



# TEST REPORT

**Report Number. :** 13117430-E2V2

**Applicant :** SRAM LLC  
1000 W Fulton Market 4<sup>th</sup> Floor  
Chicago, IL 60607, United States

**Model :** 13000

**FCC ID :** C9O-FSMB2

**ISED :** 10161A-FSMB2

**EUT Description :** Front Suspension with BLE, AIREA and ANT+ Radios

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

**Date Of Issue:**

April 13, 2020

**Prepared by:**

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## REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	3/18/2020	Initial Issue	
V2	4/13/2020	Updated Section 9.3	K.Kedida

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SRAM LLC  
1000 W Fulton Market 4<sup>th</sup> Floor  
Chicago, IL 60607, United States

**EUT DESCRIPTION:** Front Suspension with BLE, AIREA and ANT+ Radios

**MODEL:** 13000

**SERIAL NUMBER:** Radiated: 1724010107  
Conducted: 1724010103

**DATE TESTED:** February 12 – 25, 2020

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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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## 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, KDB 414788 D01 Radiated Test Site v01r01, 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 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. 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.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd
<input type="checkbox"/> Chamber A	<input type="checkbox"/> Chamber D	<input type="checkbox"/> Chamber I
<input type="checkbox"/> Chamber B	<input type="checkbox"/> Chamber E	<input checked="" type="checkbox"/> Chamber J
<input type="checkbox"/> Chamber C	<input type="checkbox"/> Chamber F	<input checked="" type="checkbox"/> Chamber K
	<input type="checkbox"/> Chamber G	<input type="checkbox"/> Chamber L
	<input type="checkbox"/> Chamber H	<input type="checkbox"/> Chamber M

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code: 2324A.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

## 4. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 4.1. METROLOGICAL TRACEABILITY

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. DECISION RULES

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

### 4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	U <sub>Lab</sub>
Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Radiated Disturbance, 26000 to 40000 MHz	5.17 dB

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

### 4.4. 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:

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

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



## 5. EQUIPMENT UNDER TEST

### 5.1. EUT DESCRIPTION

The EUT is a Front Suspension with BLE, AIREA and ANT+ Radios, powered by 7.4v, 2.2wh Li-Ion battery.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Peak		Average	
		Output Power (dBm)	Output Power (mW)	Output Power (dBm)	Output Power (mW)
2405 - 2475	AIREA	7.01	5.02	6.86	4.85

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a ceramic chip antenna with a maximum gain of 1.5 dBi.

### 5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was version B-1.0.

The test utility software used during testing was nRF Connect version 3.3.0

### 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 Z orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Z orientation.

Worst-case data rate as provided by the client was 250kbps.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

Support Equipment List			
Description	Manufacturer	Model	Serial Number
Laptop	Lenovo	T450s	PC044FTD
AC/DC Adapter	Lenovo	ADLX45NCC2A	N/A
USB Dongle	Segger	E204460	680435024
DC Power Supply	Kenwood Corporation	PA36-3A	7060074

### I/O CABLES (CONDUCTED EMISSIONS)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Unshielded	1.5	AC Main to DC Supply, to Analyzer
2	DC	1	DC	Unshielded	0.5	Power Supply to EUT
3	Antenna Port	1	SMA	Unshielded	0.5	EUT to Analyzer

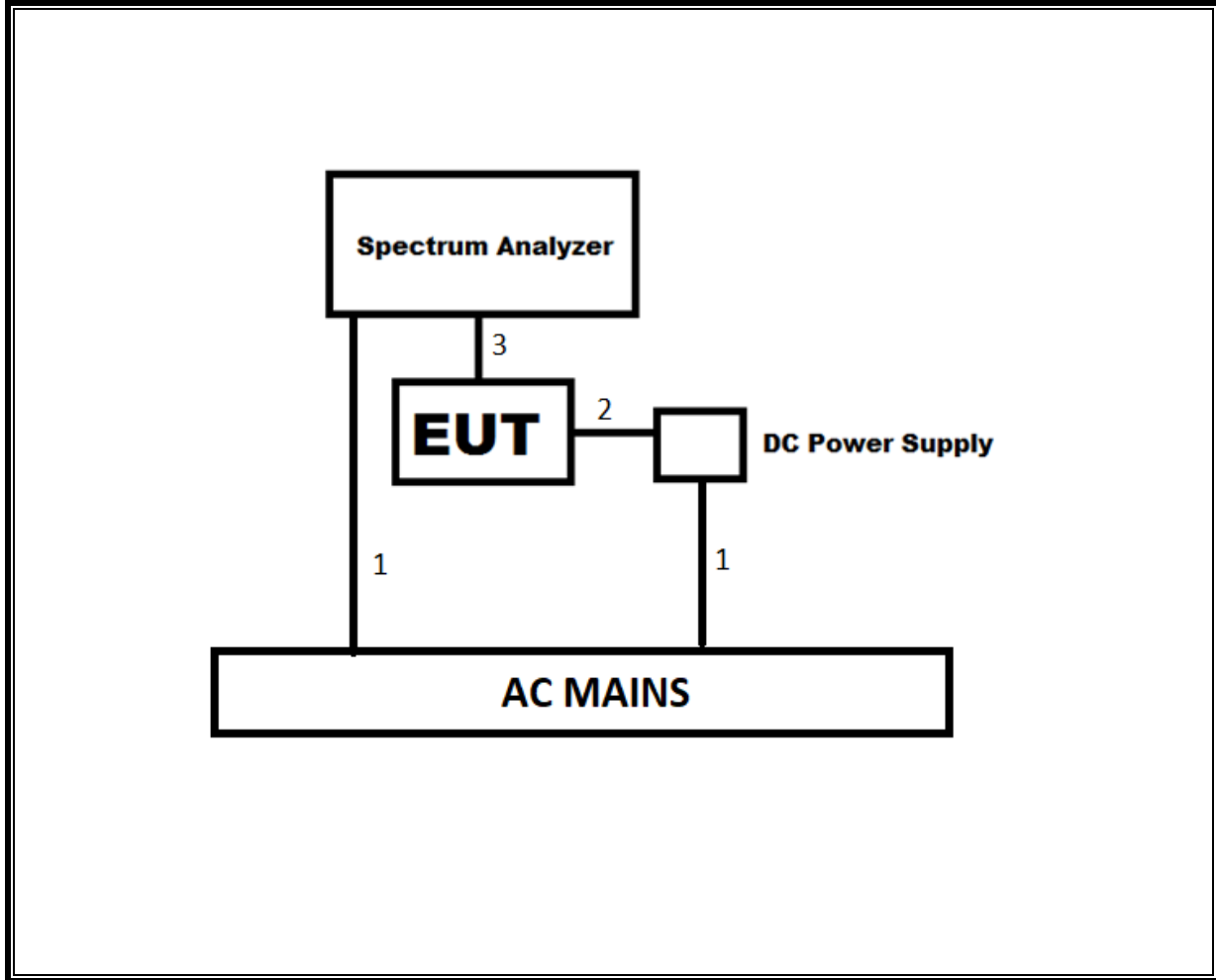
### I/O CABLES (RADIATED EMISSIONS)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC	Unshielded	1.5	AC Main to DC Supply
2	DC	1	DC	Unshielded	0.5	Power Supply to EUT

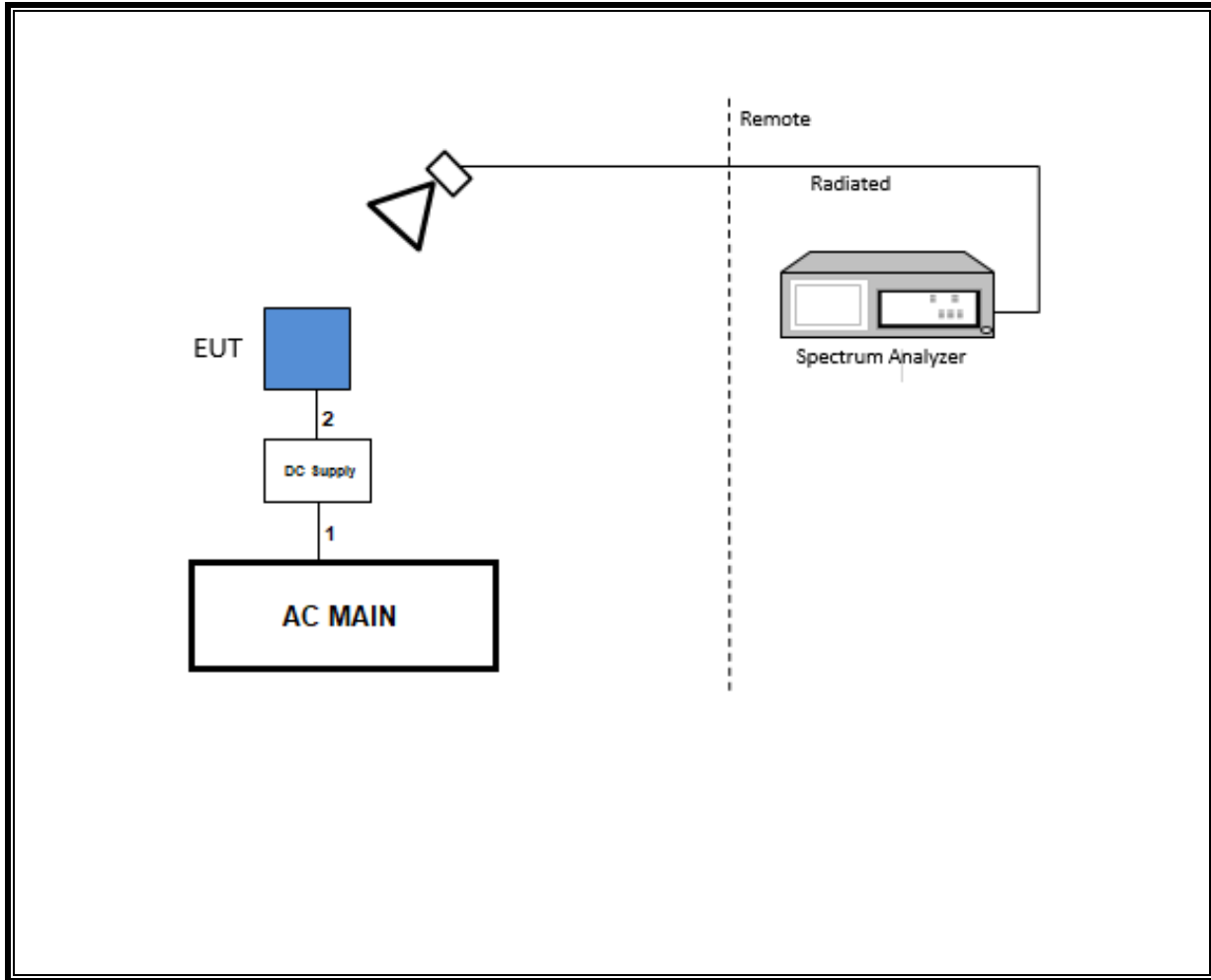
### TEST SETUP

For the purposes of testing, the EUT was powered by a 7.4V DC Power supply. The EUT is normally powered by a Li-Ion battery.

