



CERTIFICATION TEST REPORT

Report Number: R13333199-E1

Applicant : Resideo
2 Corporate Center Drive
Melville, NY 11749-3265, USA

Model : ProA7

FCC ID : CFS8DL-GRIPAI07B

IC : 573F-GRIPAI07B

EUT Description : Alarm Control Panel

Test Standard(s) : FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 ISSUE 2
ISED RSS-GEN ISSUE 5

Date Of Issue:
2020-07-17

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REPORT REVISION HISTORY

Ver.	Issue Date	Revisions	Revised By
1	2020-06-30	Initial Issue	Brian T. Kiewra
2	2020-07-01	Corrected conducted setup photo	Brian T. Kiewra
3	2020-07-17	Revised report to show that peak power for 802.15.4 is for reference only and average power for BLE is for reference only	Brian T. Kiewra

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: Alarm Control Panel

MODEL: ProA7

SERIAL NUMBER: MEL-943

DATE TESTED: 2020-04-30 to 2020-06-09

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.

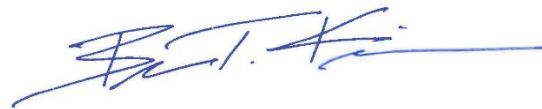
This document may not be altered or revised in any way unless done so by UL LLC and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL LLC will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. government.

Approved & Released
For UL LLC By:

Prepared By:



Jeffrey Moser
Operations Manager
Consumer Technology Division
UL LLC



Brian T. Kiewra
Project Engineer
Consumer Technology Division
UL LLC

2. TEST RESULTS SUMMARY

FCC Clause	ISED Clause	Requirement	Result	Comment
ANSI C63.10 Section 11.6.		Duty Cycle	See Comment	See Note 1
ANSI C63.10 Section 6.9.3.	RSS-GEN 6.7	99% OBW		
15.247 (a) (2)	RSS-247 5.2 (a)	6dB BW		
15.247 (b) (3)	RSS-247 5.4 (d)	Output Power	Compliant	None
Per ANSI C63.10, Section 11.9.2.3.2.		Average power		
15.247 (e)	RSS-247 5.2 (b)	PSD	See Comment	See Note 1
15.247 (d)	RSS-247 5.5	Conducted Spurious Emissions		
15.209, 15.205	RSS-GEN 8.9, 8.10	Radiated Emissions	Compliant	None
15.207	RSS-Gen 8.8	AC Mains Conducted Emissions		

Note 1: Manufacturer requested power, radiated emissions, and AC mains line conducted emissions testing only. Remaining test results to be leveraged from separate test reports and/or documentation. This documentation will be provided by the manufacturer upon request.

3. 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.

4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, NC 27709, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560, 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.
Site Code: 2180C	
<input type="checkbox"/> Chamber A RTP	<input checked="" type="checkbox"/> North Chamber
<input type="checkbox"/> Chamber C RTP	<input checked="" type="checkbox"/> 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

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. 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.

5.2. 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.)

5.3. 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	± 3.07 dB
Worst Case Radiated Disturbance, 9kHz to 26GHz	± 4.88 dB

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

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\text{Field Strength (dBuV/m)} = \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \text{Cable Loss (dB)} - \text{Preamp Gain (dB)}$$

$$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

$$\text{Final Voltage (dBuV)} = \text{Measured Voltage (dBuV)} + \text{Cable Loss (dB)} + \text{Limiter Factor (dB)} + \text{LISN Insertion Loss.}$$

$$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$$

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The EUT is a control panel with a proprietary 802.15.4 and BLE transceivers.

6.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2402 - 2480	BLE	1.11	1.29
2405 - 2475	802.15.4 - ANT1	21.50	141.25
2405 - 2475	802.15.4 - ANT2	20.98	125.31

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The BLE radio utilizes an BLE antenna, with a maximum gain of 6 dBi.

The 802.15.4 transmitters utilizes two antennas for diversity with maximum gains of:

Antenna 1: 6.6 dBi

Antenna 2: 4.7 dBi

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was v 20200226164413 v01.23-1632.

The test utility software used during testing was TestMenuScript.sh

6.5. 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 with highest output power 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 EUT is intended to operate in only one orientation (wall mounted). Therefore, all final radiated testing was performed with the EUT in its intended orientation.

6.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

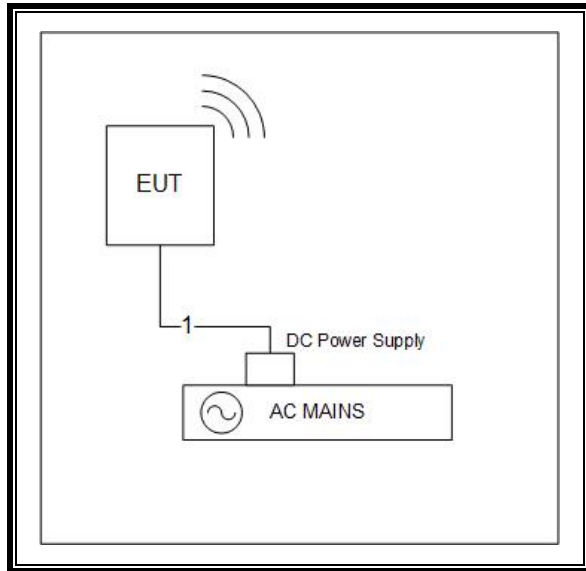
Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
Power Supply	Honeywell	ADS-25STA-1209023EPCU	300-10260C1K5066084	N/A

I/O CABLES

I/O Cable List						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC Mains	1	Barrel	Main	<3m	DC Mains from power supply

SETUP DIAGRAMS

Please refer to R13333199-EP1 for setup diagrams



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)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
0.009-30MHz (Loop Ant.)					
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2019-08-08	2020-08-08
30-1000 MHz					
AT0073	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2019-08-08	2020-08-08
1-18 GHz					
AT0069 <small>(Out of service @ noon on 05/09/2020)</small>	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2019-05-15	2020-05-15
AT0072 <small>(In service @ noon on 05/09/2020)</small>	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2020-04-27	2021-04-27
Gain-Loss Chains					
N-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2020-04-24	2021-04-24
N-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2019-05-02, 2020-04-24	2020-05-02, 2021-04-24
N-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-03-15	2021-03-15
Receiver & Software					
SA0025	Spectrum Analyzer	Agilent	N9030A	2020-03-17	2021-03-17
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
Additional Equipment used					
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)

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
0.009-30MHz (Loop Ant.)					
AT0079	Active Loop Antenna	ETS-Lindgren	6502	2019-08-08	2020-08-08
30-1000 MHz					
AT0074	Hybrid Broadband Antenna	Sunol Sciences Corp.	JB3	2019-07-16	2020-07-16
1-18 GHz					
AT0078	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2019-10-28	2020-10-28
18-26 GHz					
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2019-11-07	2020-11-07
Gain-Loss Chains					
S-SAC01	Gain-loss string: 0.009-30MHz	Various	Various	2020-04-23	2021-04-23
S-SAC02	Gain-loss string: 25-1000MHz	Various	Various	2020-04-23	2021-04-23
S-SAC03	Gain-loss string: 1-18GHz	Various	Various	2020-04-12	2021-04-12
S-SAC04	Gain-loss string: 18-40GHz	Various	Various	2020-03-23	2021-03-23
Receiver & Software					
SA0027	Spectrum Analyzer	Agilent	N9030A	2019-05-15	2020-05-31
SOFTEMI	EMI Software	UL	Version 9.5	NA	NA
Additional Equipment used					
s/n 181474409	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27

Test Equipment Used - Wireless Conducted Measurement Equipment

Equipment ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
72822	Spectrum Analyzer	Keysight Technologies	E4446A	2020-01-02	2021-01-02
PWM004 (PRE0137346)	RF Power Meter	Keysight Technologies	N1911A	2019-08-23	2020-08-23
PWS004 (PRE0126443)	Peak and Avg Power Sensor, 50MHz to 6GHz	Keysight Technologies	E9323A	2019-08-23	2020-08-23
SN 181474341	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27
76021	DC Regulated Power Supply	CircuitSpecialists.Com	CSI3005X5	N/A	N/A
PS215	CW-AC Power Source	Ametek	CW2501	NA	NA

Test Equipment Used - Conducted Disturbance Emissions Test Equipment (Morrisville – COND1)

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 161024885	Environmental Meter	Fisher Scientific	15-0770-963	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 June 15, 2019	NA	NA

8. MEASUREMENT METHOD

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter

Output Power: ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

Emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1 and 6.10.5

Radiated Spurious Emissions: ANSI C63.10-2013 Section 6.3 – 6.6

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

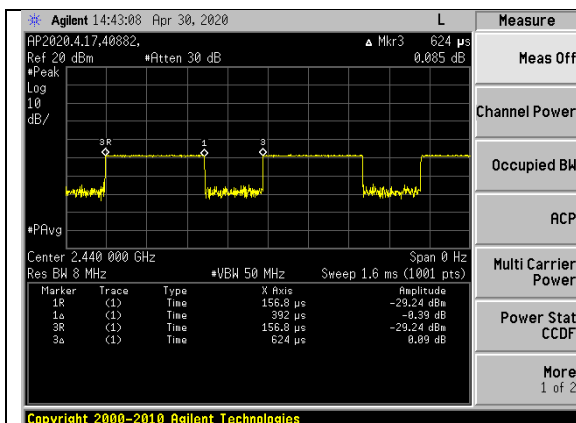
LIMITS

None; for reporting purposes only.

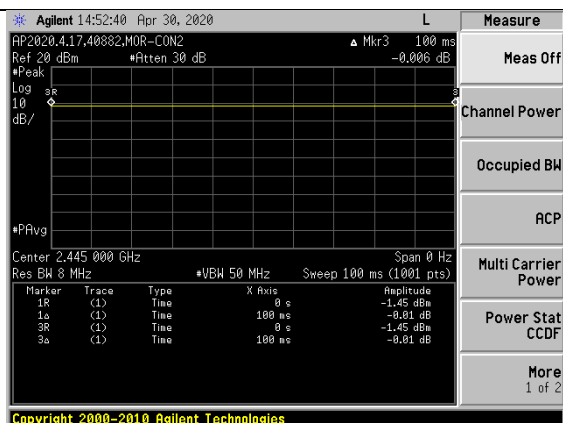
PROCEDURE

ANSI C63.10 Zero-Span Spectrum Analyzer Method.

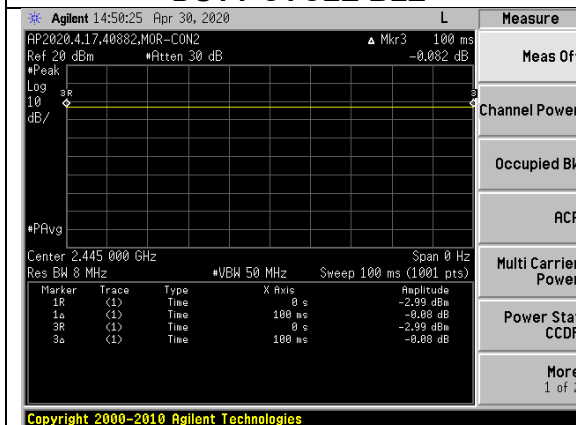
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
BLE	0.392	0.624	0.628	62.82%	4.04
802.11a 1TX	100.000	100.000	1.000	100.00%	0.00
802.11a CDD	100.000	100.000	1.000	100.00%	0.00



DUTY CYCLE BLE



802.15.4 ANT1



802.15.4 ANT2

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Note: Even though the 802.15.4 radio is operating at 100% duty cycle for test purposes, the manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ dB correction.

9.2. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

The BLE radio utilizes an antenna with a maximum gain of 6 dBi.

So the limit for BLE is 30dBm.

802.15.4 PK power is for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

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

RESULTS

9.2.1. BLE

Tested By:	40882
Date:	2020-06-09

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2402	1.11	30	-28.89
Middle	2440	0.74	30	-29.26
High	2480	0.27	30	-29.73

9.2.2. 802.15.4

ANT 1

Tested By:	40882
Date:	2020-06-09

Channel	Frequency (MHz)	Peak Power Reading (dBm)
Low	2405	21.46
Middle	2445	21.50
High	2475	19.25

ANT 2

Tested By:	40882
Date:	2020-06-09

Channel	Frequency (MHz)	Peak Power Reading (dBm)
Low	2405	19.90
Middle	2445	20.98
High	2475	19.89

9.1. AVERAGE POWER

LIMITS

FCC §15.247 (b) (3)
RSS-247 5.4 (d)

The 802.15.4 transmitters utilizes two antennas for diversity with maximum gains of:
Antenna 1: 6.6 dBi
Antenna 2: 4.7 dBi

So the limit for 802.15.4 ANT2 is 30dBm, 802.15.4 ANT1 is 29.4dBm.

BLE average power is for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

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

RESULTS

9.1.1. BLE

Tested By:	40882
Date:	2020-06-09

Channel	Frequency (MHz)	Average Power Reading (dBm)
Low	2402	0.761
Middle	2440	0.437
High	2480	-0.040

9.1.2. 802.15.4

ANT 1

Tested By:	40882
Date:	2020-06-09

Channel	Frequency (MHz)	Average Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2405	21.42	29.4	-7.98
Middle	2445	21.46	29.4	-7.94
High	2475	19.18	29.4	-10.22

ANT 2

Tested By:	40882
Date:	2020-06-09

Channel	Frequency (MHz)	Average Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2405	19.84	30	-10.16
Middle	2445	20.93	30	-9.07
High	2475	19.83	30	-10.17

10. RADIATED TEST RESULTS

10.1. 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 measurement below 1GHz; 1.5 m above the ground plane for measurement 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 and as applicable for average measurements. Voltage averaging was used for BLE and voltage with duty cycle correction per KDB 558074 D01 15.247 V05r02, FAQ Answer 3c) for 802.15.4.

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 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).

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.

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.

KDB 558074 D01 15.247 Meas Guidance V05r02

11. Frequently Asked Questions; Answer 3: c)

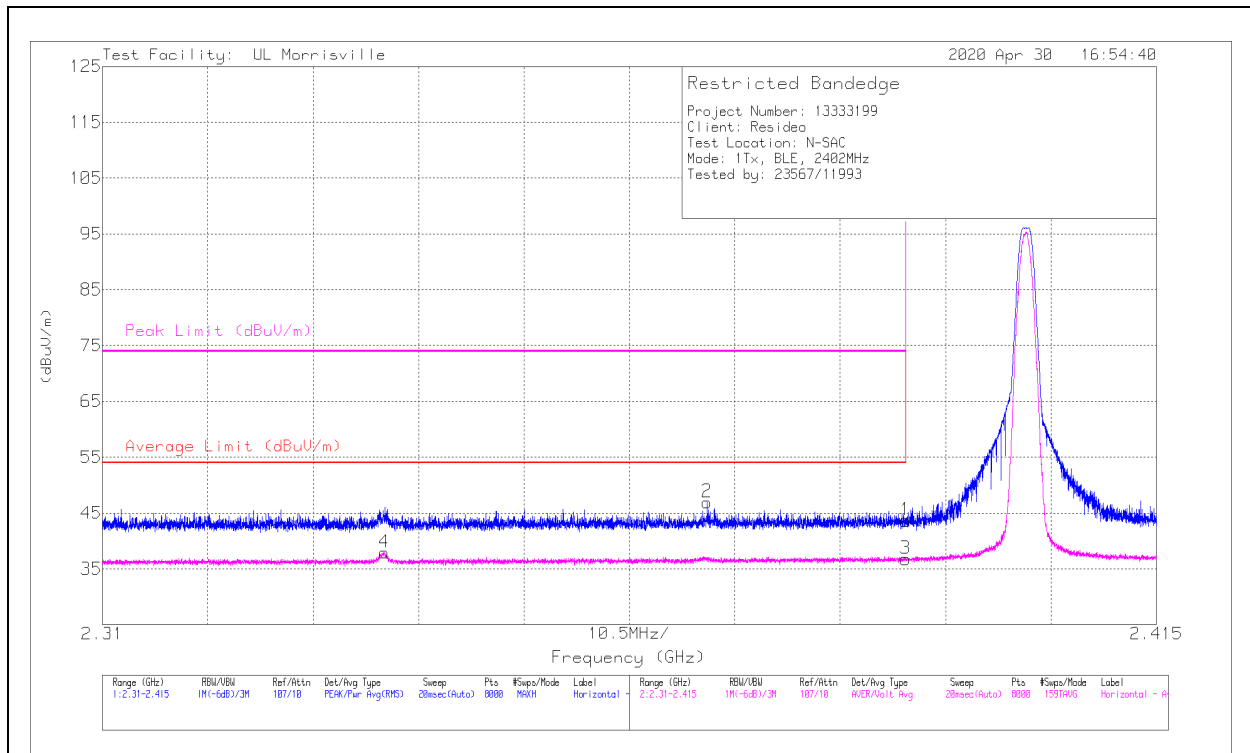
A voltage averaging measurement was taken in accordance to ANSI C63.10. The average measurement was corrected down based on the protocol-limited worst-case duty cycle of 6.75% provided by the manufacturer. The calculation of $20 \cdot \log(0.0675)$ leads to a -23.41dB correction factor that is subtracted from the average measurement.

10.2. TRANSMITTER ABOVE 1 GHz

10.2.1. BLE

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



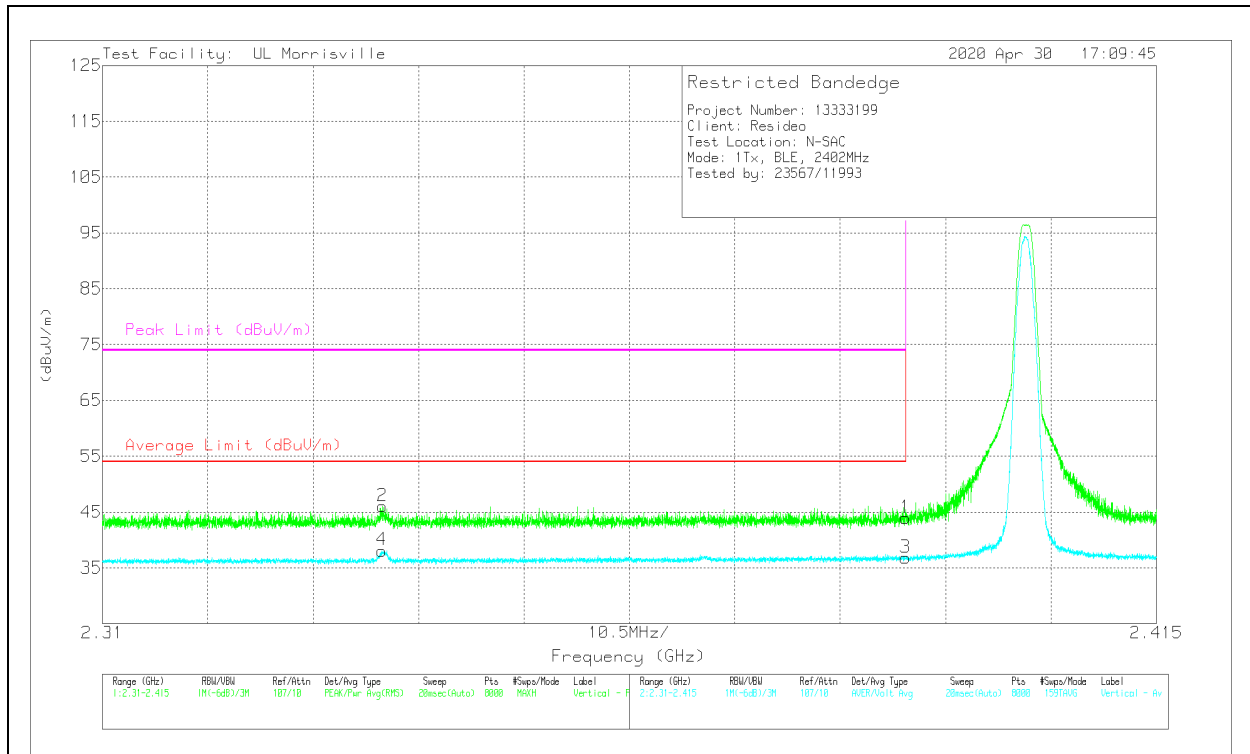
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 [dB/(m)]	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.36	Pk	31.9	-23.6	0	43.66	-	-	74	-30.34	174	236	H
2	* 2.37023	38.75	Pk	31.8	-23.6	0	46.95	-	-	74	-27.05	174	236	H
3	* 2.39	24.43	ADV	31.9	-23.6	4.04	36.77	54	-17.23	-	-	174	236	H
4	* 2.33811	25.65	ADV	31.7	-23.5	4.04	37.89	54	-16.11	-	-	174	236	H

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

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT

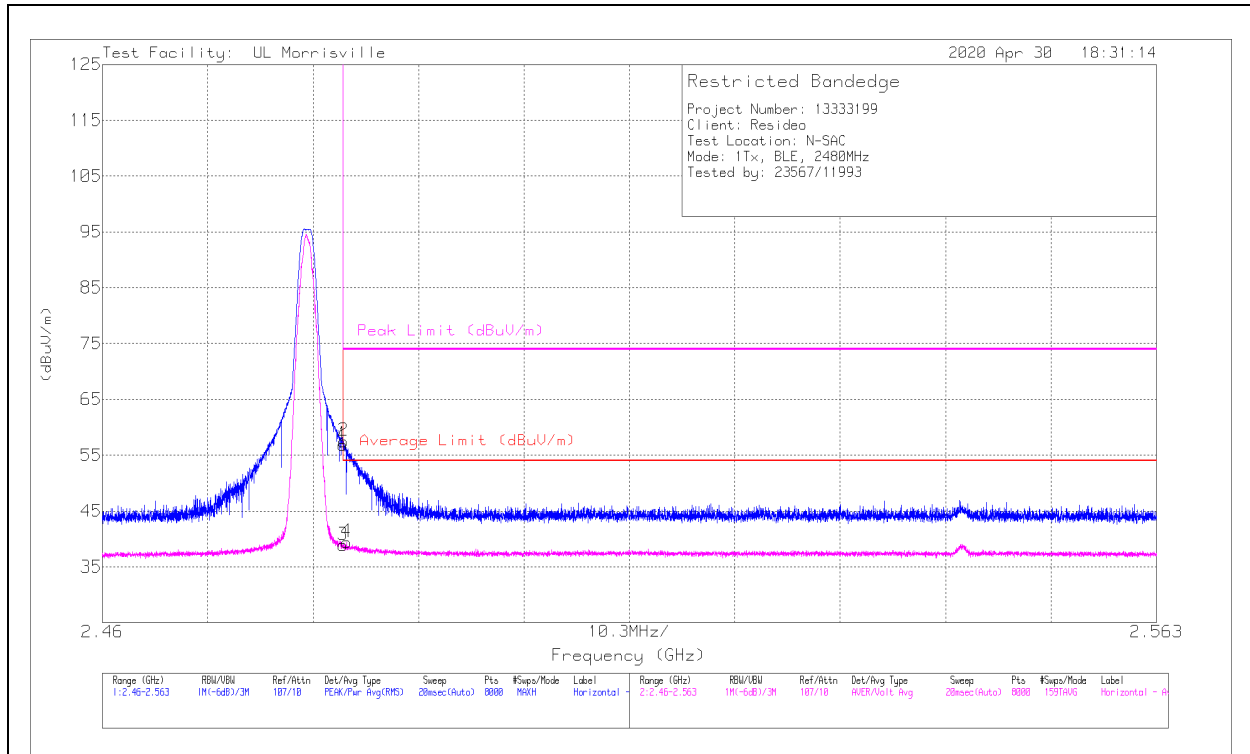


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 [dB(/m)]	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	35.61	Pk	31.9	-23.6	0	43.91	-	-	74	-30.09	244	256	V
2	* 2.33788	37.83	Pk	31.7	-23.5	0	46.03	-	-	74	-27.97	244	256	V
3	* 2.39	24.46	ADV	31.9	-23.6	4.04	36.8	54	-17.2	-	-	244	256	V
4	* 2.33786	25.87	ADV	31.7	-23.5	4.04	38.11	54	-15.89	-	-	244	256	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 ADV - Linear Voltage Average

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



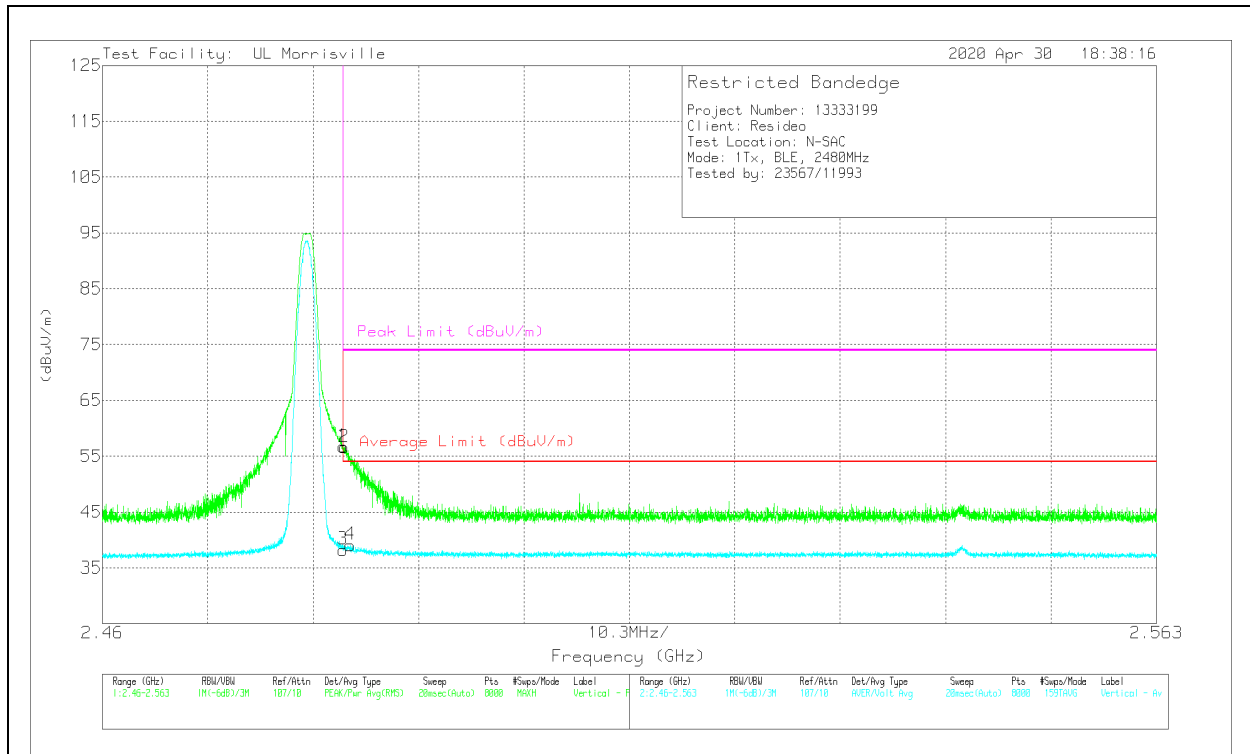
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 [dB/(m)]	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	48.02	Pk	32.3	-23.4	0	56.92	-	-	74	-17.08	129	266	H
2	* 2.48357	48.63	Pk	32.3	-23.4	0	57.53	-	-	74	-16.47	129	266	H
3	* 2.4835	25.98	ADV	32.3	-23.4	4.04	38.92	54	-15.08	-	-	129	266	H
4	* 2.48386	26.41	ADV	32.4	-23.4	4.04	39.45	54	-14.55	-	-	129	266	H

