



# **CERTIFICATION TEST REPORT**

**Report Number. :** 12371351-E3V1

**Applicant :** SONY MOBILE COMMUNICATIONS, INC.  
4-12-3 HIGASHI-SHINAGAWA  
SHINAGAWA-KU, TOKYO, 140-0002, JAPAN

**FCC ID :** PY7-26828G

**EUT Description :** GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac & NFC

**Test Standard(s) :** FCC 47 CFR PART 15 SUBPART C

**Date Of Issue:**

July 06, 2018

**Prepared by:**

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NVLAP Lab code: 200065-0

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## REPORT REVISION HISTORY

| Rev. | Issue<br>Date | Revisions     | Revised By |
|------|---------------|---------------|------------|
| V1   | 7/6/2018      | Initial Issue |            |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SONY MOBILE COMMUNICATIONS, INC.  
4-12-3 HIGASHI-SHINAGAWA,  
SHINAGAWA-KU, TOKYO, 140-0002, JAPAN

**EUT DESCRIPTION:** GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac & NFC

**SERIAL NUMBER:** BH93004ED4, BH93008XD4 (Conducted),  
BH93008MD4, BH93008QD4 (Radiated)

**DATE TESTED:** June 21 – July 2, 2018

| APPLICABLE STANDARDS     |              |
|--------------------------|--------------|
| STANDARD                 | TEST RESULTS |
| CFR 47 Part 15 Subpart C | Compliant    |

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.

Approved & Released For  
UL Verification Services Inc. By:

Reviewed By:



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CONSUMER TECHNOLOGY DIVISION  
Operations Leader  
UL Verification Services Inc.



Kiya Kedida  
CONSUMER TECHNOLOGY DIVISION  
Project Engineer  
UL Verification Services Inc.

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, KDB 558074 D01 v4 and ANSI C63.10-2013.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and at 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 (ISED:2324B-1)            | <input type="checkbox"/> Chamber D (ISED:22541-1) | <input checked="" type="checkbox"/> Chamber K (ISED: 2324A-1) |
| <input checked="" type="checkbox"/> Chamber B (ISED:2324B-2) | <input type="checkbox"/> Chamber E (ISED:22541-2) | <input checked="" type="checkbox"/> Chamber L (ISED: 2324A-3) |
| <input type="checkbox"/> Chamber C (ISED:2324B-3)            | <input type="checkbox"/> Chamber F (ISED:22541-3) |                                                               |
|                                                              | <input type="checkbox"/> Chamber G (ISED:22541-4) |                                                               |
|                                                              | <input type="checkbox"/> Chamber H (ISED:22541-5) |                                                               |

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through C are covered under ISED company address code 2324B with site numbers 2324B -1 through 2324B-3, respectively. Chambers D through H are covered under ISED company address code 22541 with site numbers 22541 -1 through 22541-5, respectively.

ISED company address codes for chambers K through L are in process, and have yet to be determined.

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

## 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

Where relevant, the following sample calculation is provided:

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

### 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. EUT DESCRIPTION

The EUT is a GSM/WCDMA/LTE Phone with BT, DTS/UNII a/b/g/n/ac & NFC.

### 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) |
|-----------------------|-------------|--------------------|-------------------|
| 2402 - 2480           | BLE (1Mbps) | 5.88               | 3.87              |
| 2402 - 2480           | BLE (2Mbps) | 6.19               | 4.16              |

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a loop antenna for chain 0 with maximum gain of -1.5dBi.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was s\_atp\_0\_00436\_A\_12\_16

The test utility software used during testing was Tera Term Ver 4.79

### 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 |
| Laptop                 | Lenovo       | 20B7S0A200  | PC015REW      | N/A    |
| Desktop                | Lenovo       | ThinkCentre | MJ00QA59      | N/A    |
| AC Adapter             | SONY         | UCH20       | 3416W45305784 | N/A    |
| DC Power Supply        | Ametek       | XT 15-4     | T463          | N/A    |

### I/O CABLES (CONDUCTED TEST)

| I/O Cable List |         |                      |                |            |                  |                      |
|----------------|---------|----------------------|----------------|------------|------------------|----------------------|
| Cable No       | Port    | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks              |
| 1              | Antenna | 1                    | RF             | Shielded   | 0.2              | To spectrum Analyzer |
| 2              | USB     | 1                    | USB Type C     | Shielded   | 1                | N/A                  |
| 3              | DC      | 1                    | DC             | Shielded   | 0.3              | N/A                  |