**SETUP DIAGRAM FOR CONDUCTED TESTS**



**SETUP DIAGRAM FOR RADIATED TESTS**



## 6. MEASUREMENT METHOD

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

6 dB BW: ANSI C63.10 Section -11.8.1 RBW  $\geq$  DTS BW

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

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

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

PSD: ANSI C63.10 Section -11.10.2 Method PKPSD (peak PSD)

Radiated emissions non-restricted frequency bands: ANSI C63.10 Section -11.11

Radiated emissions restricted frequency bands: ANSI C63.10 Section -11.12.1

Conducted emissions in restricted frequency bands: ANSI C63.10 Section -11.12.2

Band-edge: ANSI C63.10 Section - 6.10

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

## 7. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Asset	Cal Due
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179367	05/16/2020
Antenna, Broadband Hybrid, 30MHz to 2000MHz	Sunol Sciences Corp.	JB3	T899	08/23/2020
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	PRE0180174	06/01/2020
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	T344	05/07/2020
Amplifier, 1 to 18GHz, 35dB	AMPLICAL	AMP1G18-35	T1571	05/28/2020
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	PRE0179372	02/16/2020
Antenna	ETS-Lindgren	3117	EMC4294	06/14/2020
Amplifier, 1 to 18GHz, 35dB	AMPLICAL	AMP1G18-35	T1569	01/30/2021
Spectrum Analyzer, PSA, 3Hz to 44GHz	Keysight Technologies Inc	E4446A	T146	01/29/2021
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	T1264	01/21/2021
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	T1223	02/25/2020
Antenna, Active Loop 9kHz - 30MHz	COM-POWER CORP	AL-130R	PRE0165308	04/11/2020
Antenna Horn, 18 to 26.5GHz	ARA	MWH-1826/B	T447	08/13/2020
Pre-Amp 1-26.5 GHz	AMPLICAL	AMP18G26.5-60	PRE0181238	05/01/2020
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Ver 9.5, Oct 21, 2019	
Antenna Port Software	UL	UL RF	Ver 2020.1.8	

### NOTES:

1. Equipment listed above that calibrated during the testing period was set for test after the calibration.
2. Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

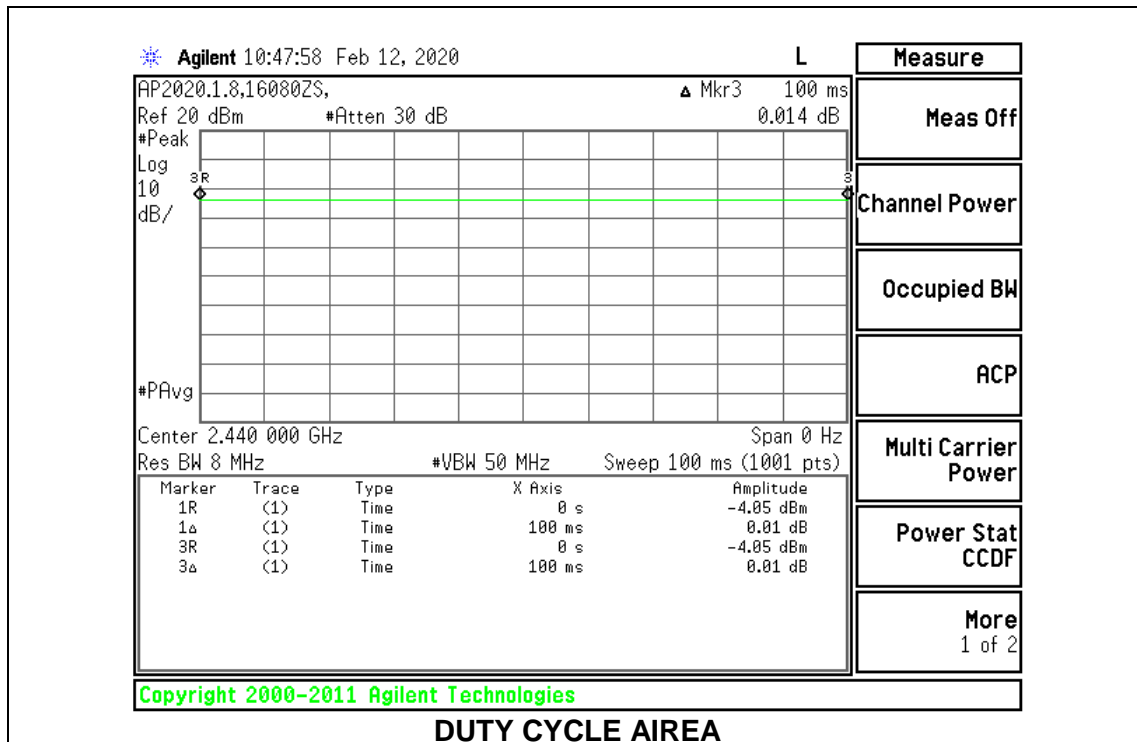
#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

#### ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
AIREA	100	100	1.000	100	0.00	0.010

#### DUTY CYCLE PLOTS



## 8.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

### RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low 11	2405	2.2321
Middle 18	2440	2.2314
High 25	2475	2.2443





### 8.3. 6 dB BANDWIDTH

#### LIMITS

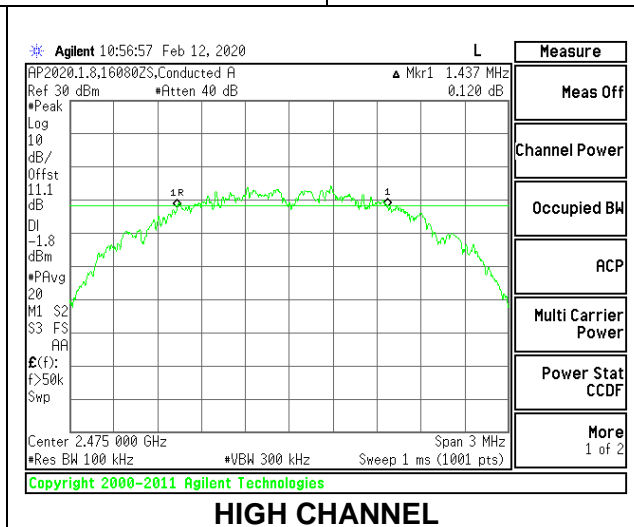
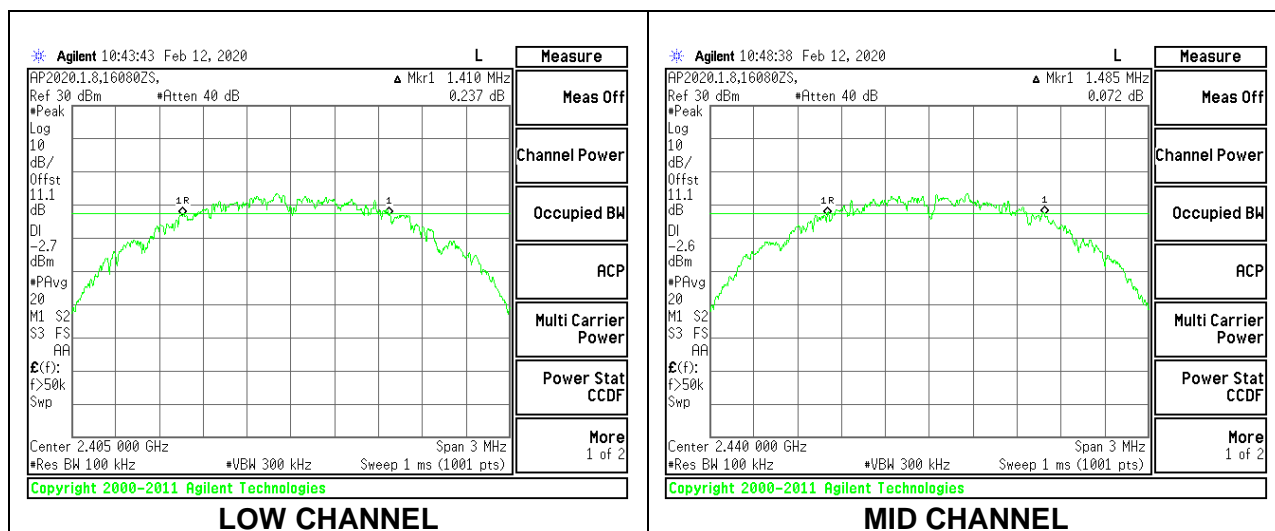
FCC §15.247 (a) (2)

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 11	2405	1.410	0.5
Middle 18	2440	1.485	0.5
High 25	2475	1.437	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 was entered as an offset in the power meter to allow for a gated peak reading of power.

### RESULTS

<b>Tested By:</b>	16080ZS
<b>Date:</b>	2/12/2020

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>Peak Power Reading (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin (dB)</b>
Low 11	2405	6.90	30	-23.10
Middle 18	2440	6.96	30	-23.04
High 25	2475	7.01	30	-22.99

## 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 was entered as an offset in the power meter to allow for a gated average reading of power.