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

Pk - Peak detector

ADV - Linear Voltage Average

VERTICAL RESULT

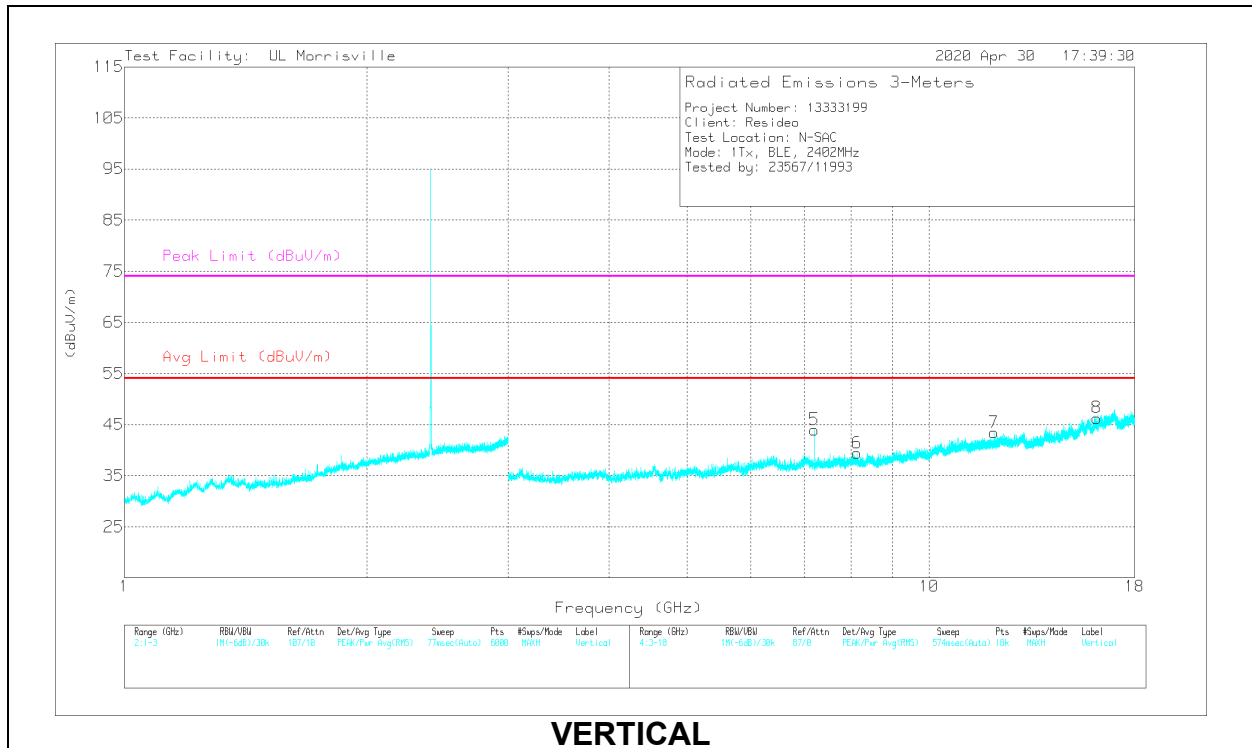
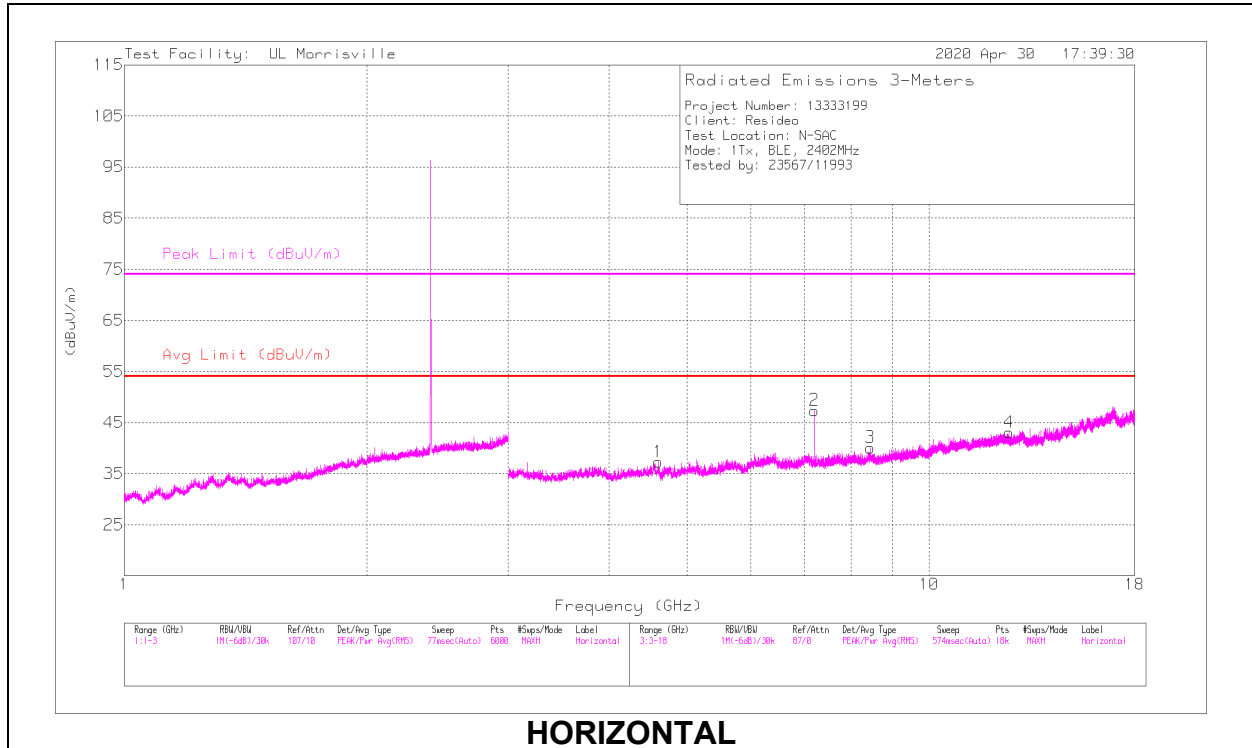


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 [dB(/m)]	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	47.83	Pk	32.3	-23.4	0	56.73	-	-	74	-17.27	242	209	V
2	* 2.4836	47.71	Pk	32.3	-23.4	0	56.61	-	-	74	-17.39	242	209	V
3	* 2.4835	25.3	ADV	32.3	-23.4	4.04	38.24	54	-15.76	-	-	242	209	V
4	* 2.48421	26.06	ADV	32.4	-23.4	4.04	39.1	54	-14.9	-	-	242	209	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS

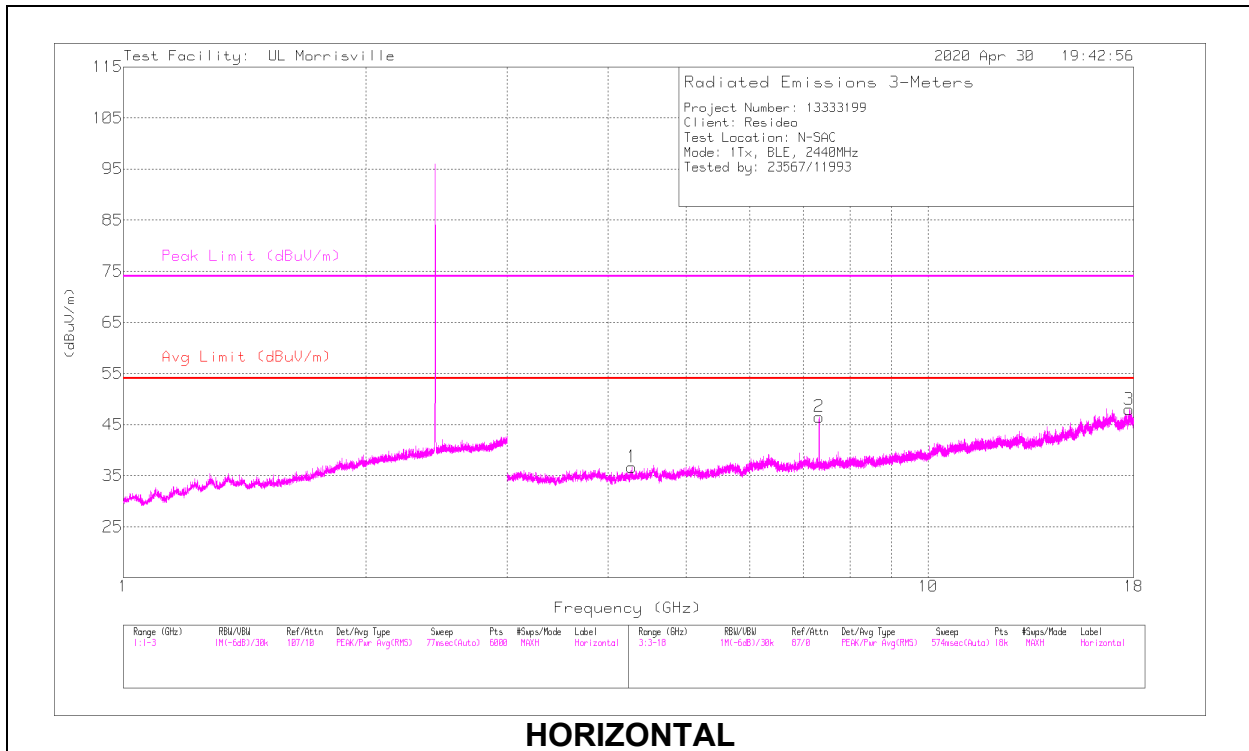


RADIATED EMISSIONS

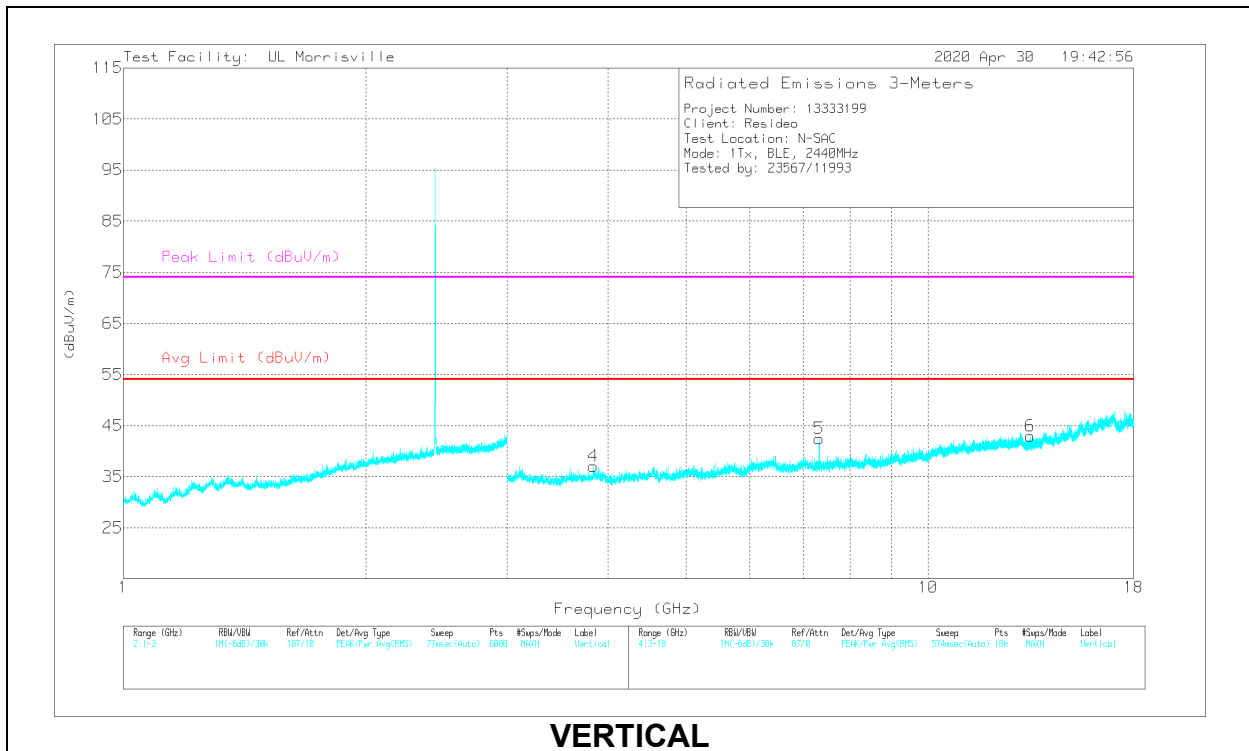
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 [dB/(m)]	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.60872	40.8	PK2	34.1	-31.8	0	43.1	-	-	74	-30.9	71	373	H
	* 4.608	27.78	ADV	34.1	-31.8	4.04	34.12	54	-19.88	-	-	71	373	H
3	* 8.45656	38.11	PK2	35.8	-27.8	0	46.11	-	-	74	-27.89	164	195	H
	* 8.45463	24.37	ADV	35.8	-27.8	4.04	36.41	54	-17.59	-	-	164	195	H
4	* 12.56184	36.66	PK2	39	-25.8	0	49.86	-	-	74	-24.14	328	230	H
	* 12.56257	22.91	ADV	39	-25.8	4.04	40.15	54	-13.85	-	-	328	230	H
6	* 8.13458	38.44	PK2	35.8	-28.1	0	46.14	-	-	74	-27.86	359	211	V
	* 8.13526	24.52	ADV	35.8	-28.1	4.04	36.26	54	-17.74	-	-	359	211	V
7	* 12.04779	35.08	PK2	38.8	-24.8	0	49.08	-	-	74	-24.92	301	231	V
	* 12.0474	21.93	ADV	38.8	-24.8	4.04	39.97	54	-14.03	-	-	301	231	V
8	* 16.16187	36.85	PK2	40.9	-25	0	52.75	-	-	74	-21.25	6	147	V
	* 16.16343	23.66	ADV	40.9	-25	4.04	43.6	54	-10.4	-	-	6	147	V
2	7.20524	40.98	Pk	35.6	-29.2	0	47.38	-	-	-	-	0-360	102	H
5	7.20607	37.59	Pk	35.6	-29.2	0	43.99	-	-	-	-	0-360	198	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - Maximum Peak
 ADV - Linear Voltage Average
 Pk - Peak detector

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 [dB(/m)]	Amp/Cbl/Filtr/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	* 4.28073	40.69	PK2	33.4	-31.2	0	42.89	-	-	74	-31.11	133	200	H
	* 4.2821	27.48	ADV	33.4	-31.2	4.04	33.72	54	-20.28	-	-	133	200	H
2	* 7.32082	44.22	PK2	35.5	-28.4	0	51.32	-	-	74	-22.68	186	123	H
	* 7.31931	33.08	ADV	35.5	-28.4	4.04	44.22	54	-9.78	-	-	186	123	H
3	* 17.76987	34.83	PK2	41.2	-22	0	54.03	-	-	74	-19.97	59	279	H
	* 17.77114	21.87	ADV	41.2	-22	4.04	45.11	54	-8.89	-	-	59	279	H
4	* 3.83547	41.21	PK2	33.5	-31.9	0	42.81	-	-	74	-31.19	250	389	V
	* 3.83497	27.99	ADV	33.5	-31.9	4.04	33.63	54	-20.37	-	-	250	389	V
5	* 7.32005	43.26	PK2	35.5	-28.4	0	50.36	-	-	74	-23.64	214	332	V
	* 7.31934	32	ADV	35.5	-28.4	4.04	43.14	54	-10.86	-	-	214	332	V
6	* 13.39814	37.17	PK2	38.9	-27	0	49.07	-	-	74	-24.93	293	271	V
	* 13.39831	23.98	ADV	38.9	-27	4.04	39.92	54	-14.08	-	-	293	271	V

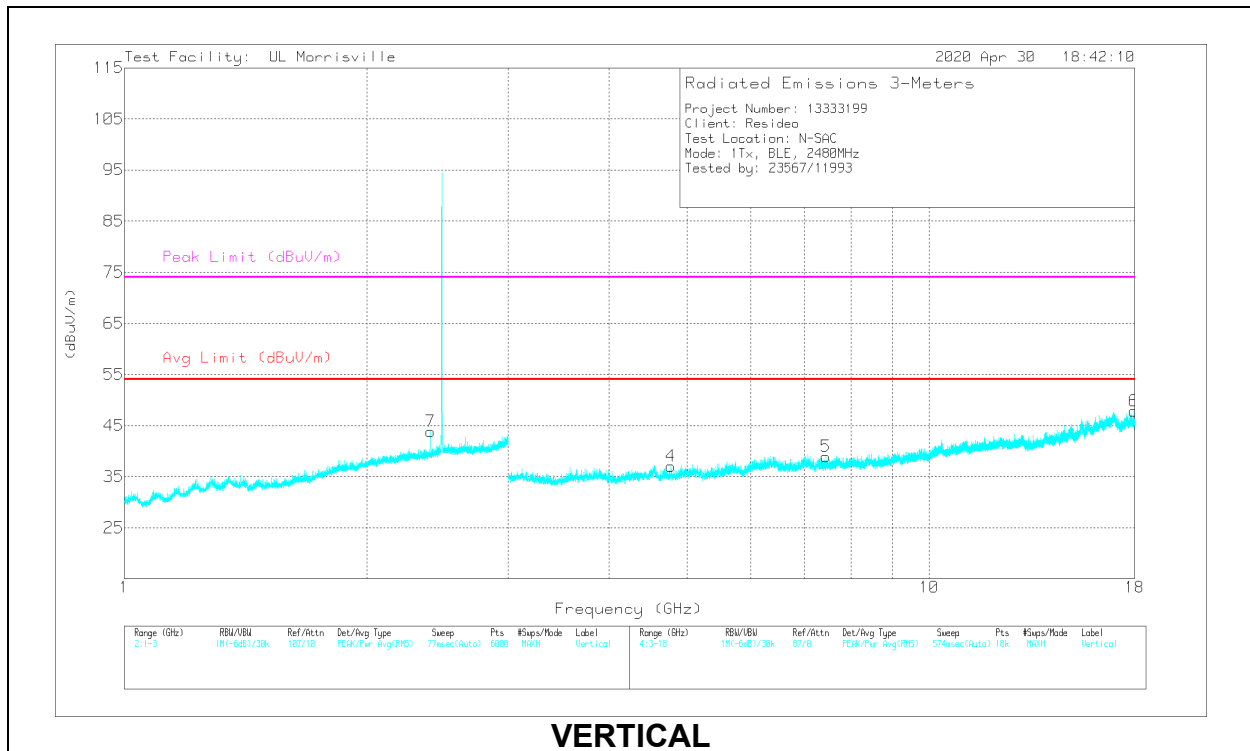
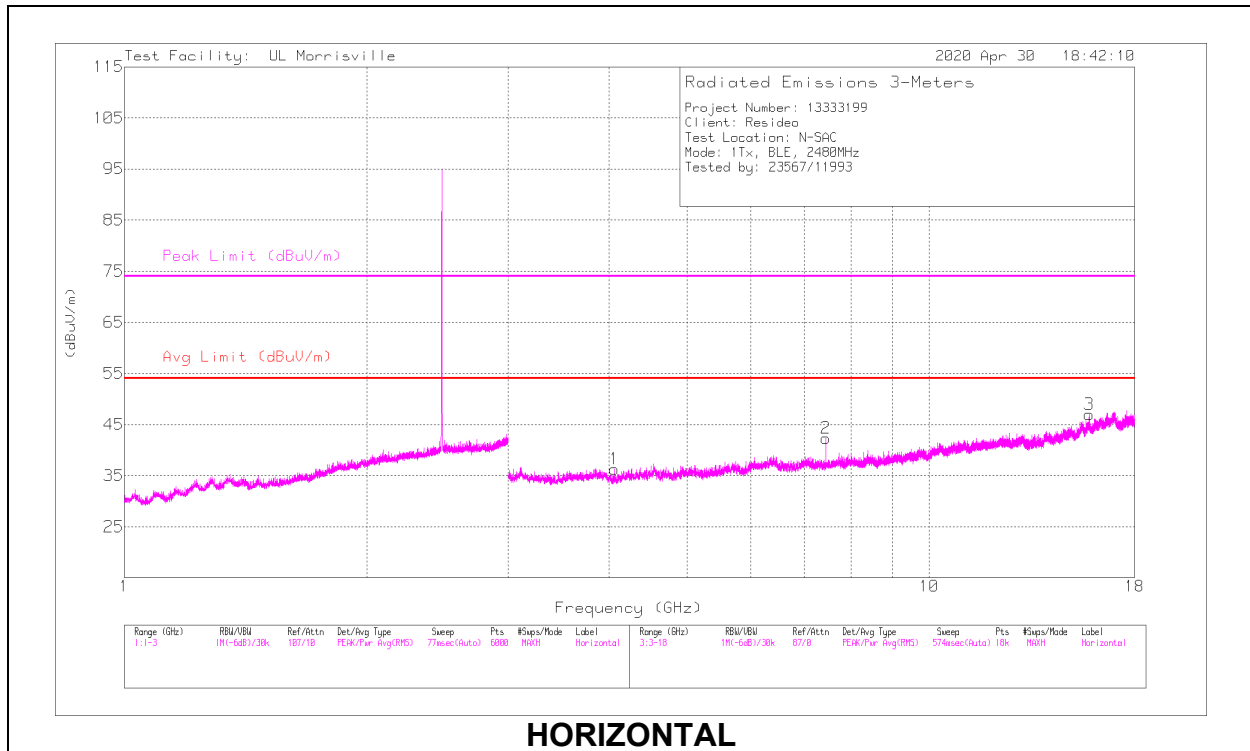
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - Maximum Peak

ADV - Linear Voltage Average

Pk - Peak detector

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 [dB/(m)]	Amp/Cbl/Filtr/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	* 4.06471	41.14	PK2	33.4	-32.3	0	42.24	-	-	74	-31.76	329	232	H
	* 4.06438	27.84	ADV	33.4	-32.3	4.04	32.98	54	-21.02	-	-	329	232	H
2	* 7.43896	41.52	PK2	35.6	-28.4	0	48.72	-	-	74	-25.28	19	225	H
	* 7.43936	29.44	ADV	35.6	-28.4	4.04	40.68	54	-13.32	-	-	19	225	H
3	* 15.8125	36.02	PK2	40.6	-24	0	52.62	-	-	74	-21.38	44	129	H
	* 15.81238	22.84	ADV	40.6	-24	4.04	43.48	54	-10.52	-	-	44	129	H
4	* 4.77137	40.51	PK2	34	-31.2	0	43.31	-	-	74	-30.69	291	195	V
	* 4.7712	27.4	ADV	34	-31.2	4.04	34.24	54	-19.76	-	-	291	195	V
5	* 7.43941	40.01	PK2	35.6	-28.4	0	47.21	-	-	74	-26.79	223	384	V
	* 7.43927	27.36	ADV	35.6	-28.4	4.04	38.6	54	-15.4	-	-	223	384	V
6	* 17.97935	35.75	PK2	41.2	-23	0	53.95	-	-	74	-20.05	318	340	V
	* 17.98062	22.18	ADV	41.2	-23	4.04	44.42	54	-9.58	-	-	318	340	V
7	2.4019	35.29	Pk	32	-23.5	0	43.79	-	-	-	-	0-360	102	V

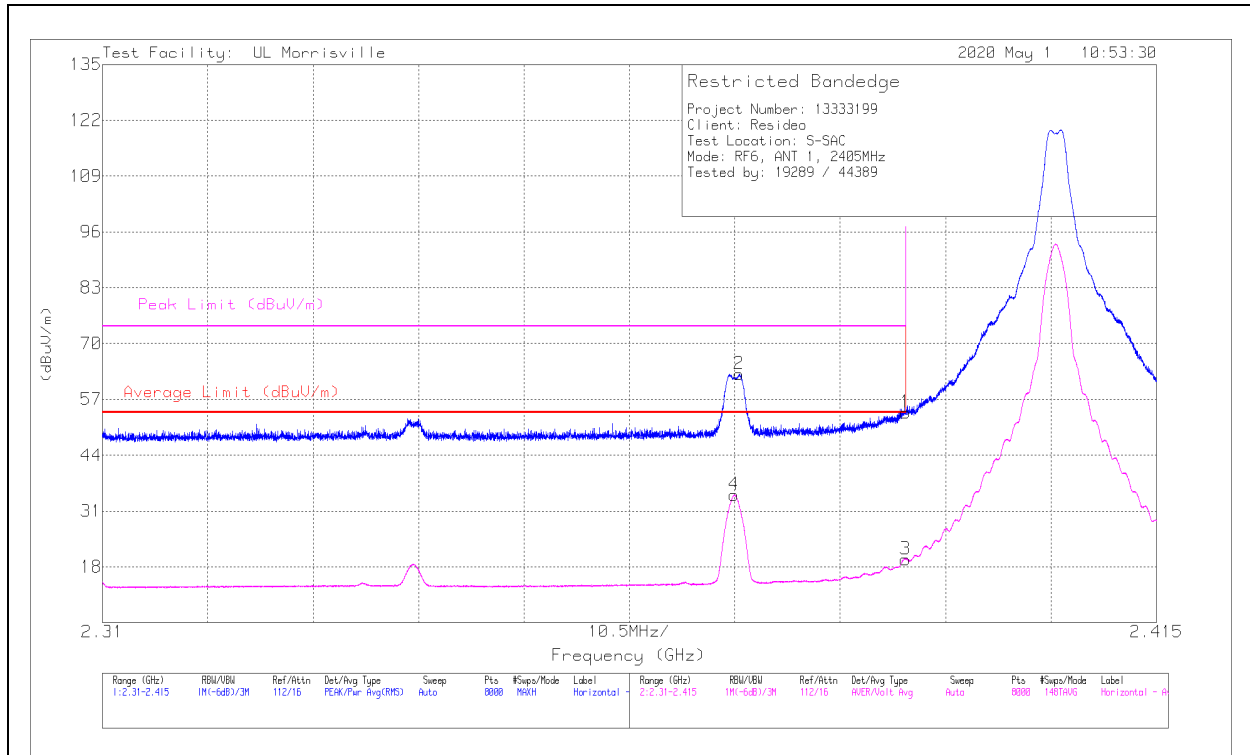
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - Maximum Peak
 ADV - Linear Voltage Average
 Pk - Peak detector

10.2.2. 802.15.4

ANT 1

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/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	45.95	Pk	32	-24	0	53.95	-	-	74	-20.05	203	198	H
2	* 2.37344	54.77	Pk	32	-23.9	0	62.87	-	-	74	-11.13	203	198	H
3	* 2.39	35.18	ADV	32	-24	-23.41	19.77	54	-34.23	-	-	203	198	V
4	* 2.37294	50.05	ADV	32	-23.9	-23.41	34.74	54	-19.26	-	-	203	198	V

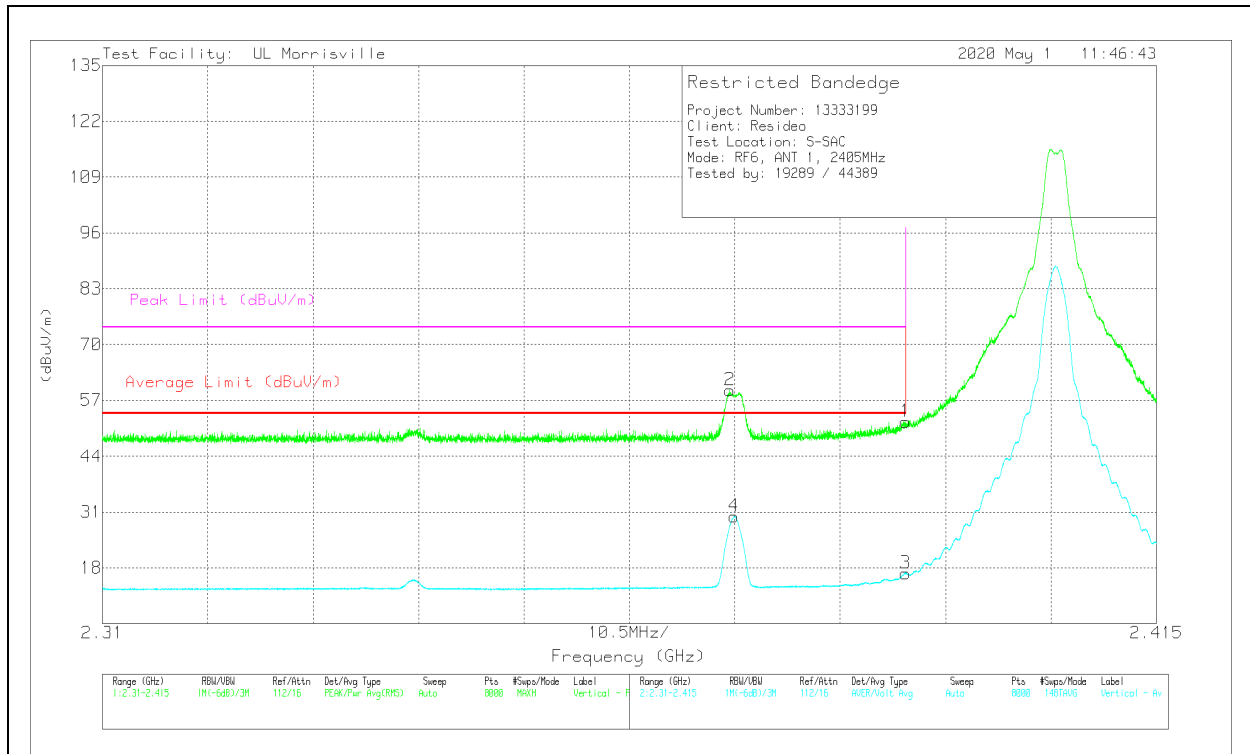
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

