CERTIFICATION TEST REPORT

Report Number. : R13170074-E1

Applicant	:	Resideo 2 Corporate Center Drive Melville, NY 11749,US
Model	:	SiXFOBA
FCC ID	:	CFS8DLRF6FOB1
IC	:	573F-RF6FOB1
EUT Description	:	Bidirectional Wireless Keyfob
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5

Date Of Issue:
2020-01-06

Prepared by:
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NVLAP TESTING

NVLAP Lab code: 200246-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
--	--	Initial Issue	--

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Resideo
2 Corporate Center Drive
Melville, NY 11749,US

EUT DESCRIPTION: Bidirectional Wireless Keyfob

MODEL: SiXFOBA

SERIAL NUMBER: MEL-917; MEL-918

DATE TESTED: 2019-12-19 to 2019-12-20

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.

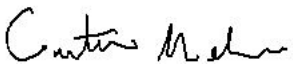
The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components.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

Brian Kiewra
Project Engineer
Consumer Technology Division
UL LLC

Prepared By:



Cristian Melara
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, 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	
☐ Chamber A RTP	☒ North Chamber
☐ Chamber C RTP	☒ South Chamber

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
Conducted Emissions (0.150-30MHz) - LISN	3.07 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%.

5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a Bidirectional Wireless Keyfob

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	2.41	1.74

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an integral antenna, with a maximum gain of 1.8 dBi

5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version V2.3.7

The test utility software used during testing was Resideo FCC Test Code.

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

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID
None				

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 installed as a standalone device

SETUP DIAGRAMS

Please refer to R13170074-EP1 for setup diagrams.

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 -11.9.1.3.1 Method PKPM1(Measurement using a Peak Power meter)
ANSI C63.10 Subclause -11.9.2.3.2 Method AVGPM-G (Measurement using a gated RF average-reading power meter)

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (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

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

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 - South Chamber)

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
18-40 GHz					
AT0076	Horn Antenna, 18-26.5GHz	ARA	MWH-1826/B	2019-11-07	2020-11-07
Gain-Loss Chains					
S62/AMP017/ CBL269426-001	Gain-loss string: 18-40GHz	Huber+Suhner Miteq MegaPhase	SUCOFLEX 102EA TTA1840-35-HG NC12-K1K1-216	2019-03-21	2020-03-21
Receiver & Software					
SA0027 (18-40GHz RSE)	Spectrum Analyzer	Agilent	N9030A	2019-05-15	2020-05-15
SOFTEMI	EMI Software	UL	Version 9.5 (2016-12-01)	NA	NA
Additional Equipment used					
s/n 181474409	Environmental Meter	Fisher Scientific	15-077-963	2018-07-27	2020-07-27

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

Equip. ID	Description	Manufacturer	Model Number	Last Cal.	Next Cal.
0.009-30MHz					
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					
AT0067	Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz	ETS Lindgren	3117	2019-03-22	2020-03-22
Receiver & Software					
SA0026	Spectrum Analyzer	Agilent	N9030A	2019-03-19	2020-03-19
SOFTEMI	EMI Software	UL	Version 9.5 (2016-12-01)	NA	NA
Additional Equipment used					
s/n 181474341	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.
Conducted Room 2					
T177 (PRE0079253)	Spectrum Analyzer	Agilent Technologies	E4446A	2019-04-22	2020-04-22
PWM002 (PRE0137344)	RF Power Meter	Keysight Technologies	N1911A	2019-08-23	2020-08-23
PWS002	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
SOFTEMI	EMC Software	UL	Version 10.3 (2019-09-24)	NA	NA

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

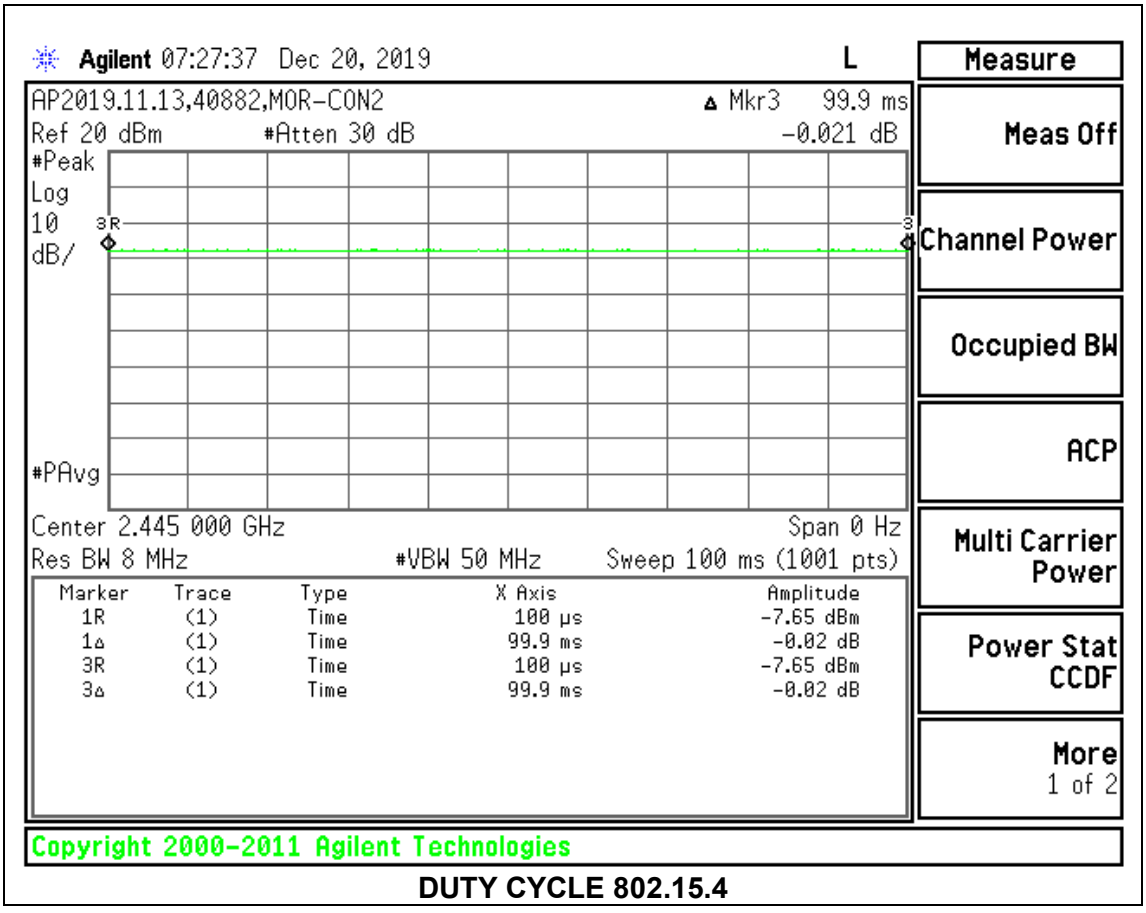
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

Note: Duty cycle below shows how sample operated during testing. Real life worst-case duty cycle is protocol limited to 6.016% resulting in a duty cycle correction of 20log(1/.06016) = 24.41dB.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.15.4	100.000	100.000	1.000	100.00%	-24.41	0.010



DUTY CYCLE 802.15.4

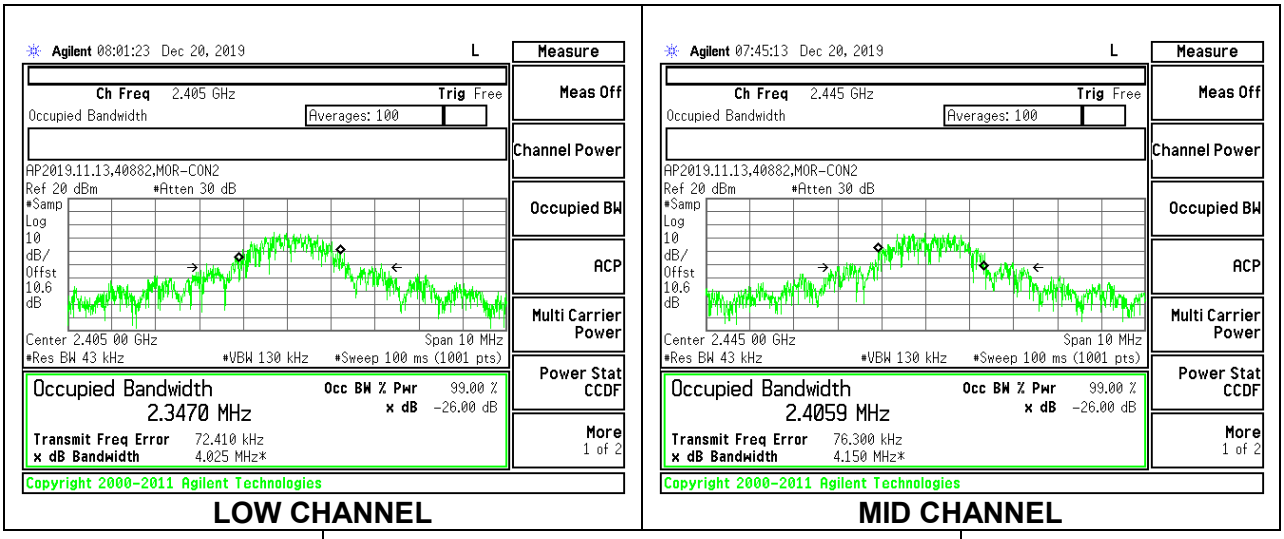
8.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2405	2.3470
Middle	2445	2.4059
High	2475	2.4794



