



# **TEST REPORT**

**Report Number. :** 12888721 -E1V2

**Applicant :** SRAM LLC  
1000 W Fulton Market 4<sup>th</sup> Floor  
Chicago, IL 60607 U.S.A

**Model :** 00030

**FCC ID :** C9O-LSBB1

**IC :** 10161A-LSBB1

**EUT Description :** Left Extension with BLE and AIREA Radios

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

**Date Of Issue:**  
November 14, 2019

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## REPORT REVISION HISTORY

| Rev. | Issue Date | Revisions                          | Revised By  |
|------|------------|------------------------------------|-------------|
| V1   | 10/29/2019 | Initial Issue                      | --          |
| V2   | 11/14/2019 | Updated Model Number and Section 7 | Steven Tran |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SRAM LLC  
1000 W Fulton Market 4th Floor  
Chicago, IL 60607 U.S.A

**EUT DESCRIPTION:** Left Extension with BLE and AIREA Radios

**MODEL:** 00030

**SERIAL NUMBER:** 3412909108 (Radiated)

**DATE TESTED:** August 9 – 13 , 2019

| 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. All indications of Pass/Fail in this report are opinions expressed by UL Verification Services Inc. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. 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, 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 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. The full scope of accreditation can be viewed at <http://nist.gov/standards/scopes/2000650.htm>.

## 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

Where relevant, the following sample calculation is provided:

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

### 4.3. MEASUREMENT UNCERTAINTY

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

| PARAMETER                                           | UNCERTAINTY |
|-----------------------------------------------------|-------------|
| Worst Case Conducted Disturbance, 9KHz to 0.15 MHz  | 3.84 dB     |
| Worst Case Conducted Disturbance, 0.15 to 30 MHz    | 3.65 dB     |
| Worst Case Radiated Disturbance, 9KHz to 30 MHz     | 3.15 dB     |
| Worst Case Radiated Disturbance, 30 to 1000 MHz     | 5.36 dB     |
| Worst Case Radiated Disturbance, 1000 to 18000 MHz  | 4.32 dB     |
| Worst Case Radiated Disturbance, 18000 to 26000 MHz | 4.45 dB     |
| Worst Case Radiated Disturbance, 26000 to 40000 MHz | 5.24 dB     |

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

## **5. EQUIPMENT UNDER TEST**

### **5.1. DESCRIPTION OF EUT**

The EUT is a Left Extension with BLE and AIREA Radios, powered by CR2032 coin cell battery.

### **5.2. MAXIMUM OUTPUT POWER**

*Please refer to UL report # 12292105-E1V1.*

*The output powers were verified and measured at same or lower power setting compared to the original certification testing level.*

### **5.3. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes a chip antenna type number W3008C, with a maximum gain of 2.2dBi.

### **5.4. SOFTWARE AND FIRMWARE**

The EUT firmware installed during testing was A-1.0.

The test utility software used during testing was Lightblue v2.6.4

### **5.5. DESCRIPTION OF CLASS II PERMISSIVE CHANGE**

The major change filed under Class II Permissive Change application are: Changing enclosure and adding model 00030.

## **5.6. WORST-CASE CONFIGURATION AND MODE**

Radiated band edge, harmonic, and spurious emissions from 1GHz to 18GHz were performed with the EUT was set to transmit at highest power on Low/Middle/High channels.

Radiated emissions below 30MHz, below 1GHz, 18-26GHz and power line conducted emissions were performed with the EUT transmits at the channel with the highest output power as worst-case scenario.

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.



## 5.7. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Support Equipment List |              |           |               |
|------------------------|--------------|-----------|---------------|
| Description            | Manufacturer | Model     | Serial Number |
| Ipod Touch             | Apple        | MKJ02LL/A | CCQVRHY2GGNL  |
| DC Power Supply        | ABM          | 8185D     | D021366       |

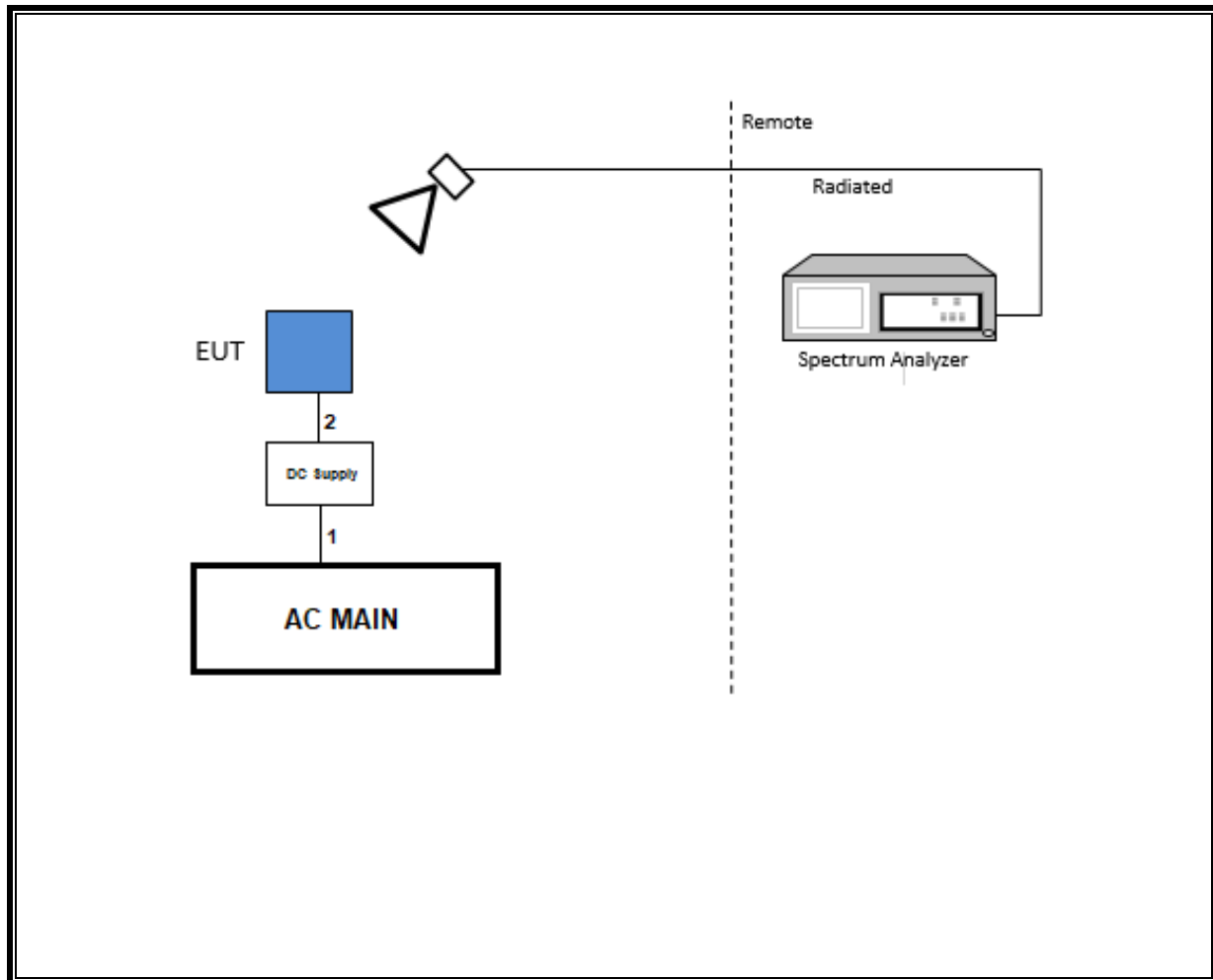
### I/O CABLES (RADIATED EMISSIONS)

| 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 3V DC Power supply. The EUT is normally powered by a CR2032 coin cell battery. The iPod Touch wirelessly sends commands to the EUT.