VERTICAL RESULT



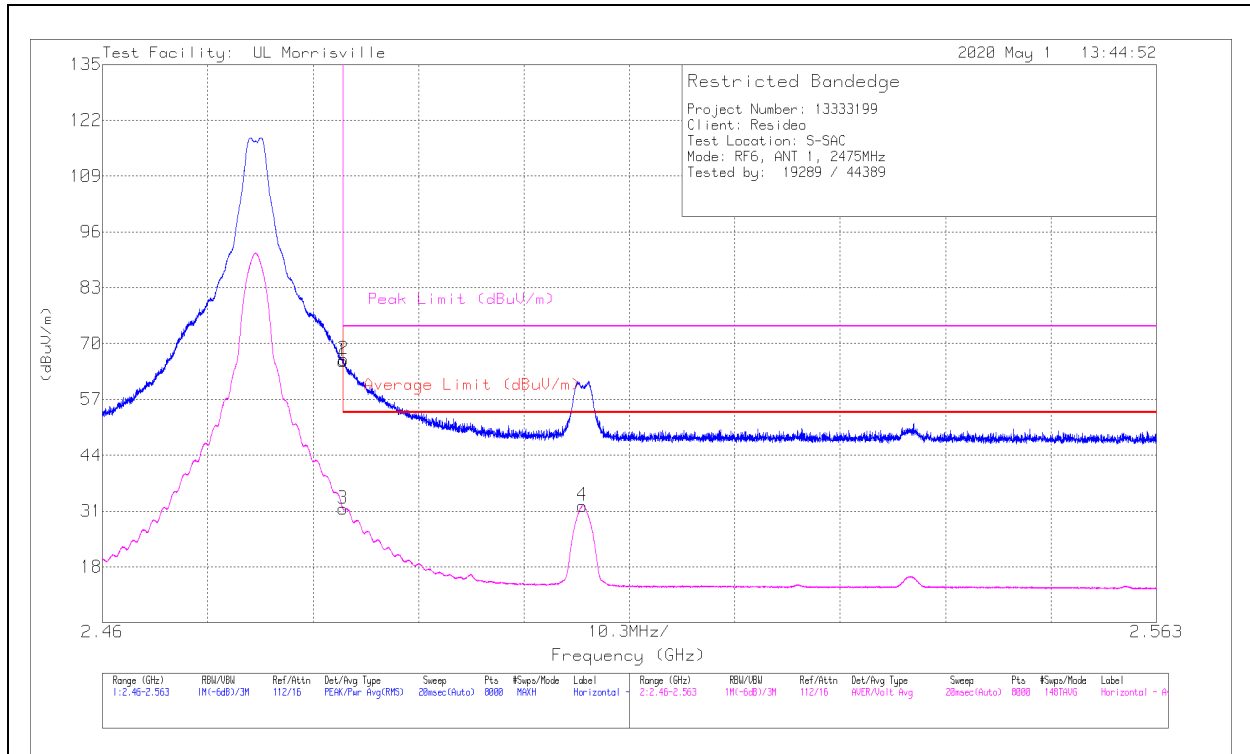
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	44.02	Pk	32	-24	0	52.02	-	-	74	-21.98	275	199	V
2	* 2.37251	51.21	Pk	32	-23.9	0	59.31	-	-	74	-14.69	275	199	V
3	* 2.39	32.07	ADV	32	-24	-23.41	16.66	54	-37.34	-	-	275	199	V
4	* 2.37294	45.24	ADV	32	-23.9	-23.41	29.93	54	-24.07	-	-	275	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 ADV - Linear Voltage Average

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/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	58.19	Pk	32.1	-24.4	0	65.89	-	-	74	-8.11	191	179	H
2	* 2.48355	58.62	Pk	32.1	-24.4	0	66.32	-	-	74	-7.68	191	179	H
3	* 2.4835	47.28	ADV	32.1	-24.4	-23.41	31.57	54	-22.43	-	-	191	179	V
4	2.50692	48.18	ADV	32.2	-24.7	-23.41	32.27	54	-21.73	-	-	191	179	V

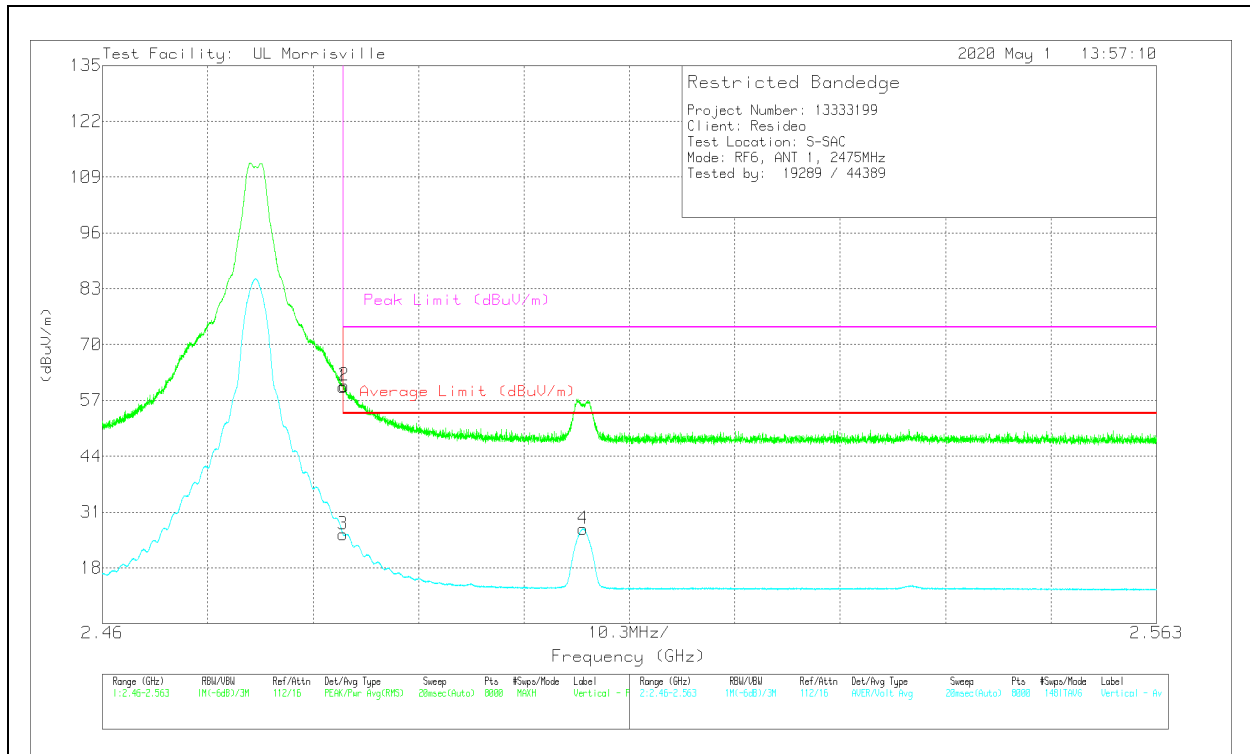
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

VERTICAL RESULT



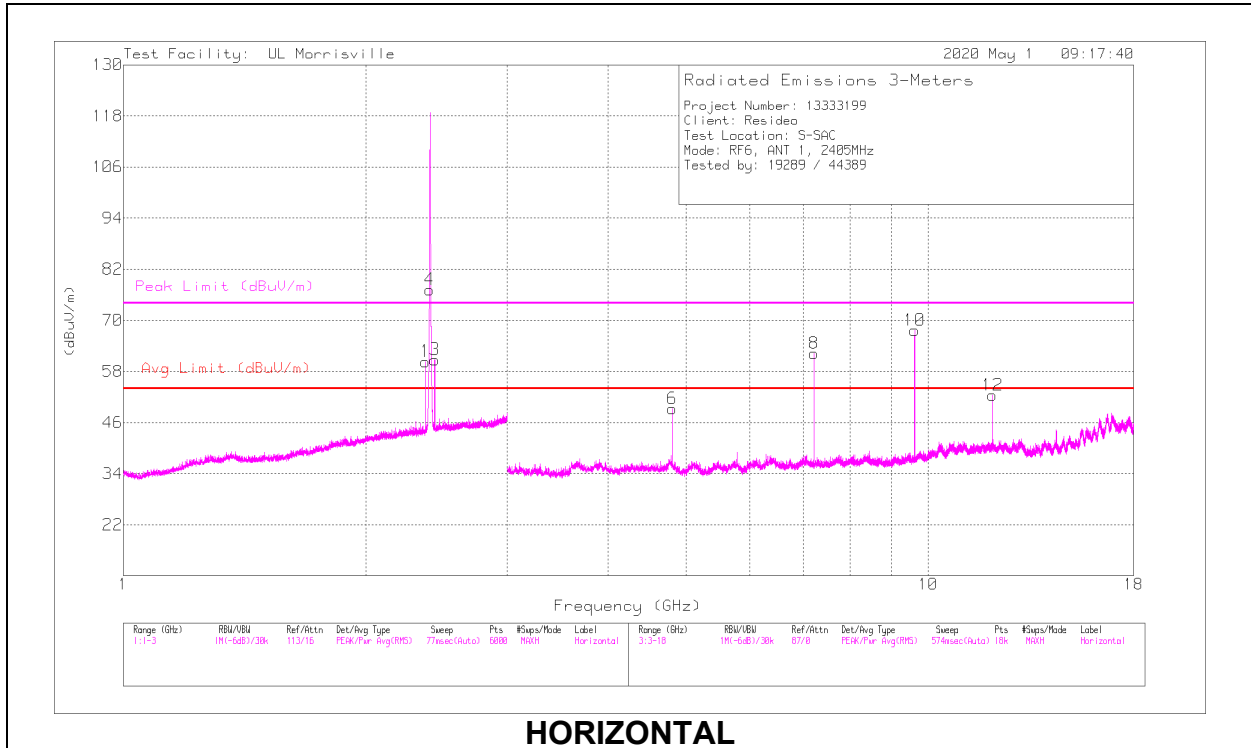
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	52.49	Pk	32.1	-24.4	0	60.19	-	-	74	-13.81	279	165	V
2	* 2.4836	52.71	Pk	32.1	-24.4	0	60.41	-	-	74	-13.59	279	165	V
3	* 2.4835	41.55	ADV	32.1	-24.4	-23.41	25.84	54	-28.16	-	-	279	165	V
4	2.50698	43	ADV	32.2	-24.7	-23.41	27.09	54	-26.91	-	-	279	165	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 ADV - Linear Voltage Average

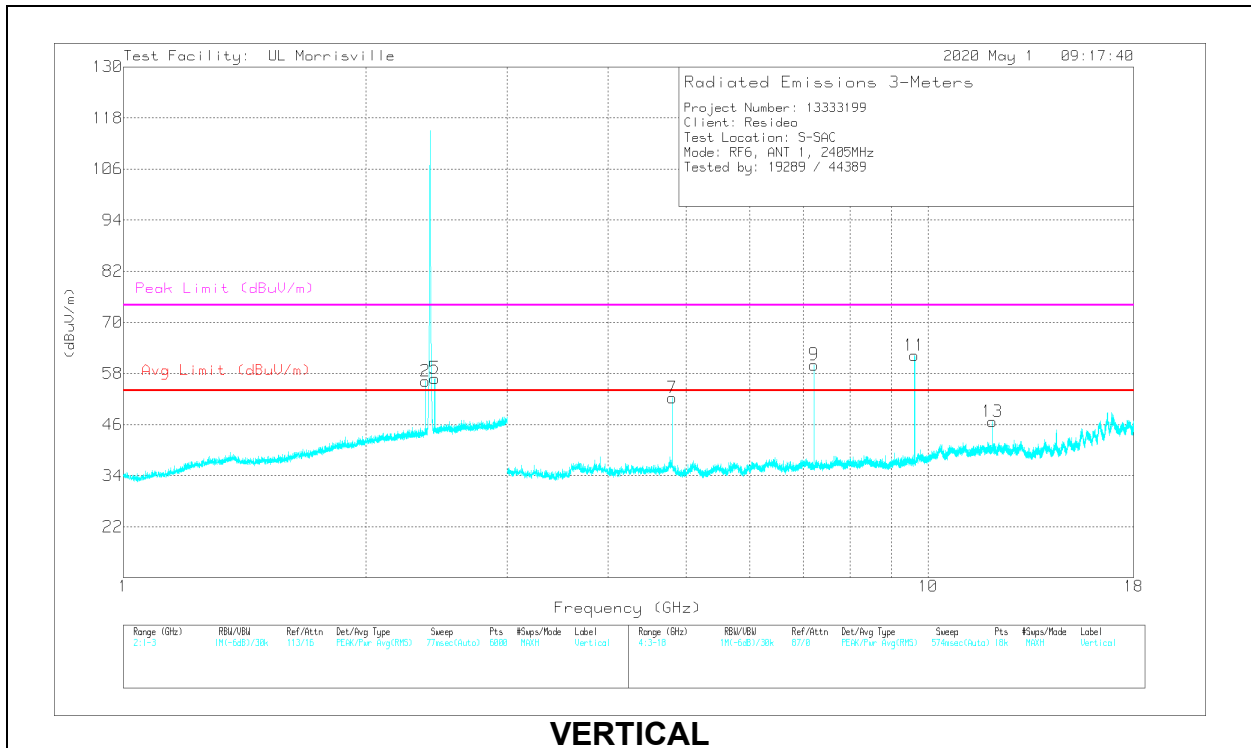
Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



VERTICAL

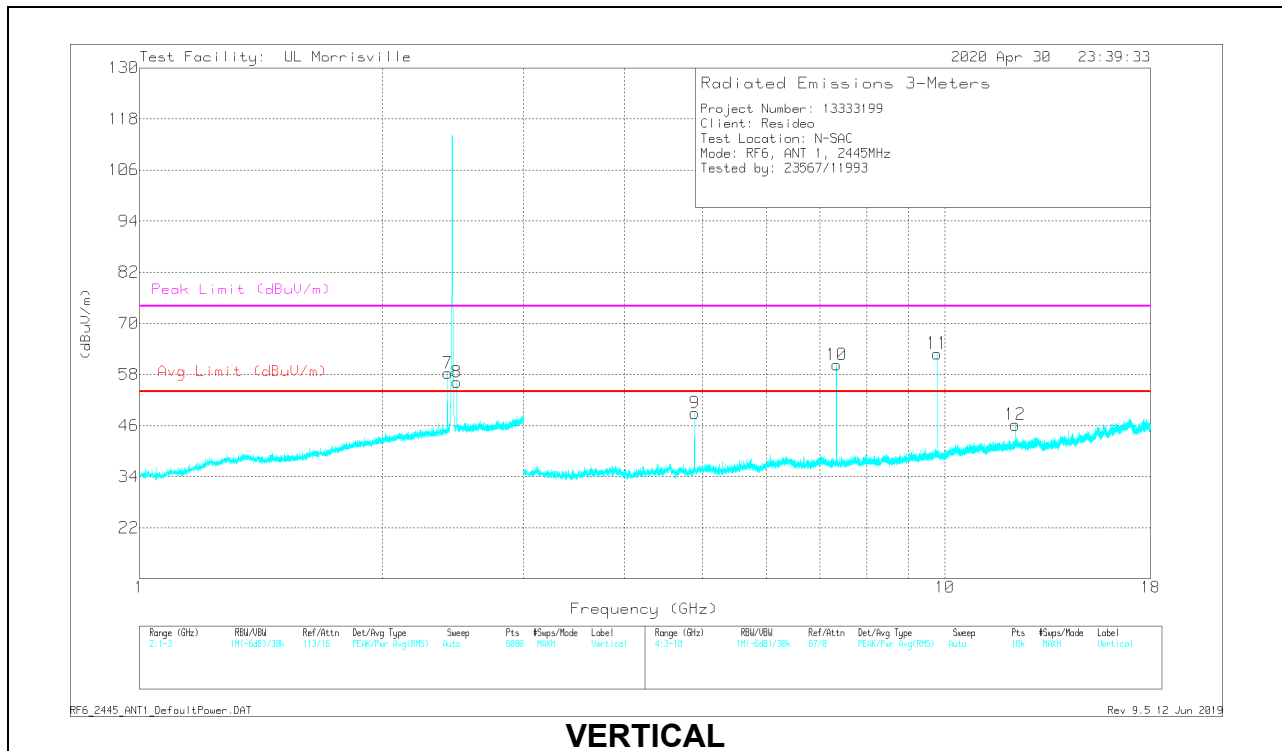
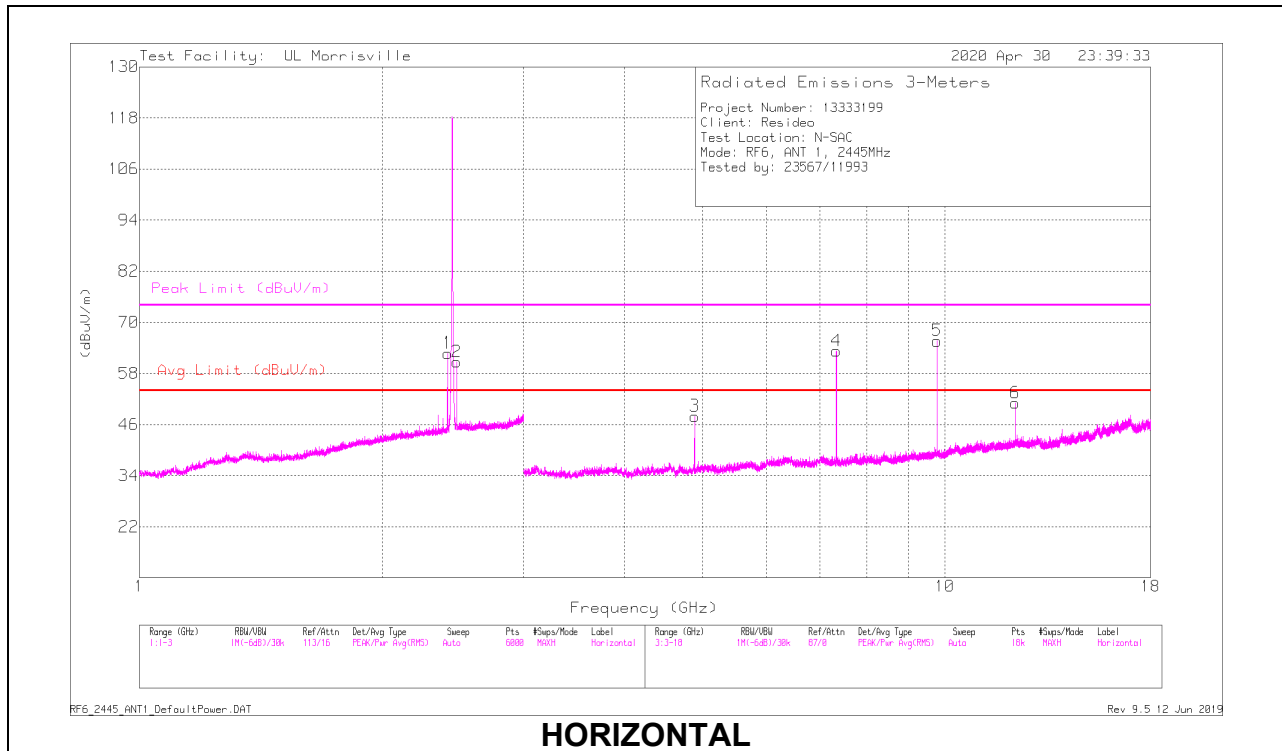
RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 [dB(/m)]	Amp/Cbl/Fitr/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	* 2.37248	55.24	PK2	31.9	-23.6	0	63.54	-	-	74	-10.46	200	200	H
	* 2.37296	50.31	ADV	31.9	-23.6	-23.41	35.2	54	-18.8	-	-	200	200	H
2	* 2.37256	50.89	PK2	31.9	-23.6	0	59.19	-	-	74	-14.81	318	201	V
	* 2.37296	45.32	ADV	31.9	-23.6	-23.41	30.21	54	-23.79	-	-	318	201	V
6	* 4.80899	49.37	PK2	34	-31.1	0	52.27	-	-	74	-21.73	345	101	H
	* 4.80897	41.03	ADV	34	-31.1	-23.41	20.52	54	-33.48	-	-	345	101	H
12	* 12.02737	44.21	PK2	38.7	-24.9	0	58.01	-	-	74	-15.99	271	227	H
	* 12.02723	35.03	ADV	38.7	-24.9	-23.41	25.42	54	-28.58	-	-	271	227	H
7	* 4.809	53.88	PK2	34	-31.1	0	56.78	-	-	74	-17.22	12	263	V
	* 4.80899	46.3	ADV	34	-31.1	-23.41	25.79	54	-28.21	-	-	12	263	V
13	* 12.02247	40.23	PK2	38.7	-25	0	53.93	-	-	74	-20.07	144	156	V
	* 12.02254	29.98	ADV	38.7	-25	-23.41	20.27	54	-33.73	-	-	144	156	V
4	2.40057	68.7	Pk	32	-23.5	0	77.2	-	-	-	-	0-360	199	H
3	2.43724	52.07	Pk	32.2	-23.5	0	60.77	-	-	-	-	0-360	199	H
5	2.43724	48.17	Pk	32.2	-23.5	0	56.87	-	-	-	-	0-360	199	V
8	7.21607	55.81	Pk	35.5	-29.1	0	62.21	-	-	-	-	0-360	199	H
9	7.21607	53.63	Pk	35.5	-29.1	0	60.03	-	-	-	-	0-360	199	V
11	9.61704	52.94	Pk	36.7	-27.4	0	62.24	-	-	-	-	0-360	199	V
10	9.6212	58.45	Pk	36.7	-27.5	0	67.65	-	-	-	-	0-360	101	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - KDB558074 Method: Maximum Peak
 ADV - AD primary method, Linear Voltage Average
 Pk - Peak detector

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

MID CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 [dB/(m)]	Amp/Cbl/Filtr/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
4	* 7.33335	59.71	PK2	35.6	-28.3	0	67.01	-	-	74	-6.99	191	111	H
	* 7.33354	52.98	ADV	35.6	-28.3	-23.41	36.87	54	-17.13	-	-	191	111	H
3	* 4.891	49.78	PK2	34	-30.9	0	52.88	-	-	74	-21.12	279	103	H
	* 4.89083	41.79	ADV	34	-30.9	-23.41	21.48	54	-32.52	-	-	279	103	H
6	* 12.22726	42.04	PK2	38.9	-25.6	0	55.34	-	-	74	-18.66	189	211	H
	* 12.22722	32.24	ADV	38.9	-25.6	-23.41	22.13	54	-31.87	-	-	189	211	H
9	* 4.88897	49.95	PK2	34	-30.8	0	53.15	-	-	74	-20.85	289	194	V
	* 4.88897	42.21	ADV	34	-30.8	-23.41	22	54	-32	-	-	289	194	V
10	* 7.33643	56.56	PK2	35.6	-28.4	0	63.76	-	-	74	-10.24	338	395	V
	* 7.33626	49.41	ADV	35.6	-28.4	-23.41	33.2	54	-20.8	-	-	338	395	V
12	* 12.22247	41.02	PK2	38.9	-25.6	0	54.32	-	-	74	-19.68	209	331	V
	* 12.22247	30.84	ADV	38.9	-25.6	-23.41	20.73	54	-33.27	-	-	209	331	V
7	2.4129	49.77	Pk	32	-23.5	0	58.27	-	-	-	-	0-360	198	V
1	2.41357	54.14	Pk	32.1	-23.5	0	62.74	-	-	-	-	0-360	198	H
2	2.47691	51.68	Pk	32.4	-23.4	0	60.68	-	-	-	-	0-360	198	H
8	2.47758	47.22	Pk	32.4	-23.4	0	56.22	-	-	-	-	0-360	102	V
5	9.77788	55.34	Pk	36.9	-26.6	0	65.64	-	-	-	-	0-360	102	H
11	9.77788	52.59	Pk	36.9	-26.6	0	62.89	-	-	-	-	0-360	198	V