8.3. 6 dB BANDWIDTH

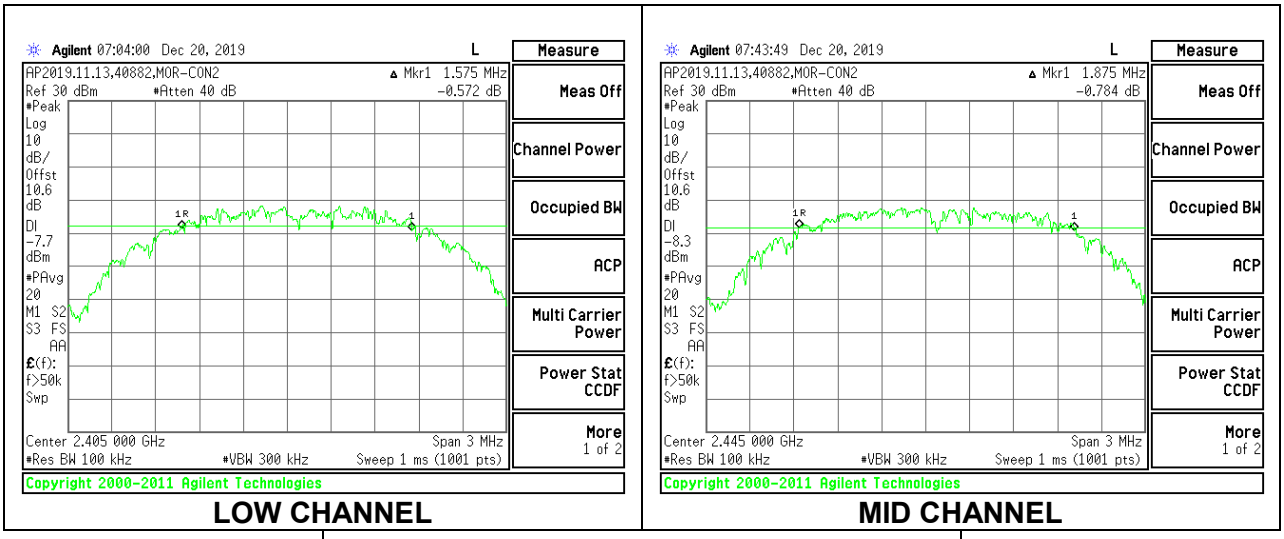
LIMITS

FCC §15.247 (a) (2)
RSS-247 5.2 (a)

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

RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2405	1.5750	0.5
Middle	2445	1.8750	0.5
High	2475	1.8540	0.5



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 10.6 dB (including 10 dB pad and 0.6 dB cable) was entered as an offset in the power meter to allow for a peak reading of power.

RESULTS

Tested By:	40882
Date:	2019-12-20

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2405	2.410	30	-27.590
Middle	2445	2.320	30	-27.680
High	2475	2.140	30	-27.860

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 10.6 dB (including 10 dB pad and 0.6 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

Tested By:	40882
Date:	2019-12-20

Channel	Frequency (MHz)	AV power (dBm)
Low	2405	2.37
Middle	2445	2.14
High	2475	2

8.6. POWER SPECTRAL DENSITY

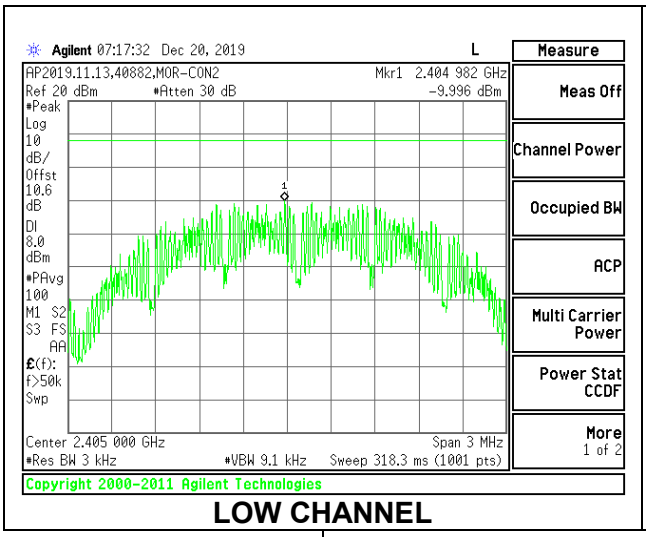
LIMITS

FCC §15.247 (e)
RSS-247 (5.2) (b)

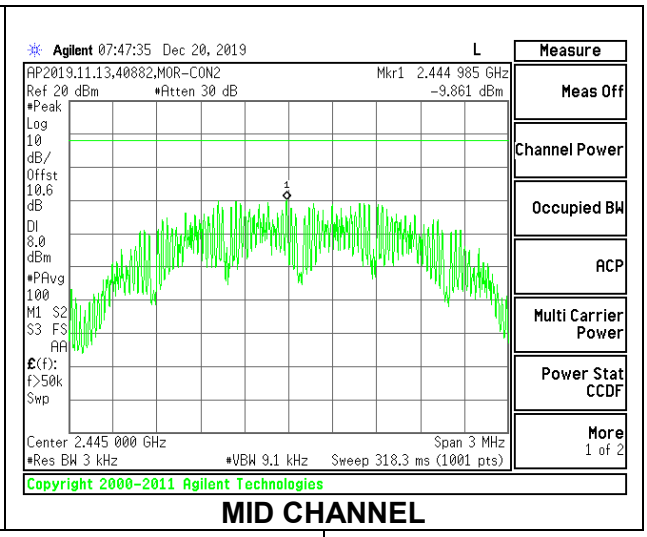
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

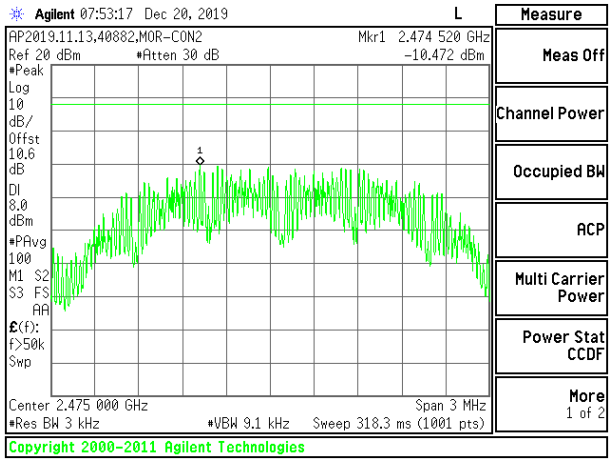
Channel	Frequency (MHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Margin (dB)
Low	2405	-10.00	8	-18.00
Middle	2445	-9.86	8	-17.86
High	2475	-10.47	8	-18.47



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

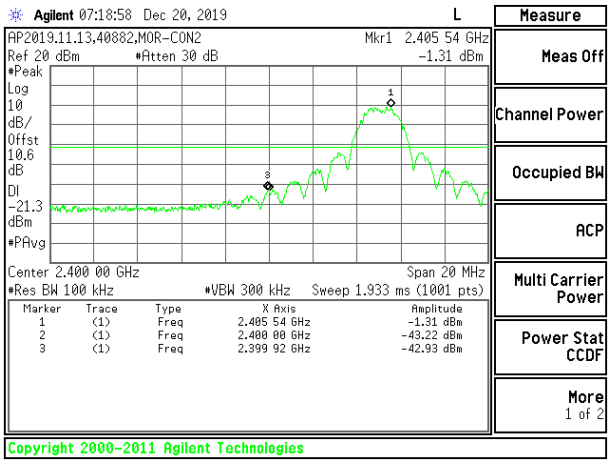
8.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