**SETUP DIAGRAM FOR RADIATED TESTS**



## 6. MEASUREMENT METHOD

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

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

Band-edge: ANSI C63.10 Subclause -11.13.3.4 Integration method -Trace averaging across  
ON and OFF times DC correction

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:

| Test Equipment List                     |                      |                        |            |            |            |
|-----------------------------------------|----------------------|------------------------|------------|------------|------------|
| Description                             | Manufacturer         | Model                  | ID No.     | Cal Date   | Cal Due    |
| Antenna, Horn 1-18GHz                   | ETS-Lindgren         | 3117                   | T862       | 6/6/2019   | 6/5/2020   |
| Antenna, Horn 18-26.5GHz                | ARA                  | MWH-1826/B             | T449       | 08/13/2020 | 08/13/2019 |
| Amplifier 1-8GHz 30dB gain              | L3 Narda             | AMF-4D-01000800-30-29P | 167494     | 8/24/2019  | 8/24/2020  |
| EMI TEST RECEIVER                       | Rohde & Schwarz      | ESW44                  | PRE0179376 | 2/14/2019  | 2/14/2020  |
| Amplifier, 9KHz to 1GHz, 32dB           | SONOMA INSTRUMENT    | 310                    | PRE0180175 | 5/30/2019  | 5/29/2020  |
| RF Amplifier, 1-18GHz                   | MITEQ                | AFS42-00101800-25-S-42 | 171460     | 8/24/2019  | 8/24/2020  |
| Filter, HPF 3.0GHz                      | MICRO-TRONICS        | HPM17543               | 171903     | 8/24/2019  | 8/24/2020  |
| Antenna,BroadBand Hybrid, 30MHz to 3GHz | Sunol Sciences Corp. | JB3                    | PRE0184971 | 11/13/2018 | 11/13/2019 |
| Filter, HPF 3.0GHz                      | MICRO-TRONICS        | HPM17543               | T897       | 5/5/2019   | 5/4/2020   |
| Amplifier, 1 to 18GHz, 35dB             | AMPLICAL             | AMP1G18-35             | T1569      | 5/5/2019   | 5/4/2020   |
| EMI TEST RECEIVER                       | Rohde & Schwarz      | ESW44                  | PRE0179372 | 2/16/2019  | 2/16/2020  |
| Antenna,Broadband Hybrid, 30MHz to 3GHz | Sunol Sciences Corp. | JB3                    | PRE0184052 | 10/24/2018 | 10/24/2019 |
| Amplifier, 9KHz to 1GHz, 32dB           | SONOMA INSTRUMENT    | 310                    | 175953     | 12/13/2018 | 12/13/2019 |
| Antenna, Passive Loop 30Hz to 1MHz      | ELETRO METRICS       | EM-6871                | PRE0179466 | 05/31/2019 | 05/31/2020 |
| Antenna, Passive Loop 100KHz to 30MHz   | ELETRO METRICS       | EM-6872                | PRE0179468 | 05/31/2019 | 05/31/2020 |

| Test Software List |              |        |                       |
|--------------------|--------------|--------|-----------------------|
| Description        | Manufacturer | Model  | Version               |
| Radiated Software  | UL           | UL EMC | Ver 9.5, Dec 01, 2016 |

## 8. RADIATED TEST RESULTS

### 8.1. 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.

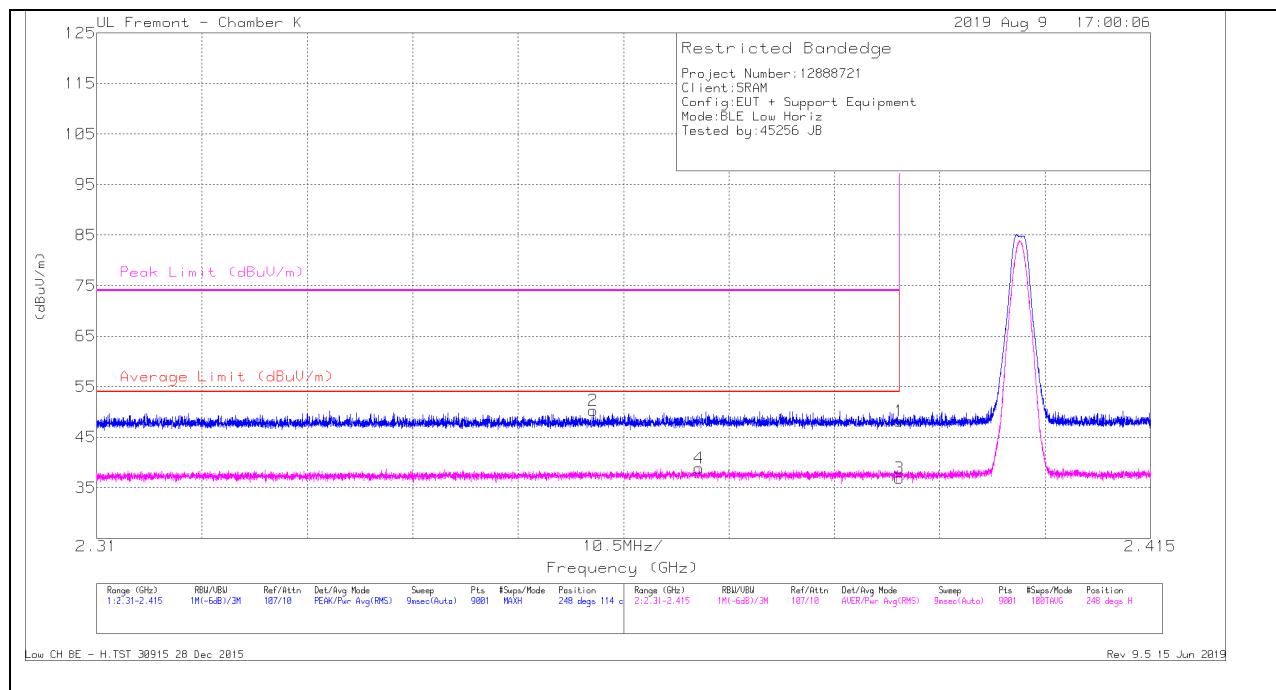
The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

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.

## 8.2. TRANSMITTER ABOVE 1 GHz

### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT



#### Trace Markers

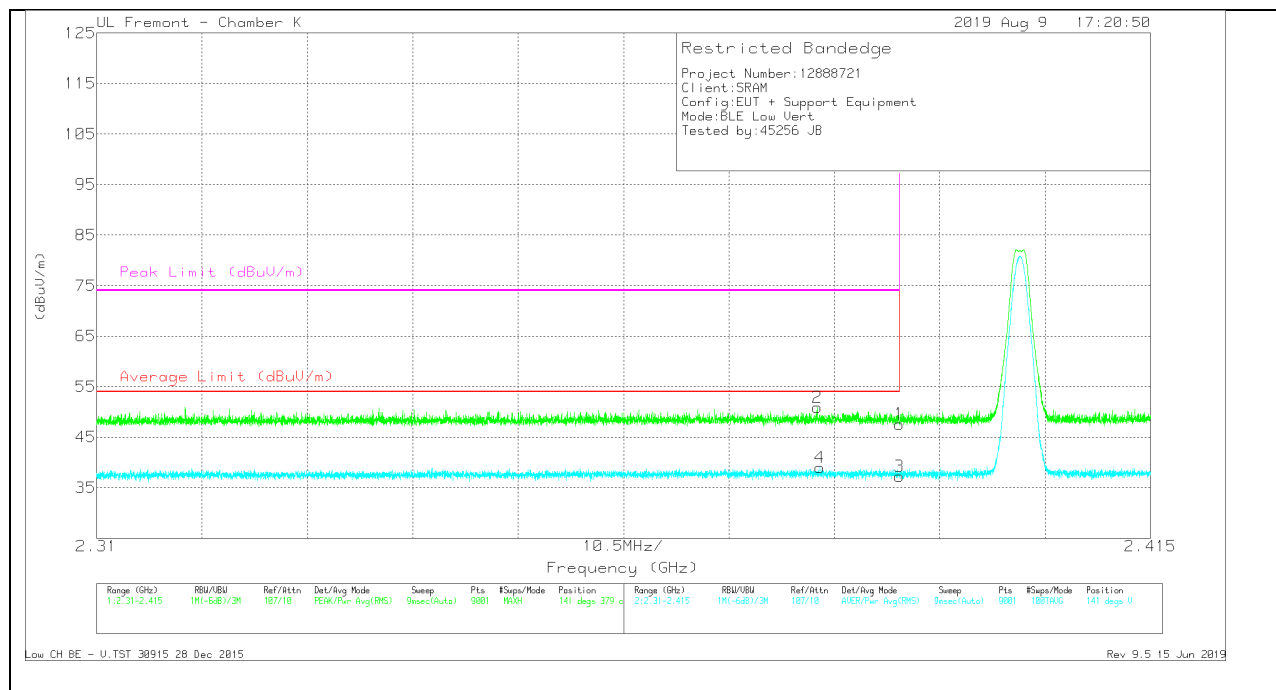
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T862 (dB/m) | Amp/Cb/Fitr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.38999       | 40.99                | Pk  | 31.9           | -24.7                | 0            | 48.19                      | -                      | -           | 74                  | -25.81         | 248            | 114         | H        |
| 2      | * 2.35947       | 43.04                | Pk  | 31.8           | -24.6                | 0            | 50.24                      | -                      | -           | 74                  | -23.76         | 248            | 114         | H        |
| 3      | * 2.38999       | 29.73                | RMS | 31.9           | -24.7                | 0            | 36.93                      | 54                     | -17.07      | -                   | -              | 248            | 114         | H        |
| 4      | * 2.37          | 31.55                | RMS | 31.9           | -24.6                | 0            | 38.85                      | 54                     | -15.15      | -                   | -              | 248            | 114         | 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 T862 (dB/m) | Amp/Ch/Flt/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Altitude (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|---------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|-----------------|-------------|----------|
| 1      | * 2.38999       | 40.42                | Pk  | 31.9           | -24.7               | 0            | 47.62                      | -                      | -           | 74                  | -26.38         | 141             | 379         | V        |
| 2      | * 2.38182       | 43.75                | Pk  | 31.9           | -24.7               | 0            | 50.95                      | -                      | -           | 74                  | -23.05         | 141             | 379         | V        |
| 3      | * 2.38999       | 30.11                | RMS | 31.9           | -24.7               | 0            | 37.31                      | 54                     | -16.69      | -                   | -              | 141             | 379         | V        |
| 4      | * 2.38206       | 31.75                | RMS | 31.9           | -24.7               | 0            | 38.95                      | 54                     | -15.05      | -                   | -              | 141             | 379         | V        |