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

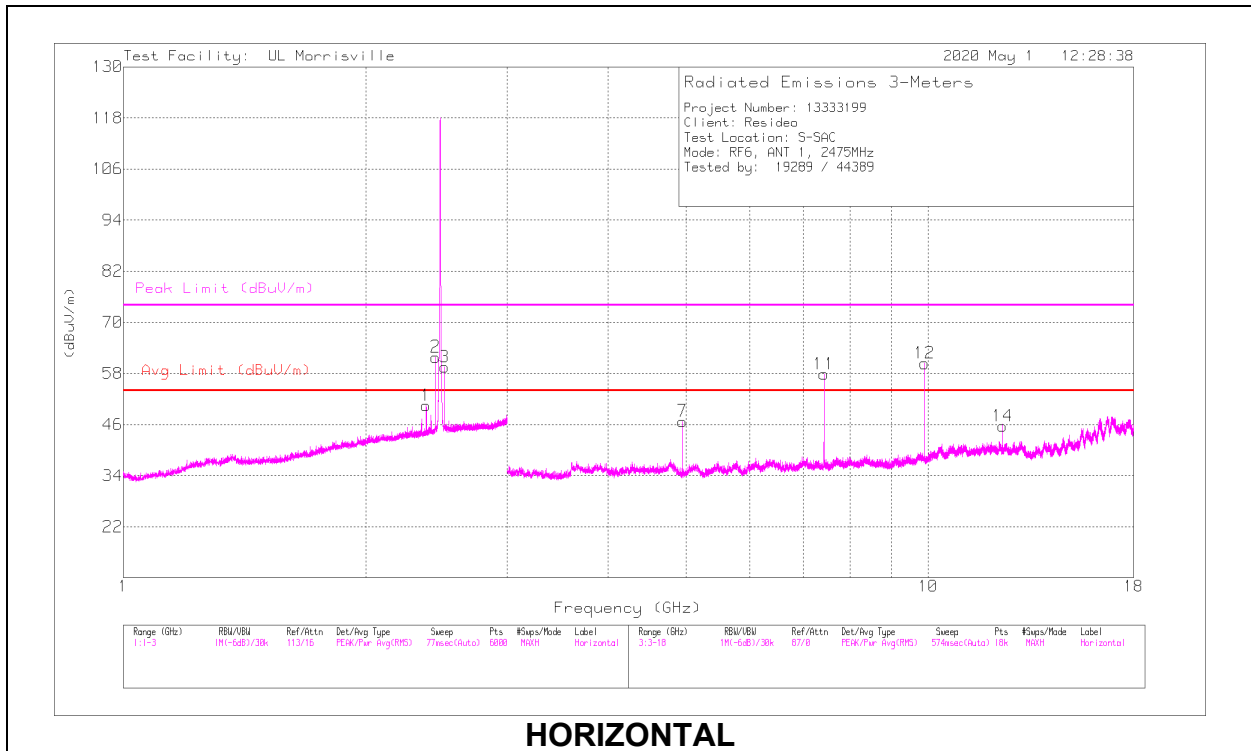
PK2 - Maximum Peak

ADV - Linear Voltage Average

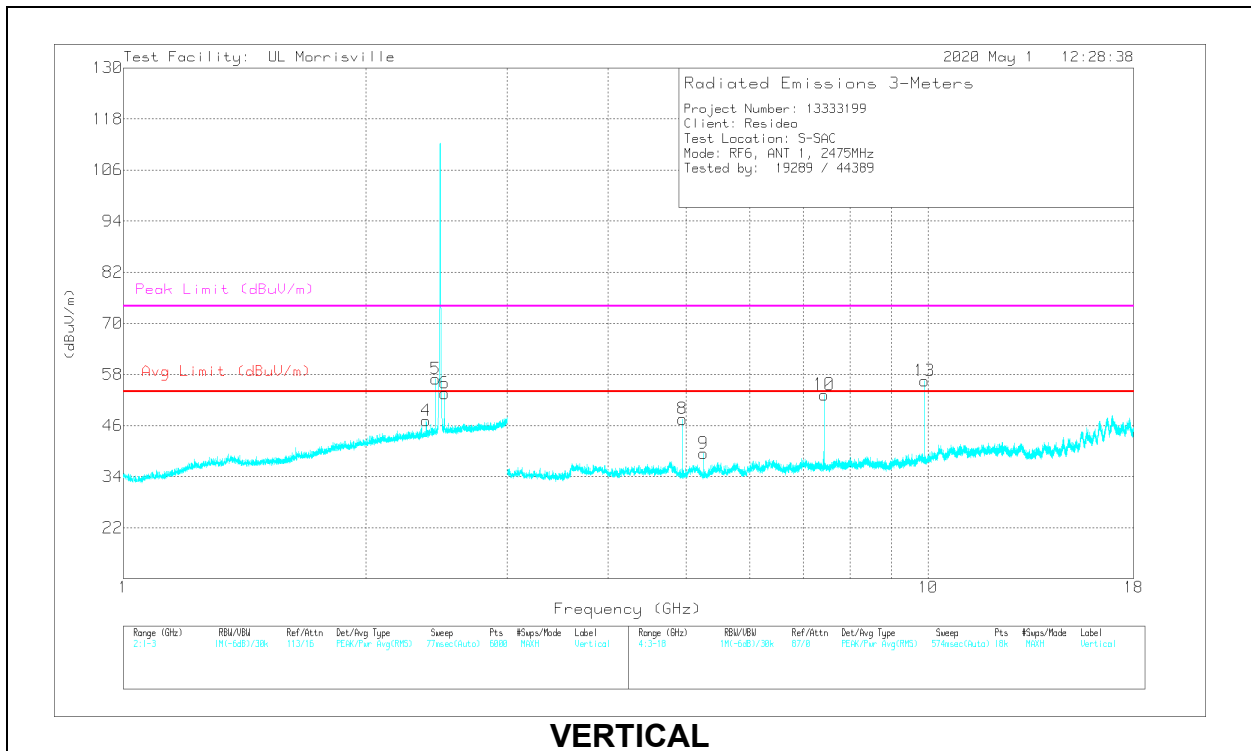
Pk - Peak detector

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0069 [dB(/m)]	Amp/Cbl/Filtr/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	* 2.3784	47.65	PK2	31.9	-23.6	0	55.95	-	-	74	-18.05	199	228	H
	* 2.37899	37.93	ADV	31.9	-23.6	-23.41	22.82	54	-31.18	-	-	199	228	H
4	* 2.37945	45.72	PK2	31.9	-23.6	0	54.02	-	-	74	-19.98	286	160	V
	* 2.37902	35.19	ADV	31.9	-23.6	-23.41	20.08	54	-33.92	-	-	286	160	V
7	* 4.95101	48.87	PK2	34	-31.6	0	51.27	-	-	74	-22.73	358	101	H
	* 4.94896	41.16	ADV	34	-31.6	-23.41	20.15	54	-33.85	-	-	358	101	H
11	* 7.42335	52.49	PK2	35.6	-28.4	0	59.69	-	-	74	-14.31	158	214	H
	* 7.42353	45.22	ADV	35.6	-28.4	-23.41	29.01	54	-24.99	-	-	158	214	H
14	* 12.37286	37.09	PK2	38.8	-25.8	0	50.09	-	-	74	-23.91	171	134	H
	* 12.37239	26.27	ADV	38.8	-25.8	-23.41	15.86	54	-38.14	-	-	171	134	H
8	* 4.94885	48.77	PK2	34	-31.6	0	51.17	-	-	74	-22.83	22	297	V
	* 4.95092	41.07	ADV	34	-31.6	-23.41	20.06	54	-33.94	-	-	22	297	V
10	* 7.42339	51.27	PK2	35.6	-28.4	0	58.47	-	-	74	-15.53	39	371	V
	* 7.42357	44.24	ADV	35.6	-28.4	-23.41	28.03	54	-25.97	-	-	39	371	V
2	2.44257	53.13	Pk	32.2	-23.5	0	61.83	-	-	-	-	0-360	199	H
5	2.44324	48.27	Pk	32.2	-23.5	0	56.97	-	-	-	-	0-360	101	V
6	2.50659	44.58	Pk	32.4	-23.4	0	53.58	-	-	-	-	0-360	199	V
3	2.50725	50.51	Pk	32.4	-23.4	0	59.51	-	-	-	-	0-360	199	H
9	5.26096	36.8	Pk	34.3	-31.6	0	39.5	-	-	-	-	0-360	199	V
13	9.89705	46.36	Pk	37.1	-27	0	56.46	-	-	-	-	0-360	199	V
12	9.90122	50.27	Pk	37.1	-27	0	60.37	-	-	-	-	0-360	101	H

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

PK2 - Maximum Peak

ADV - Linear Voltage Average

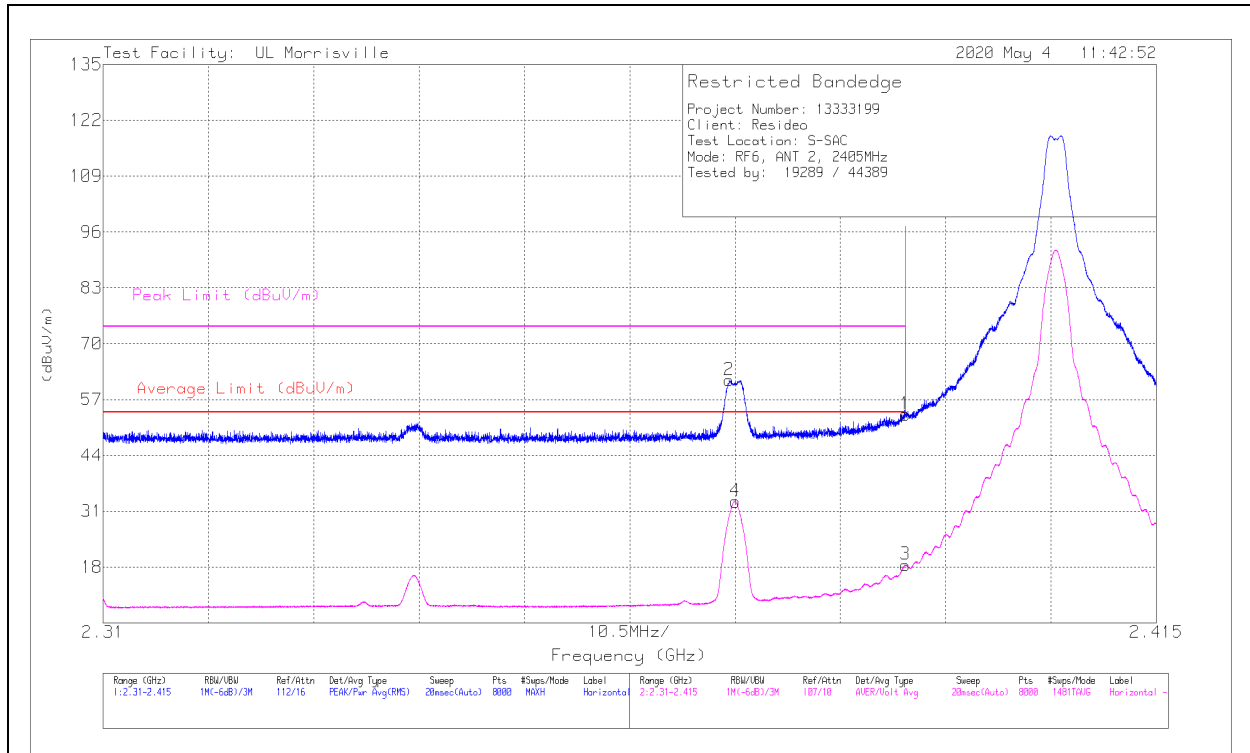
Pk - Peak detector

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

ANT 2

BANEDGE (LOW CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/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	45.53	Pk	32	-24	0	53.53	-	-	74	-20.47	251	292	H
2	* 2.37241	53.39	Pk	32	-23.9	0	61.49	-	-	74	-12.51	251	292	H
3	* 2.39	33.92	ADV	32	-24	-23.41	18.51	54	-35.49	-	-	251	292	H
4	* 2.37301	48.59	ADV	32	-23.9	-23.41	33.28	54	-20.72	-	-	251	292	H

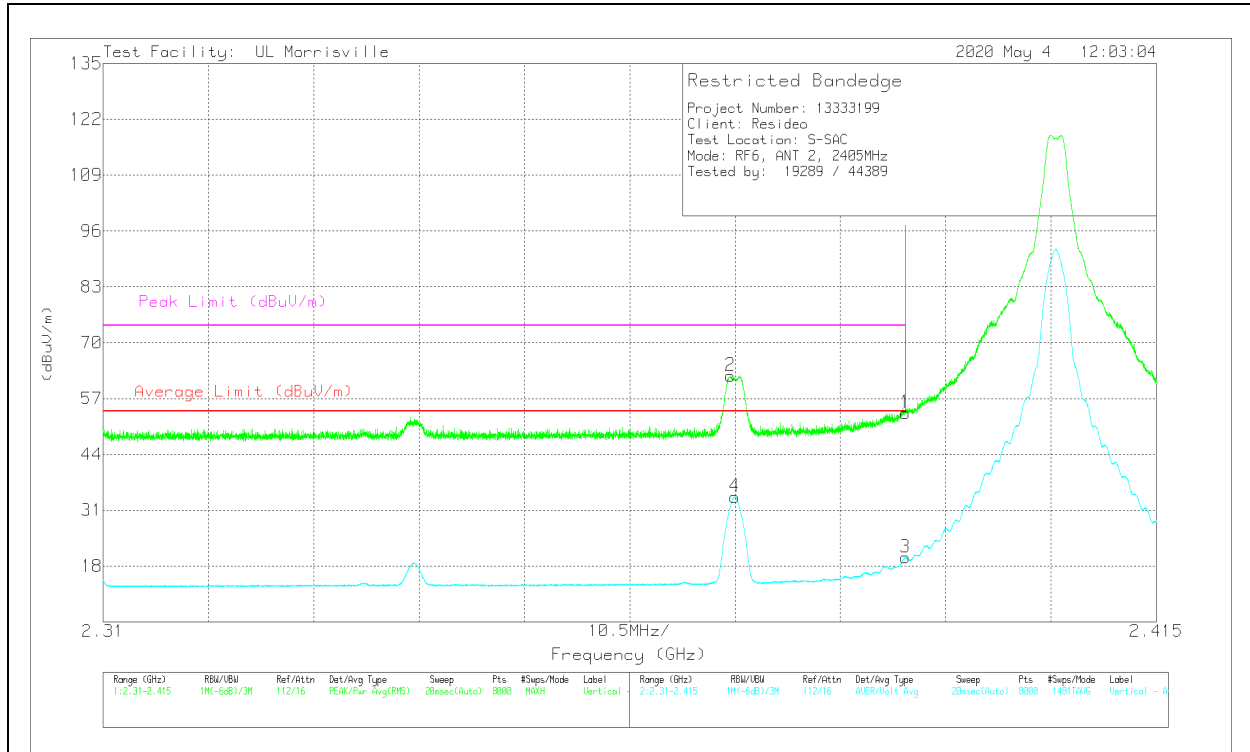
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

VERTICAL RESULT



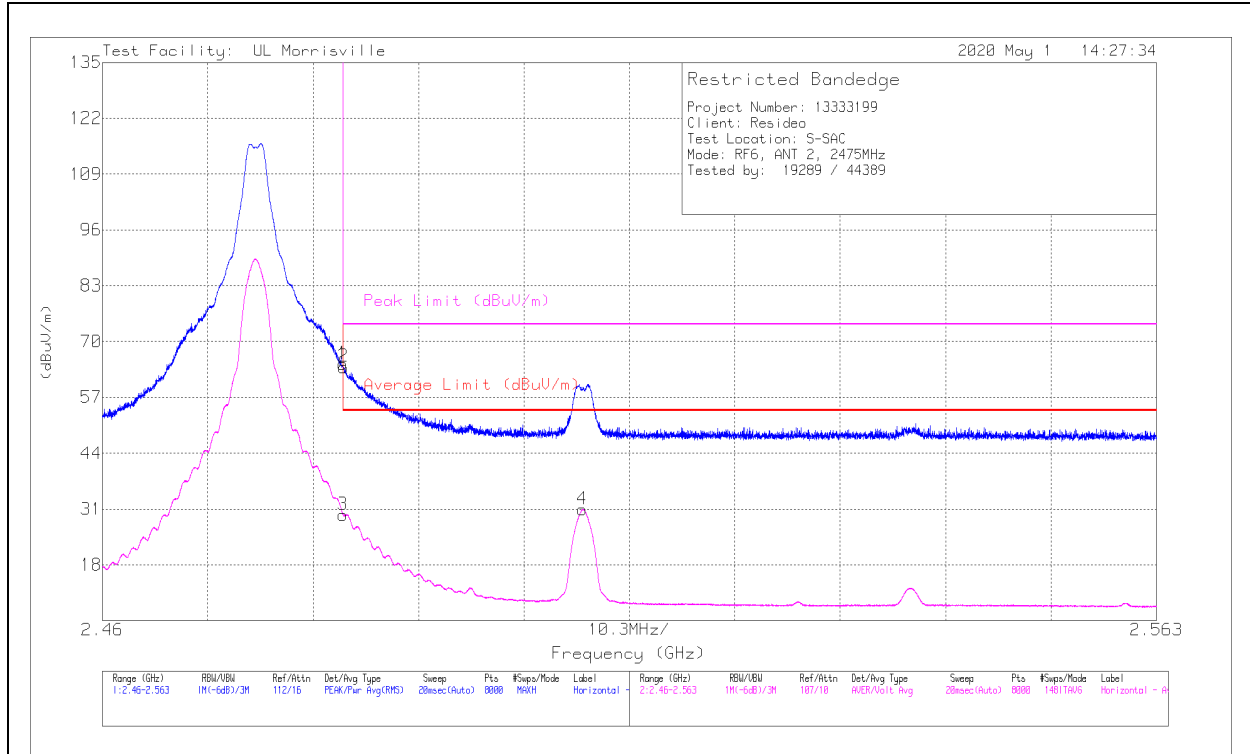
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	45.61	Pk	32	-24	0	53.61	-	-	74	-20.39	124	192	V
2	* 2.37254	54.21	Pk	32	-23.9	0	62.31	-	-	74	-11.69	124	192	V
3	* 2.39	35.4	ADV	32	-24	-23.41	19.99	54	-34.01	-	-	124	192	V
4	* 2.37297	49.44	ADV	32	-23.9	-23.41	34.13	54	-19.87	-	-	124	192	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 ADV - Linear Voltage Average

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/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	57.09	Pk	32.1	-24.4	0	64.79	-	-	74	-9.21	253	209	H
2	* 2.48359	56.38	Pk	32.1	-24.4	0	64.08	-	-	74	-9.92	253	209	H
3	* 2.4835	45.39	ADV	32.1	-24.4	-23.41	29.68	54	-24.32	-	-	253	209	H
4	2.50691	46.86	ADV	32.2	-24.7	-23.41	30.95	54	-23.05	-	-	253	209	H

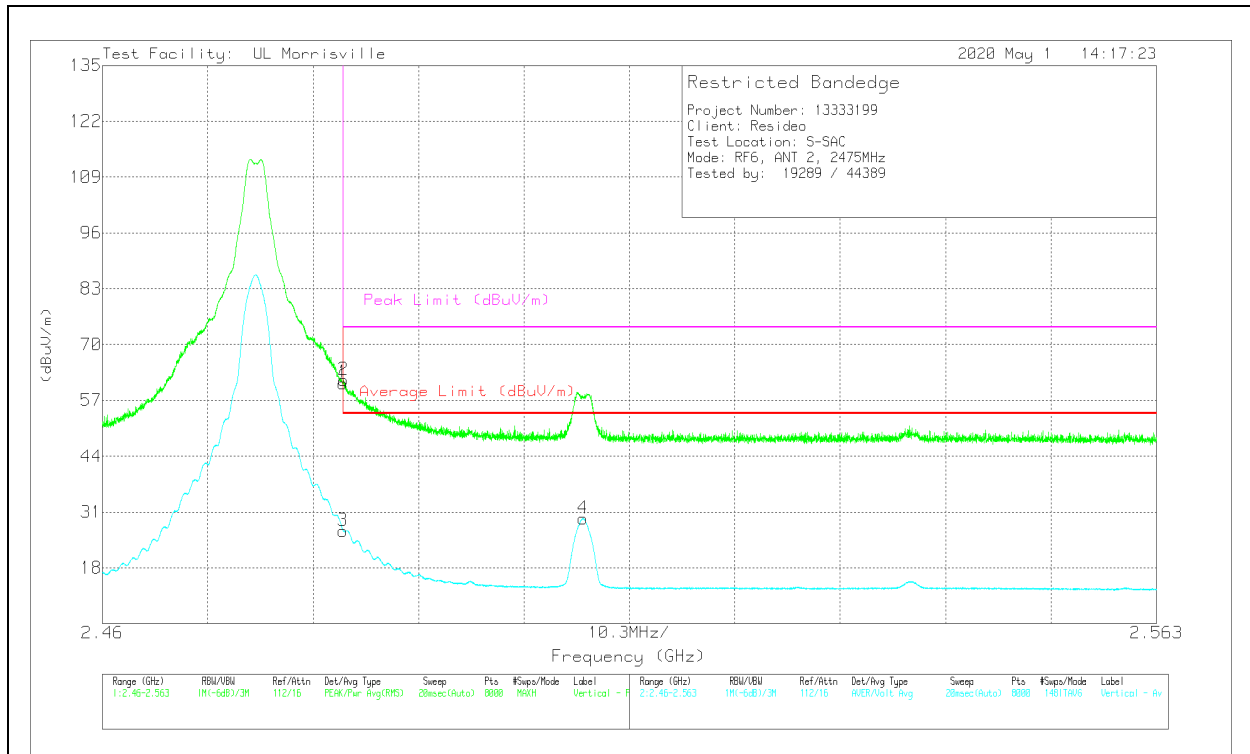
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

VERTICAL RESULT



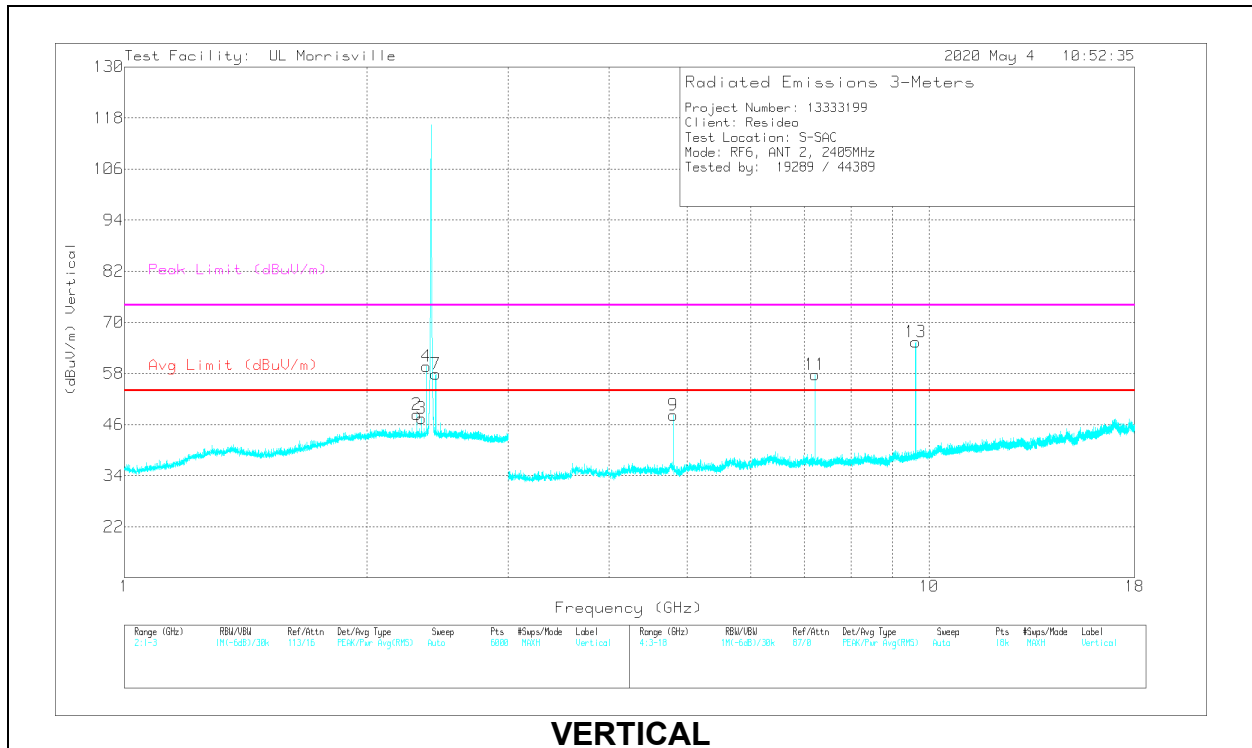
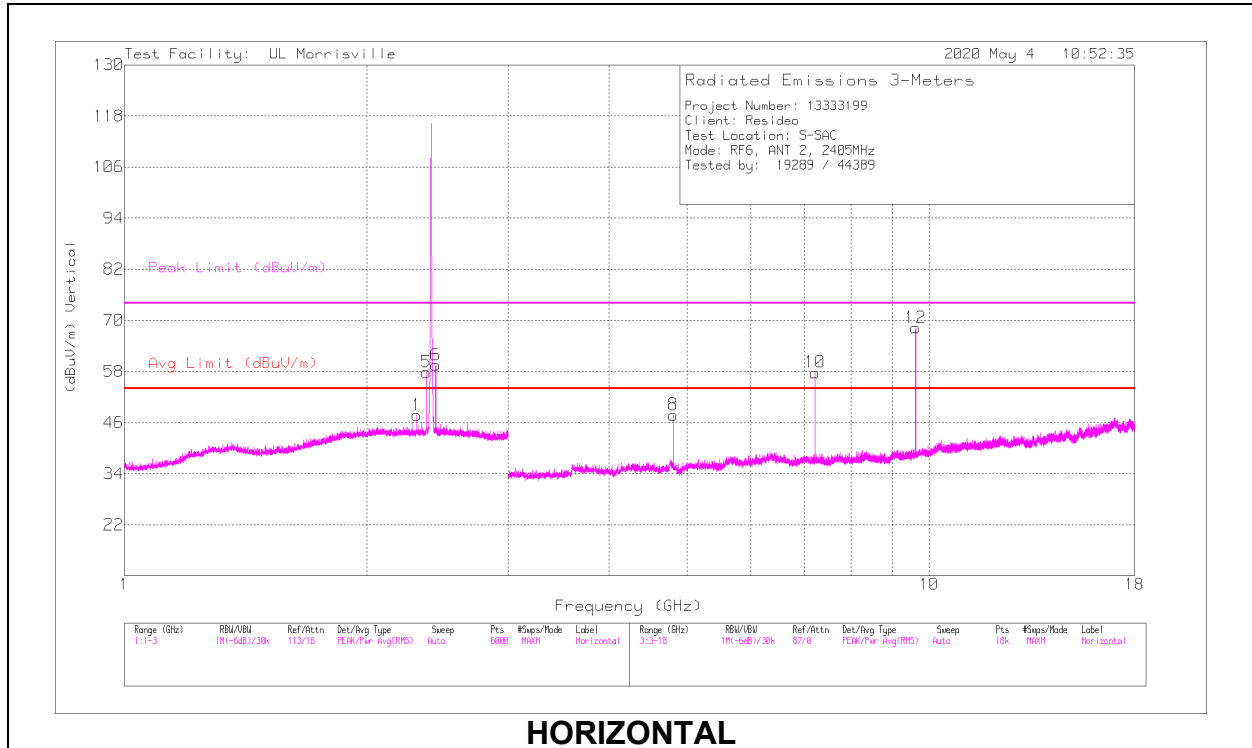
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.4835	53.34	Pk	32.1	-24.4	0	61.04	-	-	74	-12.96	292	144	V
2	* 2.48359	54.09	Pk	32.1	-24.4	0	61.79	-	-	74	-12.21	292	144	V
3	* 2.4835	42.34	ADV	32.1	-24.4	-23.41	26.63	54	-27.37	-	-	292	144	V
4	2.50696	45.39	ADV	32.2	-24.7	-23.41	29.48	54	-24.52	-	-	292	144	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector
 ADV - Linear Voltage Average

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/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
5	* 2.37255	53.25	PK2	32	-23.9	0	61.35	-	-	74	-12.65	174	108	H
	* 2.37301	48.21	ADV	32	-23.9	-23.41	32.9	54	-21.1	-	-	174	108	H
3	* 2.34073	45.56	PK2	31.8	-23.8	0	53.56	-	-	74	-20.44	115	209	V
	* 2.34097	35.26	ADV	31.8	-23.8	-23.41	19.85	54	-34.15	-	-	115	209	V
4	* 2.37241	54.17	PK2	32	-23.9	0	62.27	-	-	74	-11.73	131	208	V
	* 2.37296	49.36	ADV	32	-23.9	-23.41	34.05	54	-19.95	-	-	131	208	V
8	* 4.81093	49.15	PK2	33.9	-30.9	0	52.15	-	-	74	-21.85	146	142	H
	* 4.81077	40.92	ADV	33.9	-30.9	-23.41	20.51	54	-33.49	-	-	146	142	H
9	* 4.80889	51.32	PK2	33.9	-30.9	0	54.32	-	-	74	-19.68	12	298	V
	* 4.80898	43.53	ADV	33.9	-30.9	-23.41	23.12	54	-30.88	-	-	12	298	V
1	2.30922	39.62	Pk	31.7	-23.6	0	47.72	-	-	-	-	0-360	101	H
2	2.30955	40.23	Pk	31.7	-23.6	0	48.33	-	-	-	-	0-360	199	V
6	2.43691	51.6	Pk	32.1	-24.2	0	59.5	-	-	-	-	0-360	199	H
7	2.43724	49.98	Pk	32.1	-24.2	0	57.88	-	-	-	-	0-360	101	V
11	7.21357	50.17	Pk	35.6	-28.1	0	57.67	-	-	-	-	0-360	199	V
10	7.21607	50.18	Pk	35.6	-28	0	57.78	-	-	-	-	0-360	199	H
12	9.6212	57.9	Pk	36.6	-26.2	0	68.3	-	-	-	-	0-360	101	H
13	9.62204	54.95	Pk	36.6	-26.2	0	65.35	-	-	-	-	0-360	199	V