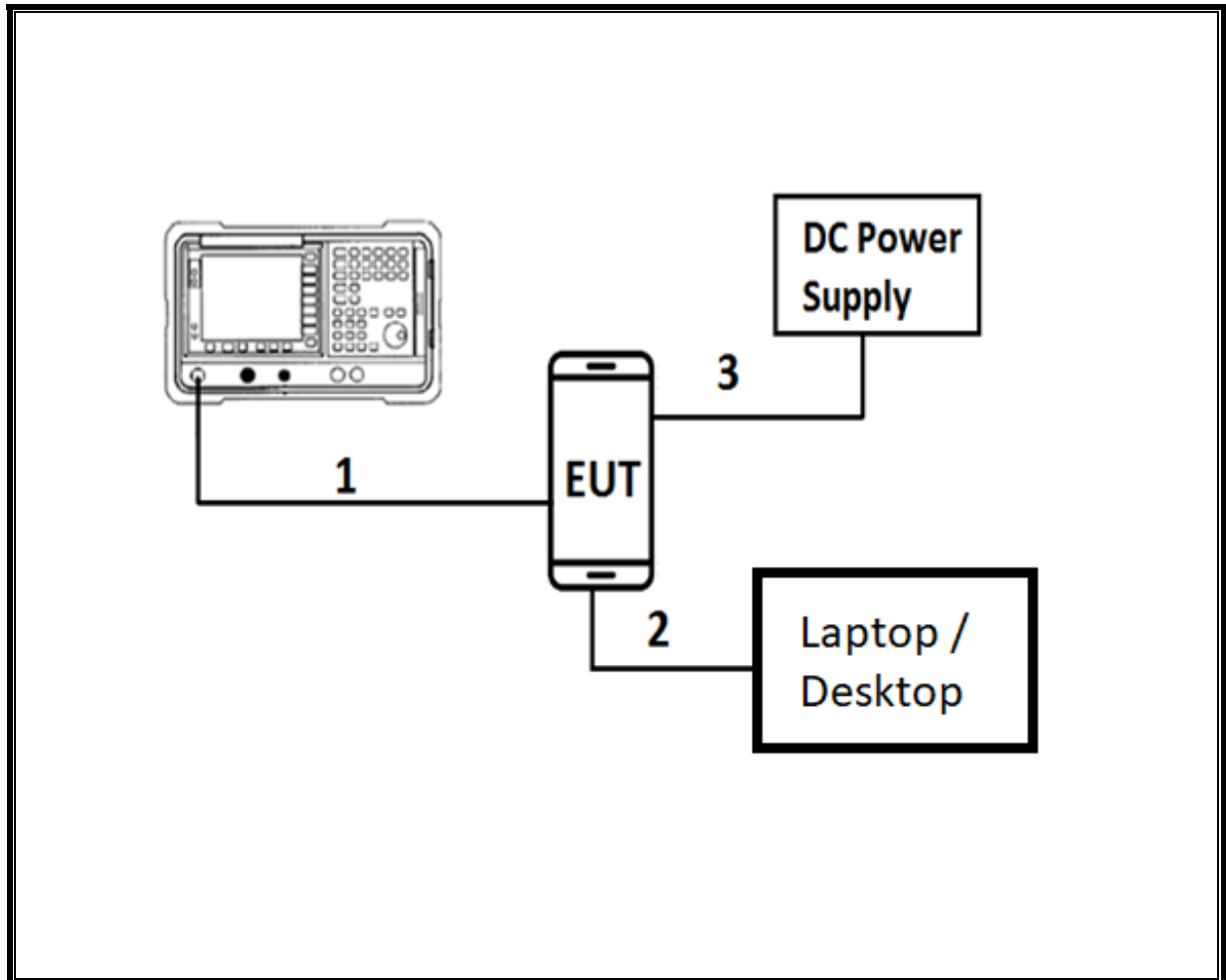
### I/O CABLES (RADIATED AND CONDUCTED EMISSIONS)

| I/O Cable List |      |                      |                |            |                  |         |
|----------------|------|----------------------|----------------|------------|------------------|---------|
| Cable No       | Port | # of identical ports | Connector Type | Cable Type | Cable Length (m) | Remarks |
| 1              | USB  | 1                    | USB Type C     | Shielded   | 3                | N/A     |