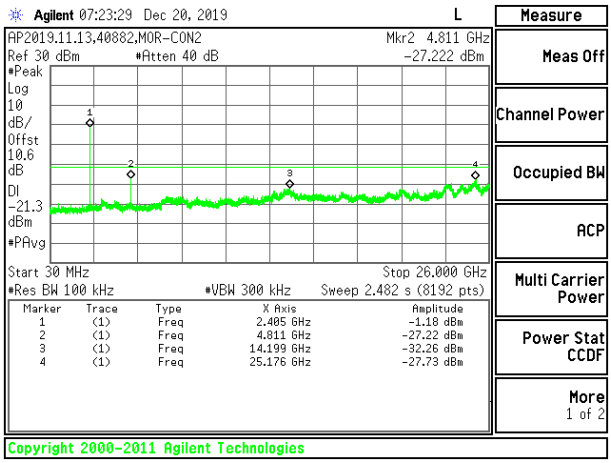
FCC §15.247 (d)
RSS-247 5.5

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

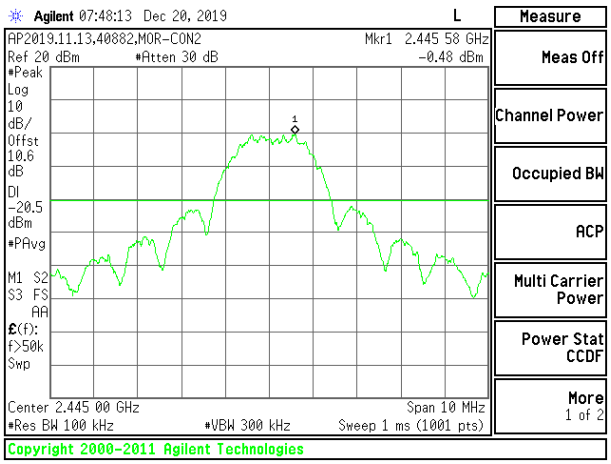
RESULTS



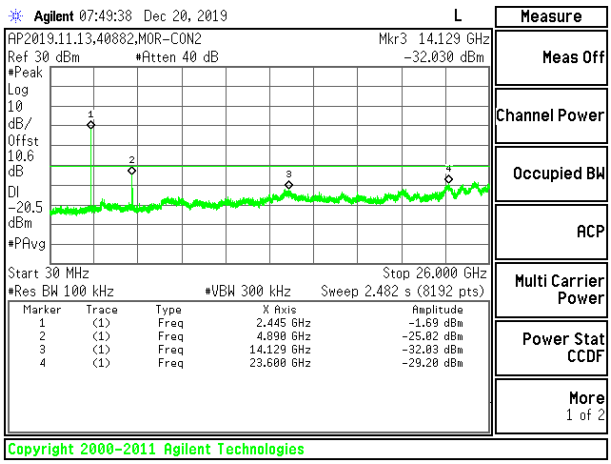
LOW CHANNEL BANDEDGE



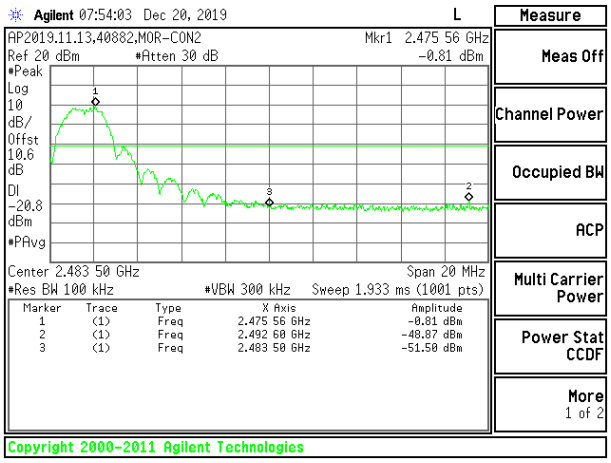
OUT-OF-BAND LOW CHANNEL



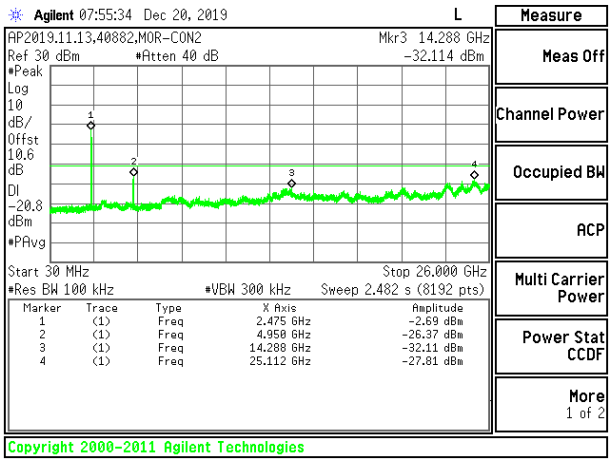
IN-BAND REFERENCE LEVEL



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 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. 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 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

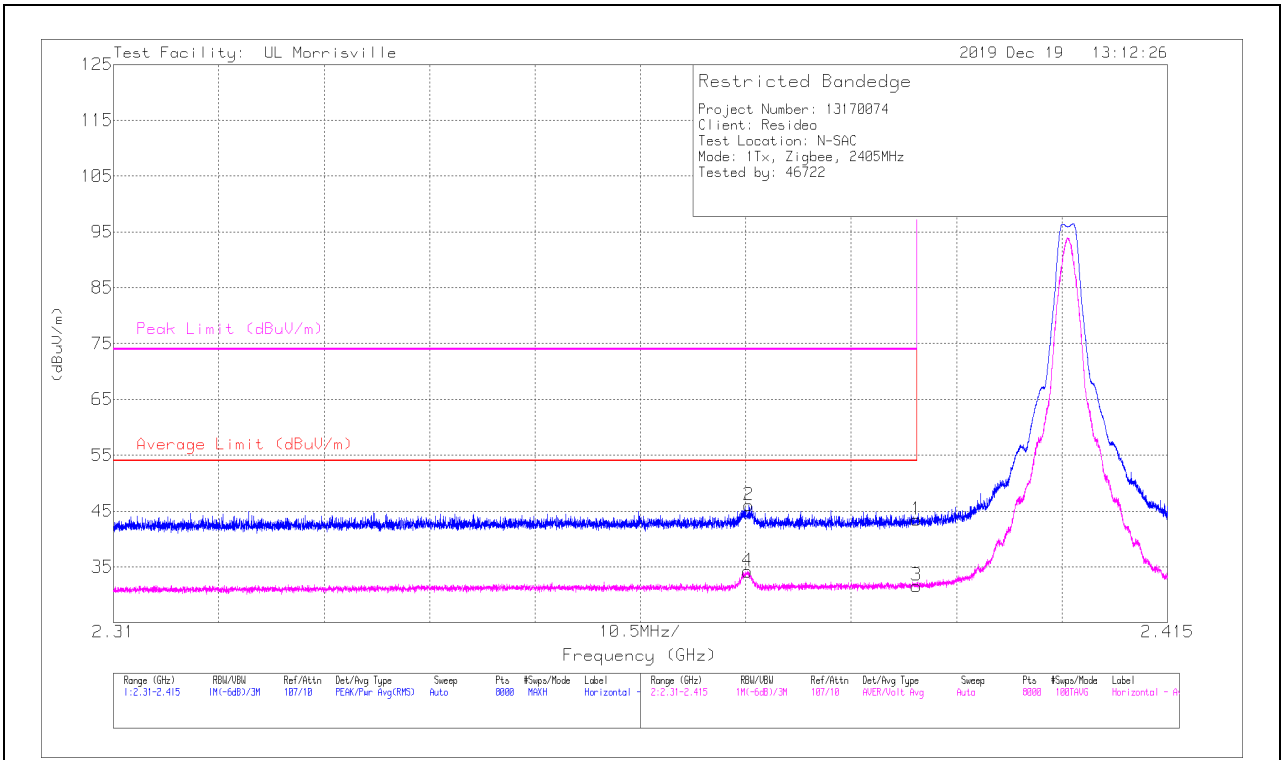
11. Frequently Asked Questions; Answer 3: c)

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 6.016% provided by the manufacturer. The calculation of 20*log(1/0.06016) leads to a -24.41dB correction factor that is subtracted from the average measurement.

9.2. TRANSMITTER ABOVE 1 GHz

BANDEDGE (LOW CHANNEL)

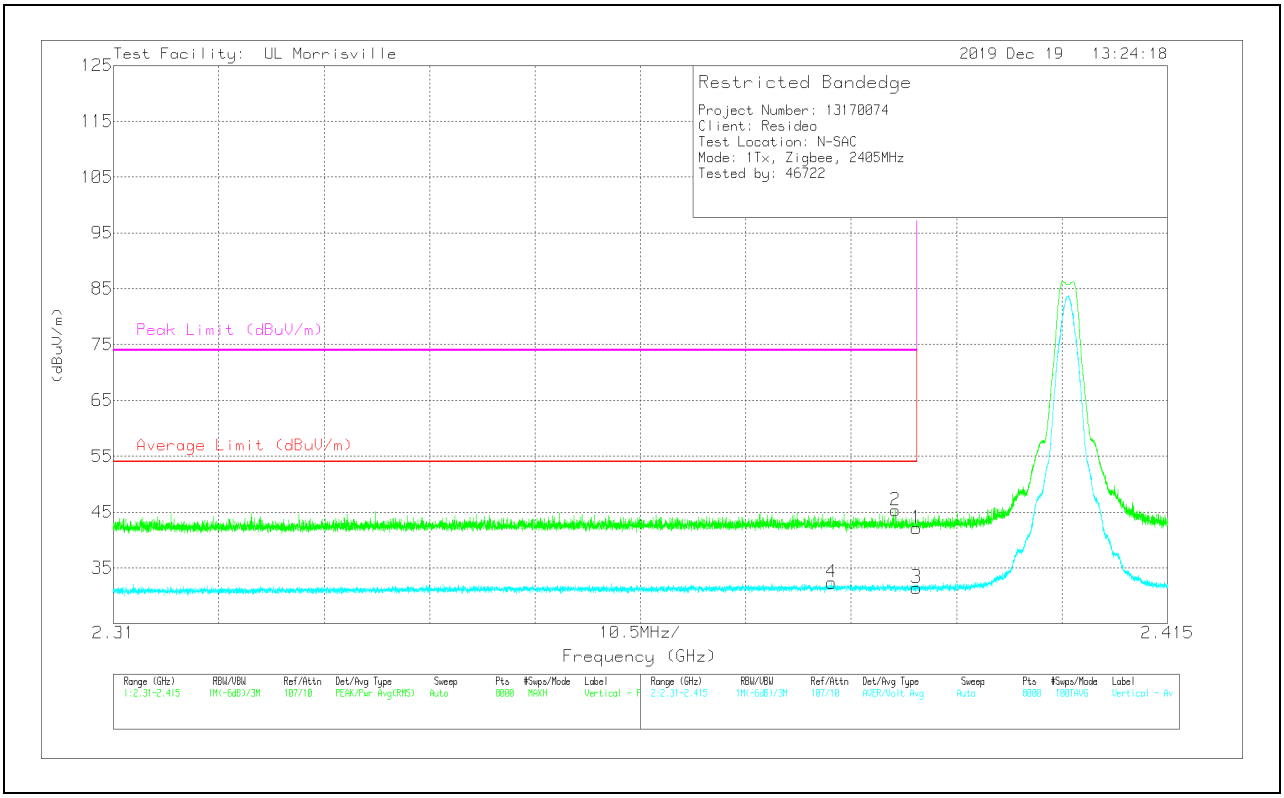
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0072 (dB/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	35.84	Pk	32	-24.4	0	43.44	-	-	74	-30.56	149	117	H
2	* ** 2.37331	38.55	Pk	31.9	-24.4	0	46.05	-	-	74	-27.95	149	117	H
3	* ** 2.39	48.42	ADV	32	-24.4	-24.41	31.61	54	-22.39	-	-	149	117	H
4	* ** 2.37315	51.12	ADV	31.9	-24.4	-24.41	34.21	54	-19.79	-	-	149	117	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - AD primary method, Linear Voltage Average