### RESULTS

<b>Tested By:</b>	16080ZS
<b>Date:</b>	2/12/2020

<b>Channel</b>	<b>Frequency (MHz)</b>	<b>AV power (dBm)</b>
Low 11	2405	6.75
Middle 18	2440	6.82
High 25	2475	6.86

## 8.6. POWER SPECTRAL DENSITY

### LIMITS

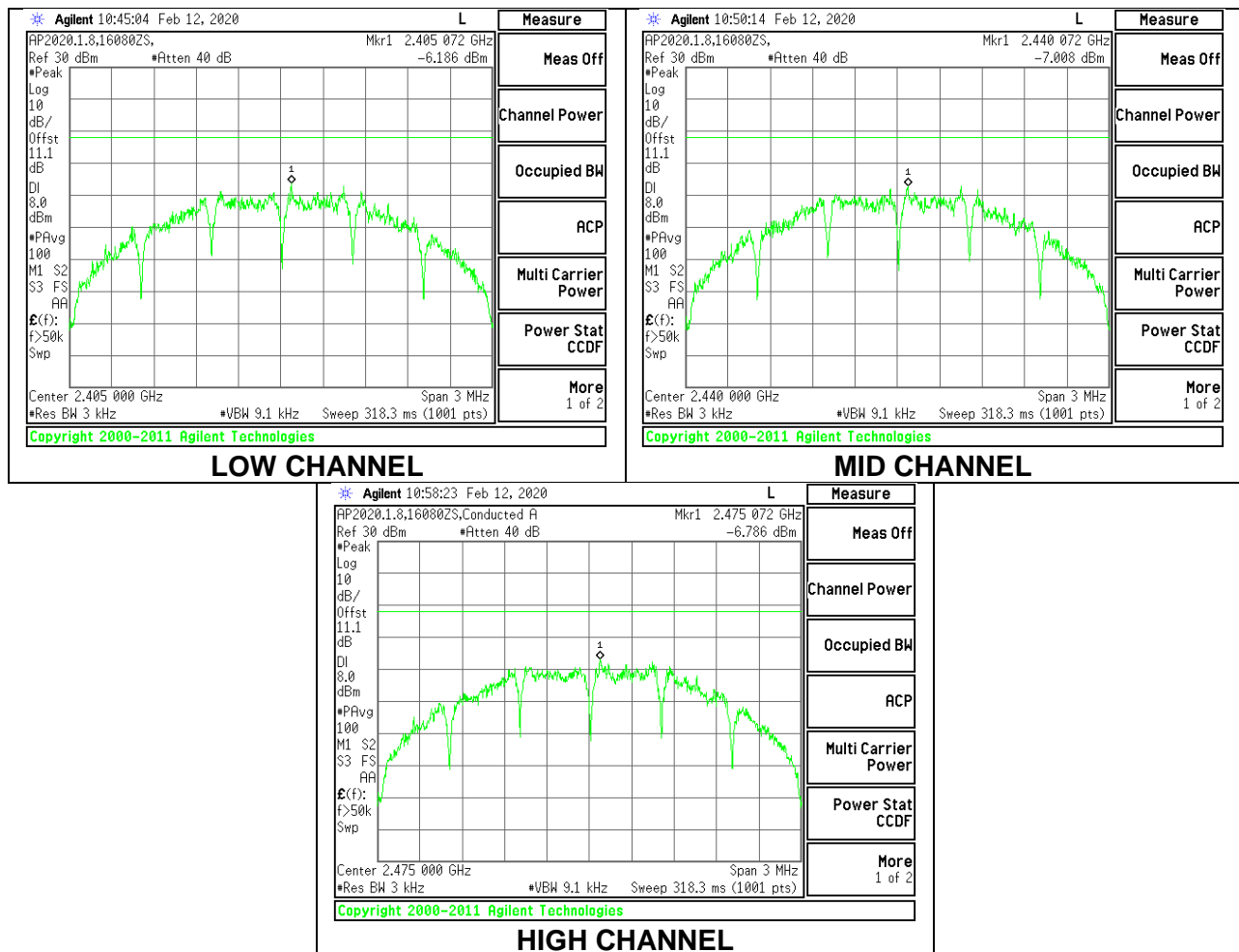
FCC §15.247 (e)

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 11	2405	-6.186	8	-14.19
Middle 18	2440	-7.008	8	-15.01
High 25	2475	-6.786	8	-14.79



## **8.7. CONDUCTED SPURIOUS EMISSIONS**

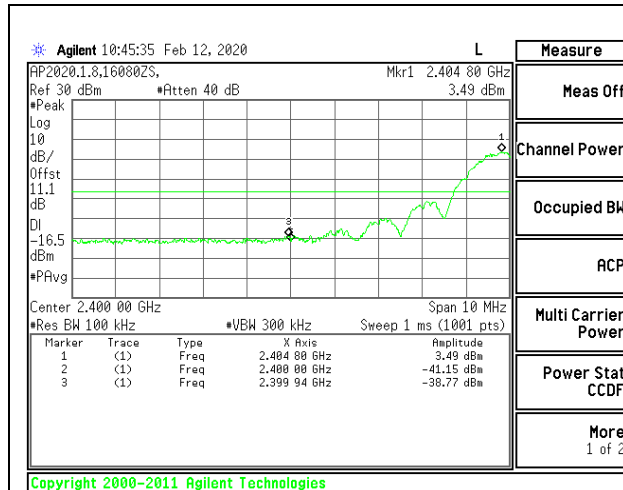
### **LIMITS**

FCC §15.247 (d)

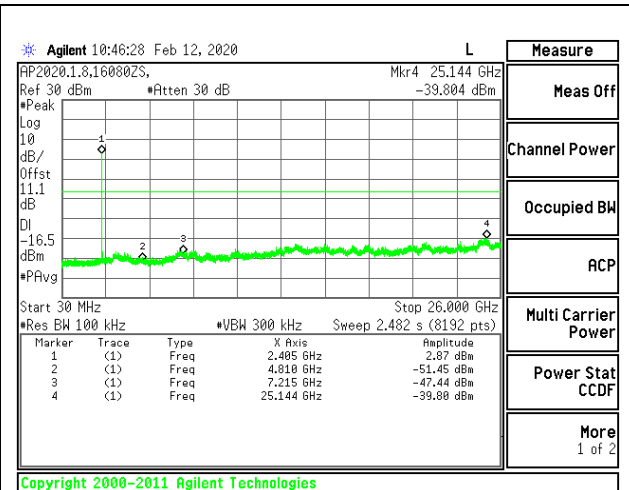
RSS-247 5.5

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

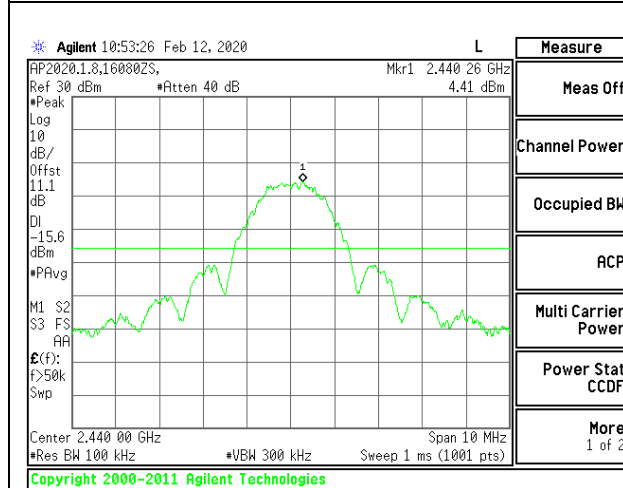
### **RESULTS**



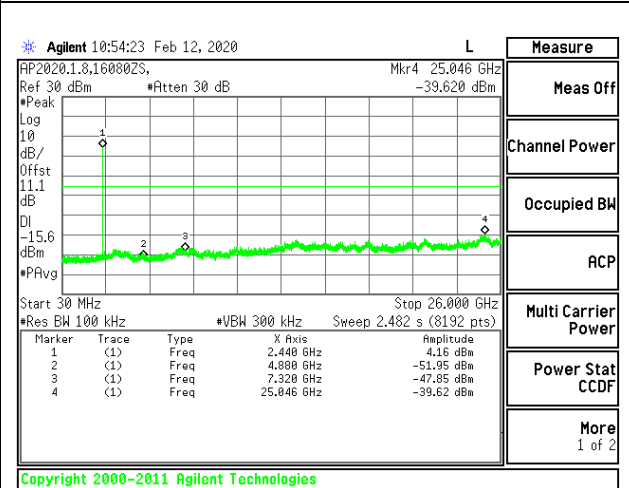
**LOW CHANNEL 11 BANDEDGE**



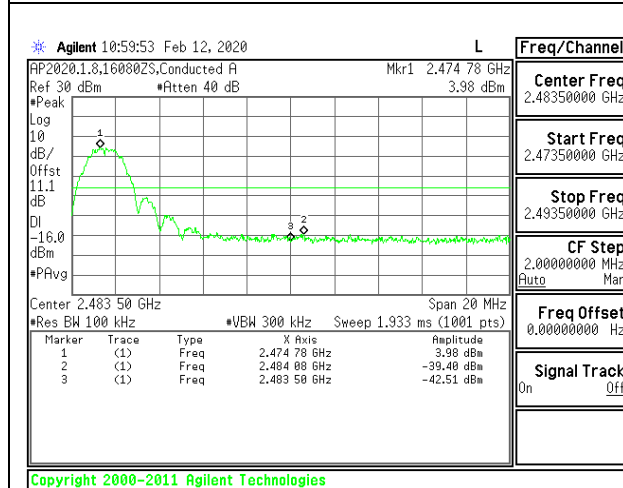
**OUT-OF-BAND LOW CHANNEL 11**



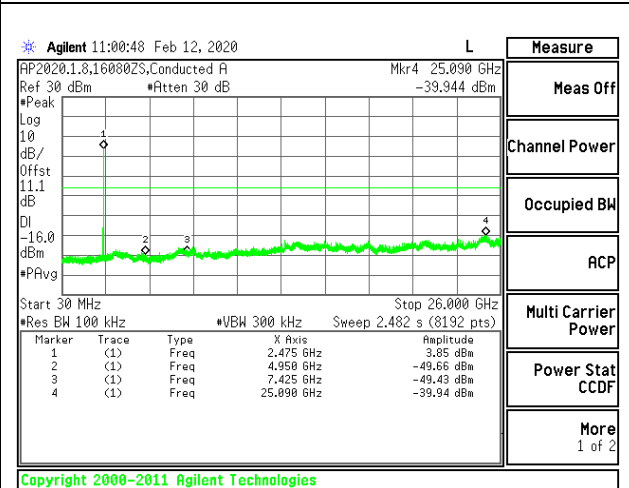
**IN-BAND REFERENCE LEVEL**



**OUT-OF-BAND MID CHANNEL**



**HIGH CHANNEL 25 BANDEDGE**



**OUT-OF-BAND HIGH CHANNEL 25**

## 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 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For 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 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.