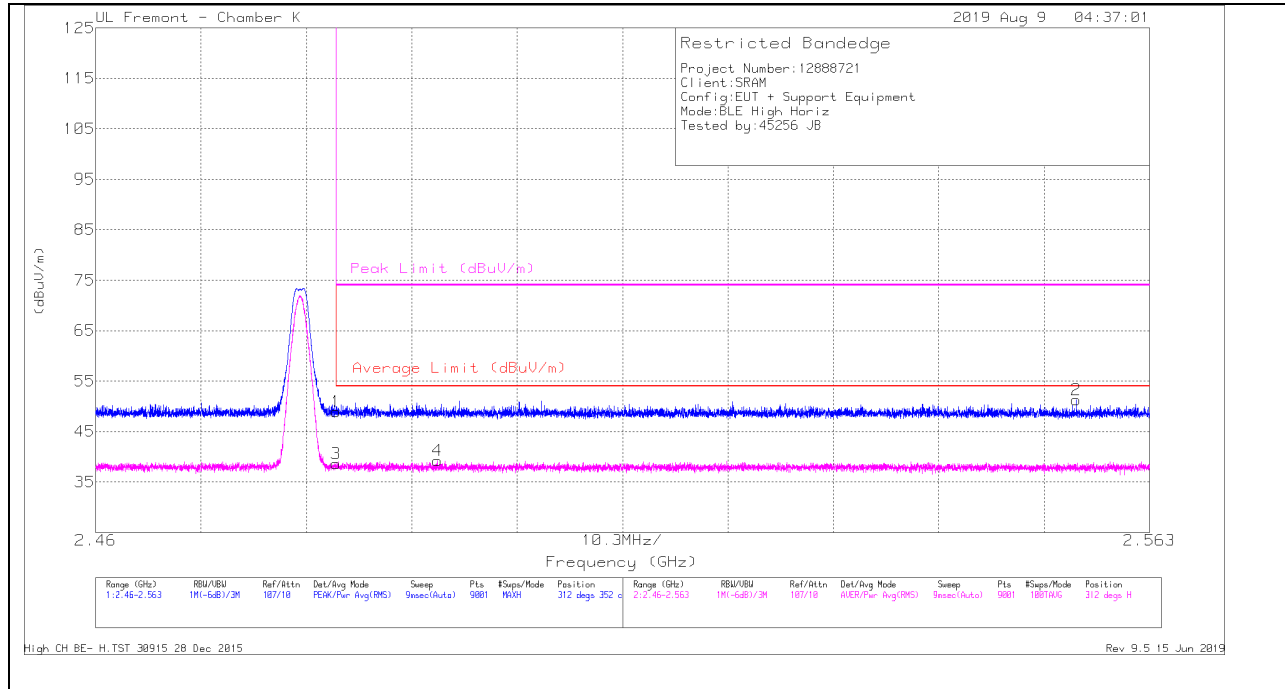
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

## BANDEDGE (HIGH CHANNEL)

### HORIZONTAL RESULT



### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AP T862 (dB/m) | Amp/Cb/Flt/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Altitude (Deg) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|---------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.48351       | 41.19                | Pk  | 32.5           | -24.8               | 0            | 48.89                      | -                      | -           | 74                  | -25.11         | 312            | 352         | H        |
| 2      | 2.55583         | 43.63                | Pk  | 32.4           | -24.8               | 0            | 51.23                      | -                      | -           | 74                  | -22.77         | 312            | 352         | H        |
| 3      | * 2.48351       | 30.9                 | RMS | 32.5           | -24.8               | 0            | 38.6                       | 54                     | -15.4       | -                   | -              | 312            | 352         | H        |
| 4      | * 2.49338       | 31.5                 | RMS | 32.5           | -24.8               | 0            | 39.2                       | 54                     | -14.8       | -                   | -              | 312            | 352         | H        |

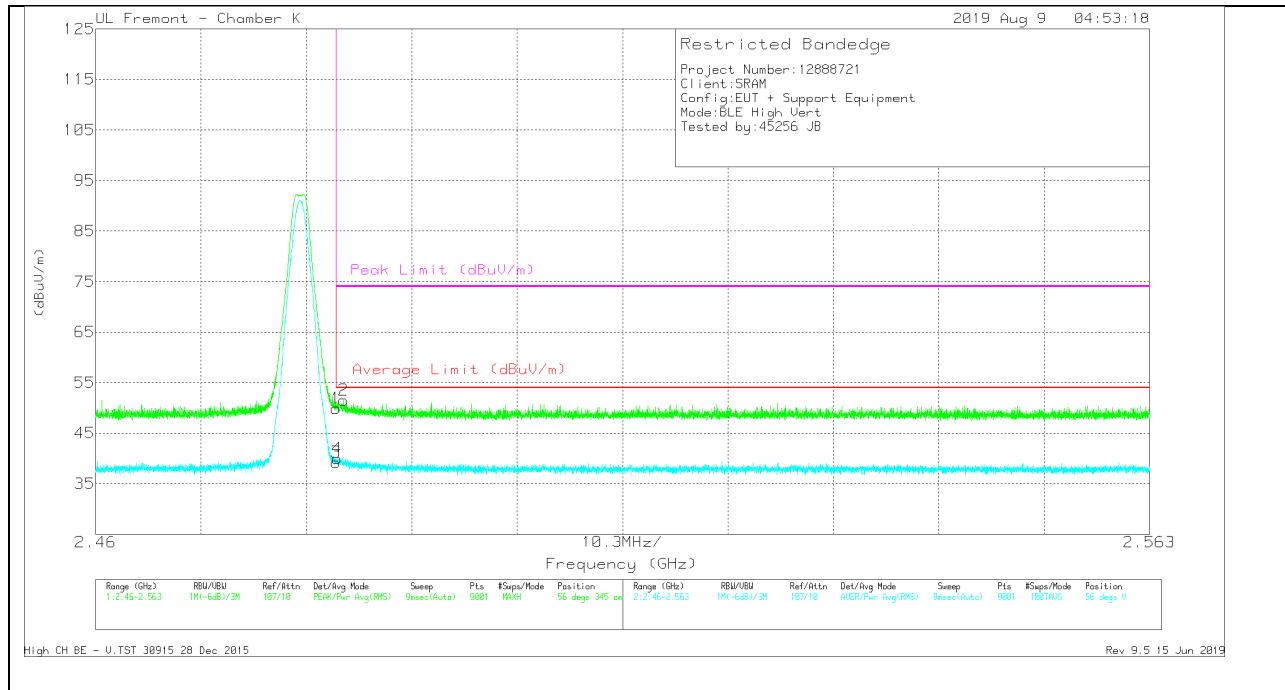
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection



## VERTICAL RESULT



## Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF T862 (dB/m) | Amp/Ch/Flt/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Altitude (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|---------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|-----------------|-------------|----------|
| 1      | * 2.48351       | 42.19                | Pk  | 32.5           | -24.8               | 0            | 49.89                      | -                      | -           | 74                  | -24.11         | 56              | 345         | V        |
| 2      | * 2.4842        | 43.82                | Pk  | 32.5           | -24.8               | 0            | 51.52                      | -                      | -           | 74                  | -22.48         | 56              | 345         | V        |
| 3      | * 2.48351       | 31.49                | RMS | 32.5           | -24.8               | 0            | 39.19                      | 54                     | -14.81      | -                   | -              | 56              | 345         | V        |
| 4      | * 2.4836        | 32.33                | RMS | 32.5           | -24.8               | 0            | 40.03                      | 54                     | -13.97      | -                   | -              | 56              | 345         | V        |

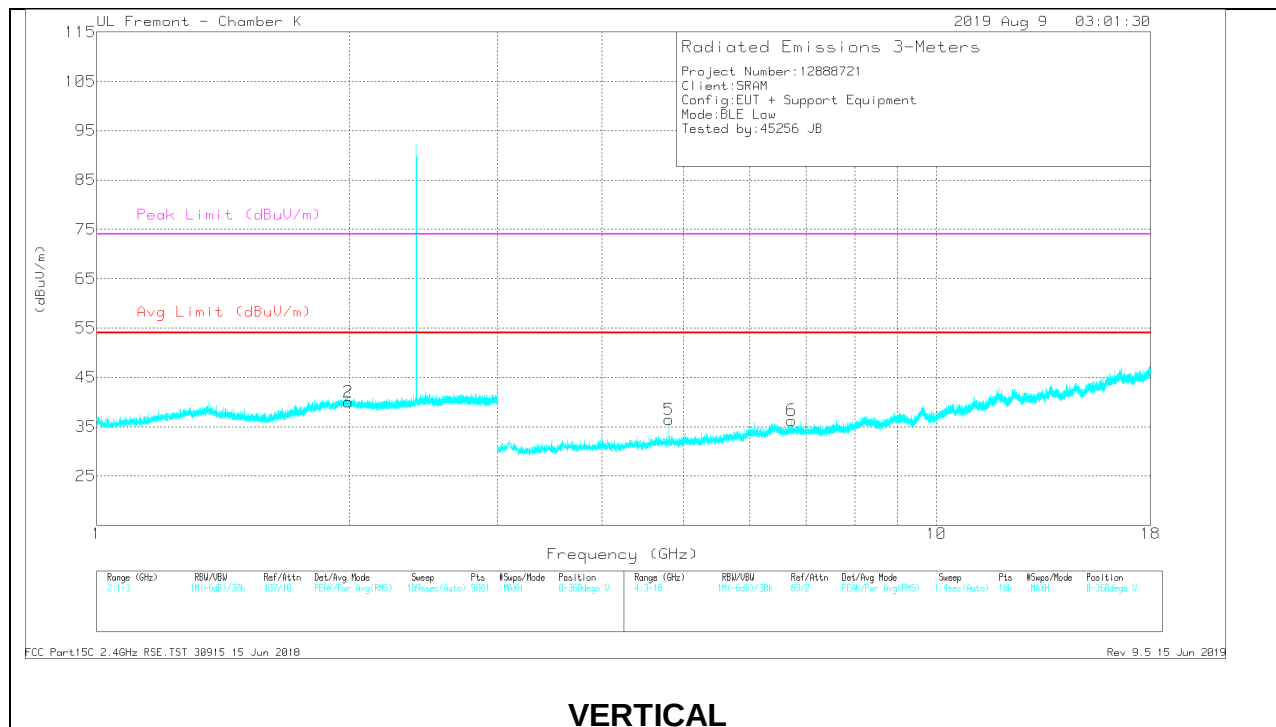
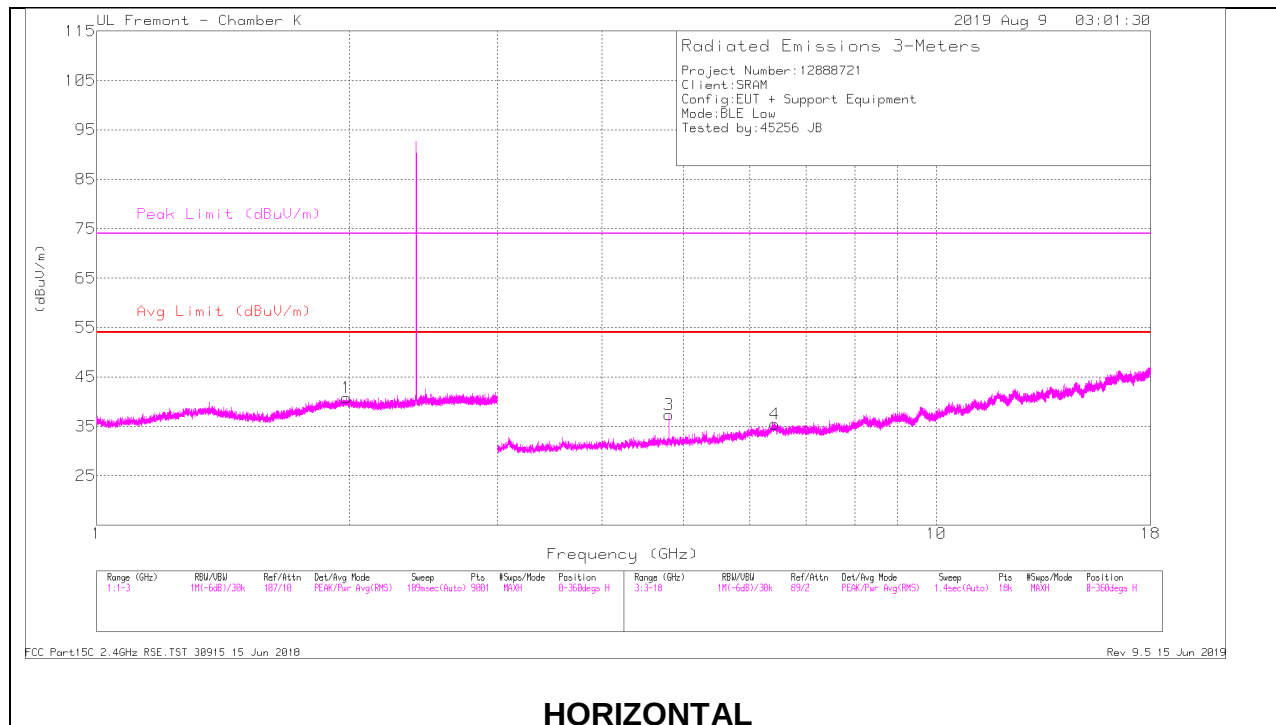
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL RESULTS