VERTICAL RESULT

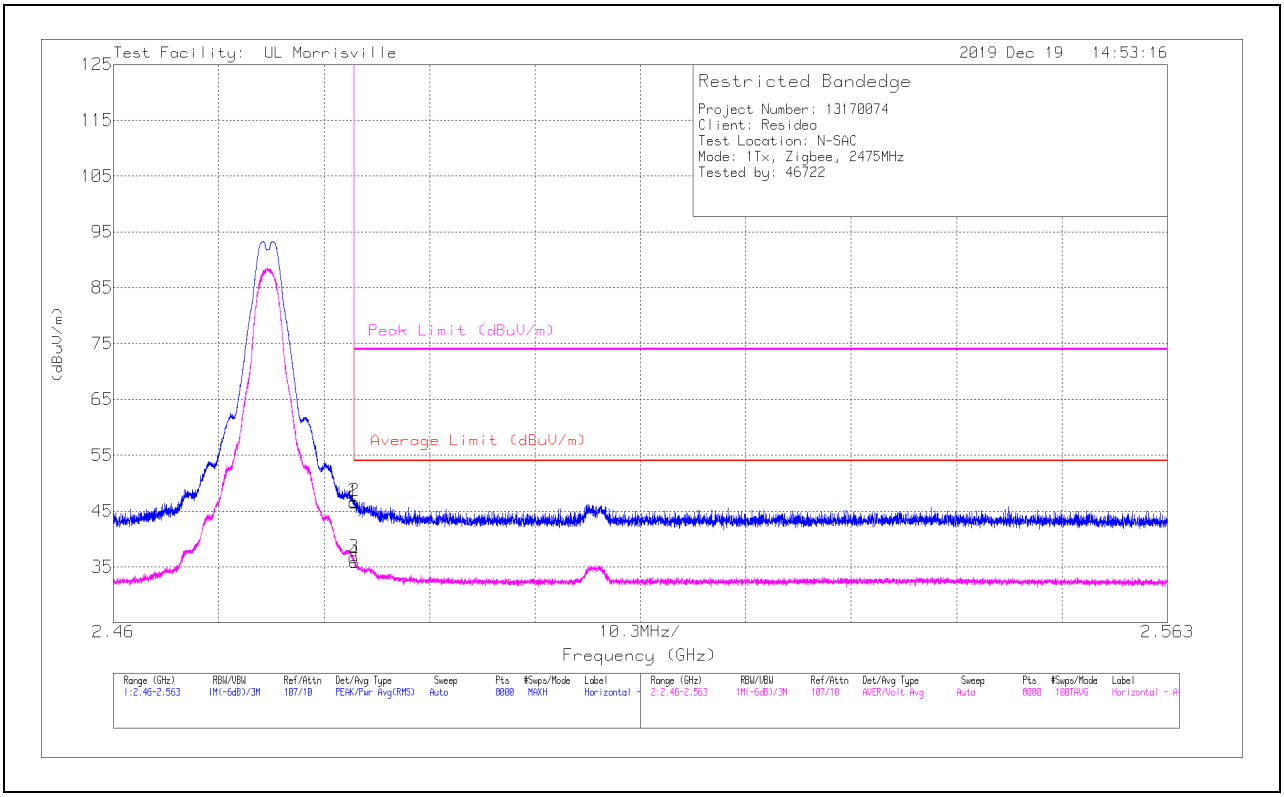


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.39	34.51	Pk	32	-24.4	0	42.11	-	-	74	-31.89	29	388	V
2	* ** 2.38791	37.68	Pk	32	-24.4	0	45.28	-	-	74	-28.72	29	388	V
3	* ** 2.39	48.27	ADV	32	-24.4	-24.41	31.46	54	-22.54	-	-	29	388	V
4	* ** 2.38156	49.17	ADV	32	-24.4	-24.41	32.36	54	-21.64	-	-	29	388	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

BANDEDGE (HIGH CHANNEL)

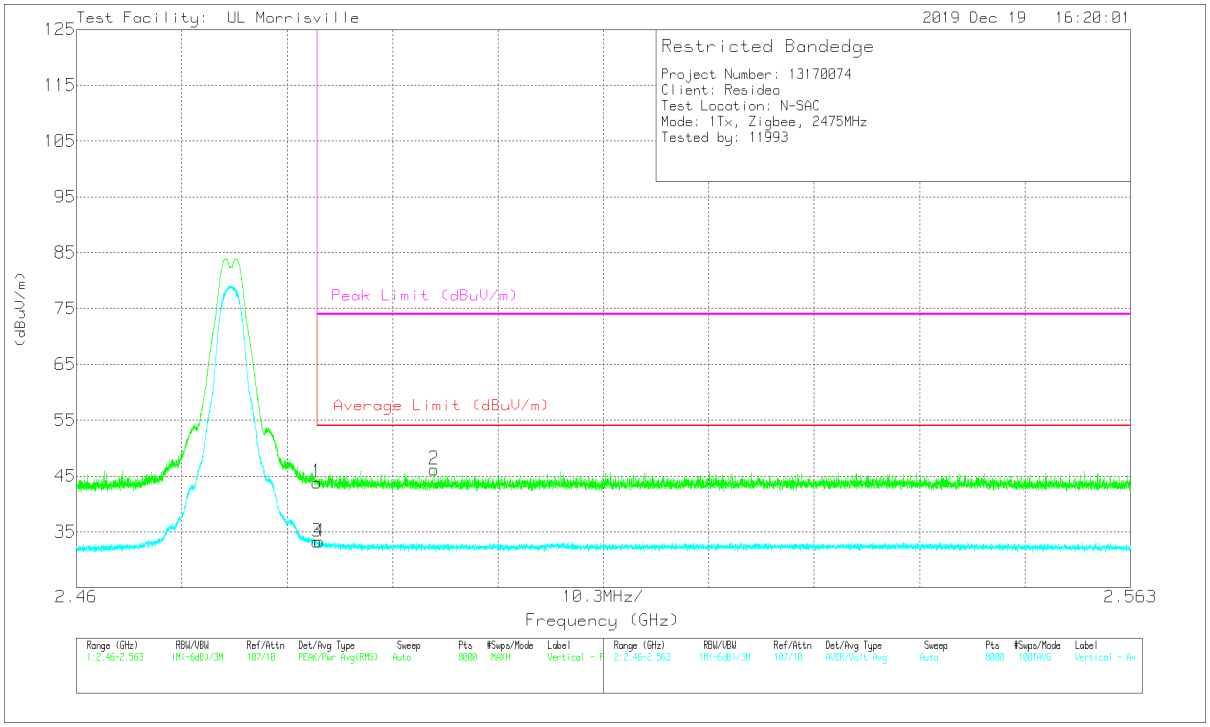
HORIZONTAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/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	38.45	Pk	32.4	-24.3	0	46.55	-	-	74	-27.45	326	198	H
2	* ** 2.48354	38.62	Pk	32.4	-24.3	0	46.72	-	-	74	-27.28	326	198	H
3	* ** 2.4835	52.98	ADV	32.4	-24.3	-24.41	36.67	54	-17.33	-	-	326	198	H
4	* ** 2.48359	52.18	ADV	32.4	-24.3	-24.41	35.87	54	-18.13	-	-	326	198	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