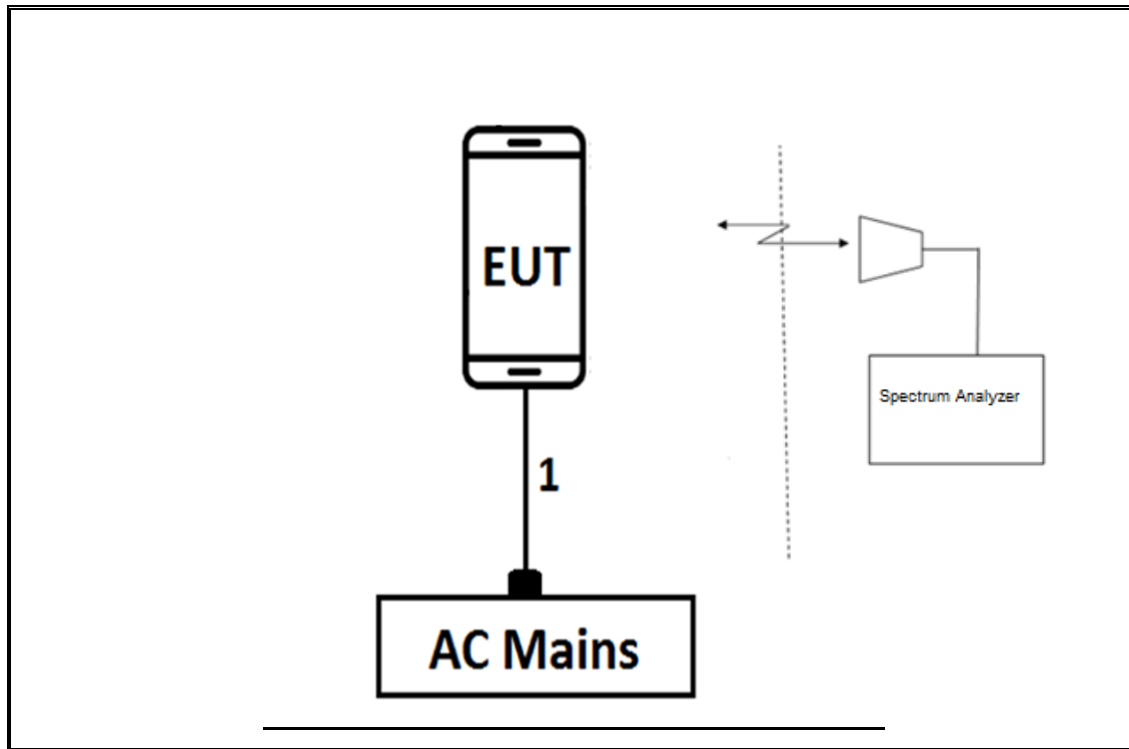
### TEST SETUP

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

**CONDCUTED TEST SETUP DIAGRAM**



**RADIATED AND AC LINE CONDUCTED EMISSIONS SETUP DIAGRAM**



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## 6. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 558074 D01 v04, Section 6.

6 dB BW: KDB 558074 D01 v04, Section 8.1.

Output Power: KDB 558074 D01 v04, Section 9.1.3.

Power Spectral Density: KDB 558074 D01 v04, Section 10.2.

Out-of-band emissions in non-restricted bands: KDB 558074 D01 v04, Section 11.0.

Out-of-band emissions in restricted bands: KDB 558074 D01 v04, Section 12.1.

Band-edge: KDB 558074 D01 v04, Section 12.1.