2D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

**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.

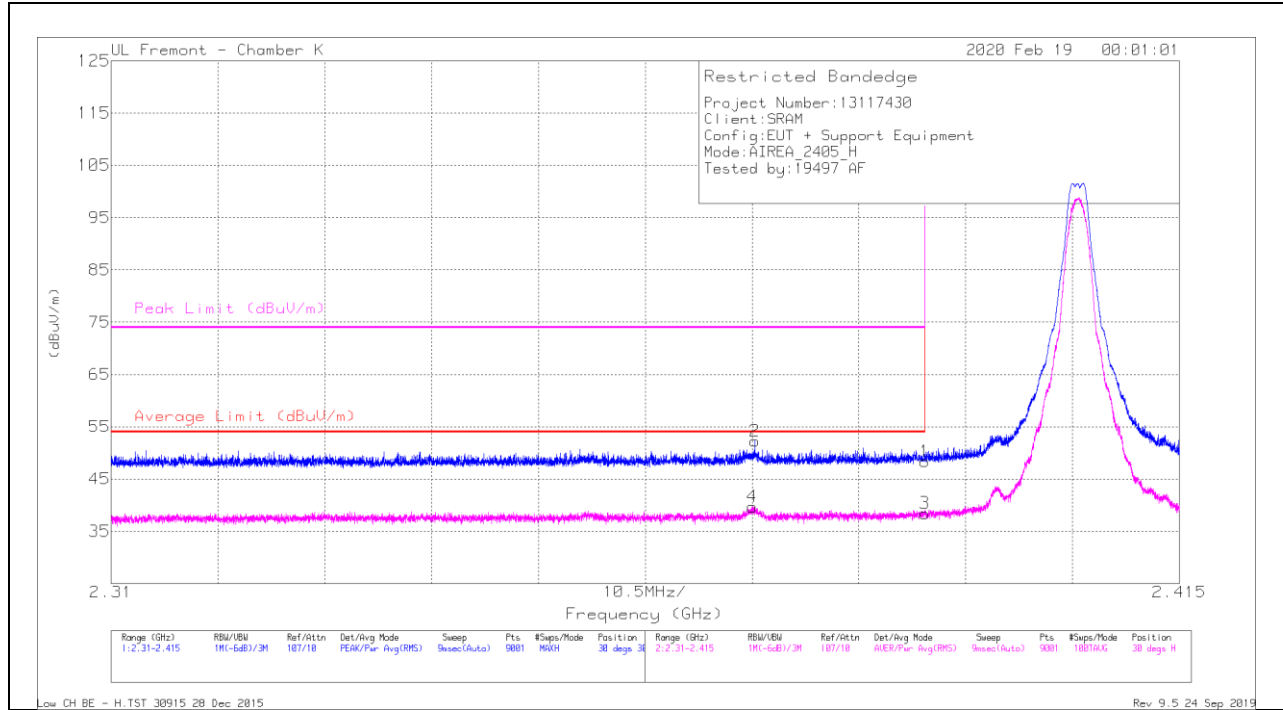
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.



## 9.2. TRANSMITTER ABOVE 1 GHz

### BANDEDGE (LOW CHANNEL 11)

### HORIZONTAL RESULT



### Trace Markers

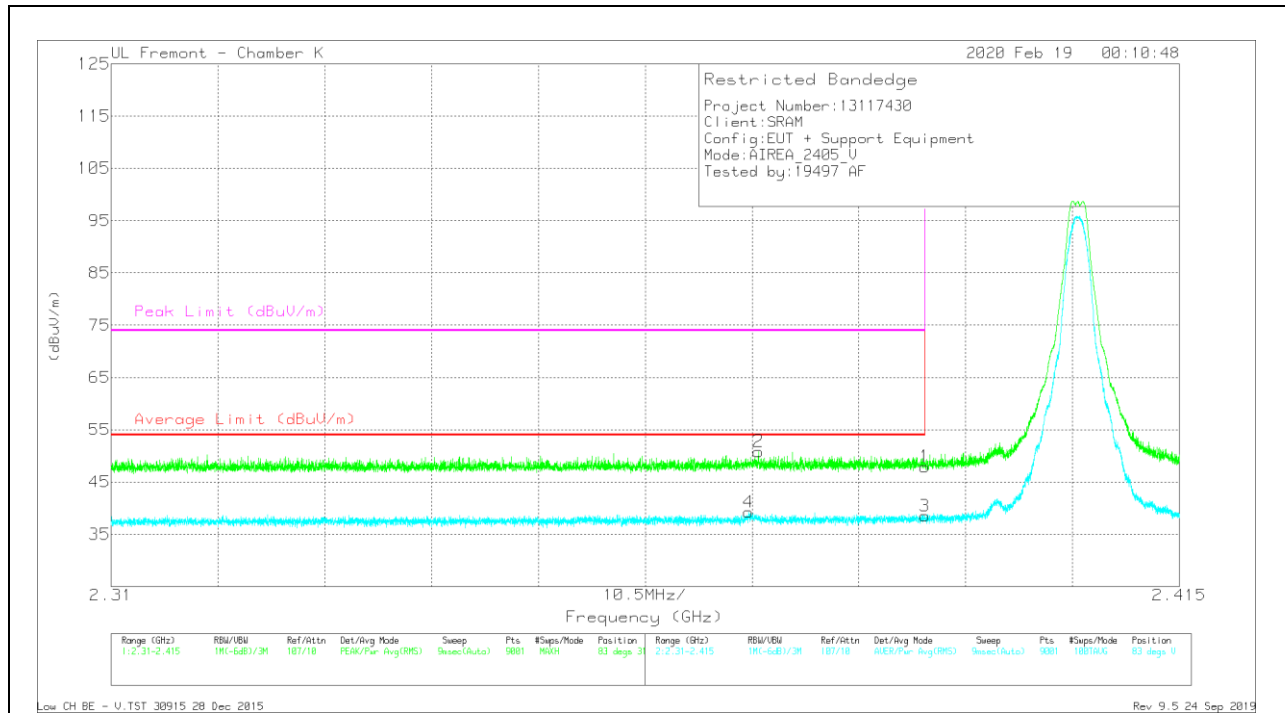
Marker	Frequency (GHz)	Meter Reading (dBUV)	Det	AF EMC4294 (dB/m)	Amp/Cb/Filtr/Pad (dB)	Corrected Reading (dBUV/m)	Average Limit (dBUV/m)	Margin (dB)	Peak Limit (dBUV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	41.15	Pk	31.9	-24.7	48.35	-	-	74	-25.65	30	301	H
2	* 2.37326	45.07	Pk	31.9	-24.7	52.27	-	-	74	-21.73	30	301	H
3	* 2.38999	31.21	RMS	31.9	-24.7	38.41	54	-15.59	-	-	30	301	H
4	* 2.37303	32.47	RMS	31.9	-24.7	39.67	54	-14.33	-	-	30	301	H

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

Pk - Peak detector

RMS - RMS detection

### VERTICAL RESULT



### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cb/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.38999	40.73	Pk	31.9	-24.7	47.93	-	-	74	-26.07	83	317	V
2	* 2.37363	43.63	Pk	31.9	-24.7	50.83	-	-	74	-23.17	83	317	V
3	* 2.38999	31.28	RMS	31.9	-24.7	38.48	54	-15.52	-	-	83	317	V
4	* 2.37264	31.91	RMS	31.9	-24.6	39.21	54	-14.79	-	-	83	317	V

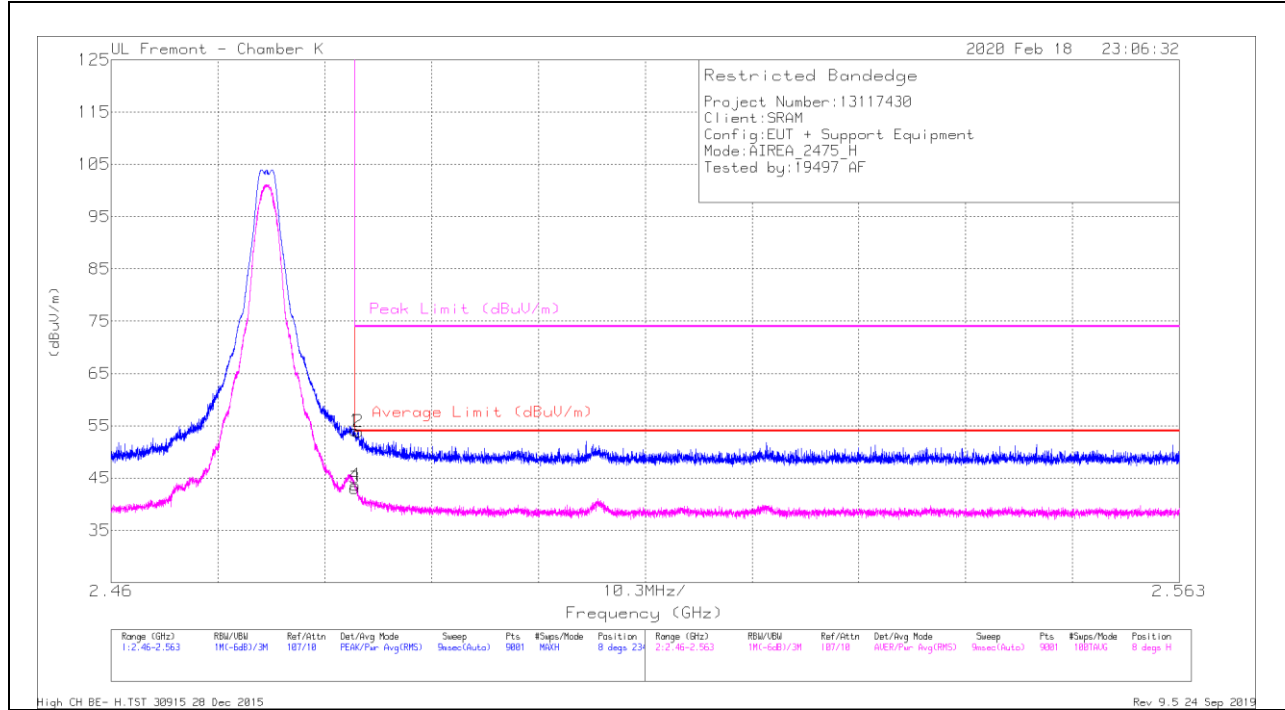
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