VERTICAL RESULT

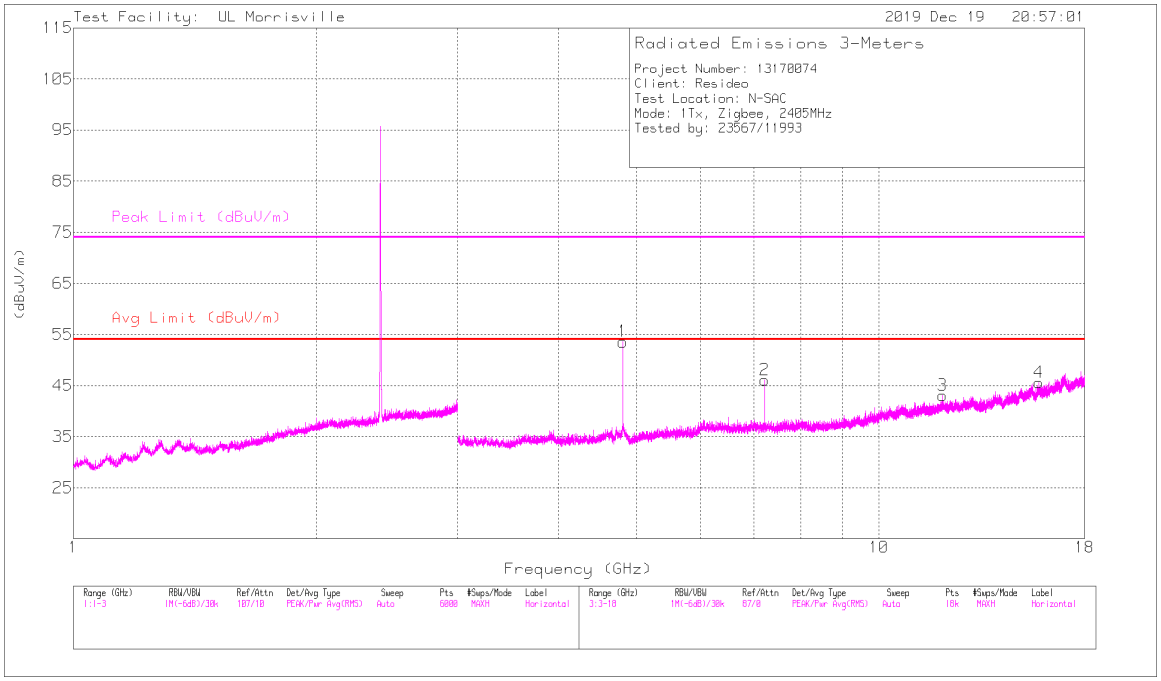


Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 (dB/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 2.4835	35.78	Pk	32.4	-24.3	0	43.88	-	-	74	-30.12	278	367	V
2	* ** 2.49496	38	Pk	32.5	-24.3	0	46.2	-	-	74	-27.8	278	367	V
3	* ** 2.4835	49.58	ADV	32.4	-24.3	-24.41	33.27	54	-20.73	-	-	278	367	H
4	* ** 2.48377	49.6	ADV	32.4	-24.3	-24.41	33.29	54	-20.71	-	-	278	367	H

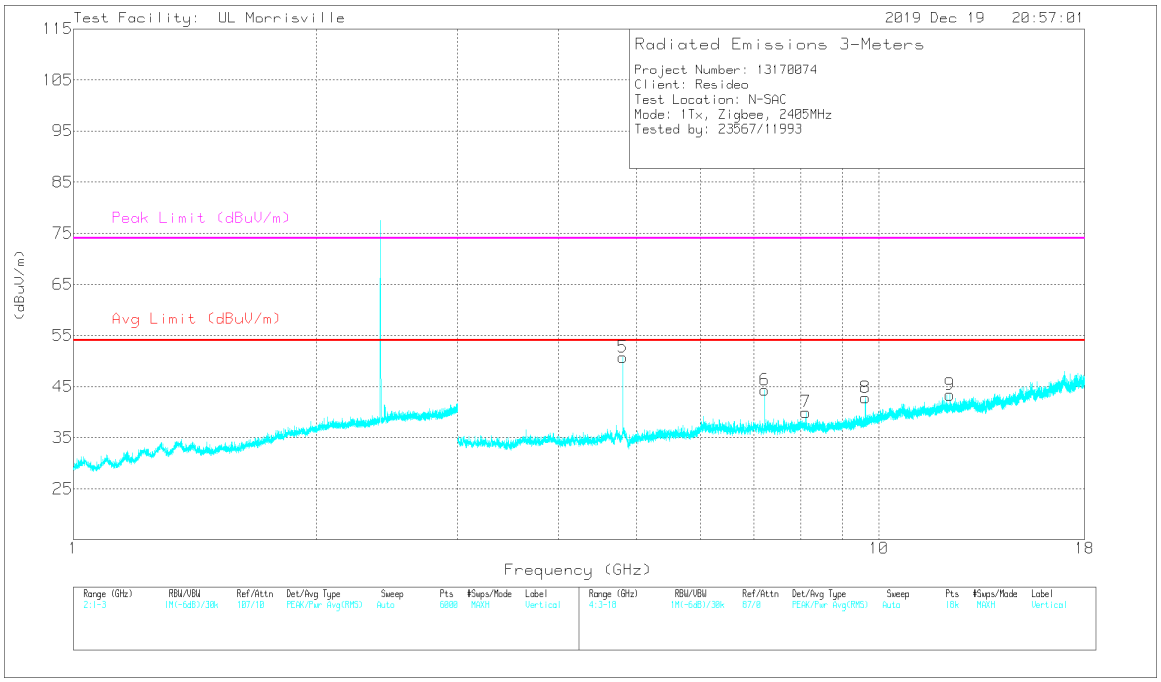
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector
ADV - Linear Voltage Average