## RADIATED EMISSIONS

### Radiated Emissions

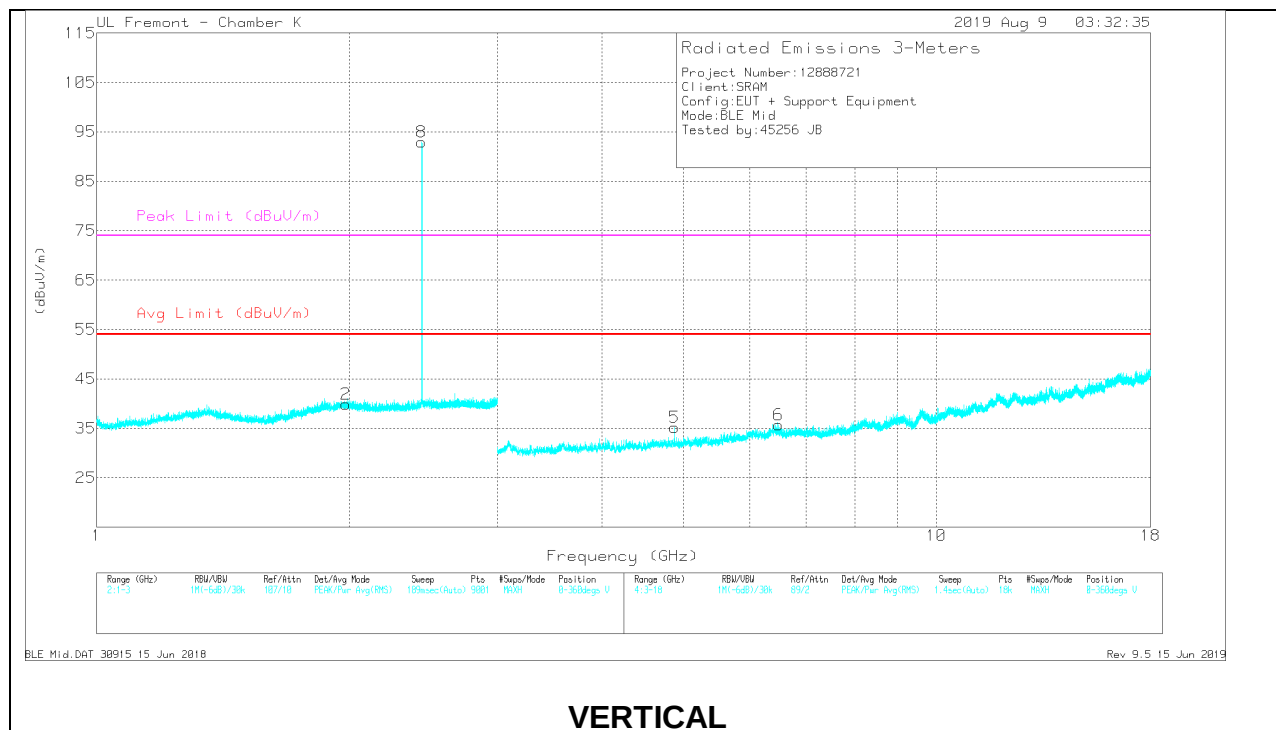
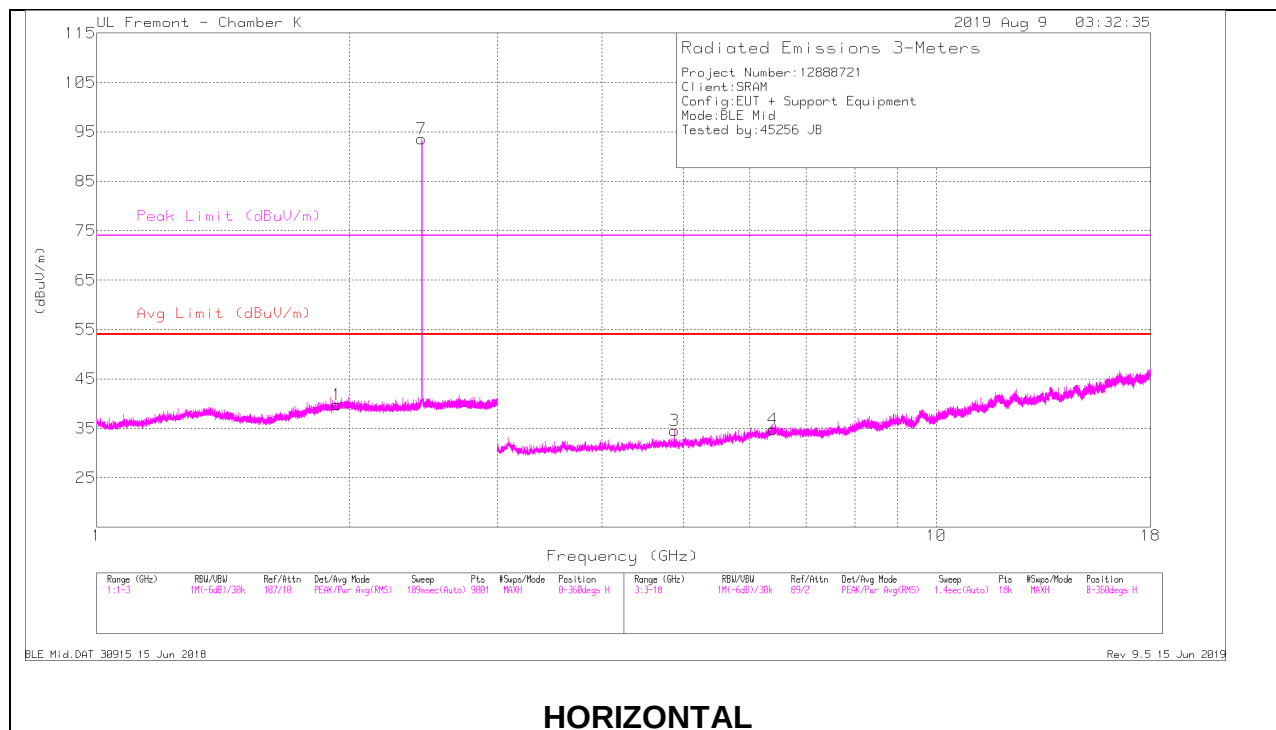
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF T862 (dB/m) | Amp/Cbl/Filtr/ Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|----------------|-------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | 1.98489         | 33.59                | Pk   | 31.6           | -24.4                   | 0            | 40.79                      | -                  | -           | -                   | -              | 0-360          | 200         | H        |
| 2      | 1.99444         | 32.92                | Pk   | 31.5           | -24.4                   | 0            | 40.02                      | -                  | -           | -                   | -              | 0-360          | 100         | V        |
| 3      | * 4.80341       | 39.19                | PK2  | 34.2           | -30.3                   | 0            | 43.09                      | -                  | -           | 74                  | -30.91         | 307            | 226         | H        |
|        | * 4.80394       | 31.42                | MAv1 | 34.2           | -30.3                   | 0            | 35.32                      | 54                 | -18.68      | -                   | -              | 307            | 226         | H        |
| 4      | 6.41853         | 26.2                 | Pk   | 35.7           | -26.4                   | 0            | 35.5                       | -                  | -           | -                   | -              | 0-360          | 100         | H        |
| 5      | * 4.80344       | 39.29                | PK2  | 34.2           | -30.3                   | 0            | 43.19                      | -                  | -           | 74                  | -30.81         | 352            | 226         | V        |
|        | * 4.80344       | 30.51                | MAv1 | 34.2           | -30.3                   | 0            | 34.41                      | 54                 | -19.59      | -                   | -              | 352            | 226         | V        |
| 6      | 6.72438         | 27.27                | Pk   | 35.8           | -26.8                   | 0            | 36.27                      | -                  | -           | -                   | -              | 0-360          | 100         | 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 RESULTS



