.03518	42.34	Pk	12.7	.1	-80	-24.86	36.68	56.68	-61.54	0-360
6	.19939	45.23	Pk	11	.1	-80	-23.67	21.61	41.61	-45.28	0-360
7	13.5596	15.73	Pk	10	.6	-40	-13.67	29.54	-	-43.21	0-360
8	.0384	42.06	Pk	12.5	.1	-80	-25.34	35.92	55.92	-61.26	0-360
	Loop antenna flat										
9	.24835	42.91	Pk	11	.1	-80	-25.99	19.7	39.7	-45.69	0-360
10	13.5596	21.25	Pk	10	.6	-40	-8.15	29.54	-	-37.69	0-360
11	24.91329	17.82	Pk	8.8	.8	-40	-12.58	29.54	-	-42.12	0-360

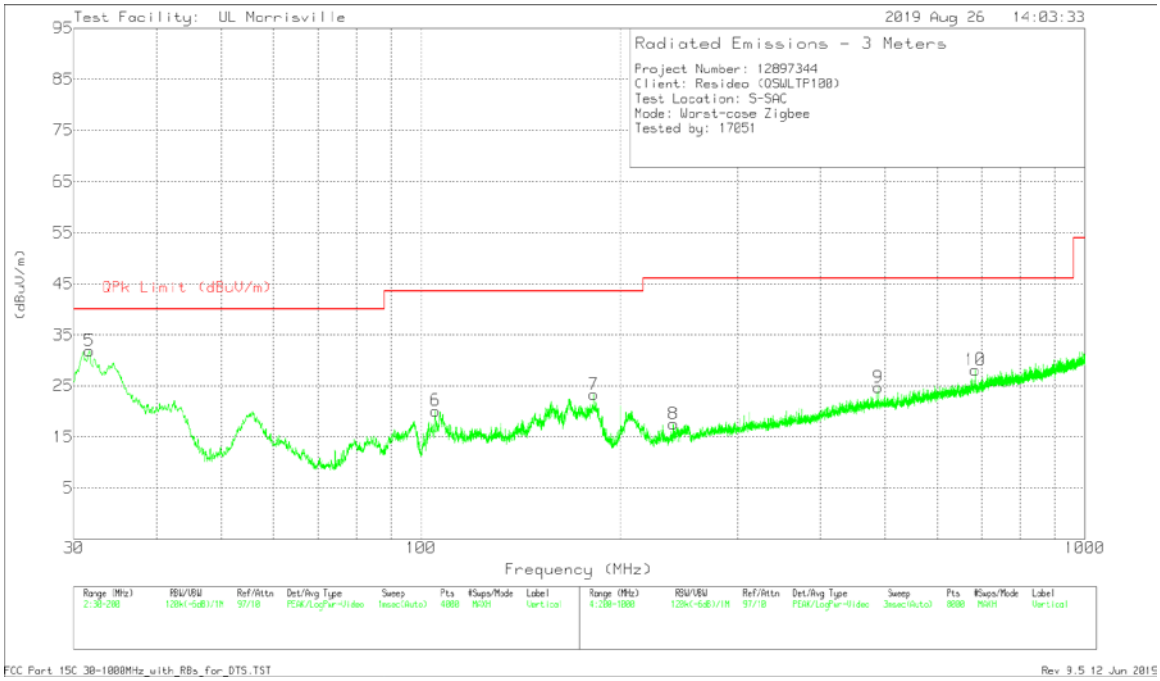
Pk - Peak detector

9.4. WORST CASE BELOW 1 GHZ

SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION)