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

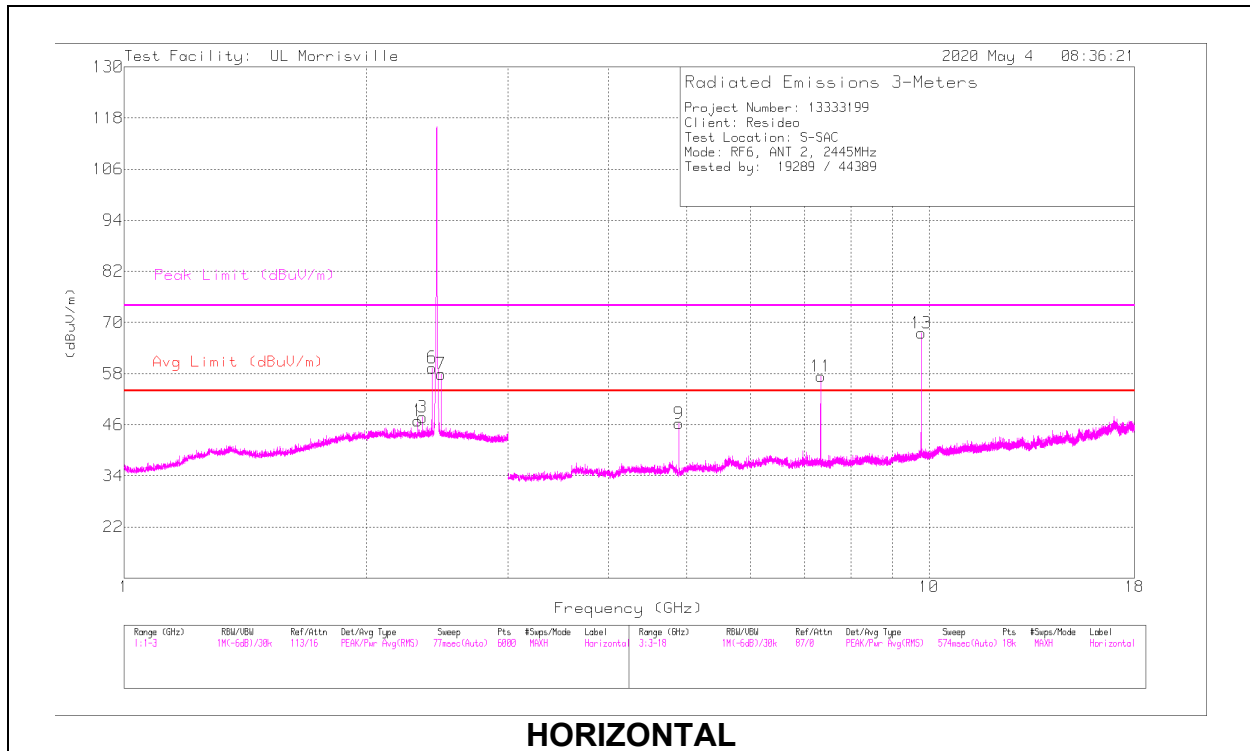
PK2 - Maximum Peak

ADV - Linear Voltage Average

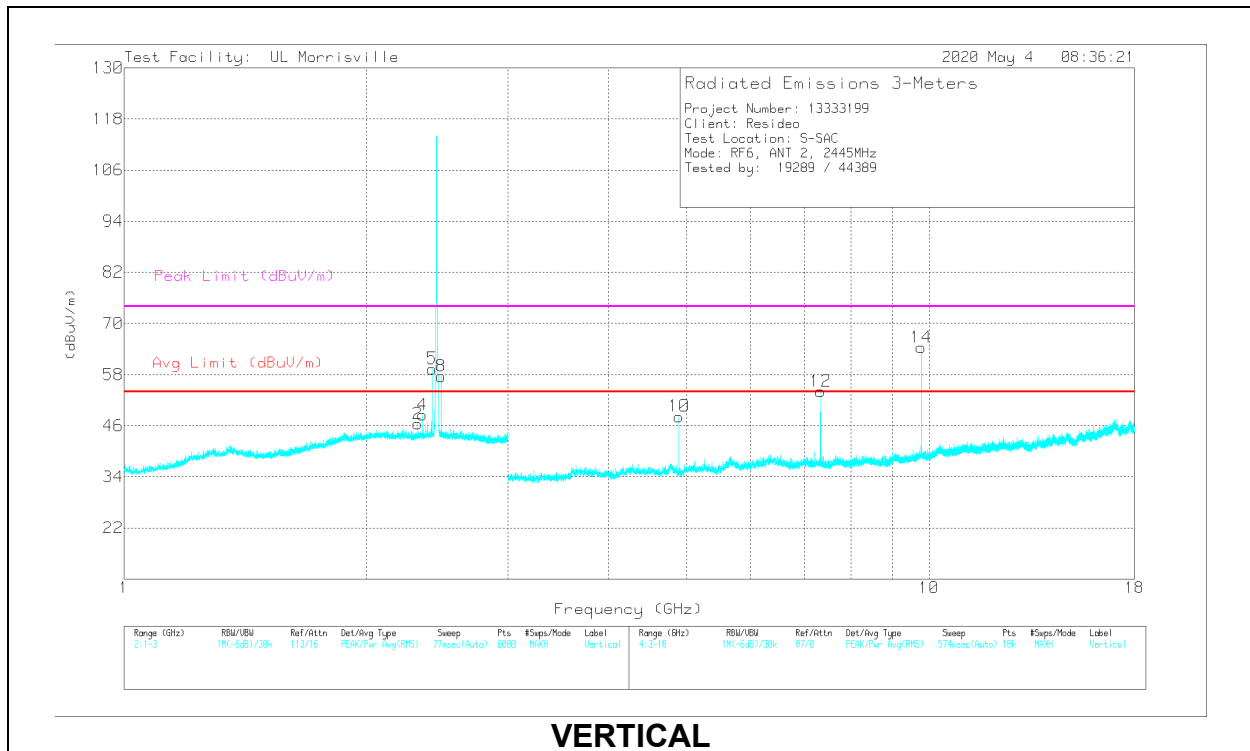
Pk - Peak detector

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

MID CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/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	* 2.31655	44.92	PK2	31.7	-23.6	0	53.02	-	-	74	-20.98	180	138	H
	* 2.317	33.28	ADV	31.7	-23.6	-23.41	17.97	54	-36.03	-	-	180	138	H
3	* 2.34944	46.45	PK2	31.8	-24	0	54.25	-	-	74	-19.75	173	112	H
	* 2.34898	36.66	ADV	31.8	-23.9	-23.41	21.15	54	-32.85	-	-	173	112	H
2	* 2.31628	44.49	PK2	31.7	-23.6	0	52.59	-	-	74	-21.41	116	302	V
	* 2.31695	33.47	ADV	31.7	-23.6	-23.41	18.16	54	-35.84	-	-	116	302	V
4	* 2.34951	46.62	PK2	31.8	-24	0	54.42	-	-	74	-19.58	103	198	V
	* 2.34896	37.49	ADV	31.8	-23.9	-23.41	21.98	54	-32.02	-	-	103	198	V
9	* 4.89096	47.63	PK2	33.8	-30.9	0	50.53	-	-	74	-23.47	1	264	H
	* 4.89087	39.46	ADV	33.8	-30.9	-23.41	18.95	54	-35.05	-	-	1	264	H
11	* 7.33345	49.19	PK2	35.6	-27.6	0	57.19	-	-	74	-16.81	94	265	H
	* 7.33348	41.55	ADV	35.6	-27.6	-23.41	26.14	54	-27.86	-	-	94	265	H
10	* 4.88895	48.83	PK2	33.8	-30.9	0	51.73	-	-	74	-22.27	18	266	V
	* 4.889	40.75	ADV	33.8	-30.9	-23.41	20.24	54	-33.76	-	-	18	266	V
12	* 7.33336	51.72	PK2	35.6	-27.6	0	59.72	-	-	74	-14.28	66	269	V
	* 7.33355	44.62	ADV	35.6	-27.6	-23.41	29.21	54	-24.79	-	-	66	269	V
6	2.41324	51.34	Pk	32.1	-24.1	0	59.34	-	-	-	-	0-360	199	H
5	2.41357	51.36	Pk	32.1	-24.1	0	59.36	-	-	-	-	0-360	199	V
7	2.47708	50.29	Pk	32.1	-24.5	0	57.89	-	-	-	-	0-360	199	H
8	2.47725	50	Pk	32.1	-24.5	0	57.6	-	-	-	-	0-360	199	V
14	9.77788	53.55	Pk	36.8	-26	0	64.35	-	-	-	-	0-360	199	V
13	9.78121	56.61	Pk	36.8	-25.9	0	67.51	-	-	-	-	0-360	101	H

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

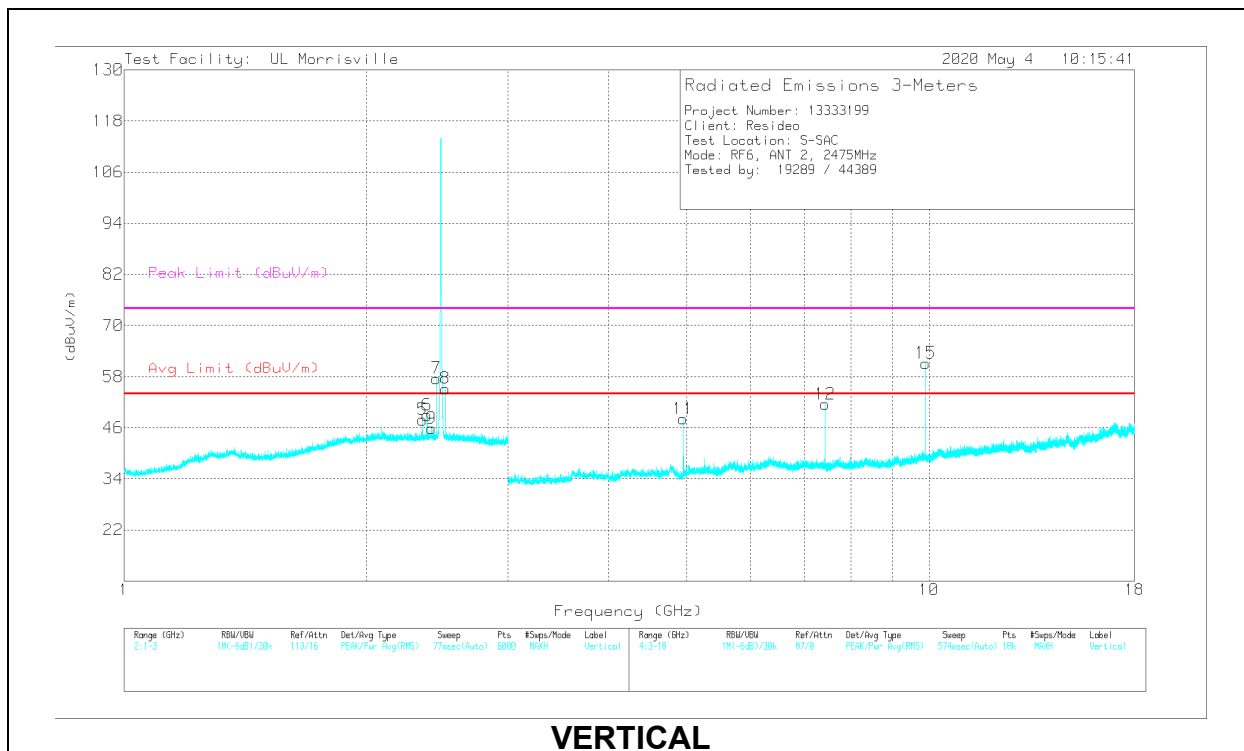
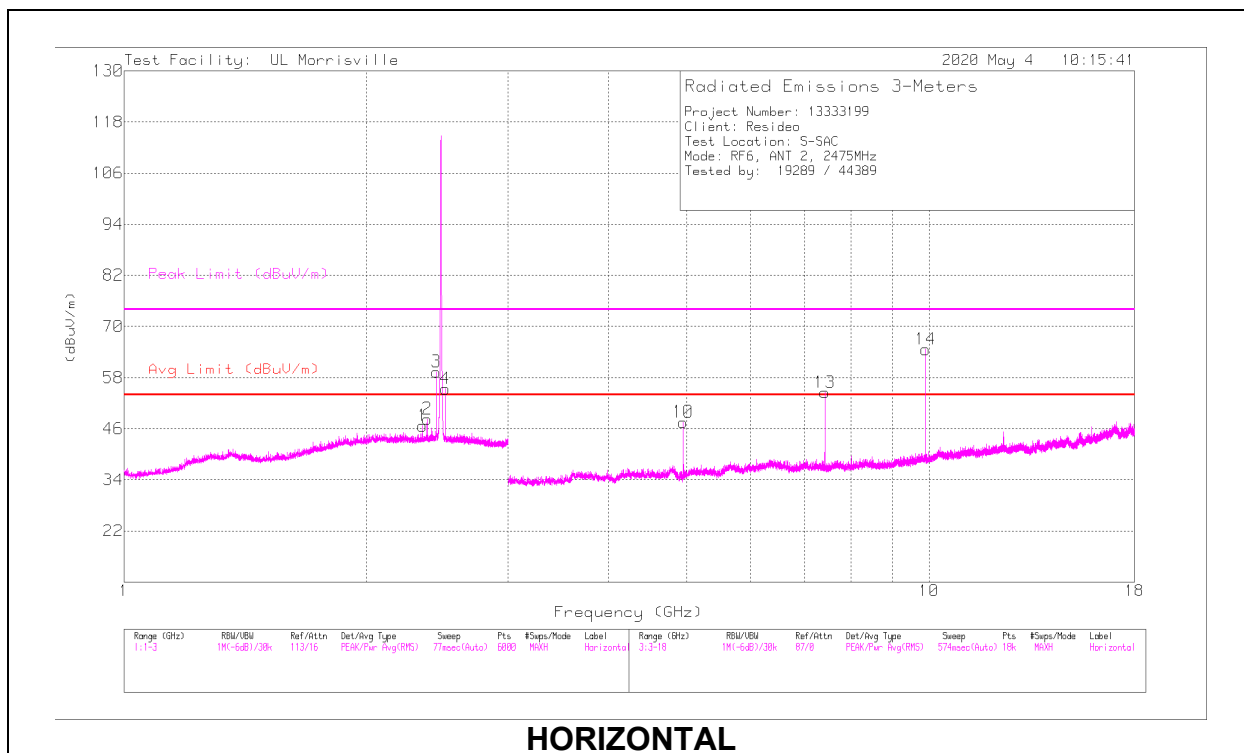
PK2 - Maximum Peak

ADV - Linear Voltage Average

Pk - Peak detector

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0078 (dB/m)	Amp/Cbl/Filtr/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	* 2.34726	44.91	PK2	31.8	-23.9	0	52.81	-	-	74	-21.19	177	115	H
	* 2.347	34.59	ADV	31.8	-23.9	-23.41	19.08	54	-34.92	-	-	177	115	H
2	* 2.37967	45.78	PK2	32	-24	0	53.78	-	-	74	-20.22	178	151	H
	* 2.37901	35.42	ADV	32	-24	-23.41	20.01	54	-33.99	-	-	178	151	H
5	* 2.34672	46.58	PK2	31.8	-23.9	0	54.48	-	-	74	-19.52	121	198	V
	* 2.34696	36.18	ADV	31.8	-23.9	-23.41	20.67	54	-33.33	-	-	121	198	V
6	* 2.34727	46.04	PK2	31.8	-23.9	0	53.94	-	-	74	-20.06	121	198	V
	* 2.34694	36.21	ADV	31.8	-23.9	-23.41	20.7	54	-33.3	-	-	121	198	V
10	* 4.94894	48.19	PK2	34	-30.9	0	51.29	-	-	74	-22.71	1	205	H
	* 4.94898	40.76	ADV	34	-30.9	-23.41	20.45	54	-33.55	-	-	1	205	H
13	* 7.4264	51.07	PK2	35.6	-27.9	0	58.77	-	-	74	-15.23	165	179	H
	* 7.42627	43.34	ADV	35.6	-27.9	-23.41	27.63	54	-26.37	-	-	165	179	H
11	* 4.9489	49.3	PK2	34	-30.9	0	52.4	-	-	74	-21.6	12	281	V
	* 4.94895	41.87	ADV	34	-30.9	-23.41	21.56	54	-32.44	-	-	12	281	V
12	* 7.42639	49.28	PK2	35.6	-27.9	0	56.98	-	-	74	-17.02	61	270	V
	* 7.42623	41.66	ADV	35.6	-27.9	-23.41	25.95	54	-28.05	-	-	61	270	V
9	2.41024	37.94	Pk	32	-24.1	0	45.84	-	-	-	-	0-360	201	V
3	2.44291	51.46	Pk	32.1	-24.2	0	59.36	-	-	-	-	0-360	199	H
7	2.44291	49.68	Pk	32.1	-24.2	0	57.58	-	-	-	-	0-360	201	V
8	2.50659	47.68	Pk	32.2	-24.7	0	55.18	-	-	-	-	0-360	201	V
4	2.50725	47.87	Pk	32.2	-24.7	0	55.37	-	-	-	-	0-360	199	H
14	9.90122	53.42	Pk	37	-25.8	0	64.62	-	-	-	-	0-360	101	H
15	9.90122	49.94	Pk	37	-25.8	0	61.14	-	-	-	-	0-360	199	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 PK2 - Maximum Peak
 ADV - Linear Voltage Average
 Pk - Peak detector

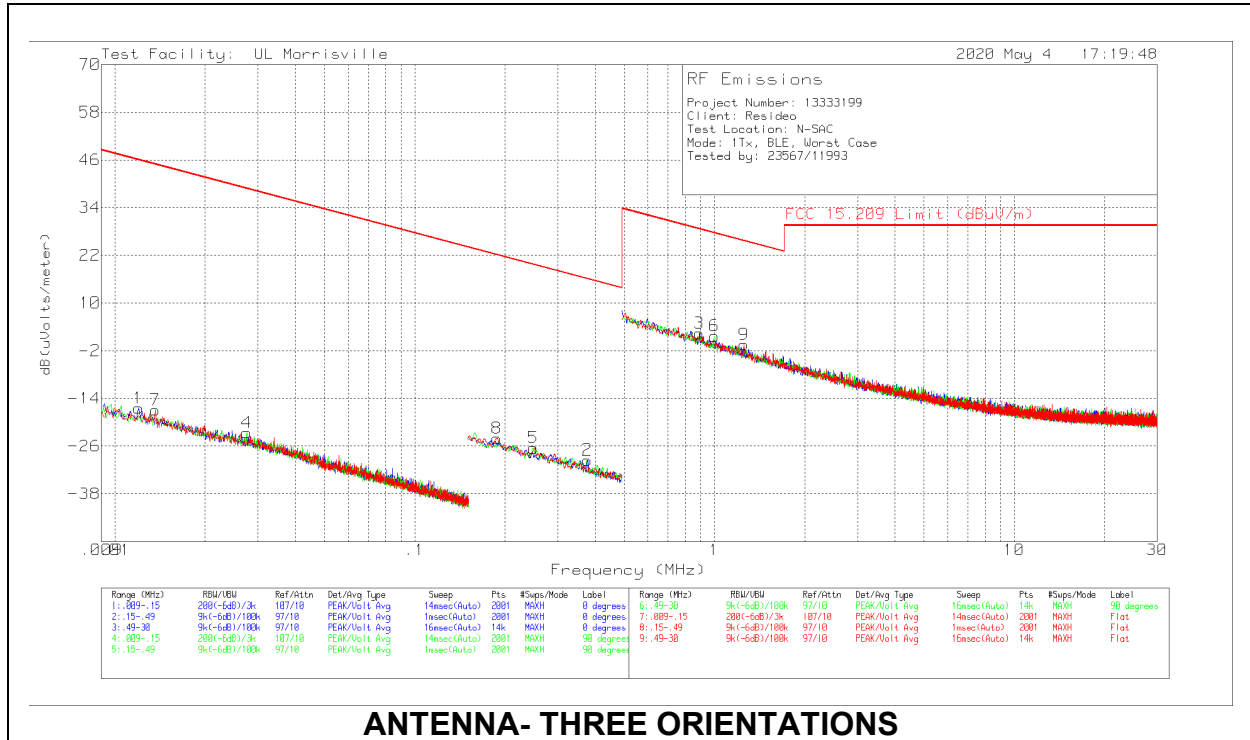
Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

10.3. WORST CASE BELOW 30MHZ

Note for below 30 MHz scans: 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 $40 \cdot \log(\text{test distance} / \text{specification distance})$.

The below 30 MHz 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 reported in the table) using the free space impedance of 377Ω . For example, the measurement frequency 11.98 KHz resulted in a level of -16.46 dBuV/m, which is equivalent to $-16.46 - 51.5 = -67.96$ dBuA/m, which has the same margin, -62.49 dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

SPURIOUS EMISSIONS BELOW 30 MHz (BLE WORST-CASE CONFIGURATION)

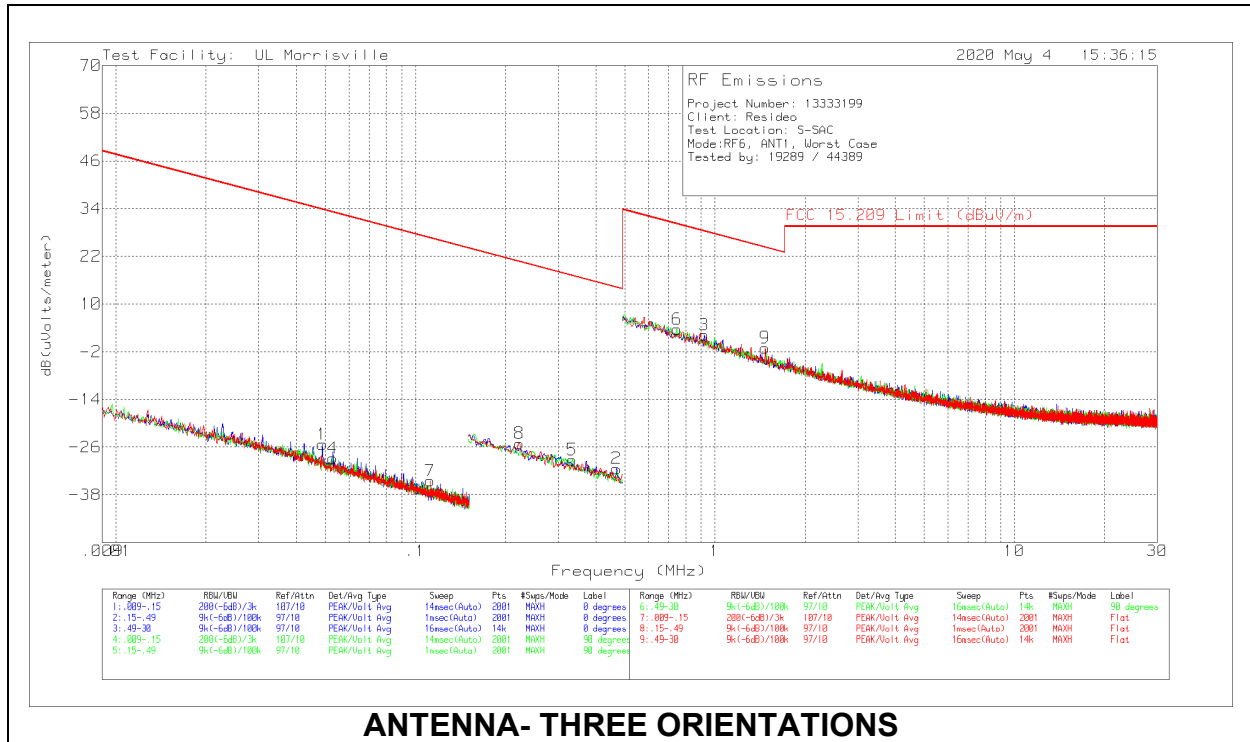


BELOW 30MHz DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0079 AF (dB/m)	Cbl (dB)	Dist. Corr. Factor (dB)	Corrected Reading dB(uV/meter)	FCC 15.209 QP/AV Limit (dBuV/m)	FCC 15.209 PK Limit (dBuV/m)	Worst-Case Margin (dB)	Azimuth (Degs)
1	.01198	46.04	Pk	17.4	.1	-80	-16.46	46.03	66.03	-62.49	0-360
7	.01362	46.26	Pk	16.7	.1	-80	-16.94	44.92	64.92	-61.86	0-360
4	.02753	43.88	Pk	13.4	.1	-80	-22.62	38.81	58.81	-61.43	0-360
8	.18783	44.84	Pk	11	.1	-80	-24.06	22.13	42.13	-46.19	0-360
5	.24835	42.44	Pk	11	.1	-80	-26.46	19.7	39.7	-46.16	0-360
2	.37721	39.37	Pk	11	.1	-80	-29.53	16.07	36.07	-45.6	0-360
3	.89052	31.25	Pk	11	.1	-40	2.35	28.61	-	-26.26	0-360
6	1.00014	30.49	Pk	11	.2	-40	1.69	27.6	-	-25.91	0-360
9	1.2531	28.22	Pk	11.1	.2	-40	-48	25.64	-	-26.12	0-360

Pk - Peak detector

SPURIOUS EMISSIONS BELOW 30 MHz (802.15.4 ANT1 WORST-CASE CONFIGURATION)

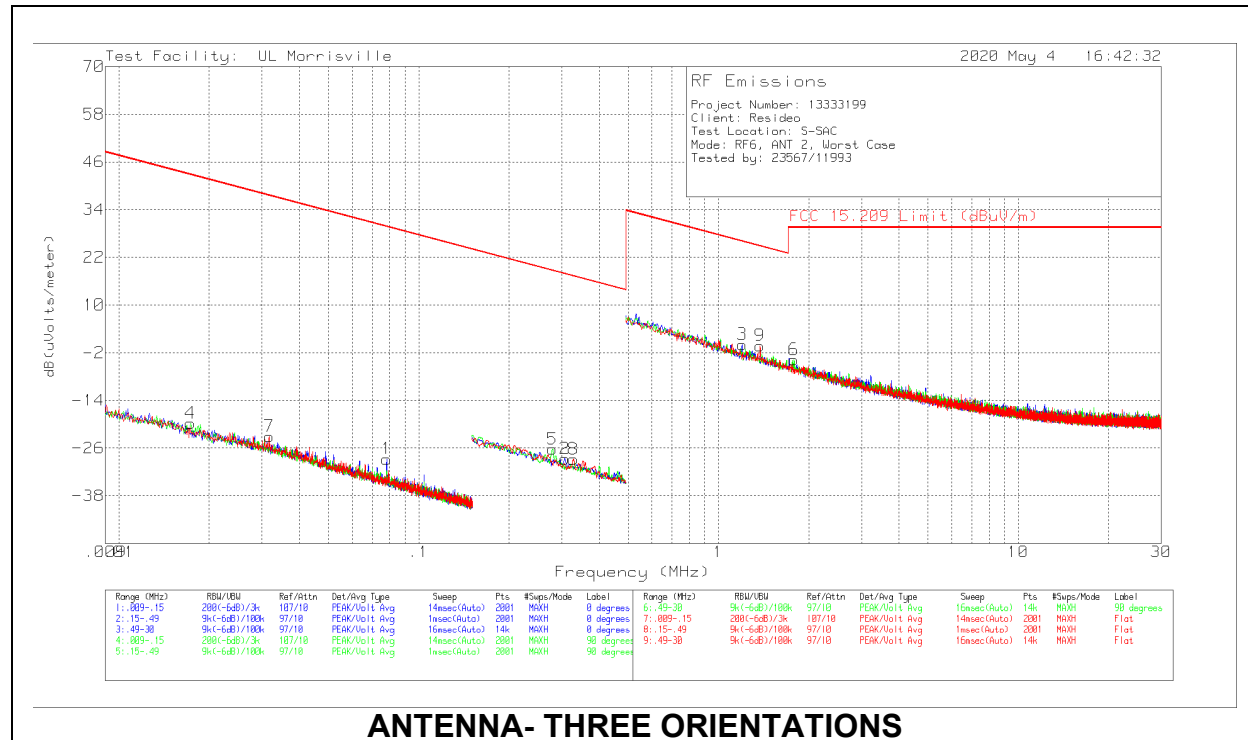


BELOW 30MHz DATA

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 QP/AV Limit (dBuV/m)	FCC 15.209 PK Limit (dBuV/m)	Worst-Case Margin (dB)	Azimuth (Degs)
1	.0489	42.96	Pk	11.6	.1	-80	-25.34	33.82	53.82	-59.16	0-360
4	.05288	39.57	Pk	11.5	.1	-80	-28.83	33.14	53.14	-61.97	0-360
7	.11181	34.29	Pk	11.1	.1	-80	-34.51	26.63	46.63	-61.14	0-360
8	.22259	43.79	Pk	11	.1	-80	-25.11	20.65	40.65	-45.76	0-360
5	.3336	39.66	Pk	11	.1	-80	-29.24	17.14	37.14	-46.38	0-360
2	.46892	37.5	Pk	11	.1	-80	-31.4	14.18	34.18	-45.58	0-360
6	.74718	32.55	Pk	11	.1	-40	3.65	30.14	-	-26.49	0-360
3	.92214	31.1	Pk	11	.1	-40	2.2	28.31	-	-26.11	0-360
9	1.47233	27.62	Pk	11.1	.2	-40	-1.08	24.24	-	-25.32	0-360

Pk - Peak detector

SPURIOUS EMISSIONS BELOW 30 MHz (802.15.4 ANT2 WORST-CASE CONFIGURATION)