## RADIATED EMISSIONS

### Radiated Emissions

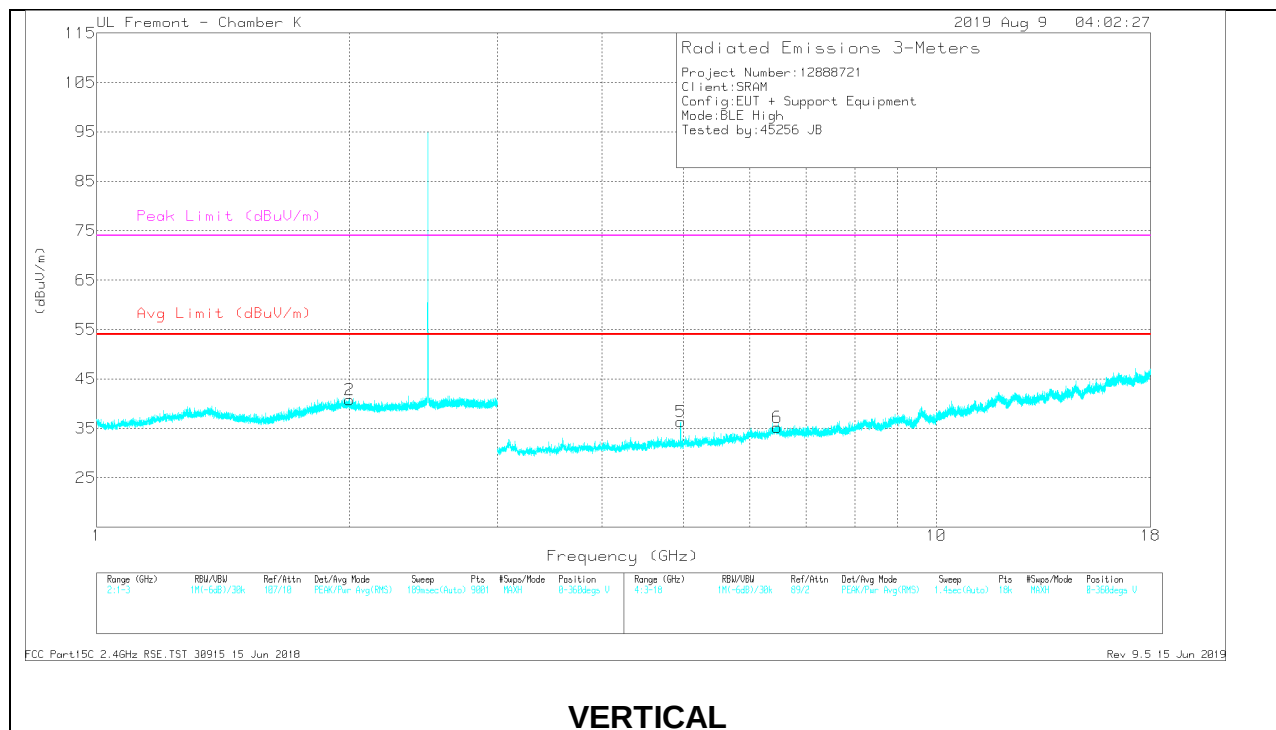
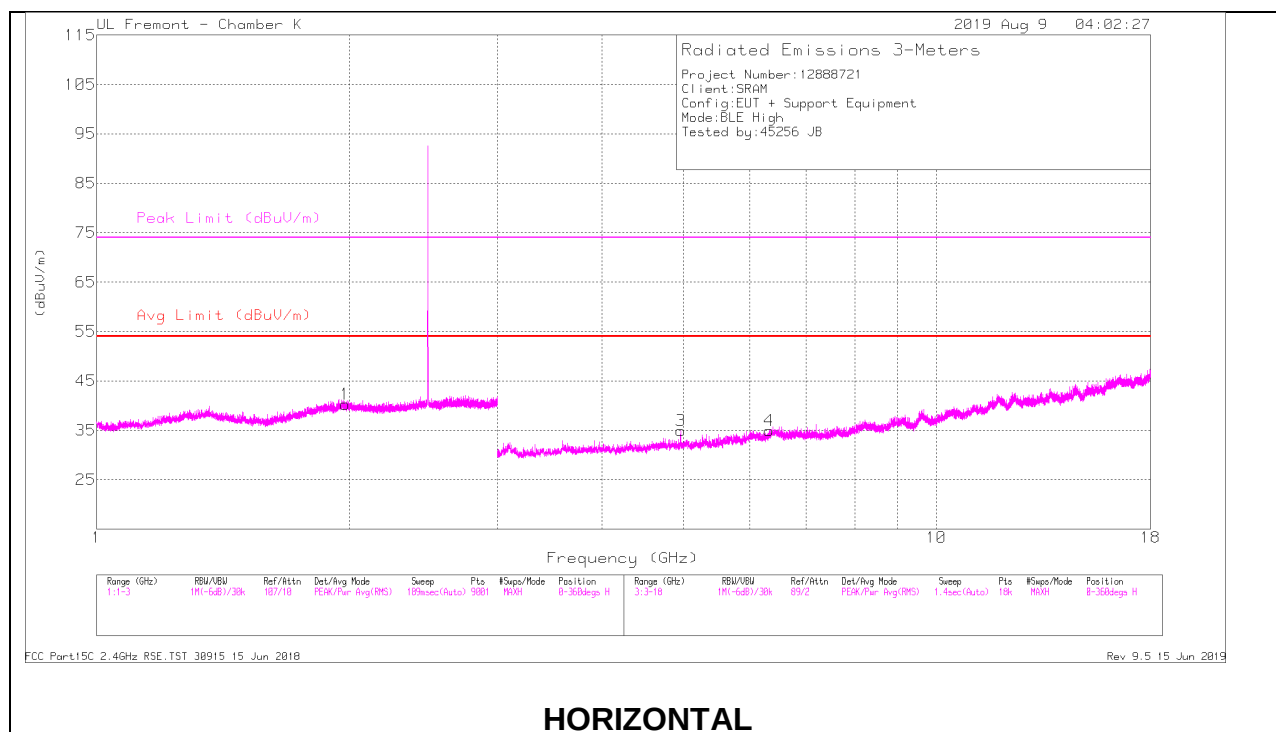
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF T862 (dB/m) | Amp/Cbl/Filtr/ Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|----------------|-------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | 1.93289         | 32.76                | Pk   | 31.1           | -24.1                   | 0            | 39.76                      | -                  | -           | -                   | -              | 0-360          | 100         | H        |
| 7      | 2.43967         | 85.44                | PK2  | 32.3           | -24.7                   | 0            | 93.04                      | -                  | -           | -                   | -              | 117            | 359         | H        |
|        | 2.43998         | 83.71                | MAv1 | 32.3           | -24.7                   | 0            | 91.31                      | -                  | -           | -                   | -              | 117            | 359         | H        |
| 2      | 1.97956         | 32.76                | Pk   | 31.5           | -24.4                   | 0            | 39.86                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |
| 8      | 2.43966         | 86.01                | PK2  | 32.3           | -24.7                   | 0            | 93.61                      | -                  | -           | -                   | -              | 59             | 216         | V        |
|        | 2.43997         | 84.35                | MAv1 | 32.3           | -24.7                   | 0            | 91.95                      | -                  | -           | -                   | -              | 59             | 216         | V        |
| 3      | * 4.87959       | 38.56                | PK2  | 34.1           | -30.5                   | 0            | 42.16                      | -                  | -           | 74                  | -31.84         | 290            | 239         | H        |
|        | * 4.88038       | 28.94                | MAv1 | 34.1           | -30.5                   | 0            | 32.54                      | 54                 | -21.46      | -                   | -              | 290            | 239         | H        |
| 4      | 6.38602         | 25.67                | Pk   | 35.8           | -26.7                   | 0            | 34.77                      | -                  | -           | -                   | -              | 0-360          | 200         | H        |
| 5      | * 4.87915       | 39.33                | PK2  | 34.1           | -30.5                   | 0            | 42.93                      | -                  | -           | 74                  | -31.07         | 95             | 211         | V        |
|        | * 4.88002       | 30.55                | MAv1 | 34.1           | -30.5                   | 0            | 34.15                      | 54                 | -19.85      | -                   | -              | 95             | 211         | V        |
| 6      | 6.49103         | 26.42                | Pk   | 35.7           | -26.4                   | 0            | 35.72                      | -                  | -           | -                   | -              | 0-360          | 100         | 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 RESULTS



## RADIATED EMISSIONS

### Radiated Emissions

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF T862 (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      | 1.97667         | 33.11                | Pk   | 31.6           | -24.4                   | 0            | 40.31                      | -                  | -           | -                   | -              | 0-360          | 200         | H        |
| 2      | 2.00044         | 33.67                | Pk   | 31.4           | -24.3                   | 0            | 40.77                      | -                  | -           | -                   | -              | 0-360          | 200         | V        |
| 3      | * 4.96011       | 31.39                | Pk   | 34.1           | -30.6                   | 0            | 34.89                      | -                  | -           | 74                  | -39.11         | 0-360          | 200         | H        |
| 4      | 6.32852         | 26.6                 | Pk   | 35.8           | -27.5                   | 0            | 34.9                       | -                  | -           | -                   | -              | 0-360          | 200         | H        |
| 5      | * 4.95958       | 39.65                | PK2  | 34.1           | -30.6                   | 0            | 43.15                      | -                  | -           | 74                  | -30.85         | 102            | 206         | V        |
|        | * 4.96028       | 31.57                | MAv1 | 34.1           | -30.6                   | 0            | 35.07                      | 54                 | -18.93      | -                   | -              | 102            | 206         | V        |
| 6      | 6.46769         | 25.87                | Pk   | 35.8           | -26.5                   | 0            | 35.17                      | -                  | -           | -                   | -              | 0-360          | 200         | V        |