HORIZONTAL



VERTICAL

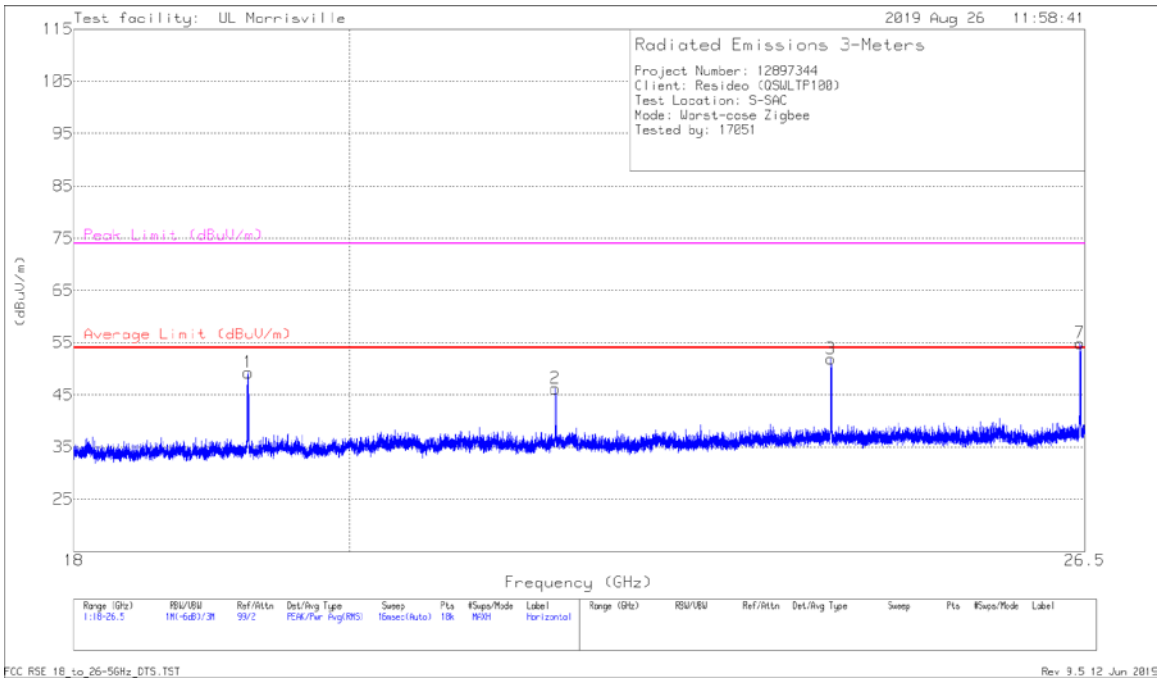
Below 1GHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0066 AF (dB/m)	Cbl/Amp	Filter (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	* 74.254	35.61	Pk	12.3	-31.2	.1	16.81	40	-23.19	0-360	398	H
4	* 240.0052	31.95	Pk	16.2	-30	.3	18.45	46.02	-27.57	0-360	198	H
8	* 240.0052	31.07	Pk	16.2	-30	.3	17.57	46.02	-28.45	0-360	102	V
1	30.6377	29.58	Pk	25.6	-31.8	.1	23.48	-	-	0-360	100	H
5	31.6579	38.67	Pk	24.9	-31.8	.1	31.87	-	-	0-360	102	V
6	105.1594	35.22	Pk	15.7	-31	.2	20.12	-	-	0-360	102	V
3	106.7749	34.96	Pk	16.1	-31	.2	20.26	-	-	0-360	299	H
7	182.0618	37.48	Pk	15.8	-30.3	.3	23.28	-	-	0-360	102	V
9	488.3375	31.19	Pk	22	-28.9	.4	24.69	-	-	0-360	102	V
10	683.9629	31.63	Pk	24.4	-28.4	.5	28.13	-	-	0-360	198	V