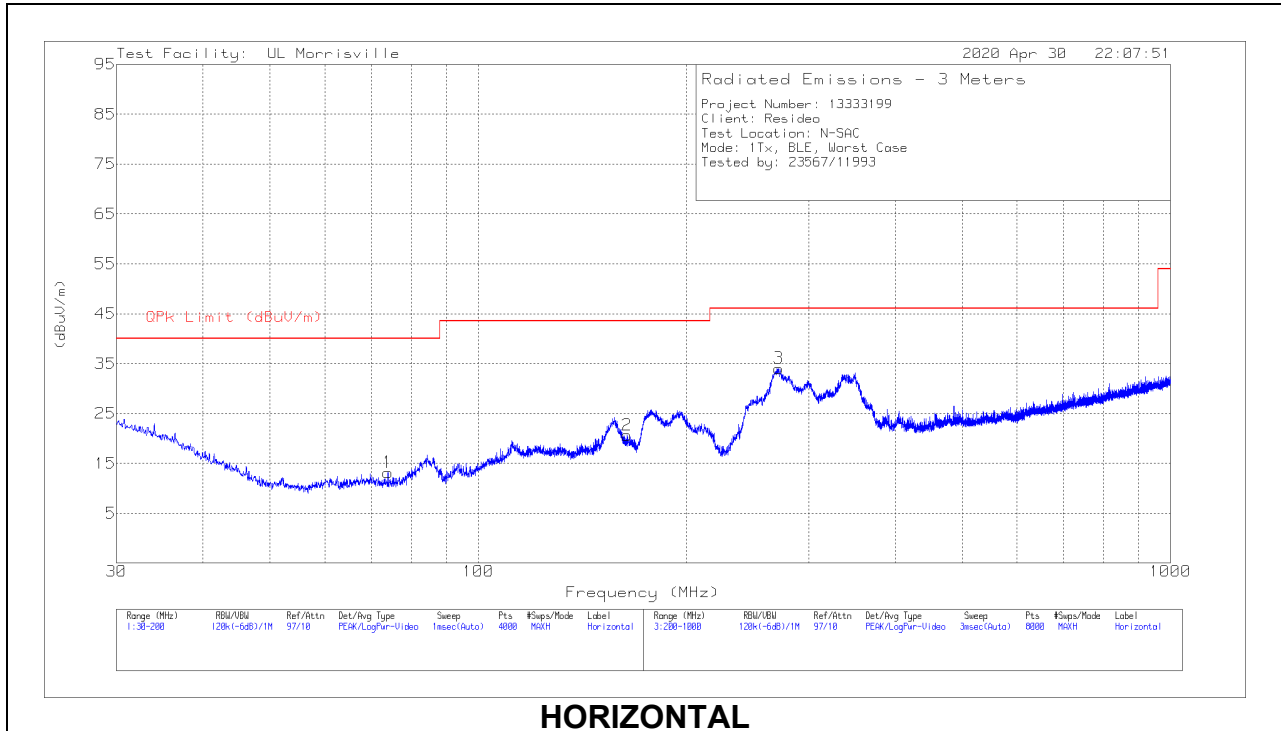
BELOW 30MHz DATA

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 QP/AV Limit (dBuV/m)	FCC 15.209 PK Limit (dBuV/m)	Worst-Case Margin (dB)	Azimuth (Degs)
4	.01731	45.05	Pk	15.1	.1	-80	-19.75	42.84	62.84	-62.59	0-360
7	.03172	43.83	Pk	13	.1	-80	-23.07	37.58	57.58	-60.65	0-360
1	.07815	39.98	Pk	11.2	.1	-80	-28.72	29.75	49.75	-58.47	0-360
5	.27946	42.63	Pk	11	.1	-80	-26.27	18.68	38.68	-44.95	0-360
2	.30742	40.23	Pk	11	.1	-80	-28.67	17.85	37.85	-46.52	0-360
8	.32808	40.12	Pk	11	.1	-80	-28.78	17.28	37.28	-46.06	0-360
3	1.2004	28.76	Pk	11.1	.2	-40	.06	26.02	-	-25.96	0-360
9	1.37536	28.48	Pk	11.1	.2	-40	-.22	24.84	-	-25.06	0-360
6	1.78642	24.84	Pk	11.2	.2	-40	-3.76	29.54	-	-33.3	0-360

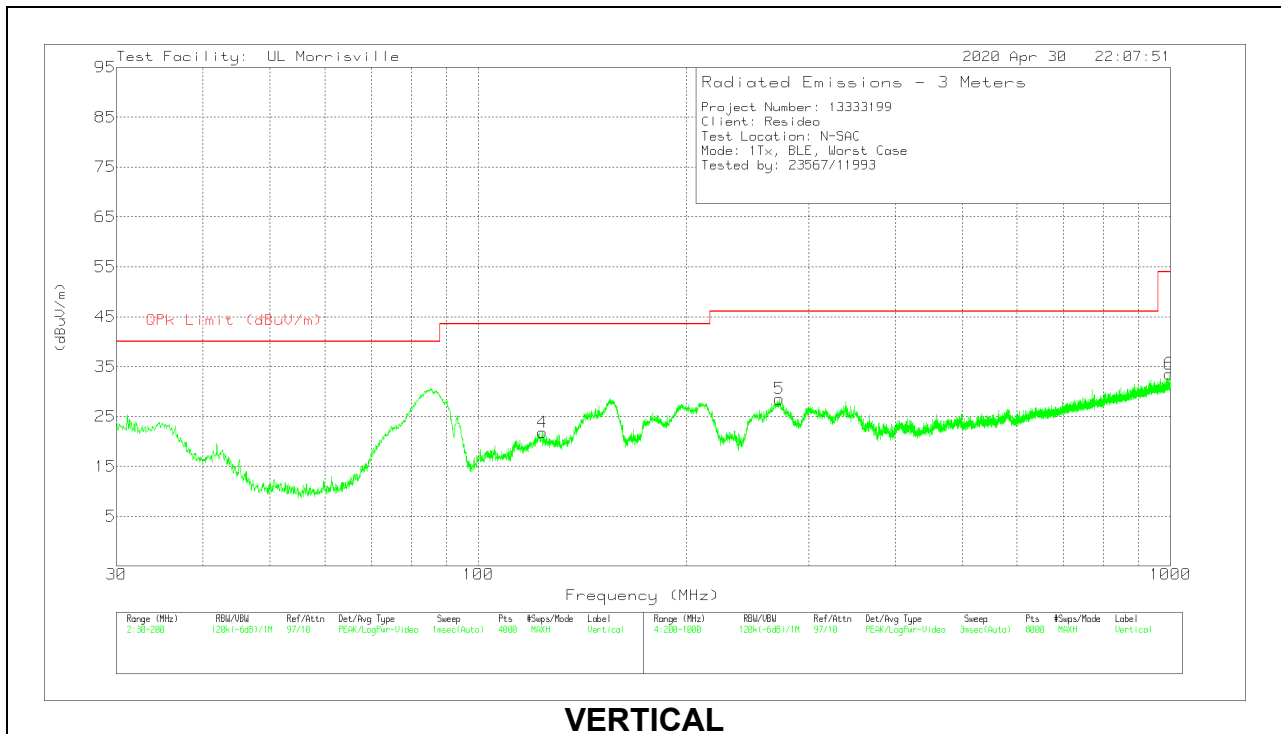
Pk - Peak detector

10.4. WORST CASE 30 – 1000MHZ

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



HORIZONTAL



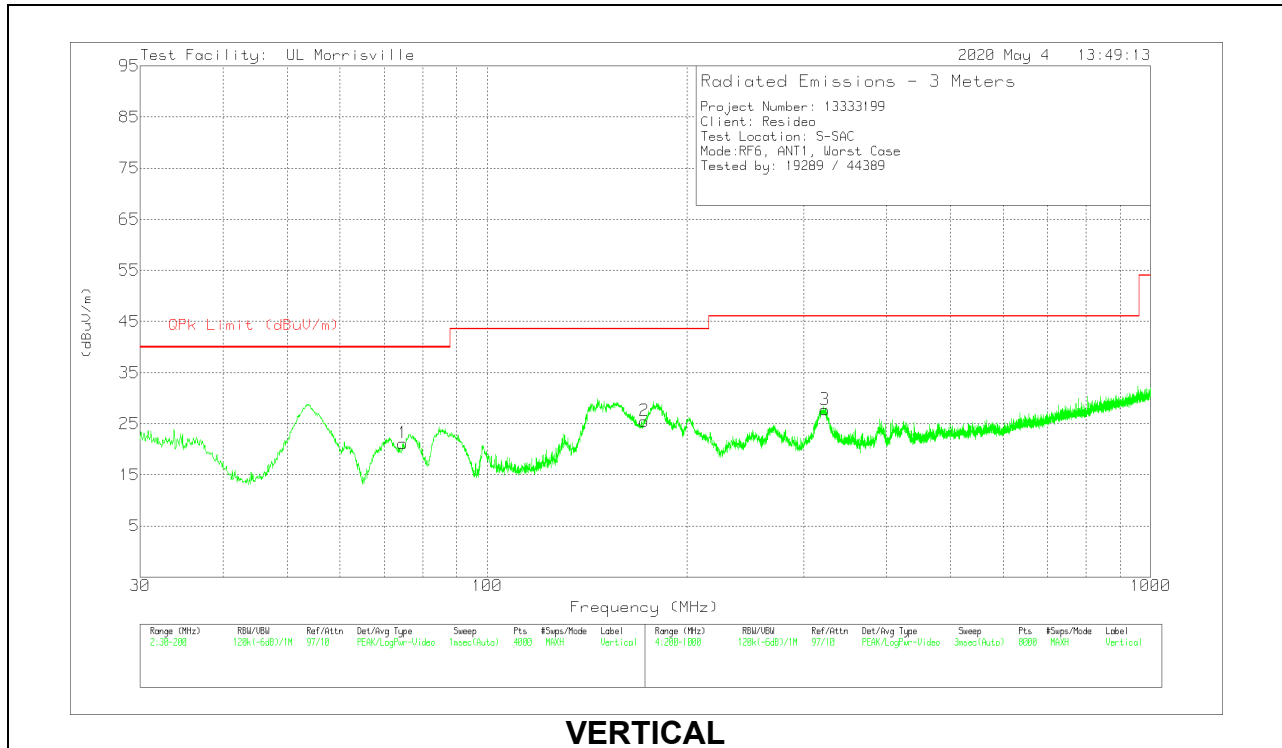
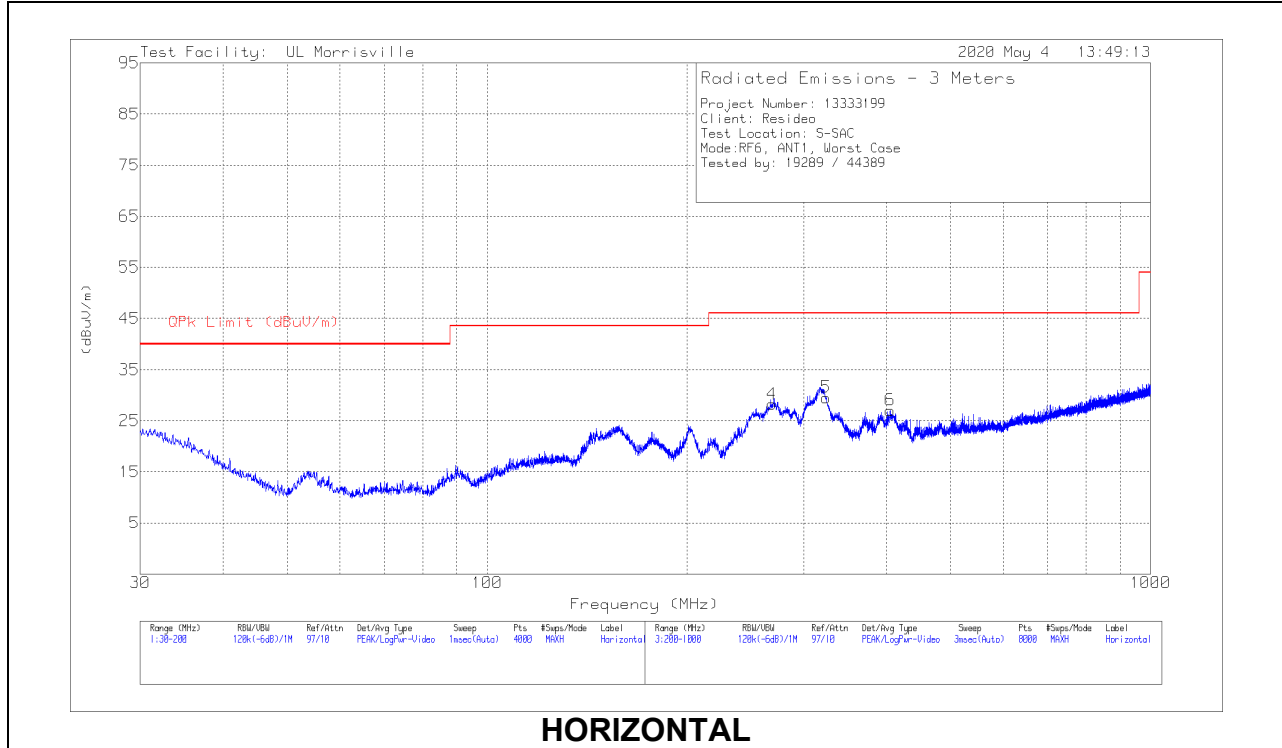
VERTICAL

BELOW 1GHz DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0073 AF (dB/m)	Cbl/Amp (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 74.0414	30.3	Pk	14	-31.1	13.2	40	-26.8	0-360	299	H
2	* 163.9522	32.73	Pk	18.3	-30.4	20.63	43.52	-22.89	0-360	299	H
3	* 271.6093	44.16	Pk	19.4	-29.5	34.06	46.02	-11.96	0-360	102	H
4	* 123.6942	32.6	Pk	19.9	-30.7	21.8	43.52	-21.72	0-360	102	V
5	* 272.1094	38.65	Pk	19.4	-29.5	28.55	46.02	-17.47	0-360	199	V
6	* 996.1035	29.25	Pk	29.4	-25.1	33.55	53.97	-20.42	0-360	102	V

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

SPURIOUS EMISSIONS 30 TO 1000 MHz (802.15.4 ANT1 WORST-CASE CONFIGURATION)

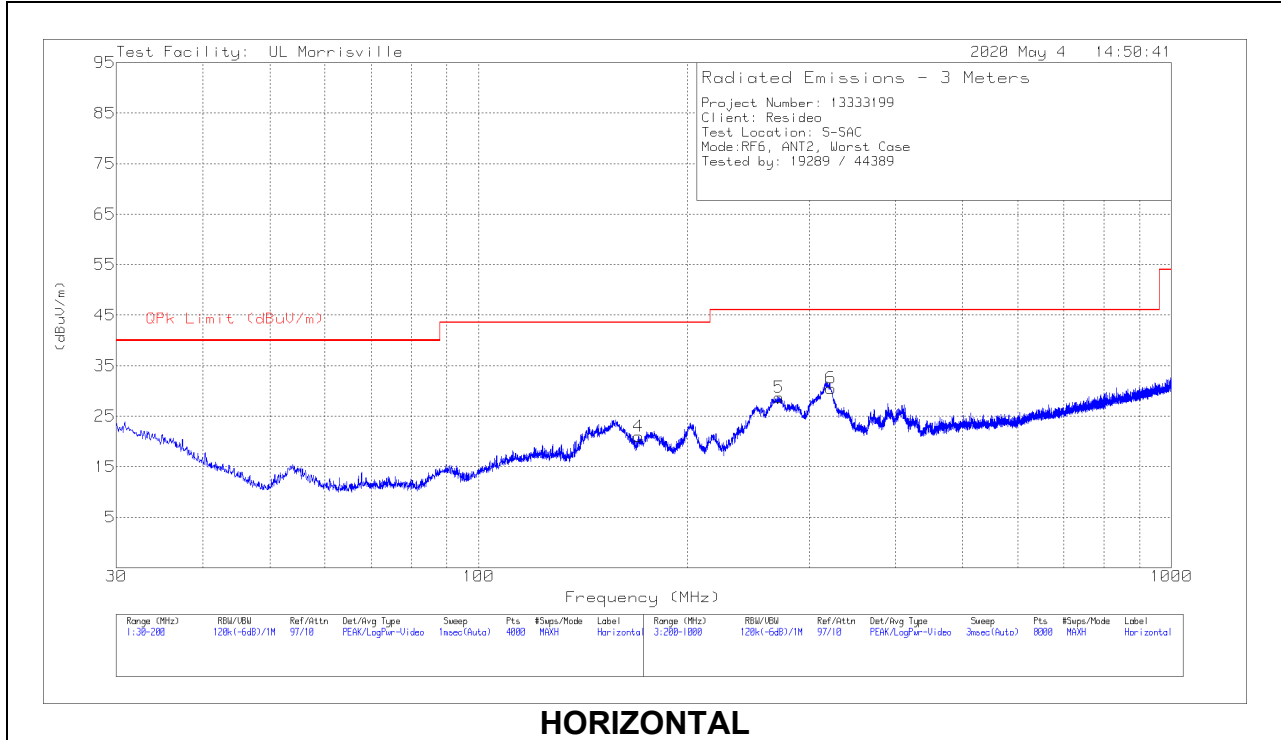


BELOW 1GHz DATA

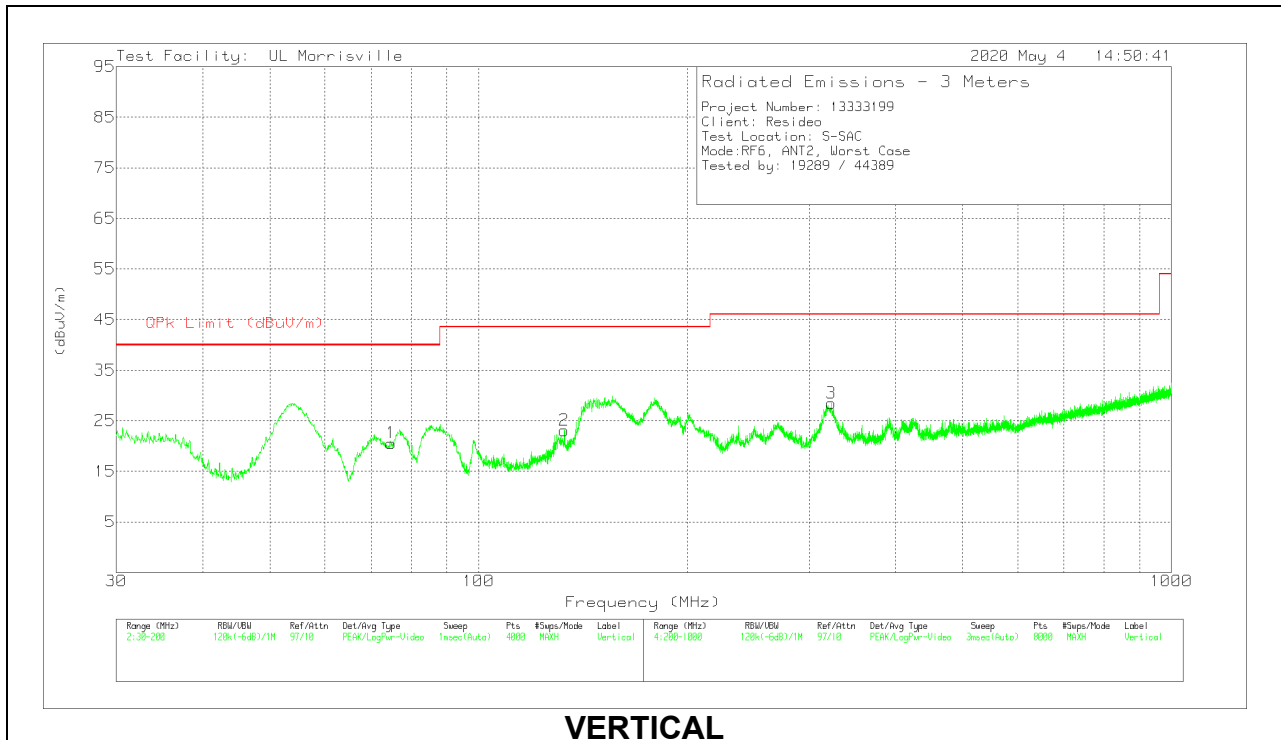
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 AF (dB/m)	Cbl/Amp (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 268.8089	38.74	Pk	19.2	-29.7	28.24	46.02	-17.78	0-360	199	H
5	* 324.2161	38.94	Pk	20	-29.4	29.54	46.02	-16.48	0-360	101	H
6	* 405.1267	34.25	Pk	21.9	-29.1	27.05	46.02	-18.97	0-360	101	H
1	74.6366	38.4	Pk	14	-31.2	21.2	40	-18.8	0-360	101	V
2	* 172.5819	38.25	Pk	17.8	-30.5	25.55	43.52	-17.97	0-360	101	V
3	* 322.916	37.16	Pk	20	-29.4	27.76	46.02	-18.26	0-360	198	V

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

SPURIOUS EMISSIONS 30 TO 1000 MHz (802.15.4 ANT2 WORST-CASE CONFIGURATION)



HORIZONTAL



VERTICAL

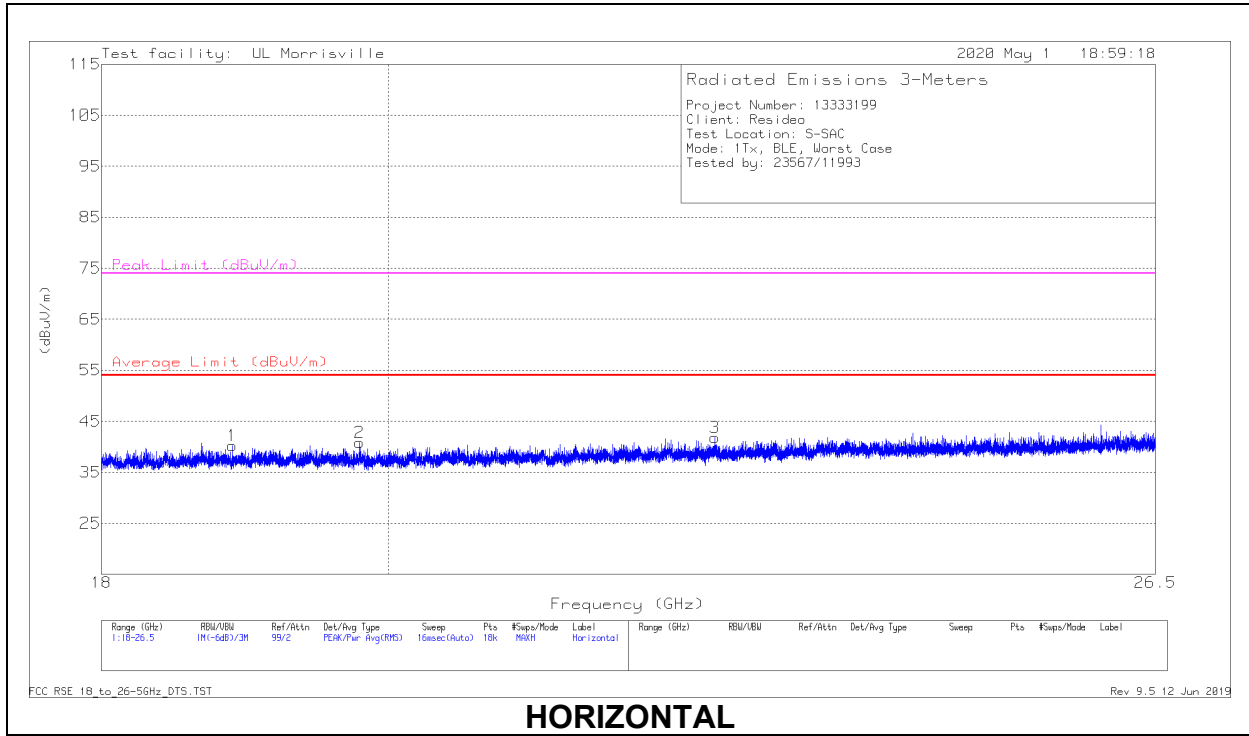
BELOW 1GHz DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0074 AF (dB/m)	Cbl/Amp (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 170.2438	33.4	Pk	18	-30.4	21	43.52	-22.52	0-360	199	H
5	* 271.5093	39.12	Pk	19.3	-29.7	28.72	46.02	-17.3	0-360	199	H
6	* 322.6159	39.94	Pk	20	-29.4	30.54	46.02	-15.48	0-360	101	H
1	74.7853	37.78	Pk	14	-31.2	20.58	40	-19.42	0-360	101	V
2	* 133.0467	34.18	Pk	19.6	-30.7	23.08	43.52	-20.44	0-360	101	V
3	* 322.816	37.85	Pk	20	-29.4	28.45	46.02	-17.57	0-360	199	V

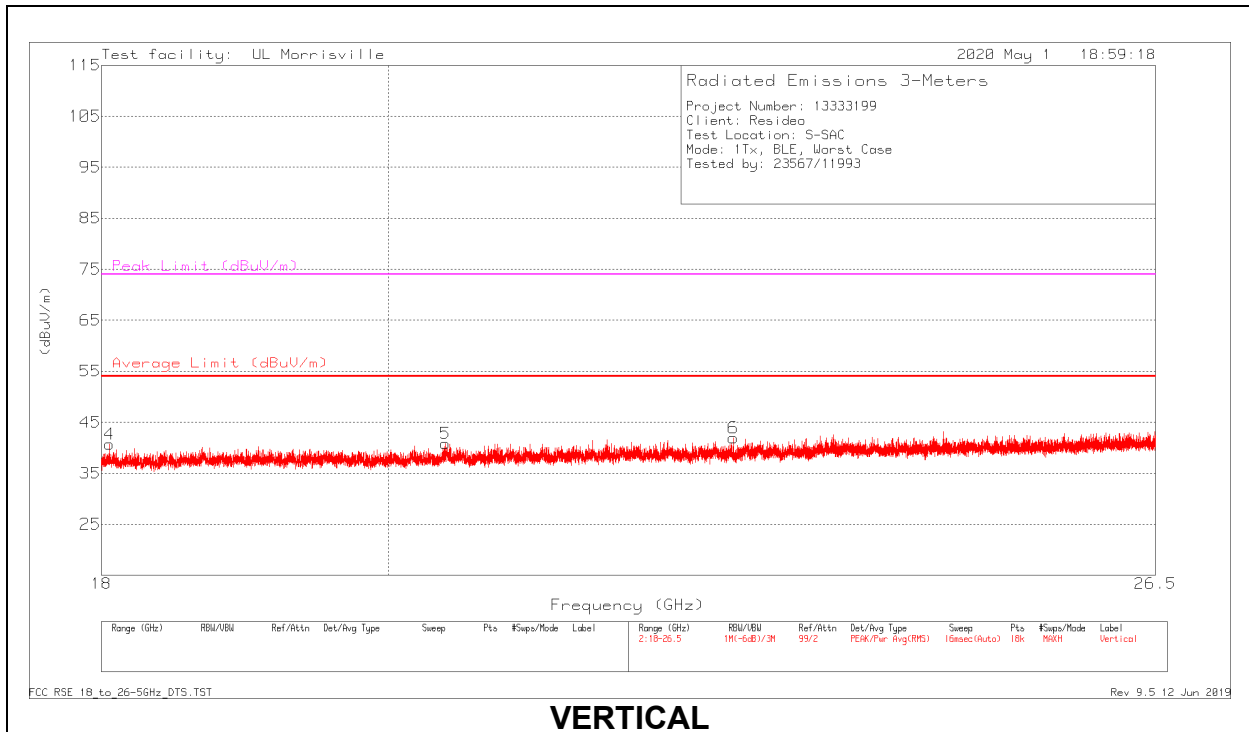
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
 Pk - Peak detector

10.5. WORST CASE 18-26 GHZ

SPURIOUS EMISSIONS 18-26 GHZ (BLE WORST-CASE CONFIGURATION)