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



HORIZONTAL



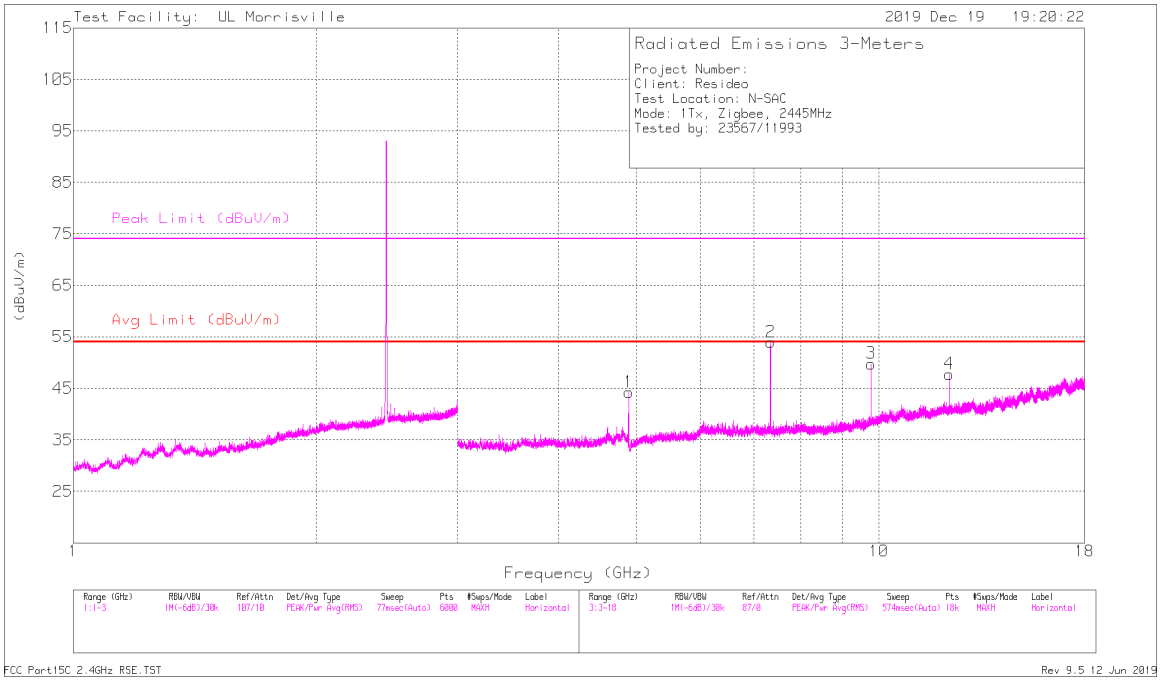
VERTICAL

RADIATED EMISSIONS

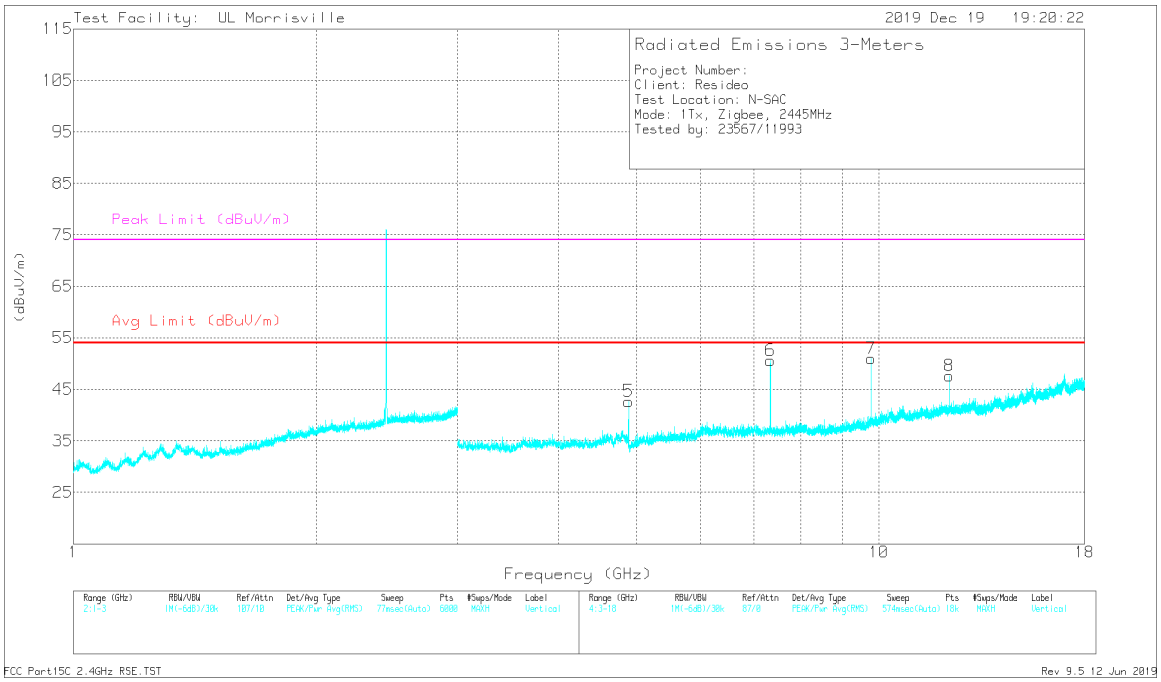
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.80931	54.98	PK2	34.1	-31.6	0	57.48	-	-	74	-16.52	258	123	H
	* ** 4.80945	47	ADV	34.1	-31.6	-24.41	25.09	54	-28.91	-	-	258	123	H
3	* ** 12.00231	36.33	PK2	38.7	-25.7	0	49.33	-	-	74	-24.67	279	259	H
	* ** 12.00202	22.3	ADV	38.7	-25.7	-24.41	10.89	54	-43.11	-	-	279	259	H
4	* ** 15.80049	35.99	PK2	40.2	-24.6	0	51.59	-	-	74	-22.41	196	168	H
	* ** 15.80012	22.78	ADV	40.2	-24.6	-24.41	13.97	54	-40.03	-	-	196	168	H
5	* ** 4.81112	55.31	PK2	34.1	-31.6	0	57.81	-	-	74	-16.19	121	304	V
	* ** 4.81093	47.12	ADV	34.1	-31.6	-24.41	25.21	54	-28.79	-	-	121	304	V
7	* ** 8.11775	38.26	PK2	35.8	-28.8	0	45.26	-	-	74	-28.74	163	207	V
	* ** 8.11771	24.49	ADV	35.8	-28.8	-24.41	7.08	54	-46.92	-	-	163	207	V
9	* ** 12.25066	35.43	PK2	38.8	-25.7	0	48.53	-	-	74	-25.47	172	124	V
	* ** 12.25043	22.1	ADV	38.8	-25.7	-24.41	10.79	54	-43.21	-	-	172	124	V
2	7.21607	40.26	Pk	35.6	-29.8	0	46.06	-	-	-	-	0-360	102	H
6	7.21607	38.51	Pk	35.6	-29.8	0	44.31	-	-	-	-	0-360	102	V
8	9.6212	34.32	Pk	36.6	-28.1	0	42.82	-	-	-	-	0-360	102	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
ADV - Linear Voltage Average
Pk - Peak detector

MID CHANNEL RESULTS



HORIZONTAL



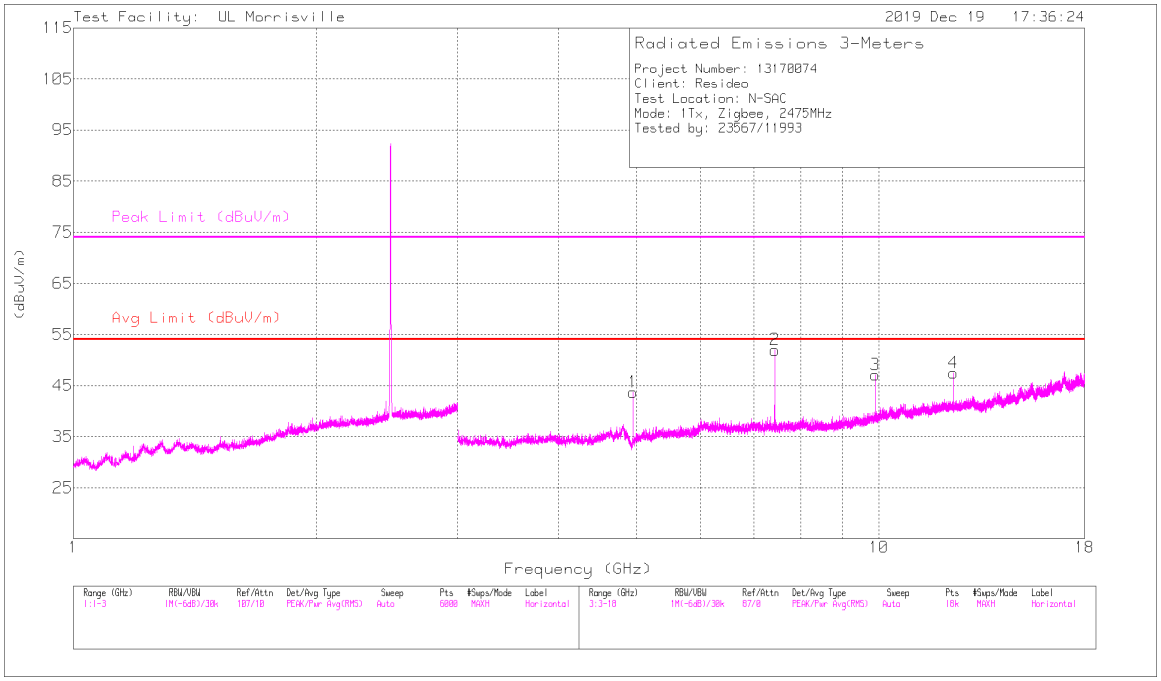
VERTICAL

RADIATED EMISSIONS

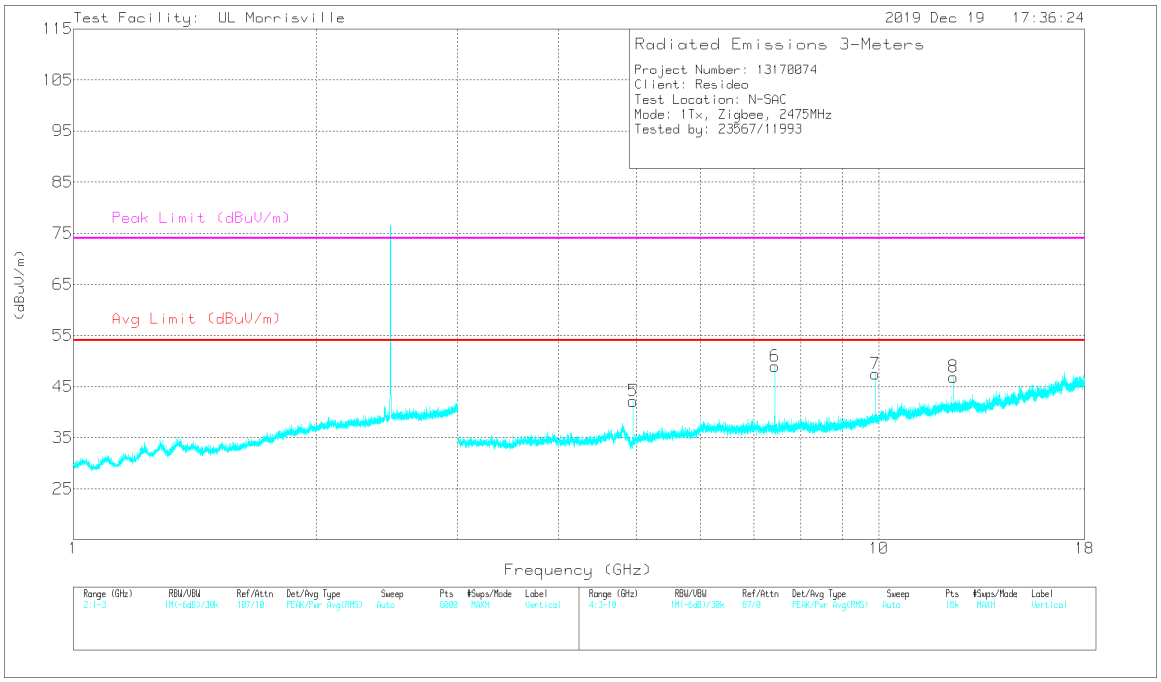
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.88904	47.96	PK2	33.9	-31.4	0	50.46	-	-	74	-23.54	264	102	H
	* ** 4.88915	39.57	ADV	33.9	-31.4	-24.41	17.66	54	-36.34	-	-	264	102	H
2	* ** 7.3367	51.82	PK2	35.6	-29.1	0	58.32	-	-	74	-15.68	106	104	H
	* ** 7.33676	43.69	ADV	35.6	-29.1	-24.41	25.78	54	-28.22	-	-	106	104	H
4	* ** 12.22274	42.51	PK2	38.8	-26.2	0	55.11	-	-	74	-18.89	266	116	H
	* ** 12.2226	31.8	ADV	38.8	-26.2	-24.41	19.99	54	-34.01	-	-	266	116	H
5	* ** 4.88922	47.09	PK2	33.9	-31.4	0	49.59	-	-	74	-24.41	108	383	V
	* ** 4.88913	38.27	ADV	33.9	-31.4	-24.41	16.36	54	-37.64	-	-	108	383	V
6	* ** 7.33396	48.86	PK2	35.6	-29.1	0	55.36	-	-	74	-18.64	197	103	V
	* ** 7.33357	40.29	ADV	35.6	-29.1	-24.41	22.38	54	-31.62	-	-	197	103	V
8	* ** 12.22288	41.46	PK2	38.8	-26.2	0	54.06	-	-	74	-19.94	339	113	V
	* ** 12.22281	30.26	ADV	38.8	-26.2	-24.41	18.45	54	-35.55	-	-	339	113	V
3	9.77788	40.09	Pk	36.8	-27.1	0	49.79	-	-	-	-	0-360	102	H
7	9.77788	41.28	Pk	36.8	-27.1	0	50.98	-	-	-	-	0-360	102	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
ADV - Linear Voltage Average
Pk - Peak detector