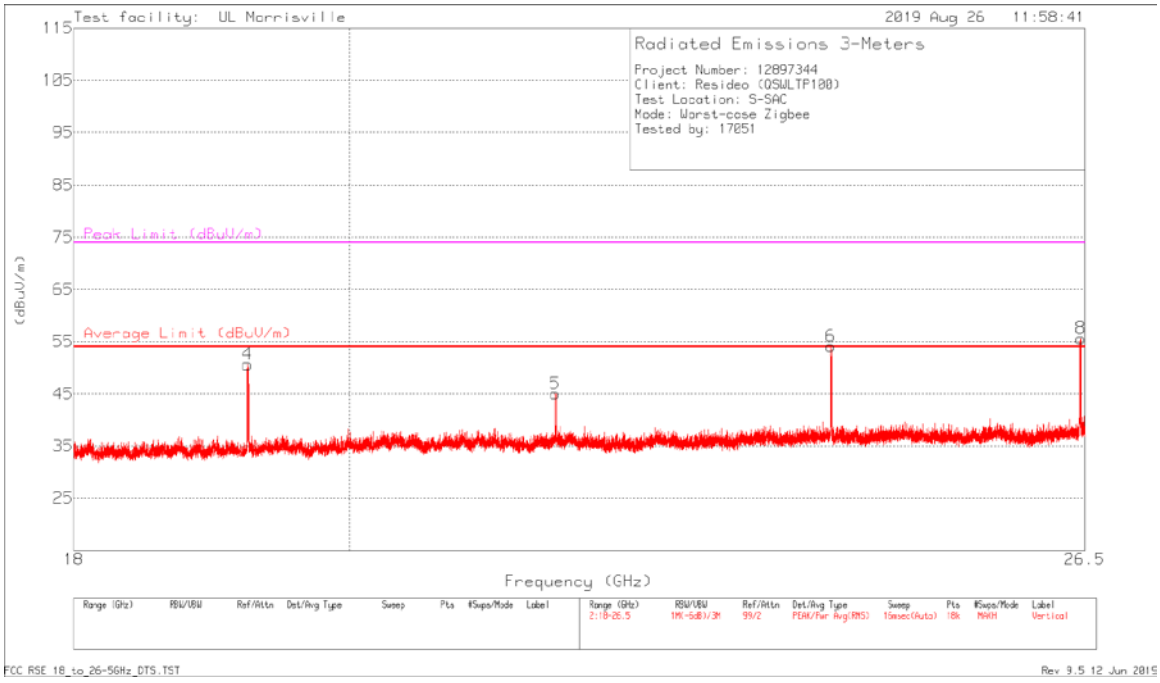
Pk - Peak detector

9.5. WORST CASE 18-26 GHZ

SPURIOUS EMISSIONS 18-26 GHz (WORST-CASE CONFIGURATION)



HORIZONTAL



VERTICAL

18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (dB/m)	Cbl/Amp (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 19.24377	59.13	PK-U	32.7	-38.8	0	53.03	-	-	74	-20.97	270	125	H
	* 19.24346	51.22	ADV	32.7	-38.8	-22.93	22.19	54	-31.81	-	-	270	125	H
4	* 19.24376	58.76	PK-U	32.7	-38.8	0	52.66	-	-	74	-21.34	218	245	V
	* 19.23591	50.55	ADV	32.7	-38.8	-22.93	21.52	54	-32.48	-	-	218	245	V
5	21.63962	49.81	Pk	33.3	-38.1	0	45.01	-	-	-	-	0-360	252	V
2	21.64009	50.99	Pk	33.3	-38.1	0	46.19	-	-	-	-	0-360	148	H
3	24.04477	55.18	Pk	34	-37.3	0	51.88	-	-	-	-	0-360	248	H
6	24.04477	57.38	Pk	34	-37.3	0	54.08	-	-	-	-	0-360	202	V
7	26.44899	56.18	Pk	34.6	-35.9	0	54.88	-	-	-	-	0-360	198	H
8	26.45985	56.83	Pk	34.6	-35.8	0	55.63	-	-	-	-	0-360	102	V