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

## 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                  | ID Num     | Cal Due    |
| Amplifier                                             | Hewlet Packard                  | 8447D                  | T64        | 06/25/2019 |
| Amplifier, 9KHz to 1GHz, 32dB                         | Sonoma Instrument               | 310                    | PRE0180089 | 06/21/2019 |
| Antenna, Broadband Hybrid, 30MHz to 2000MHz           | Sunol Sciences Corp.            | JB3                    | T407       | 05/10/2019 |
| Antenna, Broadband Hybrid, 30MHz to 2000MHz w/4dB Pad | Sunol Sciences Corp.            | JB3                    | T477       | 07/07/2018 |
| Antenna, Horn 1-18GHz                                 | ETS-Lindgren                    | 3117                   | T344       | 04/30/2019 |
| Antenna, Horn 1-18GHz                                 | ETS-Lindgren                    | 3117                   | T4294      | 04/30/2019 |
| Amplifier, 1 to 18GHz, 35dB                           | AMPLICAL                        | AMP1G18-35             | T1569      | 06/03/2019 |
| RF Amplifier                                          | MITEQ                           | AFS42-00101800-25-S-42 | T1568      | 06/21/2019 |
| Amplifier, 1 to 7.0GHz, 20.0dB Gain minimum, 6dB NF   | AMPLICAL                        | AMP1G7-20-27           | T1563      | 06/03/2019 |
| Amplifier 1-8GHz 30dB gain                            | L3 Narda                        | AMF-4D-01000800-30-29P | 167495     | 06/22/2019 |
| EMI TEST RECEIVER                                     | Rohde & Schwarz                 | ESW44                  | PRE0179522 | 05/11/2019 |
| EMI TEST RECEIVER                                     | Rohde & Schwarz                 | ESW44                  | PRE0179367 | 04/25/2019 |
| Spectrum Analyzer, PXA, 3Hz to 44GHz                  | Agilent (Keysight) Technologies | N9030A                 | T1113      | 12/21/2018 |
| Spectrum Analyzer, PSA, 3Hz to 44GHz                  | Agilent (Keysight) Technologies | N9030A                 | T146       | 07/18/2018 |
| Spectrum Analyzer, PSA, 3Hz to 44GHz                  | Agilent (Keysight) Technologies | N9030A                 | T1454      | 01/08/2019 |
| Power Meter, P-series single channel                  | Agilent (Keysight) Technologies | N1911A                 | T1271      | 07/17/2018 |
| Power Sensor, P-series, 50MHz to 18GHz, Wideband      | Agilent (Keysight) Technologies | N1921A                 | T1225      | 04/10/2019 |
| Filter, HPF 3.0GHz                                    | MICRO-TRONICS                   | HPM17543               | T1013      | 06/21/2019 |
| Filter, HPF 3.0GHz                                    | MICRO-TRONICS                   | HPM17543               | T894       | 06/03/2019 |
| Antenna, Active Loop 9kHz-30MHz                       | Com-Power Corp.                 | AL-130R                | T1866      | 10/10/2018 |
| 18 - 26.5 GHz Horn Antenna                            | Seavey Division                 | MWH-1826/B             | T89        | 01/18/2019 |
| Pre-Amp 1-26.5 GHz                                    | Agilent                         | 8449B                  | T404       | 03/09/2019 |
| EMI Reciever                                          | Rohde & Schwarz                 | ESR                    | T1436      | 02/21/2019 |
| L.I.S.N.                                              | FCC INC.                        | FCC LISN 50/250        | T1310      | 06/15/2019 |
| L.I.S.N.                                              | FCC INC.                        | FCC LISN 50/250        | T24        | 03/06/2019 |
| Thermometer - Digital                                 | Control Company                 | 14-650-118             | PRE0177862 | 02/22/2019 |

| UL AUTOMATION SOFTWARE |    |        |                        |
|------------------------|----|--------|------------------------|
| Radiated Software      | UL | UL EMC | Ver 9.5, June 22, 2018 |
| Antenna Port Software  | UL | UL EMC | Ver 8.4, June 12, 2018 |

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

#### LIMITS

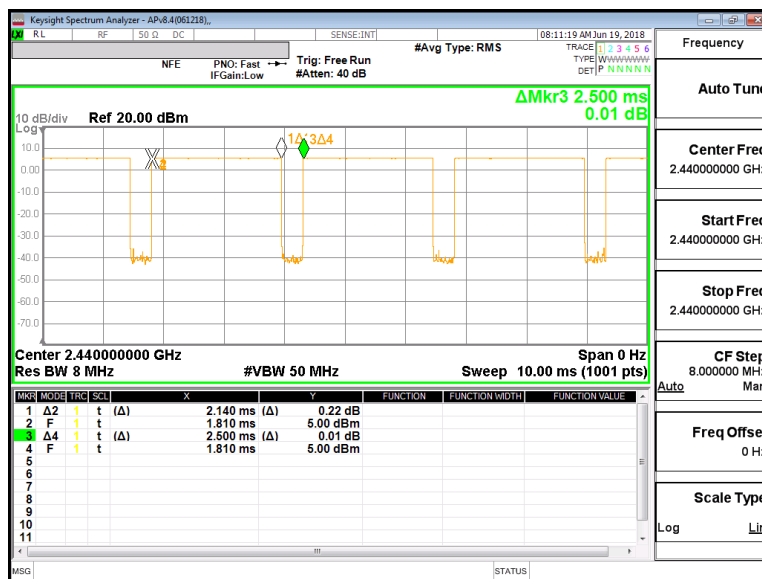
None; for reporting purposes only.