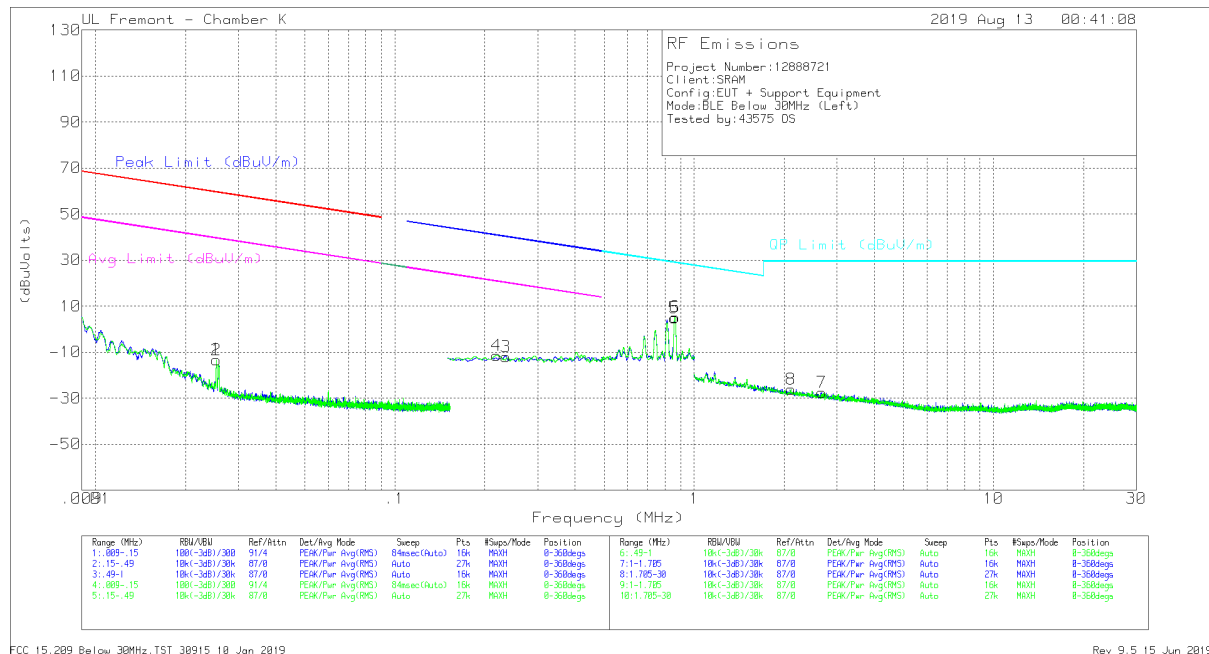
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### 8.3. Worst Case Below 30MHz

#### FACE ON AND FACE OFF PLOTS



NOTE: KDB 414788 OATS and Chamber Correlation Justification

- Based 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.
- OATs and chamber correlation testing had been performed and chamber measured test result is the worst case test result.



# **Below 30MHz DATA**

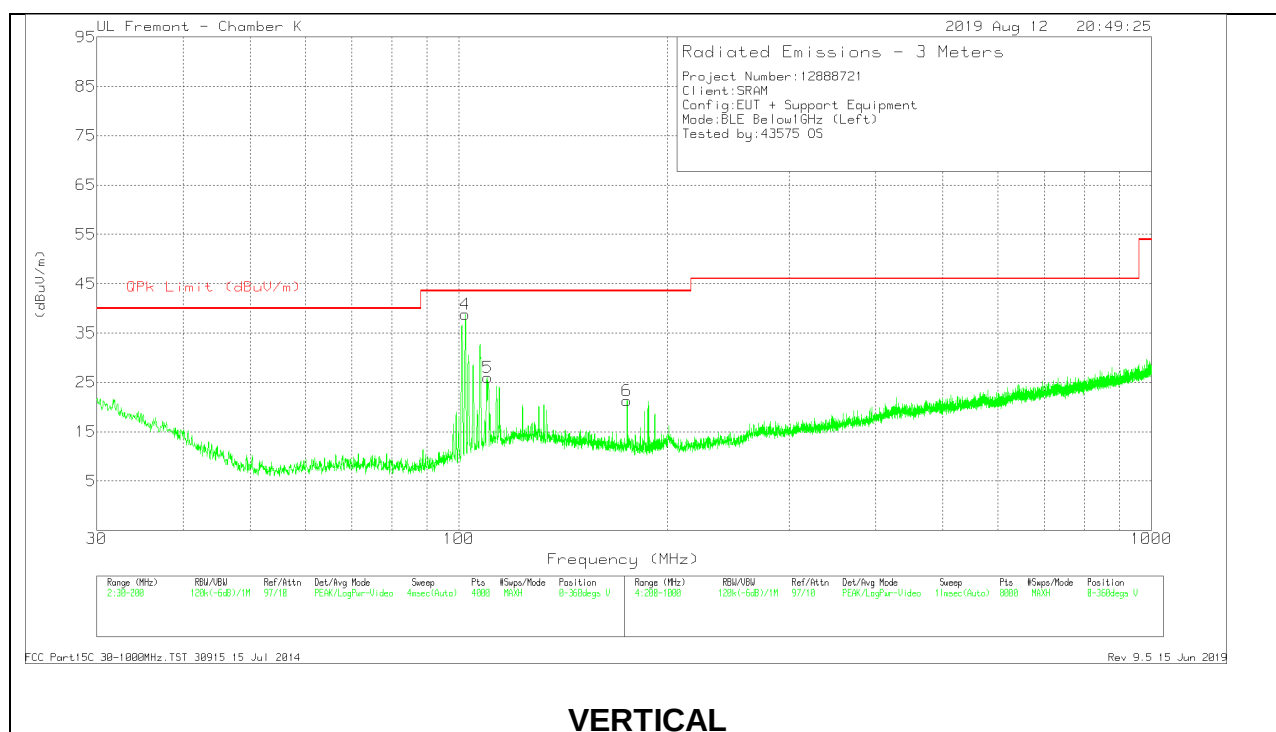
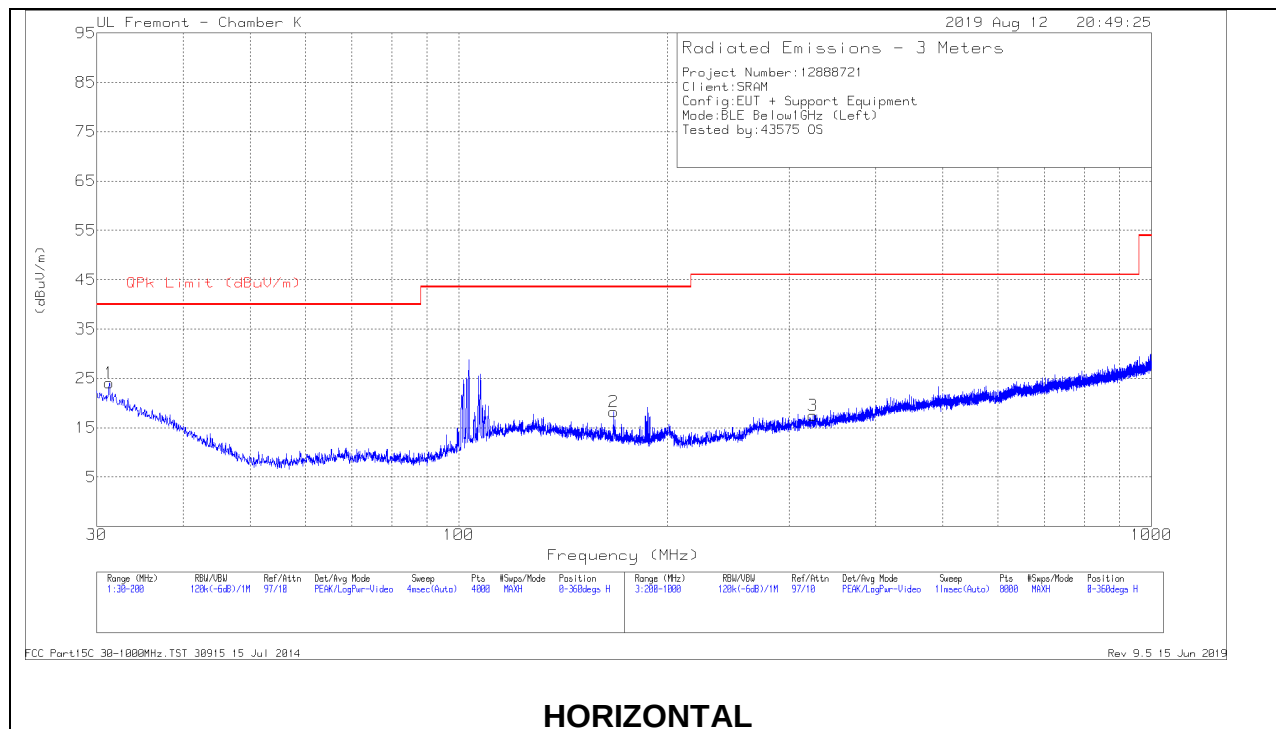
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Cbl (dB) | Dist Corr 300m | Corrected Reading (dBuVolts) | Peak Limit (dBuV/m) | Margin (dB) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Avg Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|----------|----------------|------------------------------|---------------------|-------------|--------------------|-------------|---------------------|-------------|--------------------|-------------|----------------|
| 1      | .02536          | .79                  | Pk  | 58.2                | -32.2    | -40            | -13.21                       | 59.5                | -72.71      | 39.5               | -52.71      | -                   | -           | -                  | -           | 0-360          |
| 3      | .2351           | 4.13                 | Pk  | 56.1                | -32.1    | -40            | -11.87                       | -                   | -           | -                  | -           | 40.19               | -52.06      | 20.19              | -32.06      | 0-360          |
| 2      | .02536          | .61                  | Pk  | 58.2                | -32.2    | -40            | -13.39                       | 59.5                | -72.89      | 39.5               | -52.89      | -                   | -           | -                  | -           | 0-360          |
| 4      | .21858          | 4.54                 | Pk  | 56.1                | -32.1    | -40            | -11.46                       | -                   | -           | -                  | -           | 40.82               | -52.28      | 20.82              | -32.28      | 0-360          |