HORIZONTAL



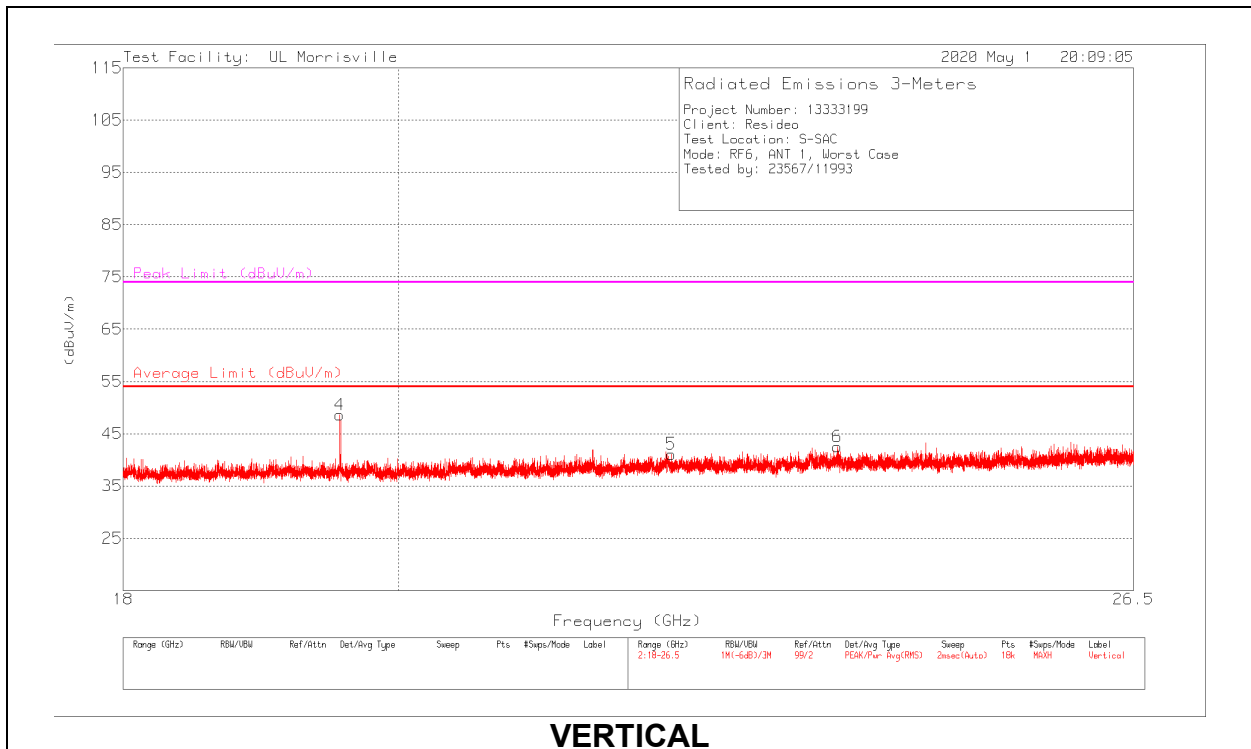
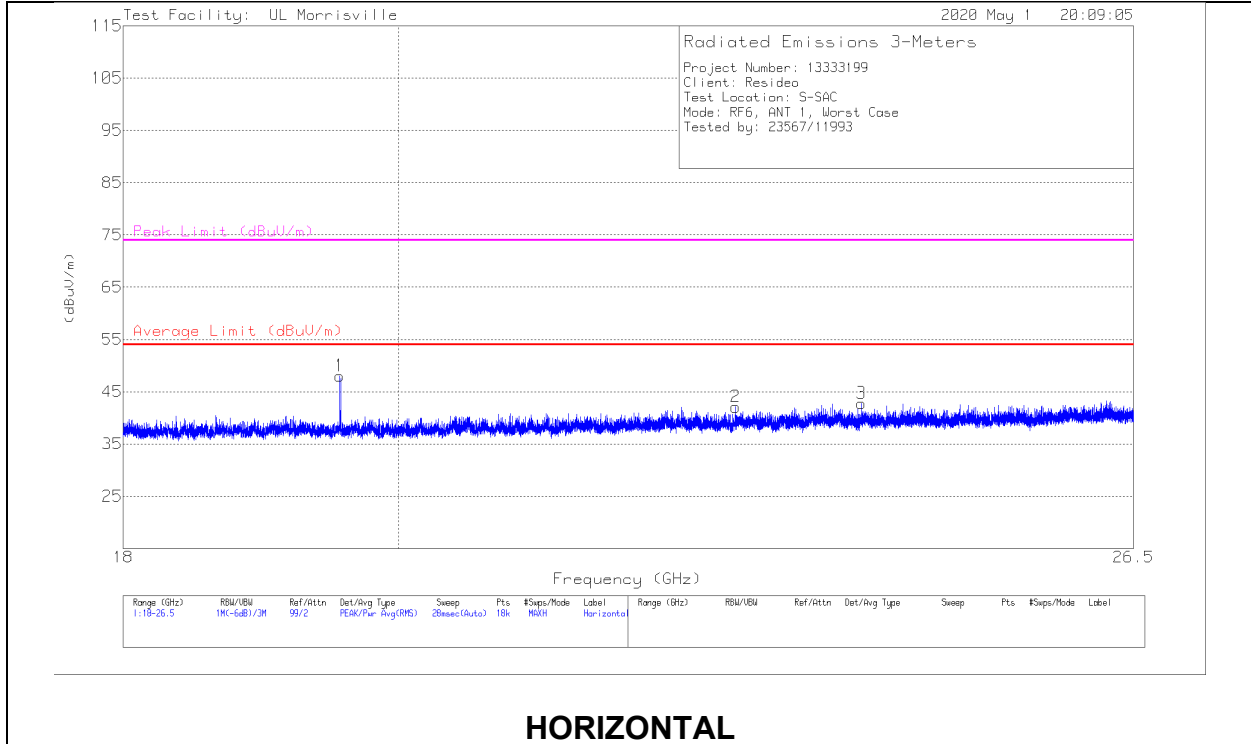
VERTICAL

18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 18.88688	45.6	Pk	32.7	-38.1	40.2	54	-13.8	74	-33.8	0-360	298	H
2	* 19.78935	45.42	Pk	32.9	-37.5	40.82	54	-13.18	74	-33.18	0-360	198	H
3	* 22.54586	45.23	Pk	33.5	-36.9	41.83	54	-12.17	74	-32.17	0-360	102	H
4	* 18.05384	46.72	Pk	32.5	-38.5	40.72	54	-13.28	74	-33.28	0-360	252	V
5	* 20.42263	45.11	Pk	33.1	-37.4	40.81	54	-13.19	74	-33.19	0-360	298	V
6	* 22.69745	45.55	Pk	33.5	-37.1	41.95	54	-12.05	74	-32.05	0-360	298	V

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

SPURIOUS EMISSIONS 18-26 GHz (802.15.4 ANT1 WORST-CASE CONFIGURATION)



18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (dB/m)	Amp/Cbl (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 19.55577	54.63	Pk	32.7	-37.8	0	49.53	-	-	74	-24.47	169	161	H
	* 19.55577	51.08	Av	32.7	-37.8	-23.41	22.57	54	-31.43	-	-	169	161	H
2	* 22.75743	45.5	Pk	33.5	-36.9	0	42.1	54	-11.9	74	-31.9	0-360	102	H
3	* 23.87854	45.18	Pk	34	-36.4	0	42.78	54	-11.22	74	-31.22	0-360	298	H
4	* 19.55568	54.94	Pk	32.7	-37.8	0	49.84	-	-	74	-24.16	171	102	V
	* 19.55568	50.98	Av	32.7	-37.8	-23.41	22.47	54	-31.53	-	-	171	102	V
5	* 22.20301	44.86	Pk	33.6	-37.4	0	41.06	54	-12.94	74	-32.94	0-360	252	V
6	* 23.658	45.1	Pk	33.9	-36.5	0	42.5	54	-11.5	74	-31.5	0-360	298	V

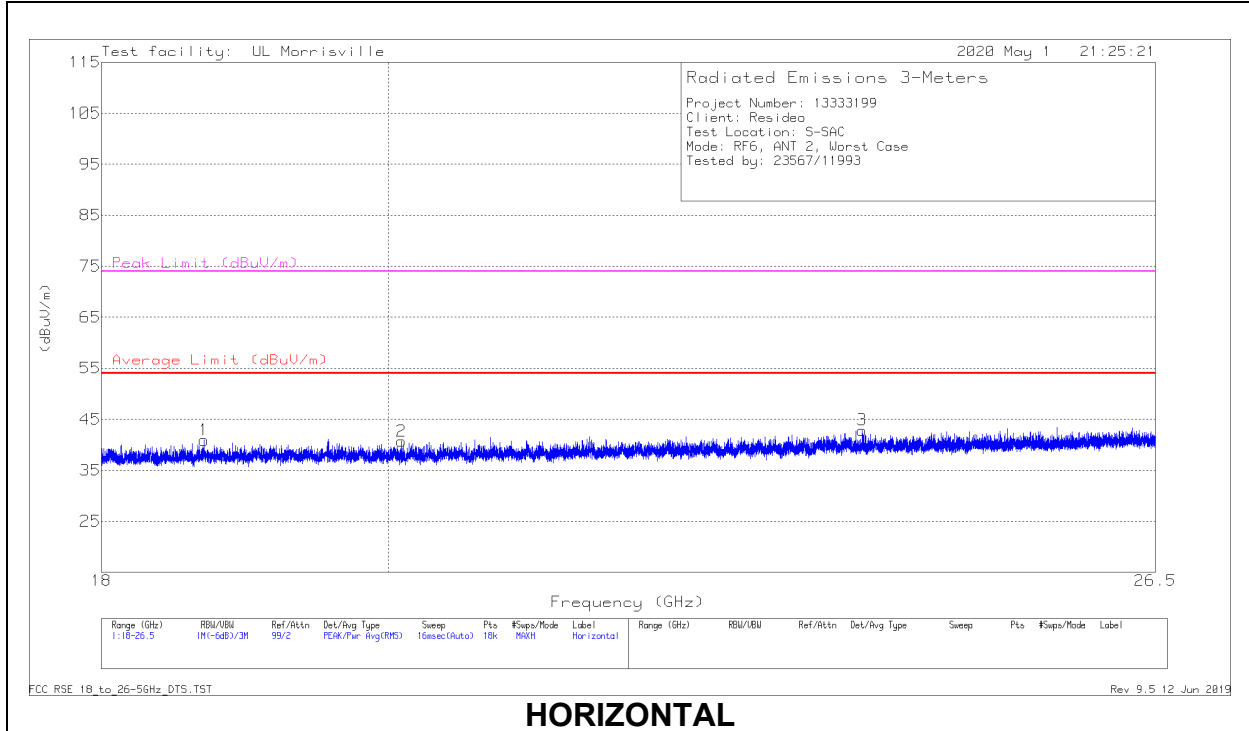
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

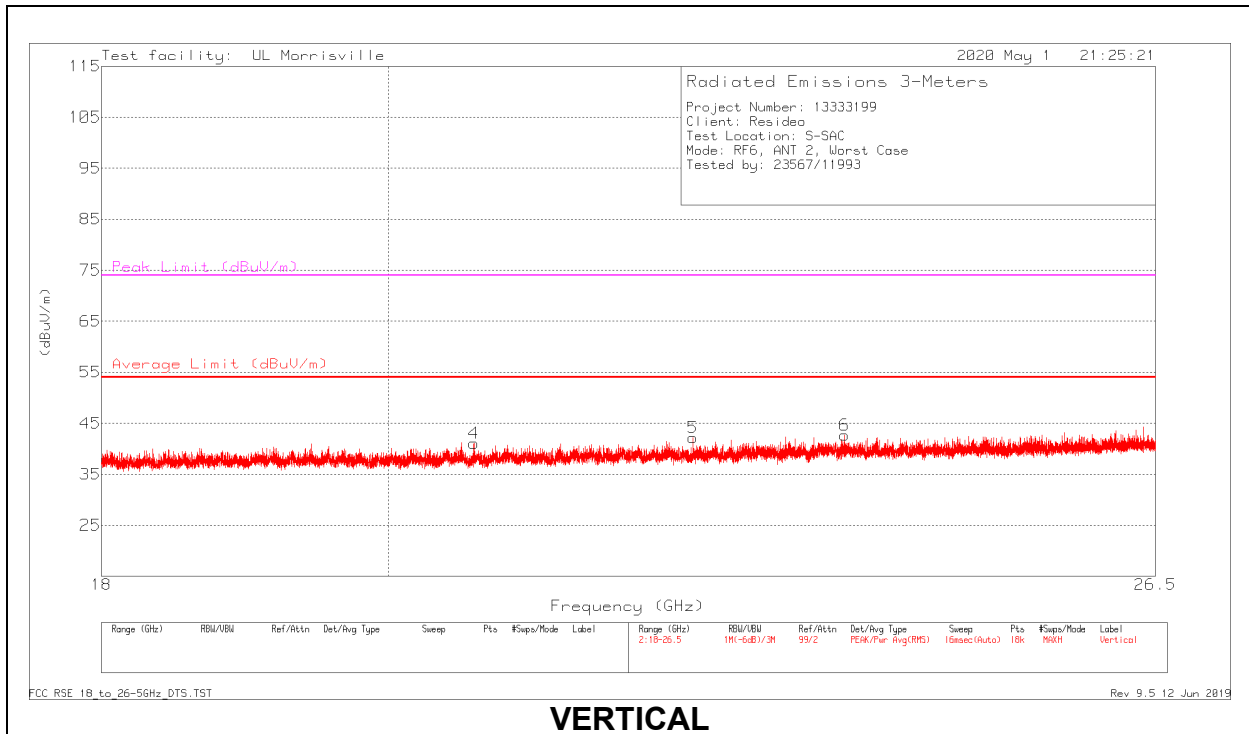
Av – Average detector

Note: The manufacturer has declared a real world duty cycle of 6.75%. This results in a $20\log(0.0675) = -23.41$ correction.

SPURIOUS EMISSIONS 18-26 GHz (802.15.4 ANT2 WORST-CASE CONFIGURATION)



HORIZONTAL



VERTICAL

18 – 26GHz DATA

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0076 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 18.68995	46.61	Pk	32.5	-38.2	40.91	54	-13.09	74	-33.09	0-360	148	H
2	* 20.09395	45.62	Pk	32.7	-37.6	40.72	54	-13.28	74	-33.28	0-360	148	H
3	* 23.79543	45.26	Pk	34	-36.4	42.86	54	-11.14	74	-31.14	0-360	298	H
4	* 20.63609	45.71	Pk	33	-37.6	41.11	54	-12.89	74	-32.89	0-360	102	V
5	* 22.36263	45.58	Pk	33.5	-36.9	42.18	54	-11.82	74	-31.82	0-360	152	V
6	* 23.64289	45.24	Pk	33.9	-36.5	42.64	54	-11.36	74	-31.36	0-360	298	V

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

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)
RSS-Gen 8.8

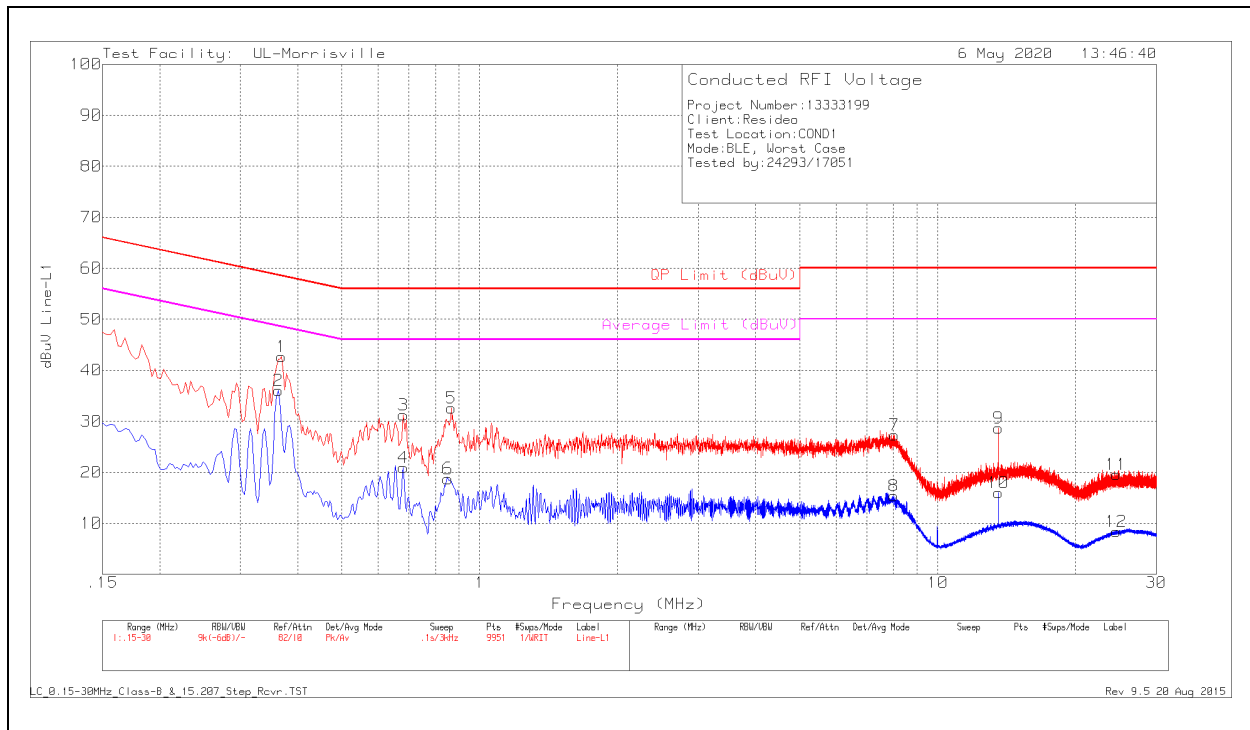
Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

RESULTS

11.1.1. BLE

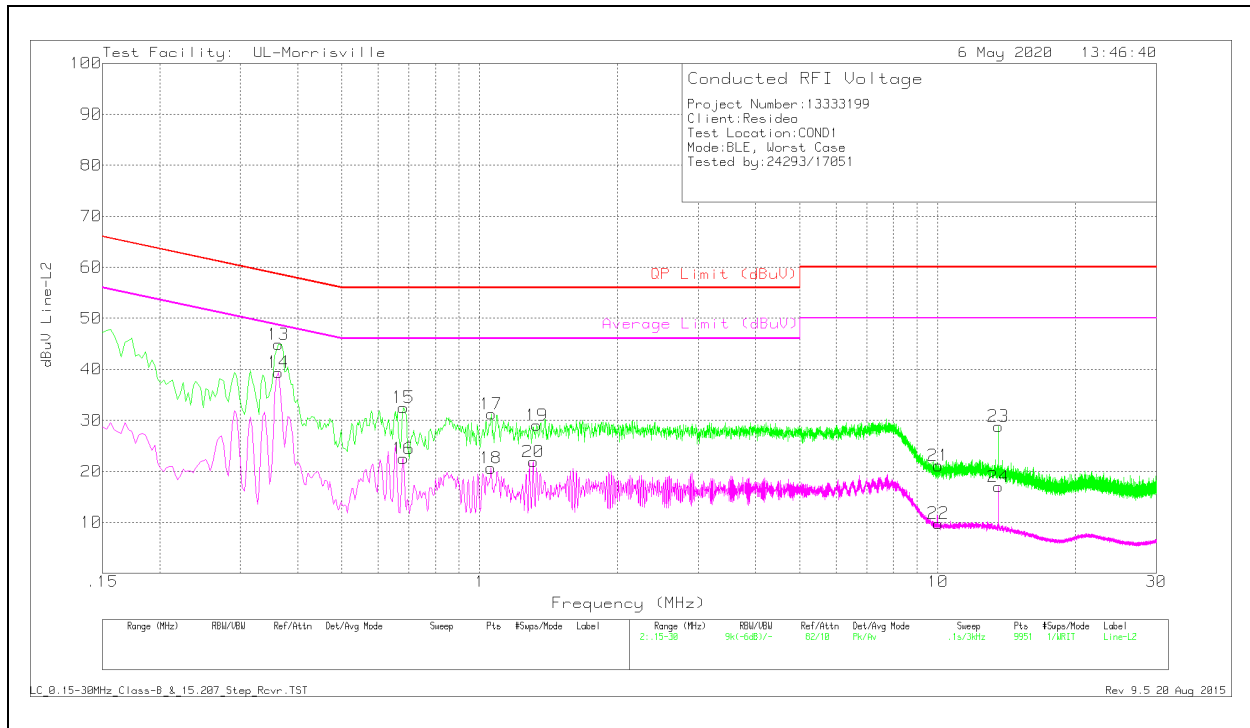
LINE 1 RESULTS



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	.369	32.84	Pk	.1	9.7	42.64	58.52	-15.88	-	-
2	.363	26.21	Av	.1	9.7	36.01	-	-	48.66	-12.65
3	.681	21.31	Pk	.1	9.8	31.21	56	-24.79	-	-
4	.681	11.03	Av	.1	9.8	20.93	-	-	46	-25.07
5	.867	22.81	Pk	0	9.8	32.61	56	-23.39	-	-
6	.852	8.94	Av	0	9.8	18.74	-	-	46	-27.26
7	8.043	17.17	Pk	.1	10	27.27	60	-32.73	-	-
8	8.013	5.28	Av	.1	10	15.38	-	-	50	-34.62
9	13.563	18.59	Pk	.1	10	28.69	60	-31.31	-	-
10	13.56	5.89	Av	.1	10	15.99	-	-	50	-34.01
11	24.519	9.18	Pk	.2	10.2	19.58	60	-40.42	-	-
12	24.531	-2.03	Av	.2	10.2	8.37	-	-	50	-41.63

Pk - Peak detector
 Av - Average detection

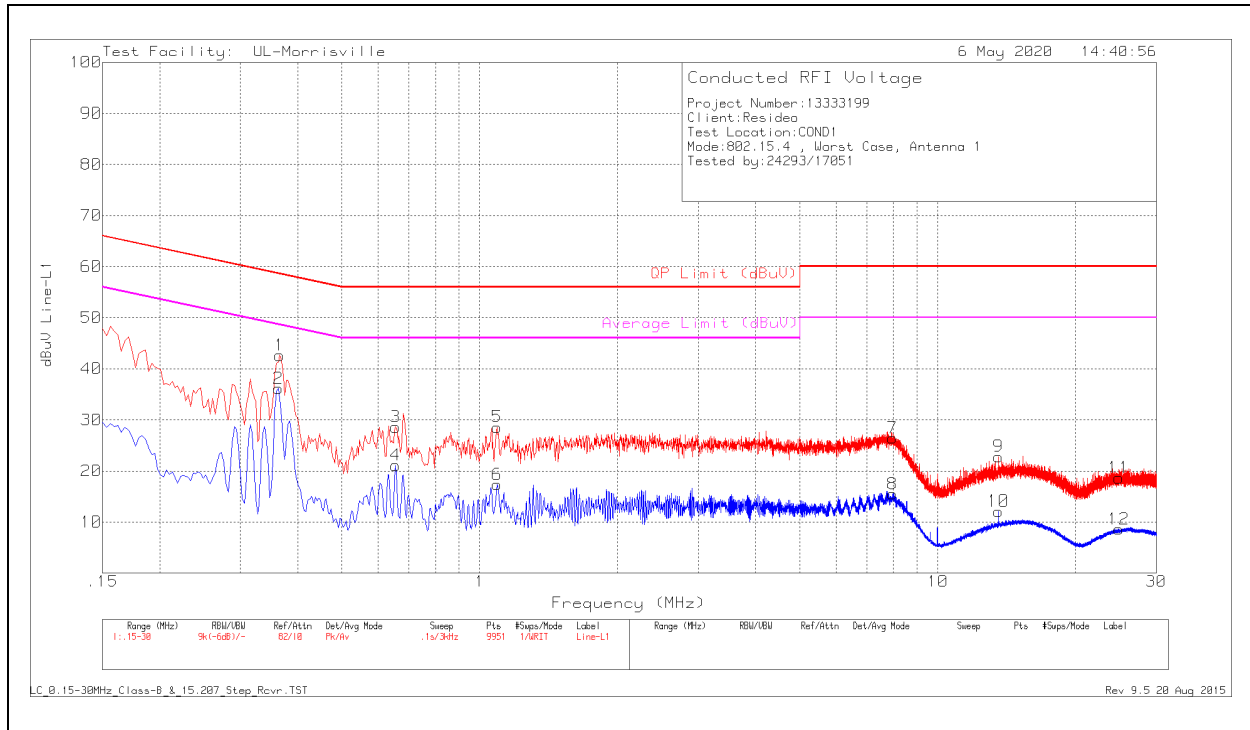
LINE 2 RESULTS



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)
13	.363	35.09	Pk	.1	9.7	44.89	58.66	-13.77	-	-
14	.363	29.59	Av	.1	9.7	39.39	-	-	48.66	-9.27
15	.681	22.71	Pk	0	9.8	32.51	56	-23.49	-	-
16	.681	12.71	Av	0	9.8	22.51	-	-	46	-23.49
17	1.059	21.43	Pk	0	9.8	31.23	56	-24.77	-	-
18	1.056	10.82	Av	0	9.8	20.62	-	-	46	-25.38
19	1.332	19.2	Pk	0	9.8	29	56	-27	-	-
20	1.308	12.06	Av	0	9.8	21.86	-	-	46	-24.14
21	10.017	11.02	Pk	.1	10	21.12	60	-38.88	-	-
22	10.032	-.31	Av	.1	10	9.79	-	-	50	-40.21
23	13.563	18.72	Pk	.1	10	28.82	60	-31.18	-	-
24	13.56	6.88	Av	.1	10	16.98	-	-	50	-33.02

Pk - Peak detector
 Av - Average detection

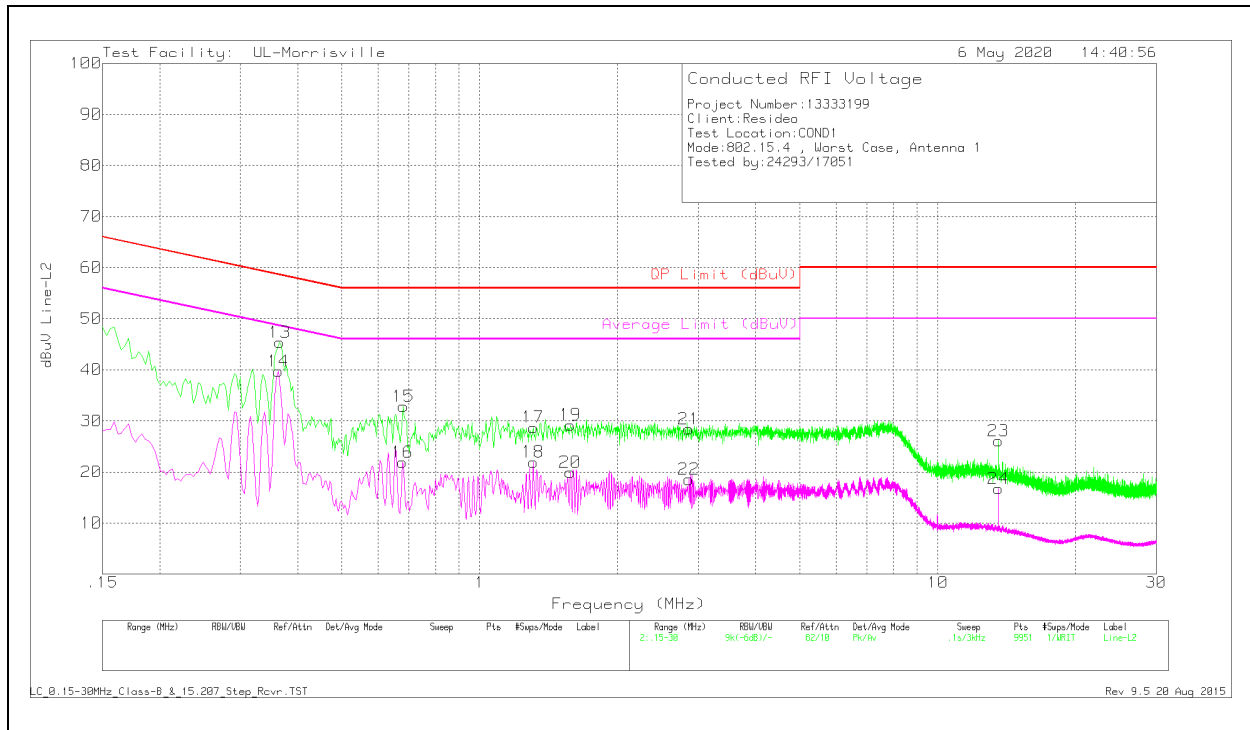
11.1.2. 802.15.4 ANT1
LINE 1 RESULTS



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	.366	32.82	Pk	.1	9.7	42.62	58.59	-15.97	-	-
2	.363	26.36	Av	.1	9.7	36.16	-	-	48.66	-12.5
3	.654	18.71	Pk	.1	9.8	28.61	56	-27.39	-	-
4	.654	11.21	Av	.1	9.8	21.11	-	-	46	-24.89
5	1.092	18.8	Pk	0	9.8	28.6	56	-27.4	-	-
6	1.092	7.55	Av	0	9.8	17.35	-	-	46	-28.65
7	7.974	16.37	Pk	.1	10	26.47	60	-33.53	-	-
8	7.968	5.38	Av	.1	10	15.48	-	-	50	-34.52
9	13.56	12.72	Pk	.1	10	22.82	60	-37.18	-	-
10	13.56	2.02	Av	.1	10	12.12	-	-	50	-37.88
11	24.819	8.26	Pk	.2	10.2	18.66	60	-41.34	-	-
12	24.846	-1.77	Av	.2	10.2	8.63	-	-	50	-41.37