HIGH CHANNEL RESULTS



HORIZONTAL



VERTICAL

RADIATED EMISSIONS

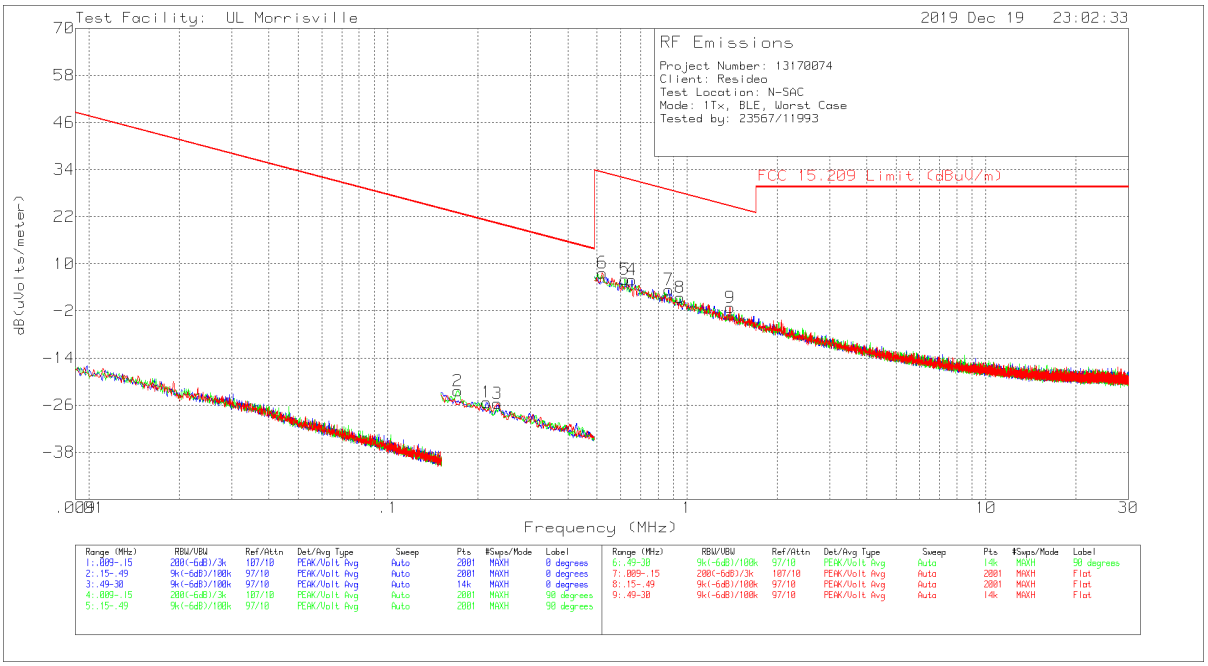
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AT0067 AF (dBuV/m)	Amp/Cbl/Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 4.94901	49.09	PK2	33.9	-32.1	0	50.89	-	-	74	-23.11	11	336	H
	* ** 4.94909	39.99	ADV	33.9	-32.1	-24.41	17.38	54	-36.62	-	-	11	336	H
2	* ** 7.42386	50.06	PK2	35.6	-29.2	0	56.46	-	-	74	-17.54	107	103	H
	* ** 7.42352	41.53	ADV	35.6	-29.2	-24.41	23.52	54	-30.48	-	-	107	103	H
4	* ** 12.37285	42.21	PK2	38.8	-26.3	0	54.71	-	-	74	-19.29	261	102	H
	* ** 12.37276	29.96	ADV	38.8	-26.3	-24.41	18.05	54	-35.95	-	-	261	102	H
5	* ** 4.94923	46.22	PK2	33.9	-32.1	0	48.02	-	-	74	-25.98	280	347	V
	* ** 4.94921	36.07	ADV	33.9	-32.1	-24.41	13.46	54	-40.54	-	-	280	347	V
6	* ** 7.4269	47.16	PK2	35.6	-29.2	0	53.56	-	-	74	-20.44	194	109	V
	* ** 7.42698	38.09	ADV	35.6	-29.2	-24.41	20.08	54	-33.92	-	-	194	109	V
8	* ** 12.37314	39.99	PK2	38.8	-26.3	0	52.49	-	-	74	-21.51	326	124	V
	* ** 12.37269	27.58	ADV	38.8	-26.3	-24.41	15.67	54	-38.33	-	-	326	124	V
3	9.89789	37.71	Pk	37	-27.6	0	47.11	-	-	-	-	0-360	102	H
7	9.89789	38.09	Pk	37	-27.6	0	47.49	-	-	-	-	0-360	102	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
PK2 - Maximum Peak
ADV - Linear Voltage Average
Pk - Peak detector

9.3. WORST CASE BELOW 30MHZ

BELOW 30MHZ

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).



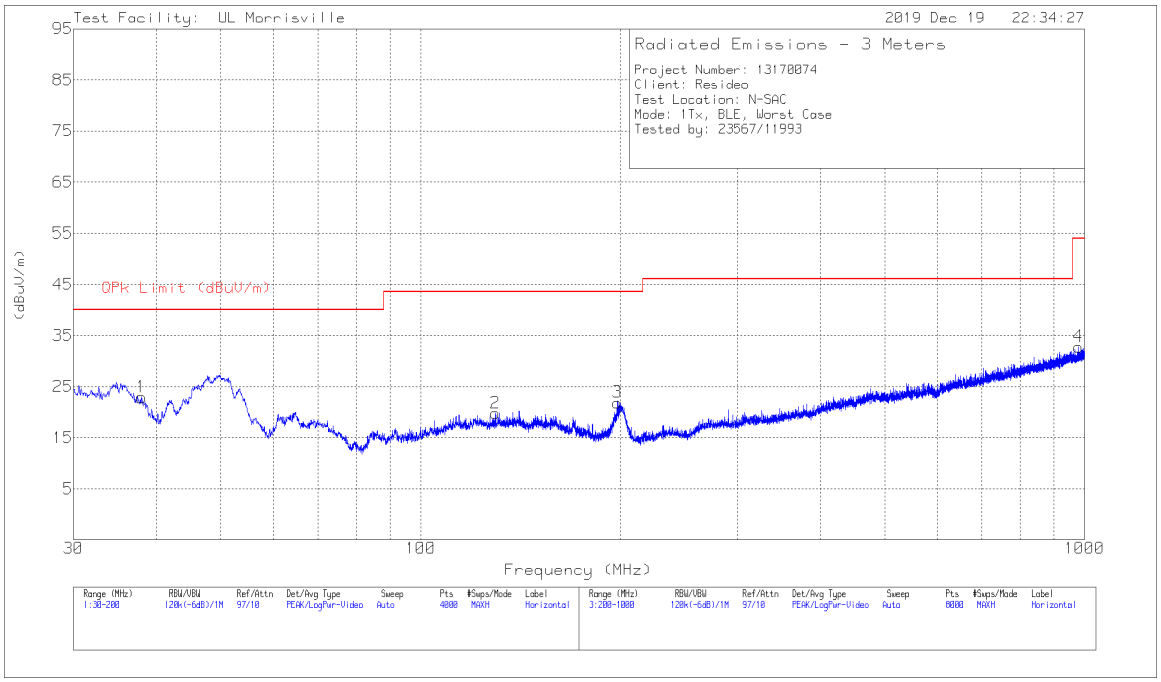
BELOW 30MHz DATA

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)
2	.17117	46.51	Pk	11	.1	-80	-22.39	22.94	42.94	-45.33	0-360
1	.21418	43.57	Pk	11	.1	-80	-25.33	20.99	40.99	-46.32	0-360
3	.23254	43.32	Pk	11	.1	-80	-25.58	20.27	40.27	-45.85	0-360
6	.52162	36.61	Pk	11	.1	-40	7.71	33.26	-	-25.55	0-360
5	.6207	34.96	Pk	11	.1	-40	6.06	31.75	-	-25.69	0-360
4	.65442	34.84	Pk	11	.1	-40	5.94	31.29	-	-25.35	0-360
7	.86944	32.27	Pk	11	.1	-40	3.37	28.82	-	-25.45	0-360
8	.94744	30.27	Pk	11	.1	-40	1.37	28.07	-	-26.7	0-360
9	1.39433	27.51	Pk	11.1	.2	-40	-1.19	24.72	-	-25.91	0-360