## **Pk - Peak detector**

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Cbl (dB) | Dist Corr 30m | Corrected Reading (dBuVolts) | QP Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Avg Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|----------|---------------|------------------------------|-------------------|-------------|---------------------|-------------|--------------------|-------------|----------------|
| 5      | .86138          | 20.82                | Pk  | 56.1                | -32.1    | -40           | 4.82                         | 28.91             | -24.09      | -                   | -           | -                  | -           | 0-360          |
| 6      | .86208          | 21.3                 | Pk  | 56.1                | -32.1    | -40           | 5.3                          | 28.91             | -23.61      | -                   | -           | -                  | -           | 0-360          |
| 7      | 2.67021         | 4.88                 | Pk  | 39.7                | -32      | -40           | -27.42                       | 29.5              | -56.92      | -                   | -           | -                  | -           | 0-360          |
| 8      | 2.10534         | 4.69                 | Pk  | 41.3                | -32      | -40           | -26.01                       | 29.5              | -55.51      | -                   | -           | -                  | -           | 0-360          |

## **Pk - Peak detector**

## 8.4. Worst Case Below 1 GHz



### **Below 1GHz Data**

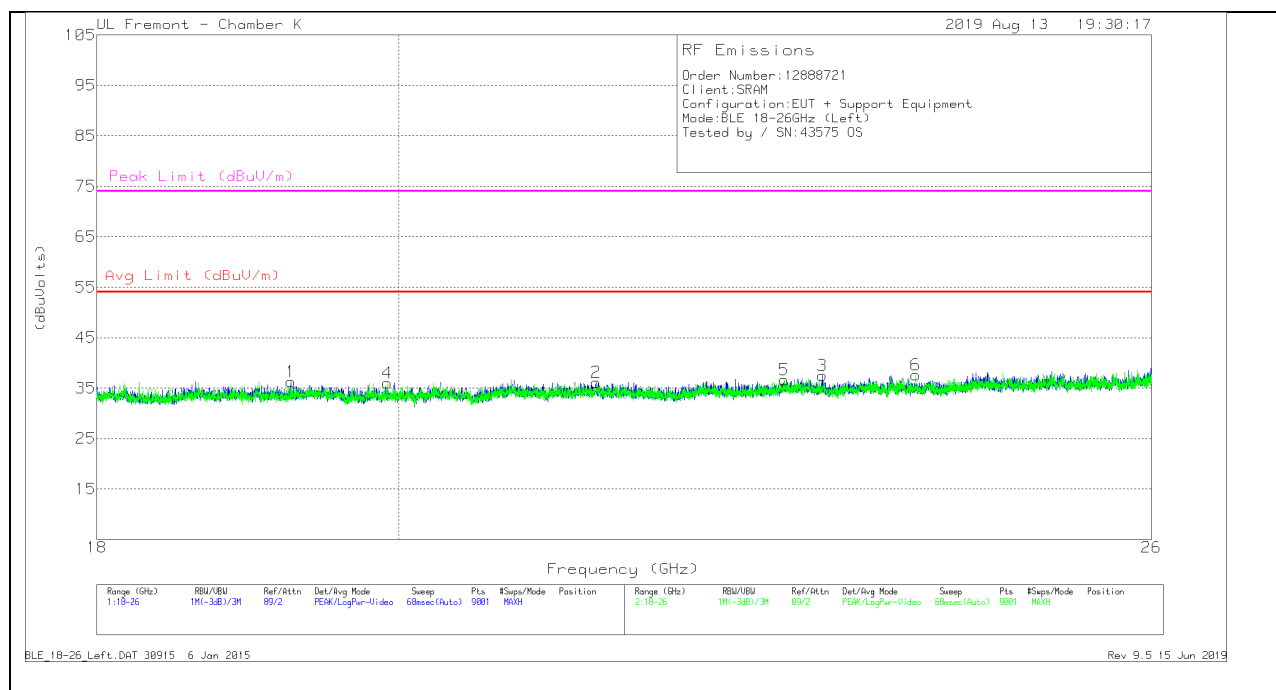
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AF T130 (dB/m) | Amp/Cbl (dB/m) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|----------------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 1      | 31.2753         | 29.72                | Pk  | 25.8           | -31.5          | 24.02                      | 40                 | -15.98      | 0-360          | 299         | H        |
| 2      | 167.2255        | 30.94                | Pk  | 17.8           | -30.5          | 18.24                      | 43.52              | -25.28      | 0-360          | 100         | H        |
| 4      | 102.0674        | 28.25                | Pk  | 16.7           | -30.9          | 14.05                      | 43.52              | -29.47      | 0              | 238         | V        |
|        | 102.0674        | 21.62                | Qp  | 16.7           | -30.9          | 7.42                       | 43.52              | -36.1       | 0              | 238         | V        |
| 5      | * 110.0907      | 38.33                | Pk  | 18.5           | -30.9          | 25.93                      | 43.52              | -17.59      | 0-360          | 100         | V        |
| 6      | 174.9625        | 34.44                | Pk  | 17.3           | -30.4          | 21.34                      | 43.52              | -22.18      | 0-360          | 100         | V        |
| 3      | * 324.8162      | 27.42                | Pk  | 19.9           | -29.9          | 17.42                      | 46.02              | -28.6       | 0-360          | 299         | H        |

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

Pk - Peak detector

Qp - Quasi-Peak detector

## 8.5. Worst Case 18-26 GHz



### 18 – 26GHz DATA

#### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | T449 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      | 19.25956        | 69.78                | Pk  | 33.3           | -57.3        | -9.5           | 36.28                        | 54                 | -17.72      | 74                  | -37.72         |
| 2      | 21.42578        | 68.88                | Pk  | 33.7           | -56.9        | -9.5           | 36.18                        | 54                 | -17.82      | 74                  | -37.82         |
| 3      | 23.17956        | 69.73                | Pk  | 34.4           | -57.1        | -9.5           | 37.53                        | 54                 | -16.47      | 74                  | -36.47         |
| 4      | 19.92           | 69.12                | Pk  | 33.5           | -57.1        | -9.5           | 36.02                        | 54                 | -17.98      | 74                  | -37.98         |
| 5      | 22.87556        | 69.25                | Pk  | 34.2           | -57.3        | -9.5           | 36.65                        | 54                 | -17.35      | 74                  | -37.35         |
| 6      | 23.94933        | 69.32                | Pk  | 34.6           | -56.8        | -9.5           | 37.62                        | 54                 | -16.38      | 74                  | -36.38         |

Pk - Peak detector