### BANDEGE (HIGH CHANNEL 25)

### HORIZONTAL RESULT

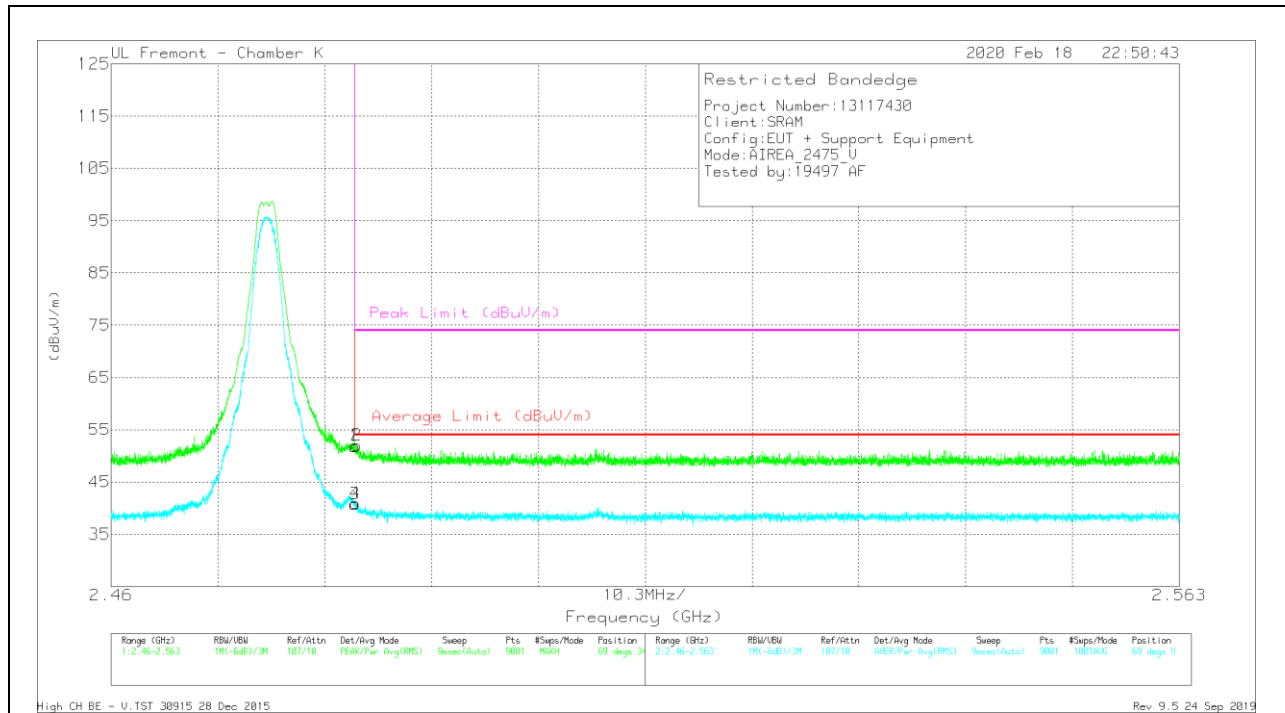


#### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cb/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	46.19	Pk	32.5	-24.6	54.09	-	-	74	-19.91	8	234	H
2	* 2.48386	45.98	Pk	32.5	-24.6	53.88	-	-	74	-20.12	8	234	H
3	* 2.48351	35.18	RMS	32.5	-24.6	43.08	54	-10.92	-	-	8	234	H
4	* 2.48355	35.73	RMS	32.5	-24.6	43.63	54	-10.37	-	-	8	234	H

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

### VERTICAL RESULT



### Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cb/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.48351	43.96	Pk	32.5	-24.6	51.86	-	-	74	-22.14	69	349	V
2	* 2.48367	44.09	Pk	32.5	-24.6	51.99	-	-	74	-22.01	69	349	V
3	* 2.48351	32.88	RMS	32.5	-24.6	40.78	54	-13.22	-	-	69	349	V
4	* 2.48355	33.04	RMS	32.5	-24.6	40.94	54	-13.06	-	-	69	349	V

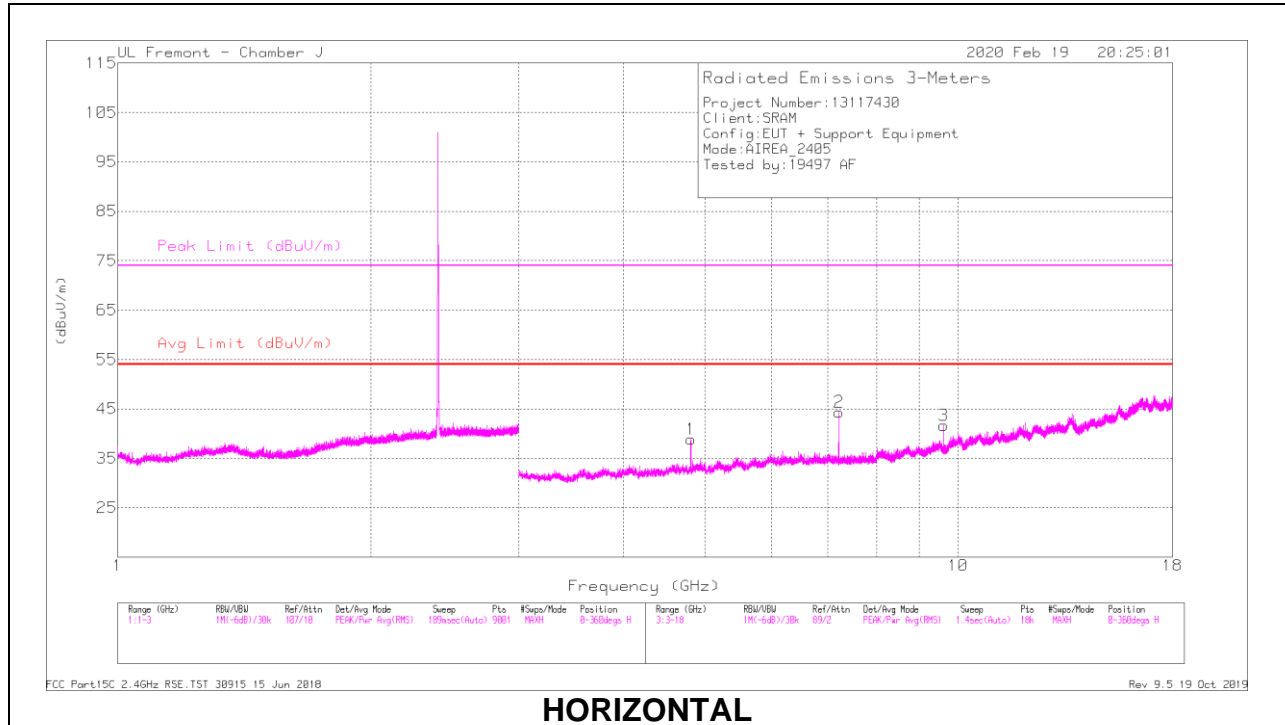
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