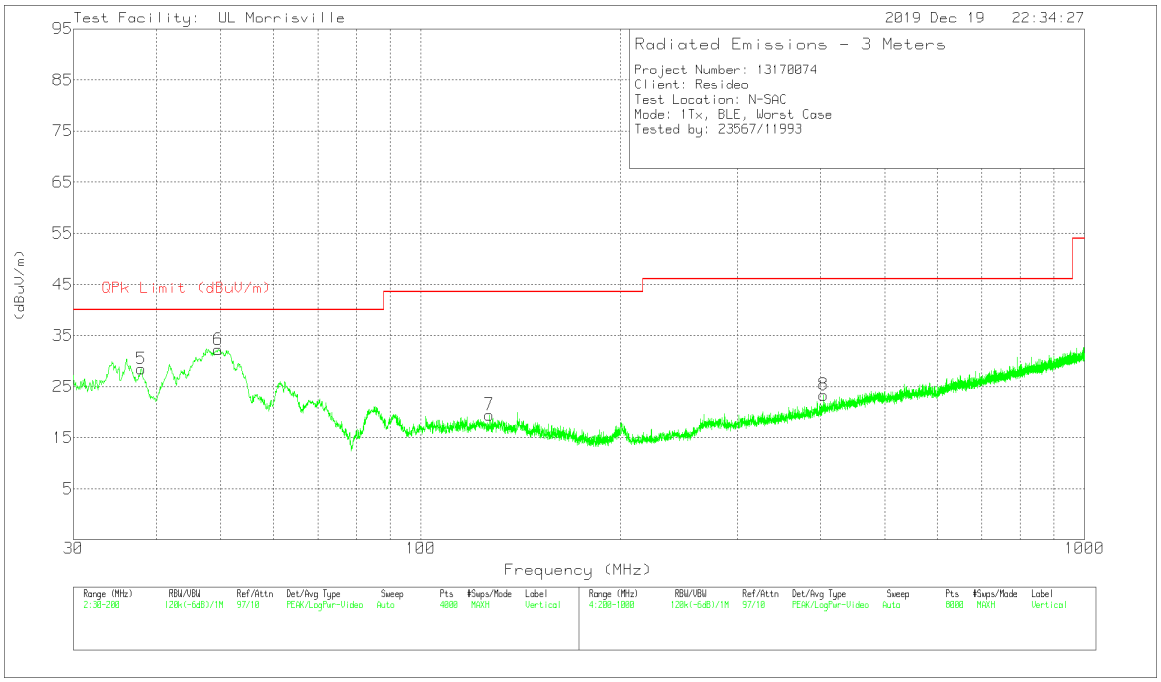
Pk - Peak detector

9.4. WORST CASE BELOW 1 GHZ

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



HORIZONTAL



VERTICAL

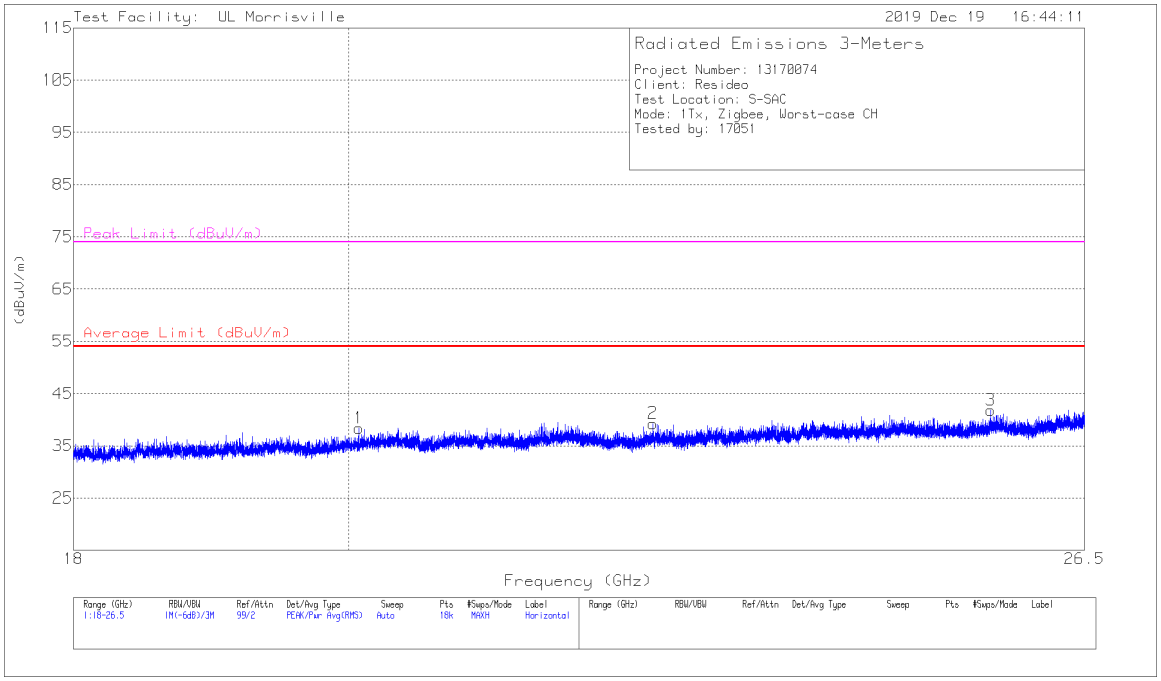
30-1000MHz DATA

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AT0073 AF (dB/m)	Amp/Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* ** 37.9921	33.2	Pk	21.3	-31.6	22.9	40	-17.1	0-360	199	H
2	* ** 129.6883	30.62	Pk	19.8	-30.6	19.82	43.52	-23.7	0-360	199	H
5	* ** 37.9496	38.9	Pk	21.3	-31.7	28.5	40	-11.5	0-360	101	V
7	* ** 126.8401	30.26	Pk	19.8	-30.6	19.46	43.52	-24.06	0-360	101	V
4	* ** 979.7013	29	Pk	29.1	-25.3	32.8	53.97	-21.17	0-360	399	H
8	* ** 404.8266	30.28	Pk	21.9	-28.8	23.38	46.02	-22.64	0-360	102	V
6	49.5551	49.75	Pk	14	-31.5	32.25	40	-7.75	0-360	101	V
3	197.9185	33.38	Pk	18.7	-30.2	21.88	43.52	-21.64	0-360	98	H

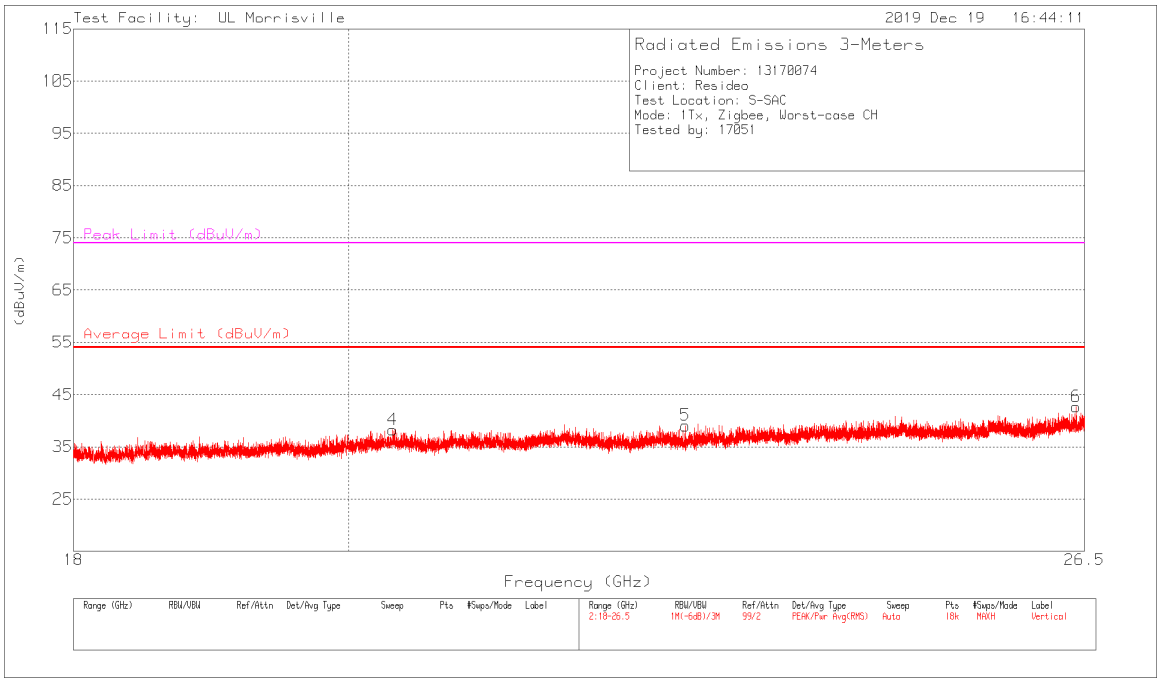
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector

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)	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	* 20.07695	40.14	Pk	32.9	-34.7	38.34	54	-15.66	74	-35.66	0-360	148	H
2	* 22.46747	40.19	Pk	33.6	-34.5	39.29	54	-14.71	74	-34.71	0-360	298	H
4	* 20.33904	39.66	Pk	33.1	-34.5	38.26	54	-15.74	74	-35.74	0-360	202	V
5	* 22.74798	39.56	Pk	33.6	-34.1	39.06	54	-14.94	74	-34.94	0-360	252	V
3	25.56683	40.38	Pk	34.5	-33.1	41.78	54	-12.22	74	-32.22	0-360	298	H
6	26.41593	40.49	Pk	35	-32.8	42.69	54	-11.31	74	-31.31	0-360	202	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band
** - indicates frequency in Taiwan NCC LP0002 Restricted Band
Pk - Peak detector

10. SETUP PHOTOS

Please refer to R13170074-EP1 for setup photos.

END OF TEST REPORT