Pk - Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

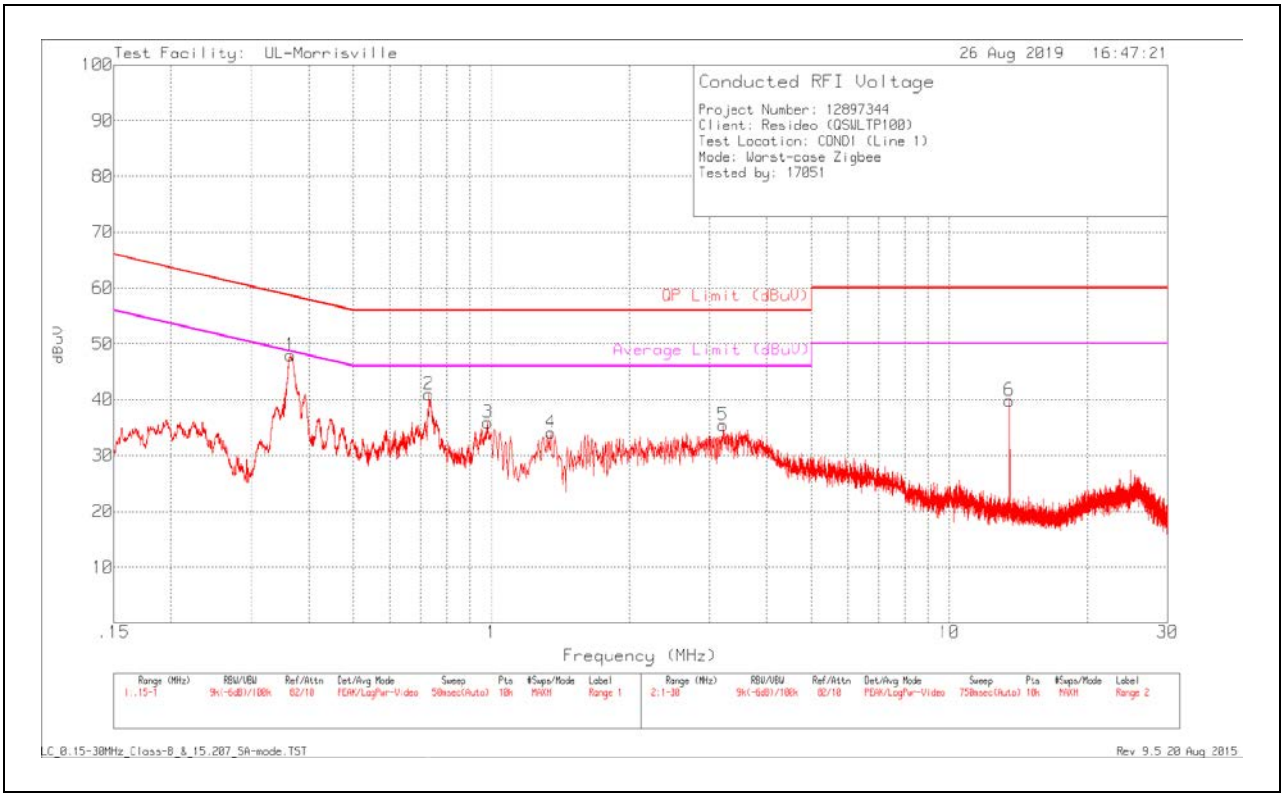
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