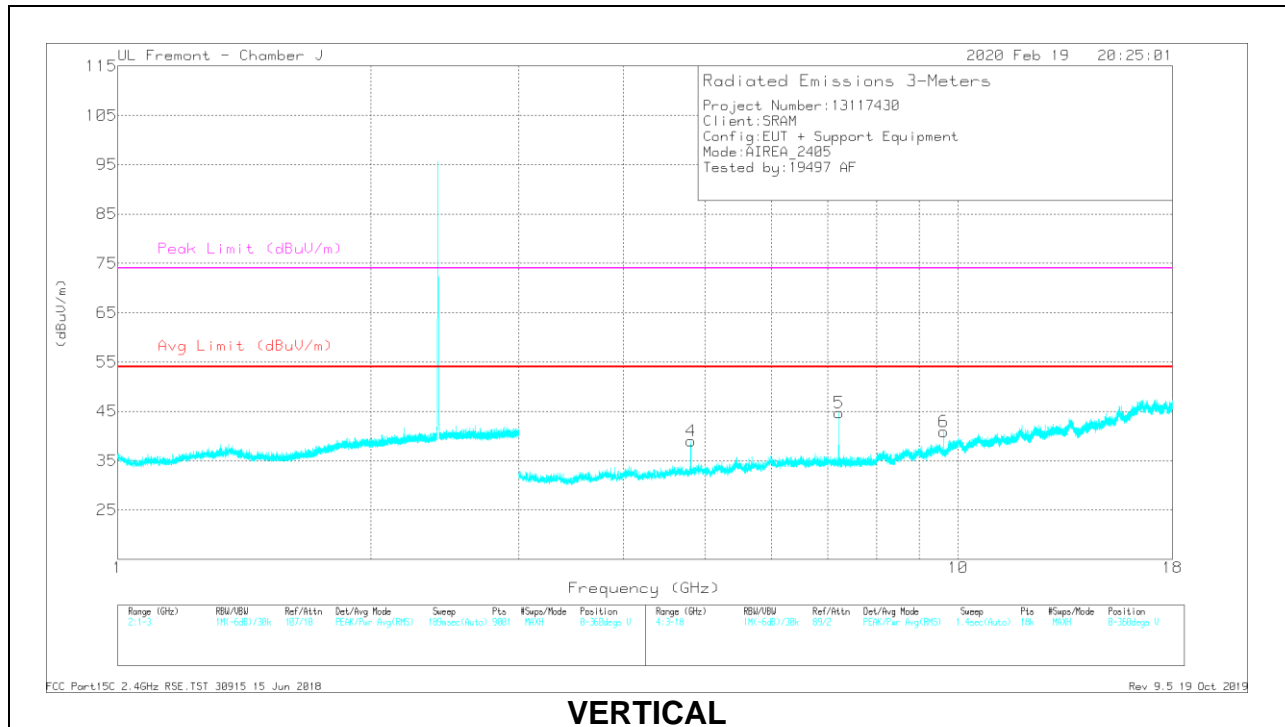
RMS - RMS detection

## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL 11 RESULTS



**HORIZONTAL**



**VERTICAL**

## RADIATED EMISSIONS

### Radiated Emissions

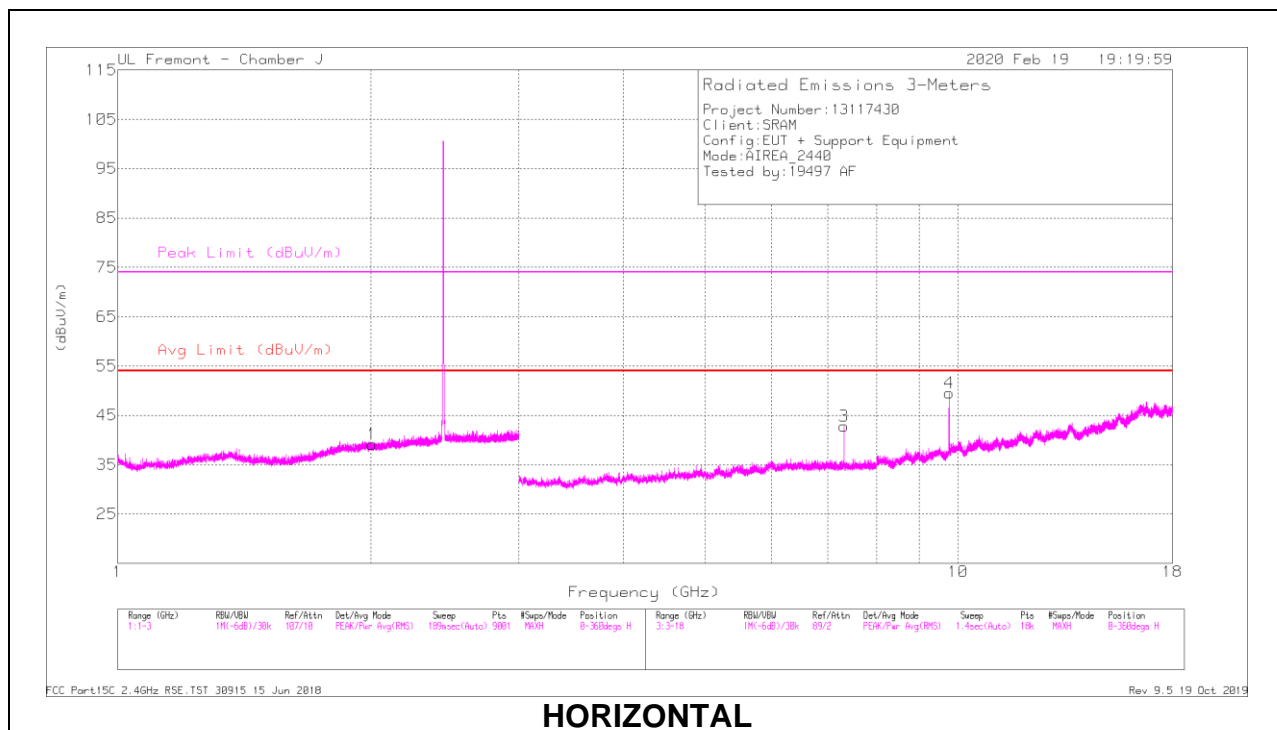
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.809	43.45	PK2	34.2	-30.8	46.85	-	-	74	-27.15	108	158	H
	* 4.80908	35.22	MAv1	34.2	-30.8	38.62	54	-15.38	-	-	108	158	H
2	7.21356	41.52	PK2	35.5	-27.2	49.82	-	-	-	-	283	110	H
3	9.62199	35.17	PK2	36.8	-24.5	47.47	-	-	-	-	65	116	H
4	* 4.80895	42.19	PK2	34.2	-30.8	45.59	-	-	74	-28.41	245	239	V
	* 4.8109	34.59	MAv1	34.2	-30.9	37.89	54	-16.11	-	-	245	239	V
5	7.2165	43.23	PK2	35.6	-27.2	51.63	-	-	-	-	164	181	V
6	9.62193	36.78	PK2	36.8	-24.5	49.08	-	-	-	-	71	109	V

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

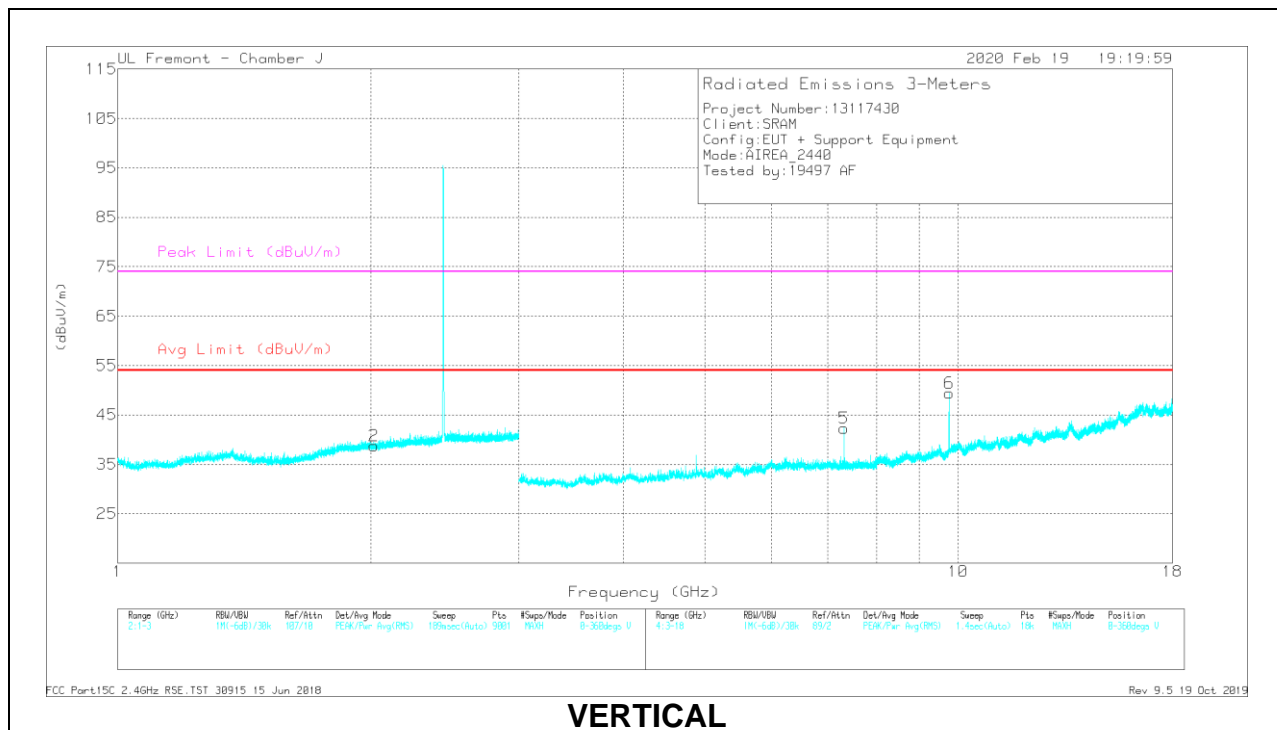
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### MID CHANNEL 18 RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.00627	41.89	PK2	31	-25.7	47.19	-	-	-	-	289	106	H
2	2.0186	41.91	PK2	30.9	-25.7	47.11	-	-	-	-	177	133	V
3	* 7.32158	41.8	PK2	35.5	-27.1	50.2	-	-	74	-23.8	276	194	H
	* 7.32131	34.58	MAv1	35.5	-27.1	42.98	54	-11.02	-	-	276	194	H
4	9.76204	42.34	PK2	36.9	-23.5	55.74	-	-	-	-	253	230	H
5	* 7.31852	40.89	PK2	35.5	-27.1	49.29	-	-	74	-24.71	153	107	V
	* 7.31876	33.21	MAv1	35.5	-27.1	41.61	54	-12.39	-	-	153	107	V
6	9.76204	42.59	PK2	36.9	-23.5	55.99	-	-	-	-	71	120	V

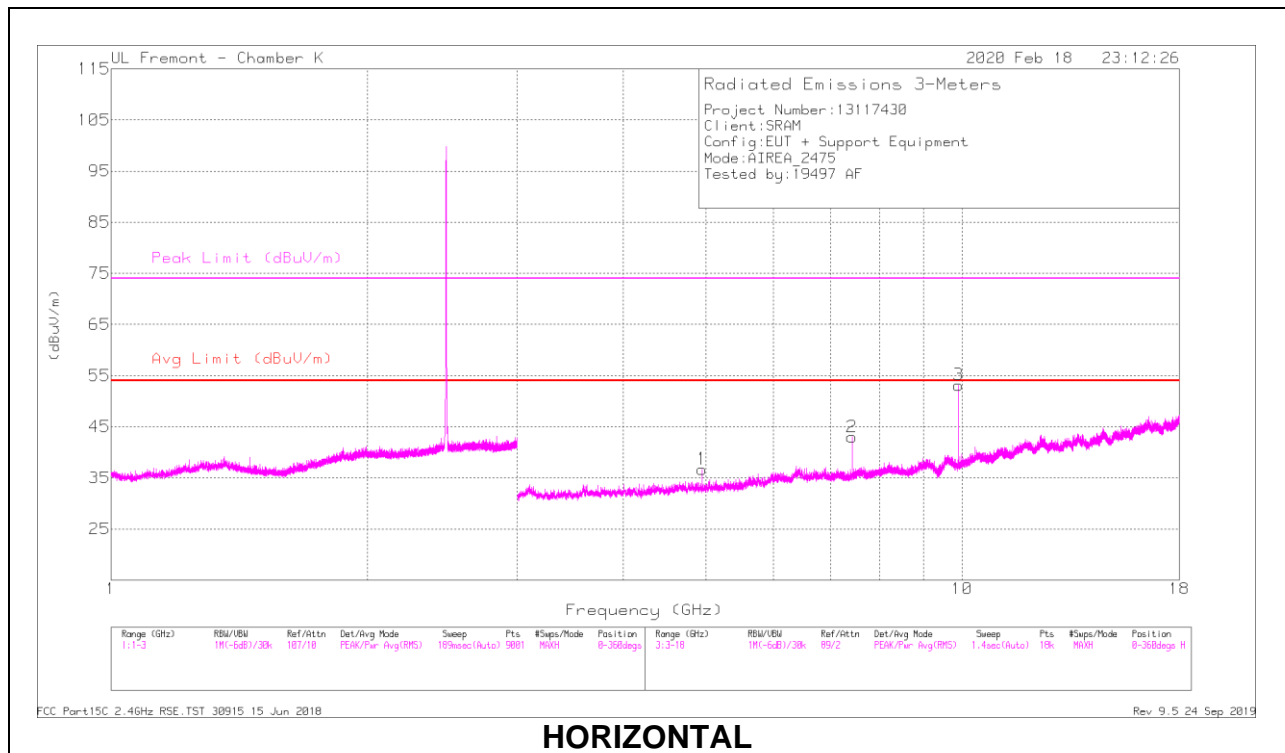
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