#### PROCEDURE

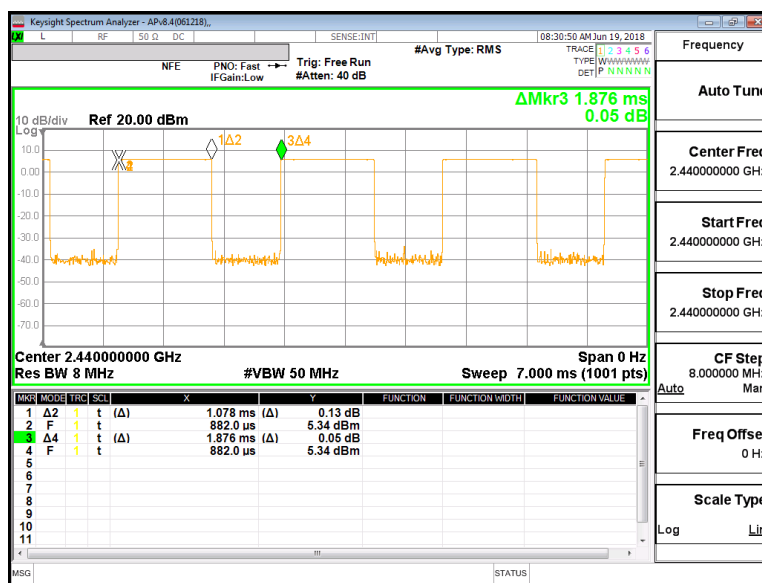
#### ON TIME AND DUTY CYCLE RESULTS

| Mode               | ON Time<br>B<br>(msec) | Period<br>(msec) | Duty Cycle<br>x<br>(linear) | Duty<br>Cycle<br>(%) | Duty Cycle<br>Correction Factor<br>(dB) | 1/B<br>Minimum VBW<br>(kHz) |
|--------------------|------------------------|------------------|-----------------------------|----------------------|-----------------------------------------|-----------------------------|
| <b>2.4GHz Band</b> |                        |                  |                             |                      |                                         |                             |
| BLE (1Mbps)        | 2.140                  | 2.500            | 0.856                       | 85.60%               | 0.68                                    | 0.467                       |
| BLE (2Mbps)        | 1.078                  | 1.876            | 0.575                       | 57.46%               | 2.41                                    | 0.928                       |

# DUTY CYCLE PLOTS



BLE (1Mbps)



BLE (2Mbps)

## 8.2. 99% BANDWIDTH

### LIMITS

None; for reporting purposes only.

### RESULTS

#### 8.2.1. BLE (1Mbps)

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low     | 2402            | 1.0331              |
| Middle  | 2440            | 1.0390              |
| High    | 2480            | 1.0403              |



## 8.2.2. BLE (2Mbps)

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low     | 2402            | 2.0620              |
| Middle  | 2440            | 2.0619              |
| High    | 2480            | 2.0596              |