Pk - Peak detector
 Av - Average detection

LINE 2 RESULTS

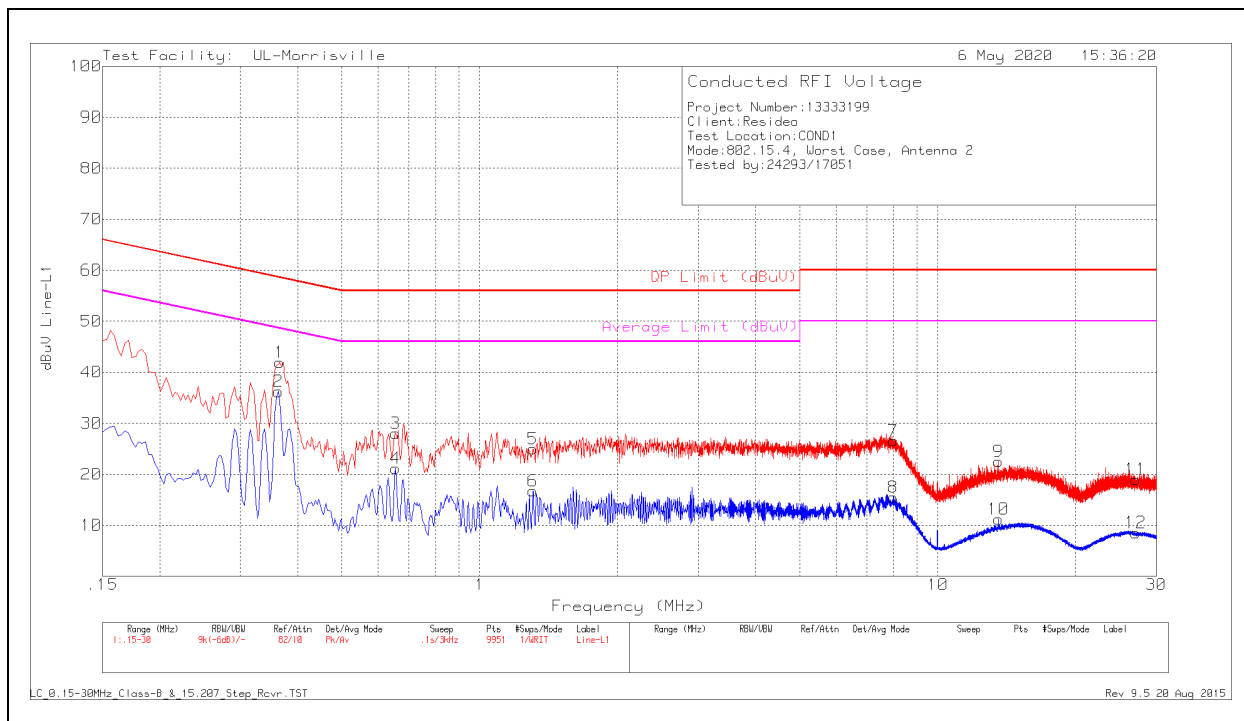


Range 2: Line=L2 .15 - 30MHz

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)
13	.366	35.54	Pk	.1	9.7	45.34	58.59	-13.25	-	-
14	.363	29.93	Av	.1	9.7	39.73	-	-	48.66	-8.93
15	.681	23.03	Pk	0	9.8	32.83	56	-23.17	-	-
16	.678	12.11	Av	0	9.8	21.91	-	-	46	-24.09
17	1.308	18.92	Pk	0	9.8	28.72	56	-27.28	-	-
18	1.308	12.14	Av	0	9.8	21.94	-	-	46	-24.06
19	1.578	19.4	Pk	0	9.8	29.2	56	-26.8	-	-
20	1.575	10.15	Av	0	9.8	19.95	-	-	46	-26.05
21	2.862	18.6	Pk	0	9.8	28.4	56	-27.6	-	-
22	2.862	8.73	Av	0	9.8	18.53	-	-	46	-27.47
23	13.563	15.96	Pk	.1	10	26.06	60	-33.94	-	-
24	13.56	6.65	Av	.1	10	16.75	-	-	50	-33.25

Pk - Peak detector
 Av - Average detection

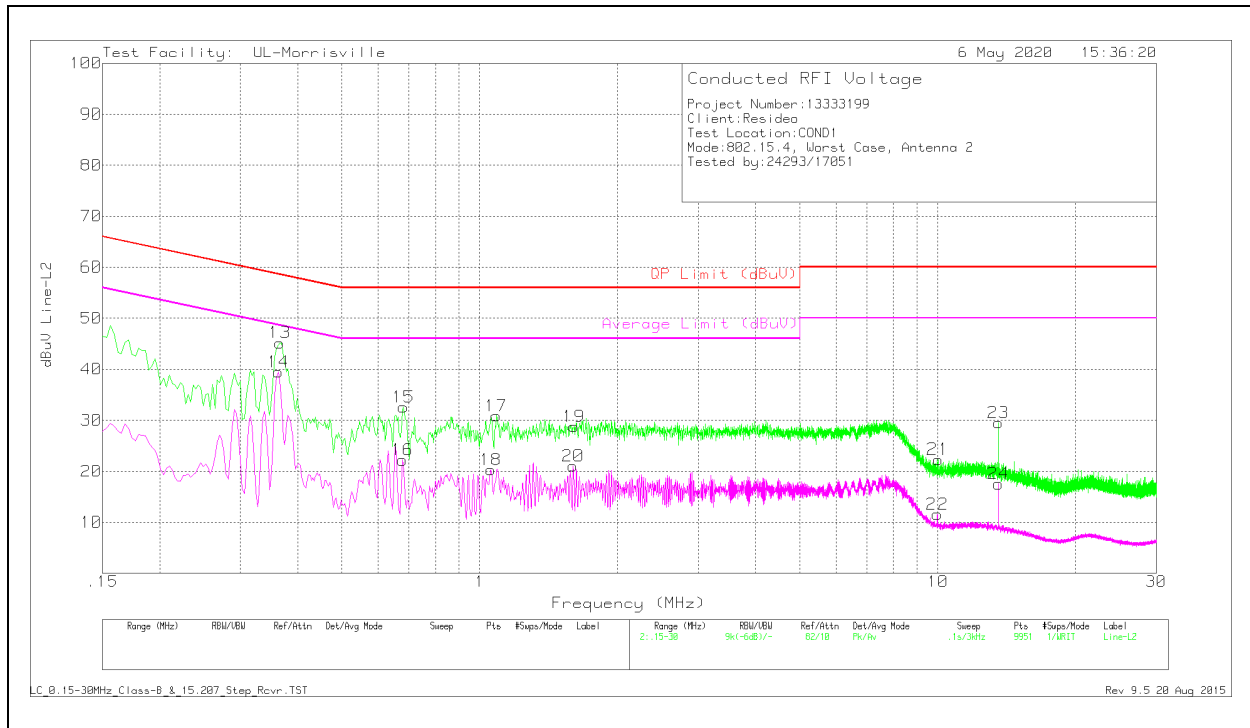
11.1.3. 802.15.4 ANT2
LINE 1 RESULTS



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	.366	32.16	Pk	.1	9.7	41.96	58.59	-16.63	-	-
2	.363	26.43	Av	.1	9.7	36.23	-	-	48.66	-12.43
3	.654	18.16	Pk	.1	9.8	28.06	56	-27.94	-	-
4	.654	11.25	Av	.1	9.8	21.15	-	-	46	-24.85
5	1.305	15.17	Pk	0	9.8	24.97	56	-31.03	-	-
6	1.305	6.91	Av	0	9.8	16.71	-	-	46	-29.29
7	7.986	16.45	Pk	.1	10	26.55	60	-33.45	-	-
8	7.989	5.42	Av	.1	10	15.52	-	-	50	-34.48
9	13.557	12.4	Pk	.1	10	22.5	60	-37.5	-	-
10	13.56	1.13	Av	.1	10	11.23	-	-	50	-38.77
11	27.036	8.49	Pk	.3	10.2	18.99	60	-41.01	-	-
12	27.042	-1.94	Av	.3	10.2	8.56	-	-	50	-41.44

Pk - Peak detector
 Av - Average detection

LINE 2 RESULTS



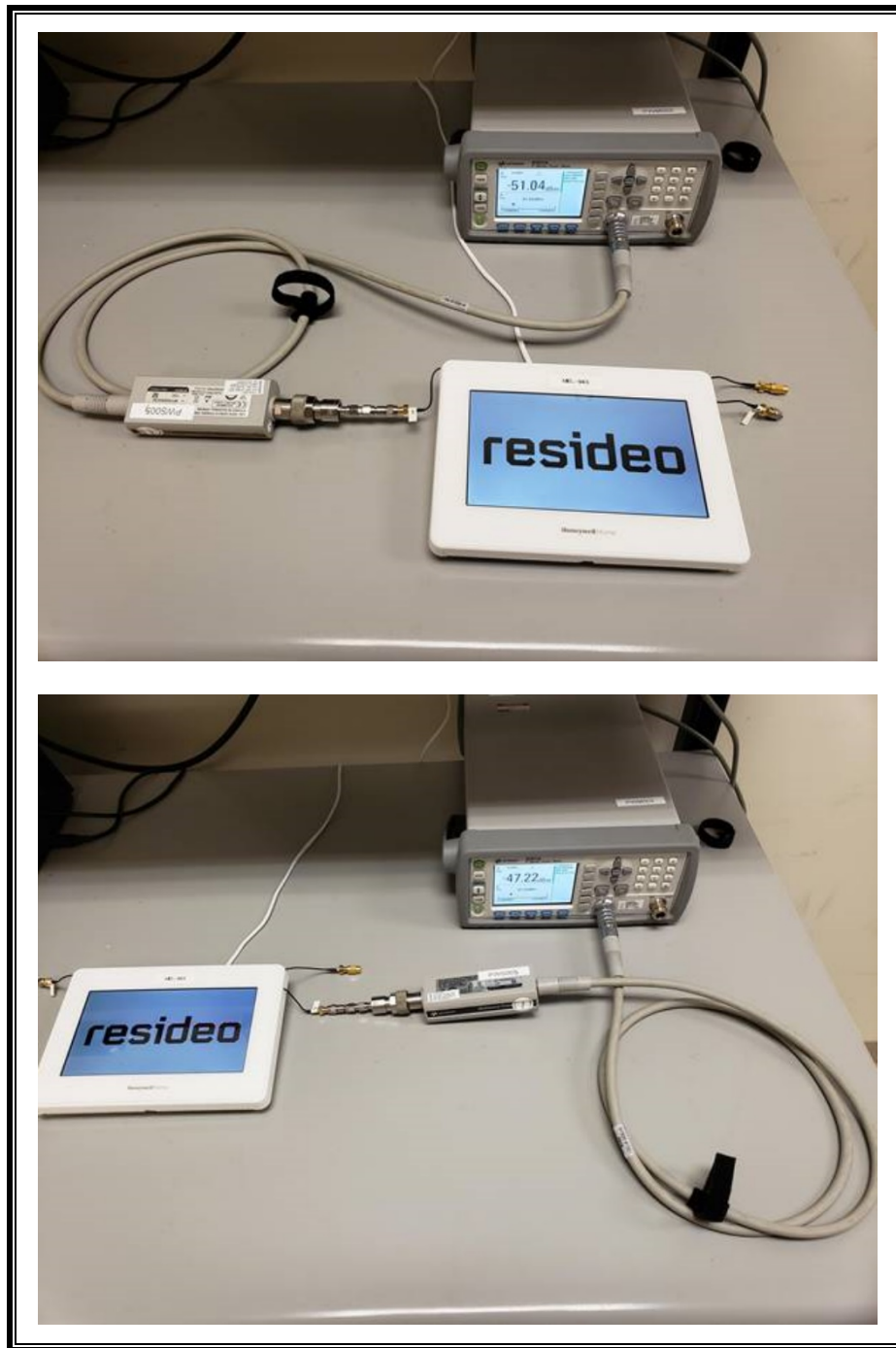
Range 2: Line-L2 .15 - 30MHz										
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	LISN VCF (dB)	Cbl/Limiter (dB)	Corrected Reading dBuV	QP Limit (dBuV)	Margin (dB)	Average Limit (dBuV)	Margin (dB)
13	.366	35.39	Pk	.1	9.7	45.19	58.59	-13.4	-	-
14	.363	29.7	Av	.1	9.7	39.5	-	-	48.66	-9.16
15	.681	22.78	Pk	0	9.8	32.58	56	-23.42	-	-
16	.678	12.42	Av	0	9.8	22.22	-	-	46	-23.78
17	1.086	21.08	Pk	0	9.8	30.88	56	-25.12	-	-
18	1.056	10.49	Av	0	9.8	20.29	-	-	46	-25.71
19	1.605	18.99	Pk	0	9.8	28.79	56	-27.21	-	-
20	1.599	11.27	Av	0	9.8	21.07	-	-	46	-24.93
21	10.011	12.22	Pk	.1	10	22.32	60	-37.68	-	-
22	9.975	1.49	Av	.1	10	11.59	-	-	50	-38.41
23	13.56	19.43	Pk	.1	10	29.53	60	-30.47	-	-
24	13.56	7.45	Av	.1	10	17.55	-	-	50	-32.45

PK - Peak detector
 Av - Average detection

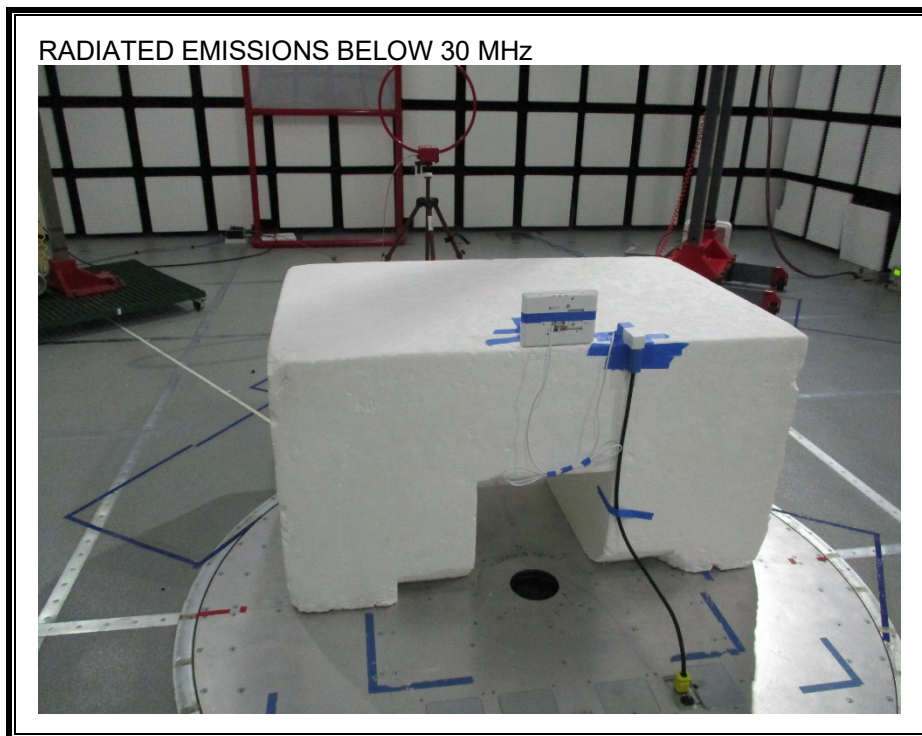
12. SETUP PHOTOS

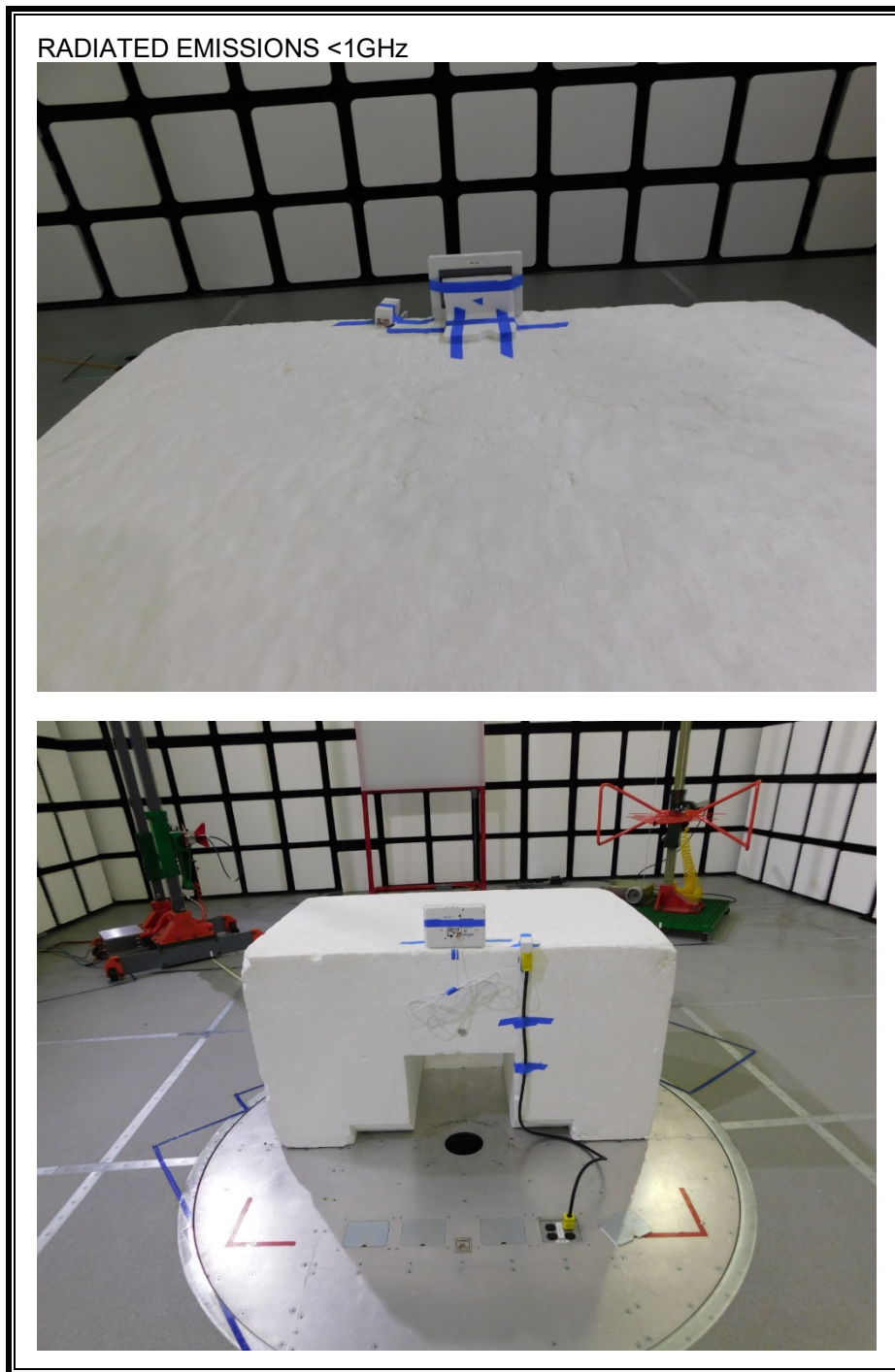
Please refer to R13333199-EP1 for setup photos

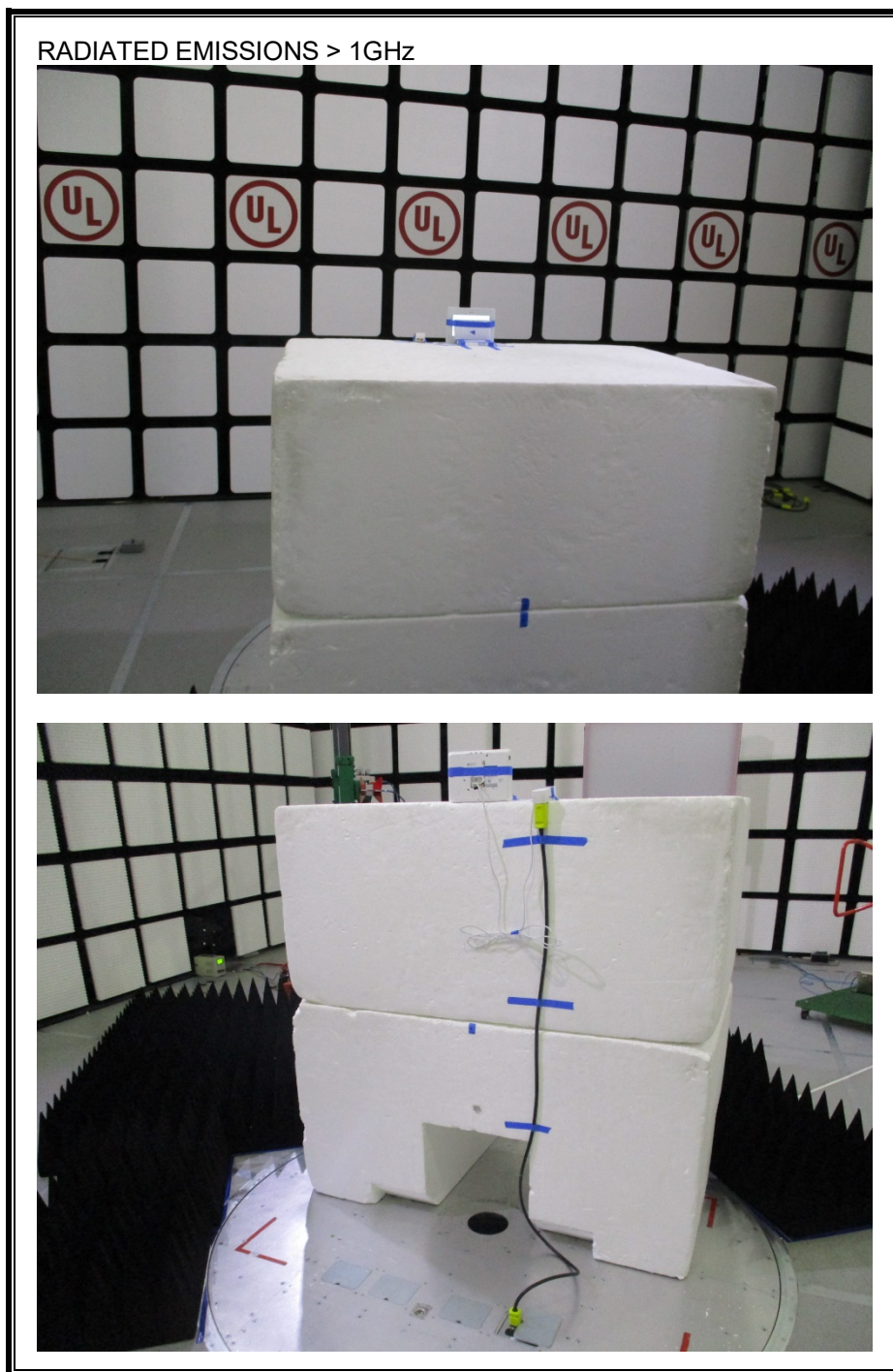
CONDUCTED SETUP



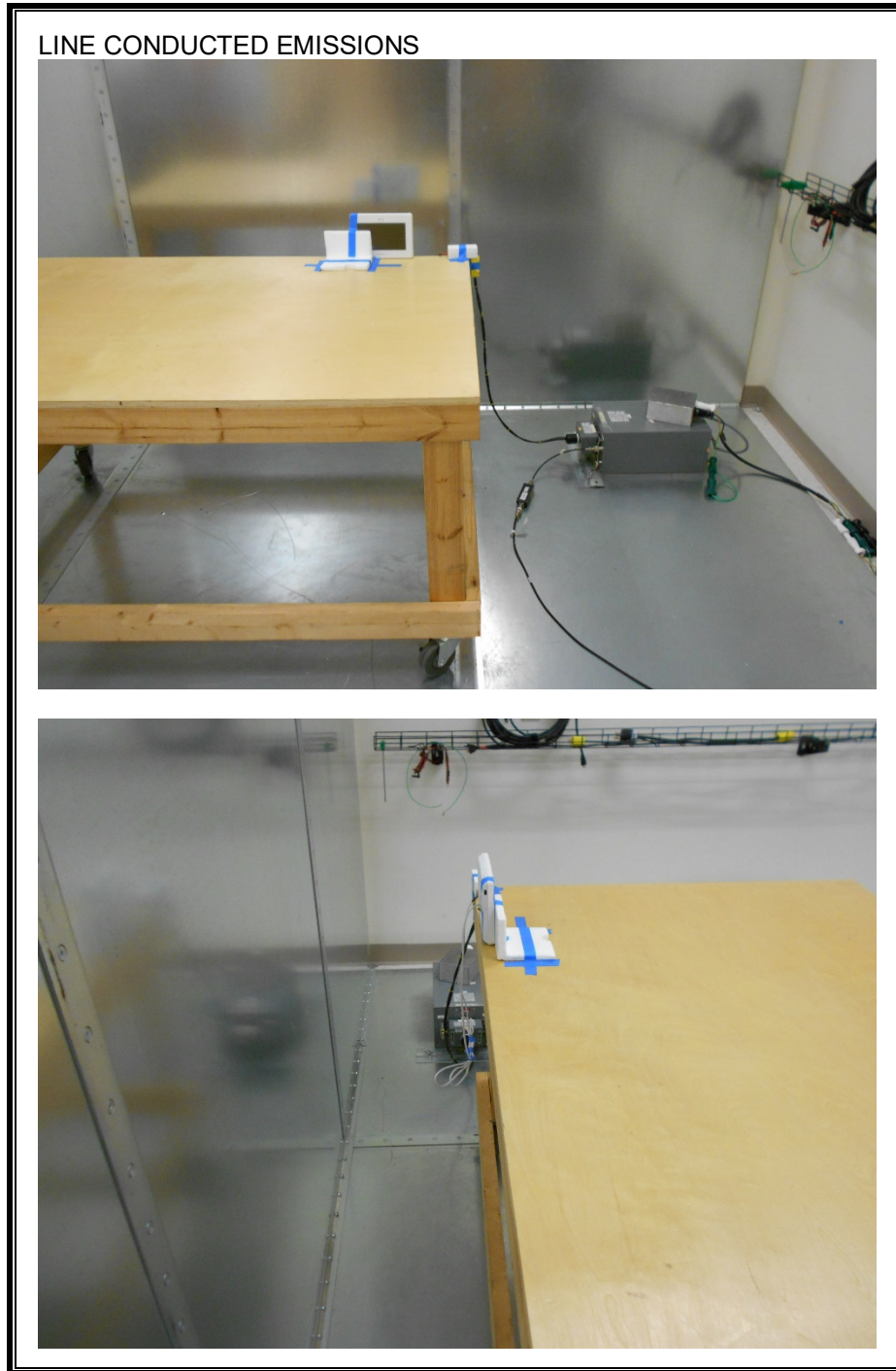
RADIATED EMISSIONS







AC MAINS LINE CONDUCTED EMISSION



END OF TEST REPORT