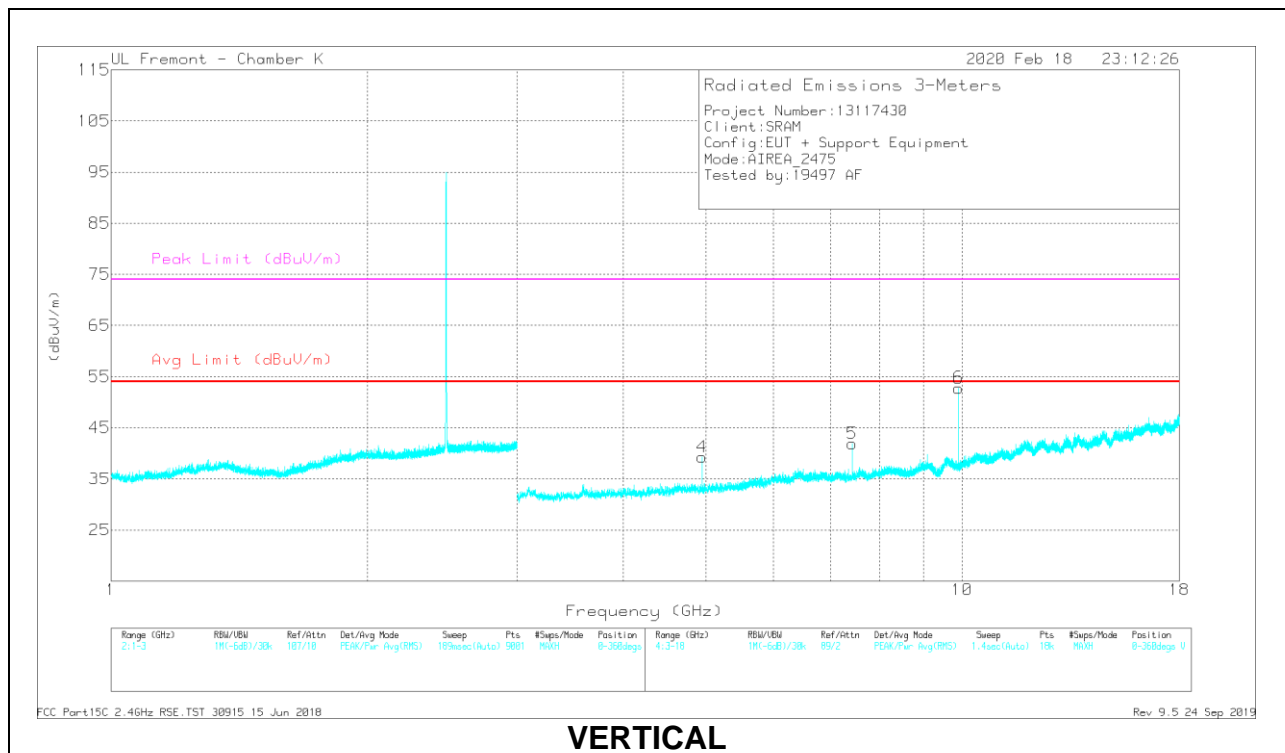
MAv1 - KDB558074 Option 1 Maximum RMS Average



### HIGH CHANNEL 25 RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF EMC4294 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 4.95099	40.08	PK2	34.1	-29.5	44.68	-	-	74	-29.32	325	208	H
	* 4.95099	31.48	MAV1	34.1	-29.5	36.08	54	-17.92	-	-	325	208	H
2	* 7.42355	39.14	PK2	35.6	-25.4	49.34	-	-	74	-24.66	104	115	H
	* 7.42378	31.29	MAV1	35.6	-25.4	41.49	54	-12.51	-	-	104	115	H
3	9.90202	44.65	PK2	37	-22	59.65	-	-	-	-	315	201	H
4	* 4.94915	41	PK2	34.1	-29.5	45.6	-	-	74	-28.4	288	108	V
	* 4.94909	33.82	MAV1	34.1	-29.5	38.42	54	-15.58	-	-	288	108	V
5	* 7.42659	39.03	PK2	35.6	-25.4	49.23	-	-	74	-24.77	318	124	V
	* 7.42627	30.87	MAV1	35.6	-25.4	41.07	54	-12.93	-	-	318	124	V
6	9.89803	43.42	PK2	37.1	-22	58.52	-	-	-	-	9	190	V

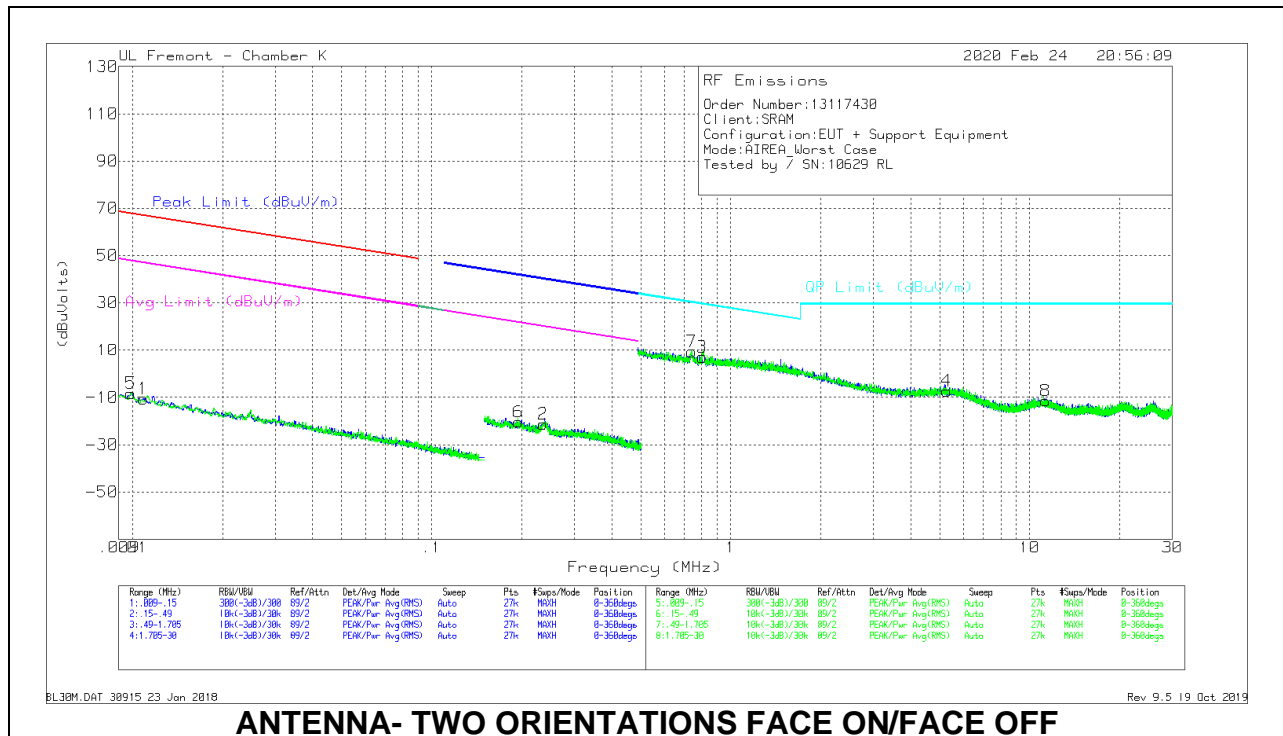
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average

### 9.3. WORST CASE BELOW 30MHz

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



#### ANTENNA- TWO ORIENTATIONS FACE ON/FACE OFF

#### Below 30MHz Data

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 300m	Corrected Reading (dBuV/m)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Avg Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
1	.01085	54.16	Pk	15.3	0	-80	-10.54	66.88	-77.42	46.88	-57.42	-	-	-	-	0-360
2	.2359	44.67	Pk	14	.1	-80	-21.23	-	-	-	-	40.16	-61.39	20.16	-41.39	0-360
5	.00988	56.26	Pk	15.5	0	-80	-8.24	67.69	-75.93	47.69	-55.93	-	-	-	-	0-360
6	.19514	45.46	Pk	14	.1	-80	-20.44	-	-	-	-	41.81	-62.25	21.81	-42.25	0-360

Pk - Peak detector

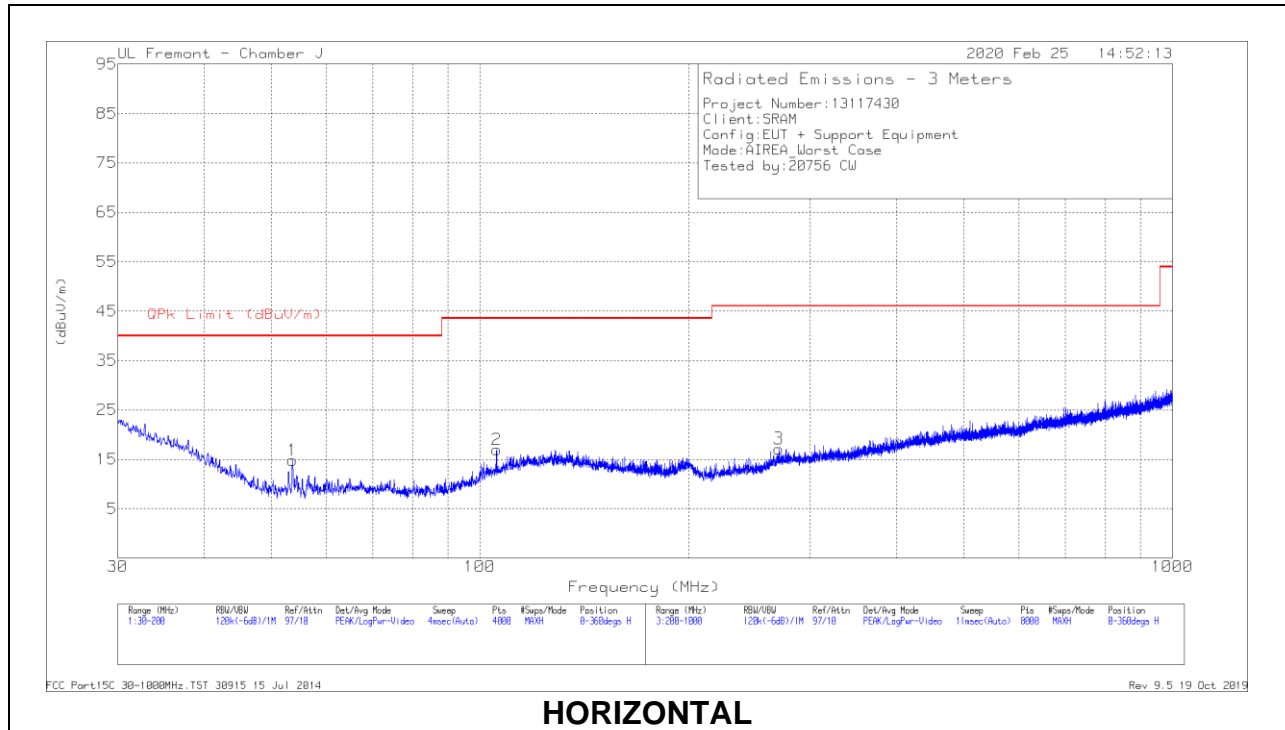
Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	Loop Antenna (dB/m)	Cables (dB)	Dist Corr 30m (dB) 40Log	Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)
3	.80444	32.89	Pk	14.1	.1	-40	7.09	29.51	-22.42	0-360
4	5.28078	17.56	Pk	14.9	.2	-40	-7.34	29.5	-36.84	0-360
7	.74162	35.2	Pk	14.1	.1	-40	9.4	30.21	-20.81	0-360
8	11.29682	13.1	Pk	15.1	.4	-40	-11.4	29.5	-40.9	0-360