RESULTS

10.1.1. AC Power Line Host

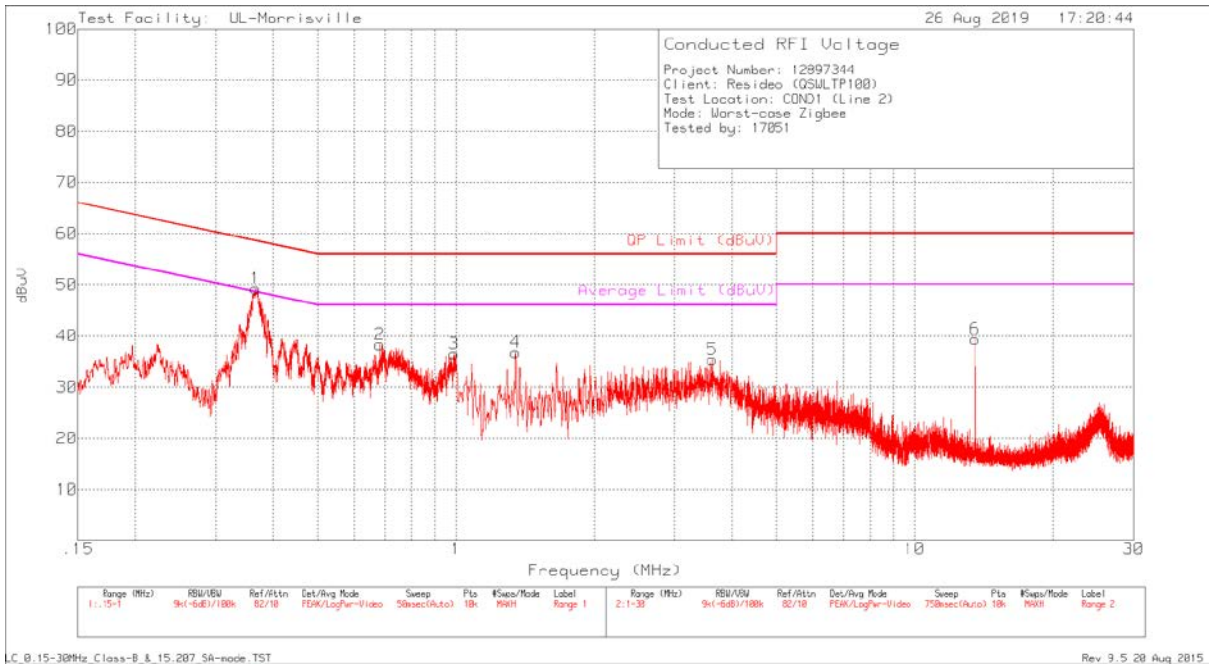
LINE 1 RESULTS



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	.3657	33.97	Qp	.1	10	44.07	58.6	-14.53	-	-
	.3657	25.56	Ca	.1	10	35.66	-	-	48.6	-12.94
2	.73639	24.47	Qp	0	10	34.47	56	-21.53	-	-
	.73639	13.57	Ca	0	10	23.57	-	-	46	-22.43
3	.98096	25.92	Pk	0	10	35.92	56	-20.08	46	-10.08
4	1.35054	23.98	Pk	0	10.1	34.08	56	-21.92	46	-11.92
5	3.20462	25.29	Pk	0	10.1	35.39	56	-20.61	46	-10.61
6	13.56139	29.37	Pk	.1	10.4	39.87	60	-20.13	50	-10.13

Pk - Peak detector
Qp - Quasi-Peak detector
Ca - CISPR average detection

LINE 2 RESULTS



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	.36609	32.75	Qp	.1	10	42.85	58.59	-15.74	-	-
	.36609	19.65	Ca	.1	10	29.75	-	-	48.59	-18.84
2	.68329	28.22	Pk	.1	10	38.32	56	-17.68	46	-7.68
3	.99235	26.49	Pk	0	10	36.49	56	-19.51	46	-9.51
4	1.35054	26.71	Pk	0	10.1	36.81	56	-19.19	46	-9.19
5	3.62758	25.28	Pk	0	10.1	35.38	56	-20.62	46	-10.62
6	13.56139	28.91	Pk	.1	10.4	39.41	60	-20.59	50	-10.59

Pk - Peak detector
Qp - Quasi-Peak detector
Ca - CISPR average detection

11. SETUP PHOTOS

Please refer to R12897344-EP1 for setup photos.

END OF TEST REPORT

UL LLC
12 Laboratory Dr., RTP, NC 27709; USA TEL: (919) 549-1400