### 8.3. 6 dB BANDWIDTH

#### LIMITS

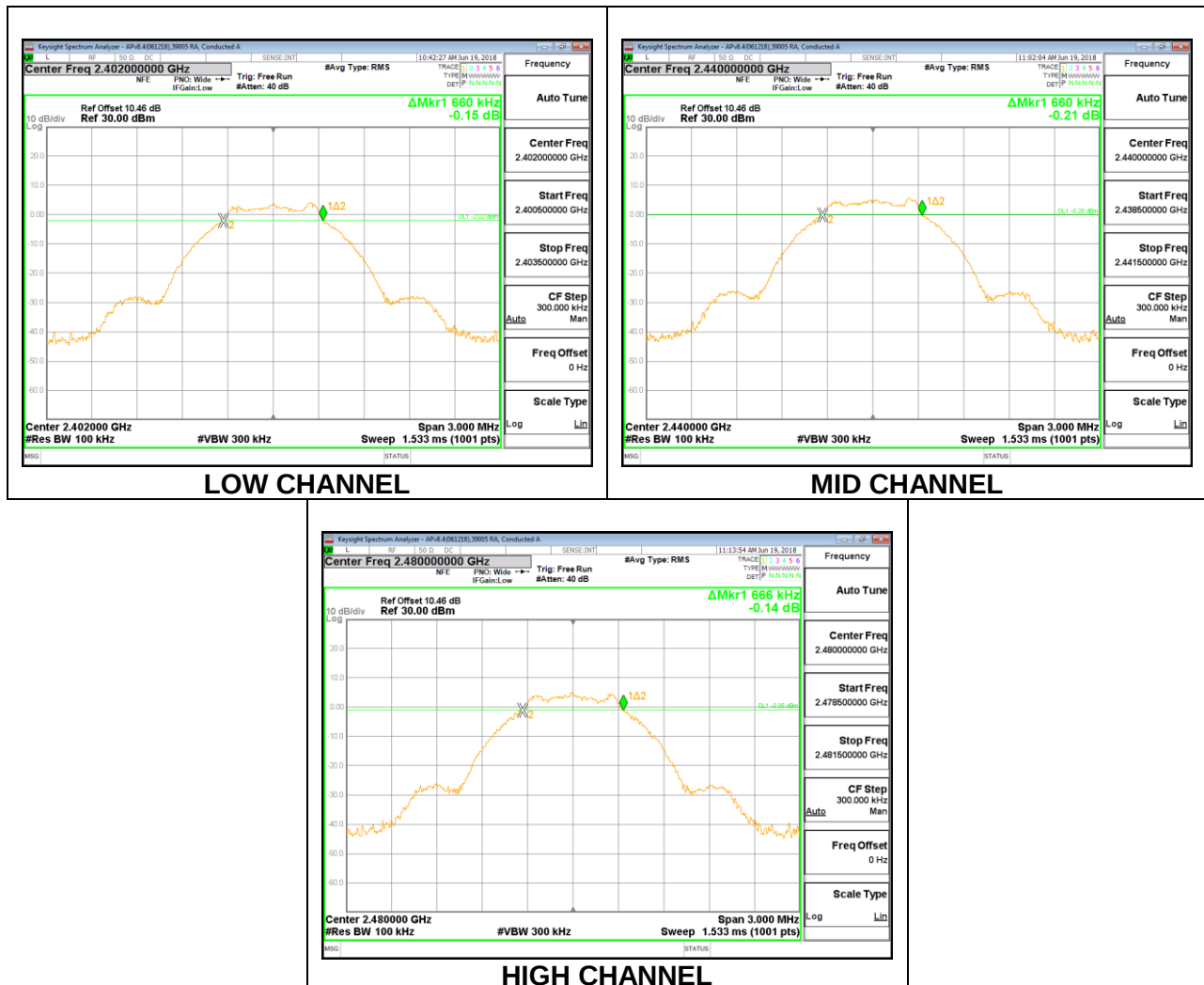
FCC §15.407 (e)