Pk - Peak detector

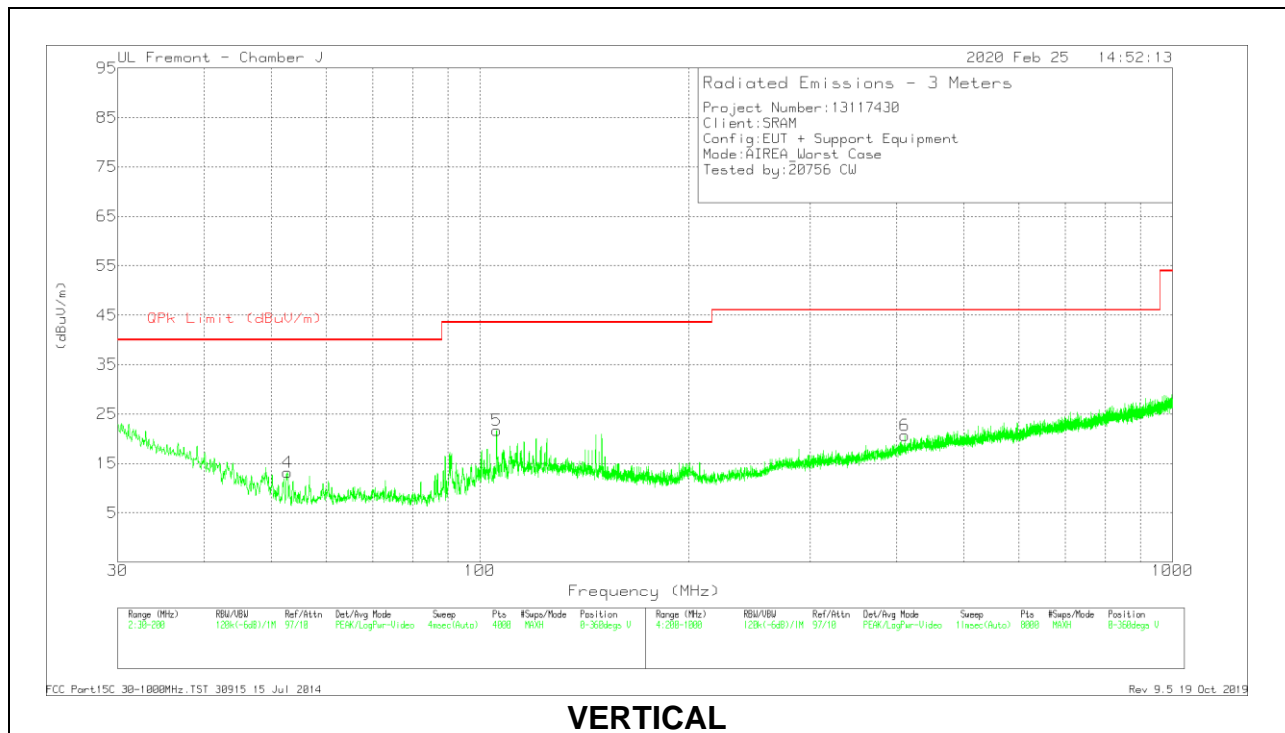
**Note:** The Limits in CRF 47, Part 15, Subpart C, Paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels ( as reported in the table) using the free space impedance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

### 9.4. WORST CASE BELOW 1 GHz

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



**HORIZONTAL**



**VERTICAL**

**Below 1GHz Data**

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T899 (dB/m)	Amp Cbl (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	53.6361	33.29	Pk	12.9	-31.4	14.79	40	-25.21	0-360	398	H
2	105.7701	37.64	Pk	17.7	-31	24.34	43.52	-19.18	76	103	V
	105.7629	35.13	Qp	17.7	-31	21.83	43.52	-21.69	76	103	V
4	52.7009	31.61	Pk	12.9	-31.4	13.11	40	-26.89	0-360	101	V
5	105.7121	34.93	Pk	17.7	-31	21.63	43.52	-21.89	0-360	101	V
3	* 270.2091	28.36	Pk	19	-30.2	17.16	46.02	-28.86	0-360	398	H
6	410.4274	28.62	Pk	21.8	-29.8	20.62	46.02	-25.4	0-360	298	V

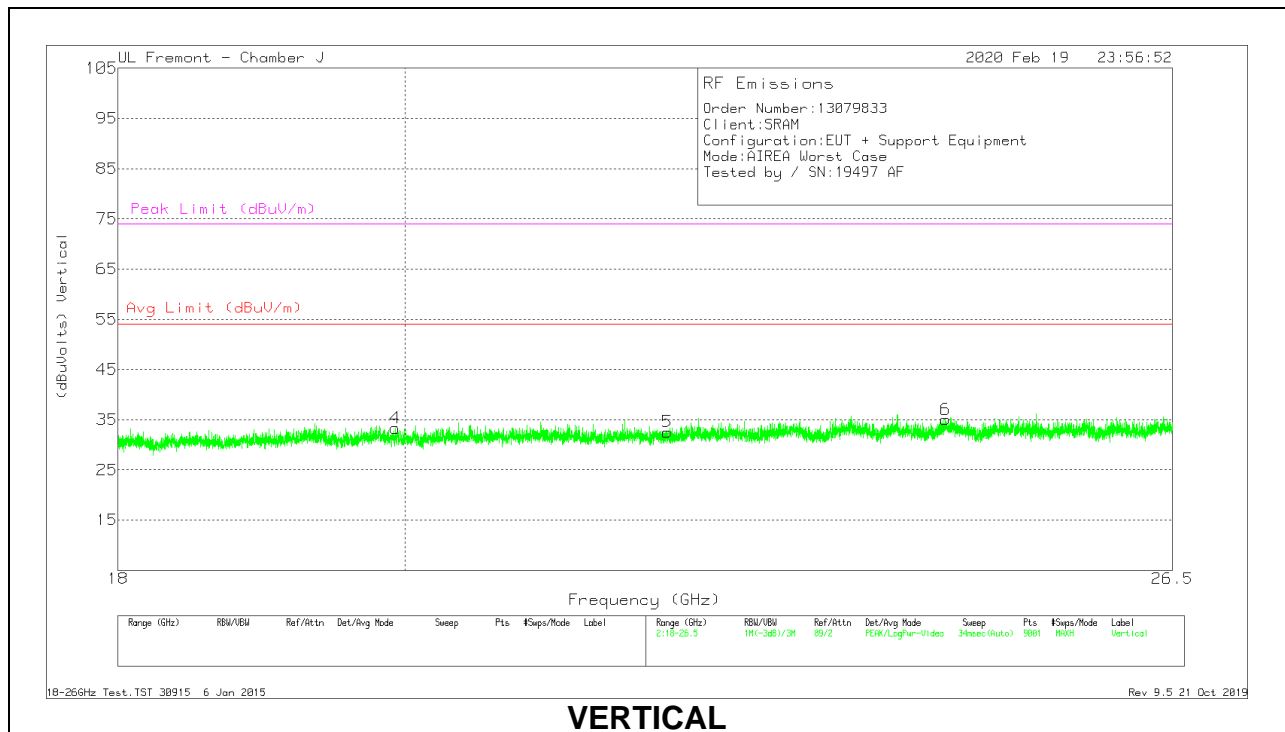
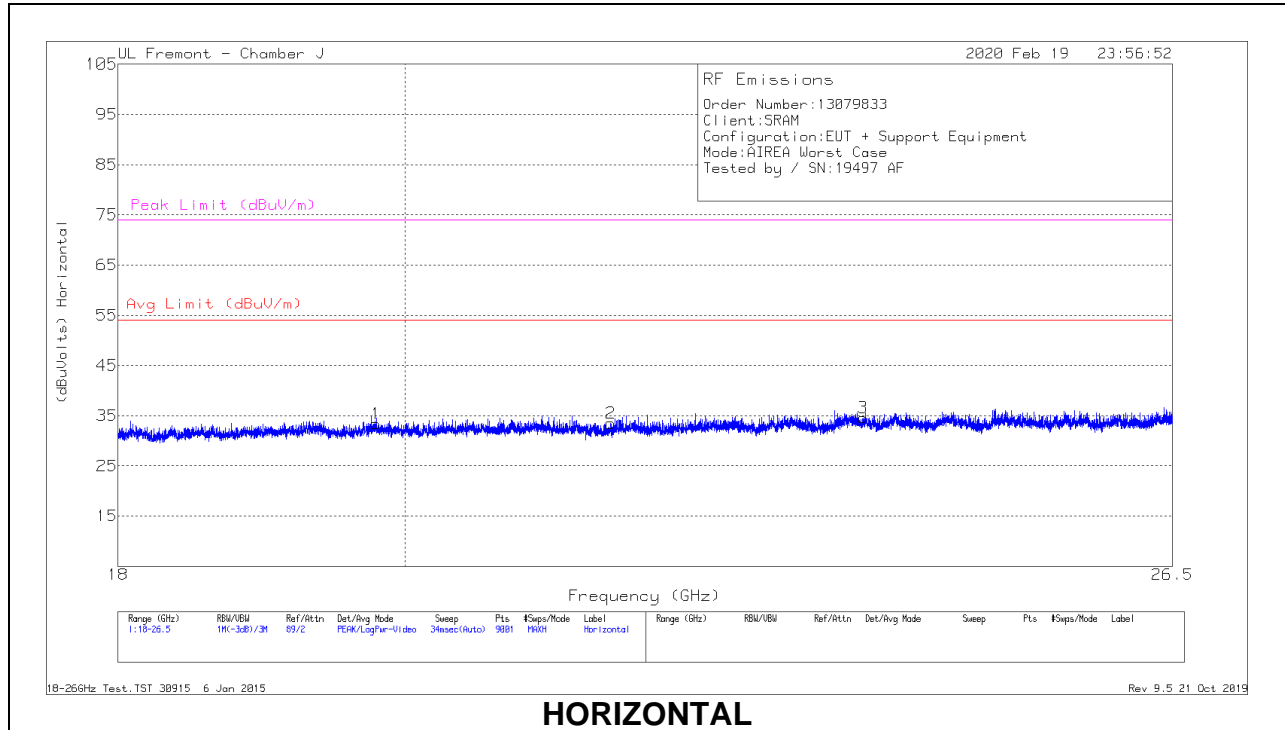
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

## 9.5. WORST CASE 18-26 GHz

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



**18 – 26GHz DATA**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T447 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	19.78689	66.89	Pk	32.8	-56.8	-9.5	33.39	54	-20.61	74	-40.61
2	21.56433	67	Pk	33.2	-57.2	-9.5	33.5	54	-20.5	74	-40.5
3	23.65628	67.19	Pk	34.2	-57.3	-9.5	34.59	54	-19.41	74	-39.41
4	19.92761	67.12	Pk	32.8	-57.1	-9.5	33.32	54	-20.68	74	-40.68
5	22.01578	66.44	Pk	33.4	-57.8	-9.5	32.54	54	-21.46	74	-41.46
6	24.38255	66.67	Pk	34.3	-56.4	-9.5	35.07	54	-18.93	74	-38.93

Pk - Peak detector