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

#### RESULTS

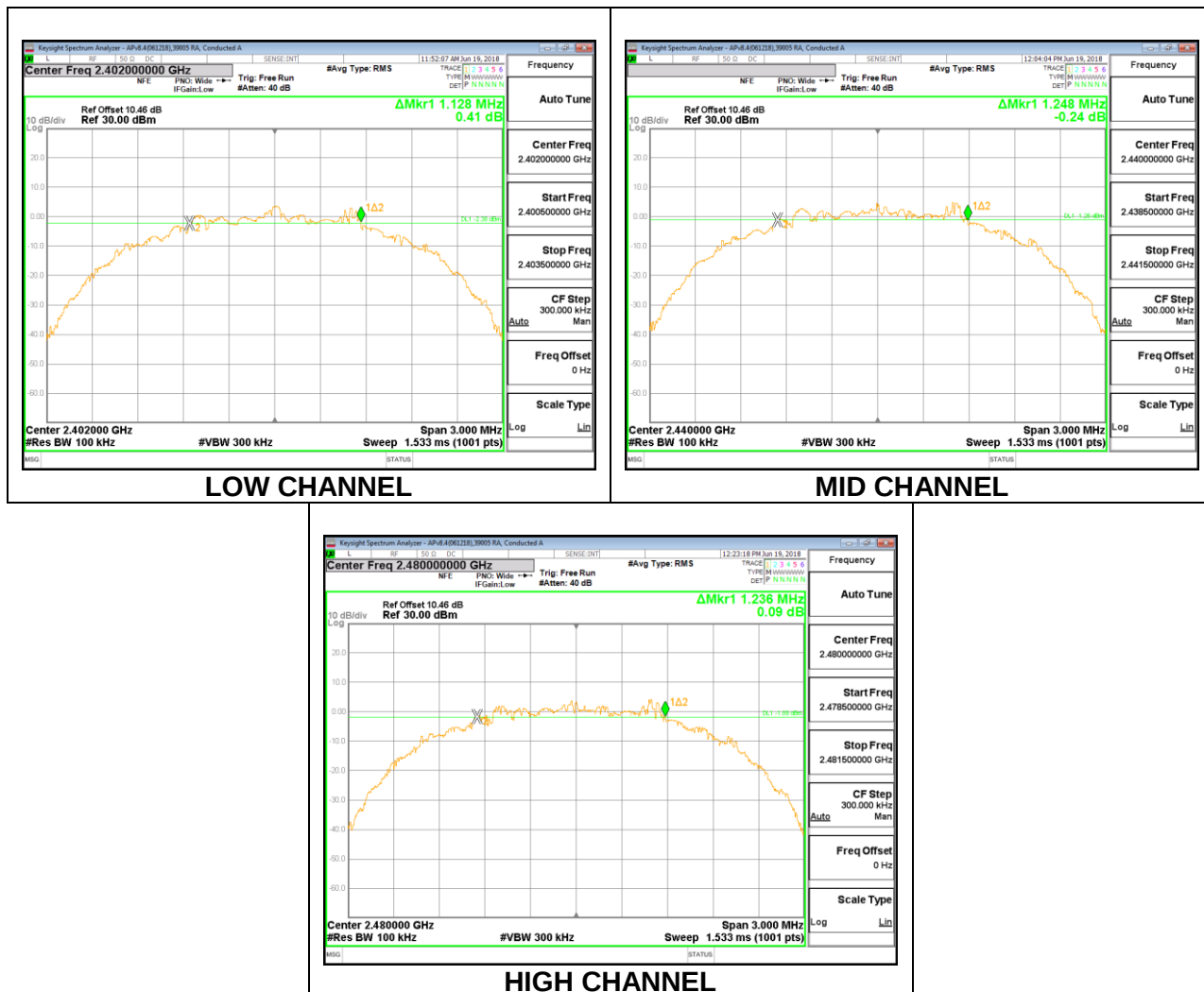
##### 8.3.1. BLE (1Mbps)

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low     | 2402            | 0.660                | 0.5                 |
| Middle  | 2440            | 0.660                | 0.5                 |
| High    | 2480            | <b>0.666</b>         | 0.5                 |



### 8.3.2. BLE (2Mbps)

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low     | 2402            | 1.128                | 0.5                 |
| Middle  | 2440            | <b>1.248</b>         | 0.5                 |
| High    | 2480            | 1.236                | 0.5                 |



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## **8.4. OUTPUT POWER**

### **LIMITS**

FCC §15.247 (b) (3)

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**

#### 8.4.1. BLE (1Mbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 39005 RA  |
| <b>Date:</b>      | 6/18/2018 |

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Peak Power<br/>Reading<br/>(dBm)</b> | <b>Limit<br/>(dBm)</b> | <b>Margin<br/>(dB)</b> |
|----------------|----------------------------|-----------------------------------------|------------------------|------------------------|
| Low            | 2402                       | 3.90                                    | 30                     | -26.100                |
| Middle         | 2440                       | <b>5.88</b>                             | 30                     | -24.120                |
| High           | 2480                       | 5.40                                    | 30                     | -24.600                |

#### 8.4.2. BLE (2Mbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 39005 RA  |
| <b>Date:</b>      | 6/18/2018 |

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>Peak Power<br/>Reading<br/>(dBm)</b> | <b>Limit<br/>(dBm)</b> | <b>Margin<br/>(dB)</b> |
|----------------|----------------------------|-----------------------------------------|------------------------|------------------------|
| Low            | 2402                       | 4.20                                    | 30                     | -25.800                |
| Middle         | 2440                       | <b>6.19</b>                             | 30                     | -23.810                |
| High           | 2480                       | 5.74                                    | 30                     | -24.260                |

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## **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**

### 8.5.1. BLE (1Mbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 39005 RA  |
| <b>Date:</b>      | 6/18/2018 |

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>AV power<br/>(dBm)</b> |
|----------------|----------------------------|---------------------------|
| Low            | 2402                       | 3.69                      |
| Middle         | 2440                       | <b>5.67</b>               |
| High           | 2480                       | 5.19                      |

### 8.5.2. BLE (2Mbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 39005 RA  |
| <b>Date:</b>      | 6/18/2018 |

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>AV power<br/>(dBm)</b> |
|----------------|----------------------------|---------------------------|
| Low            | 2402                       | 3.68                      |
| Middle         | 2440                       | <b>5.71</b>               |
| High           | 2480                       | 5.21                      |

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## **8.6. POWER SPECTRAL DENSITY**

### **LIMITS**

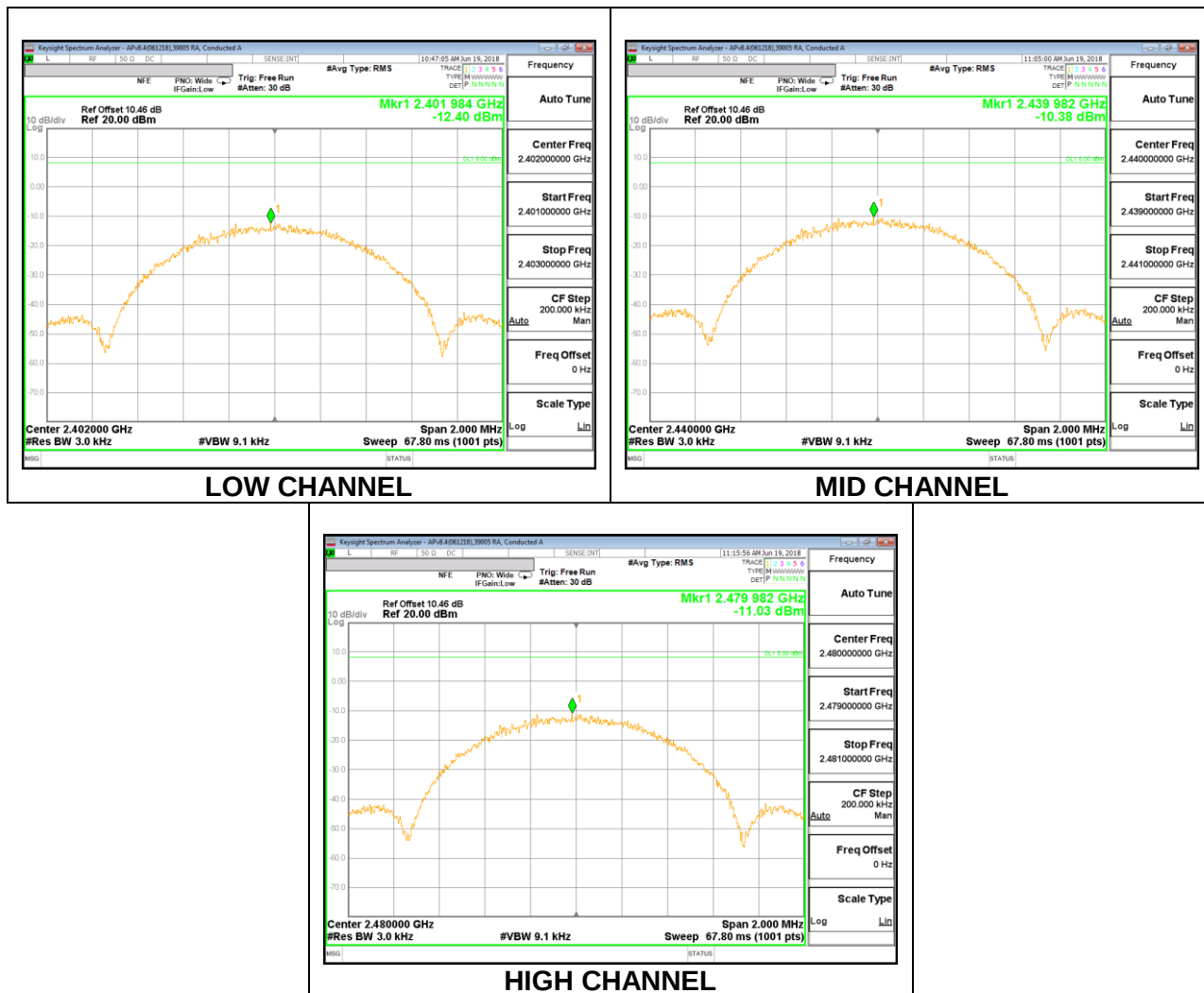
FCC §15.247 (e)

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

### **RESULTS**

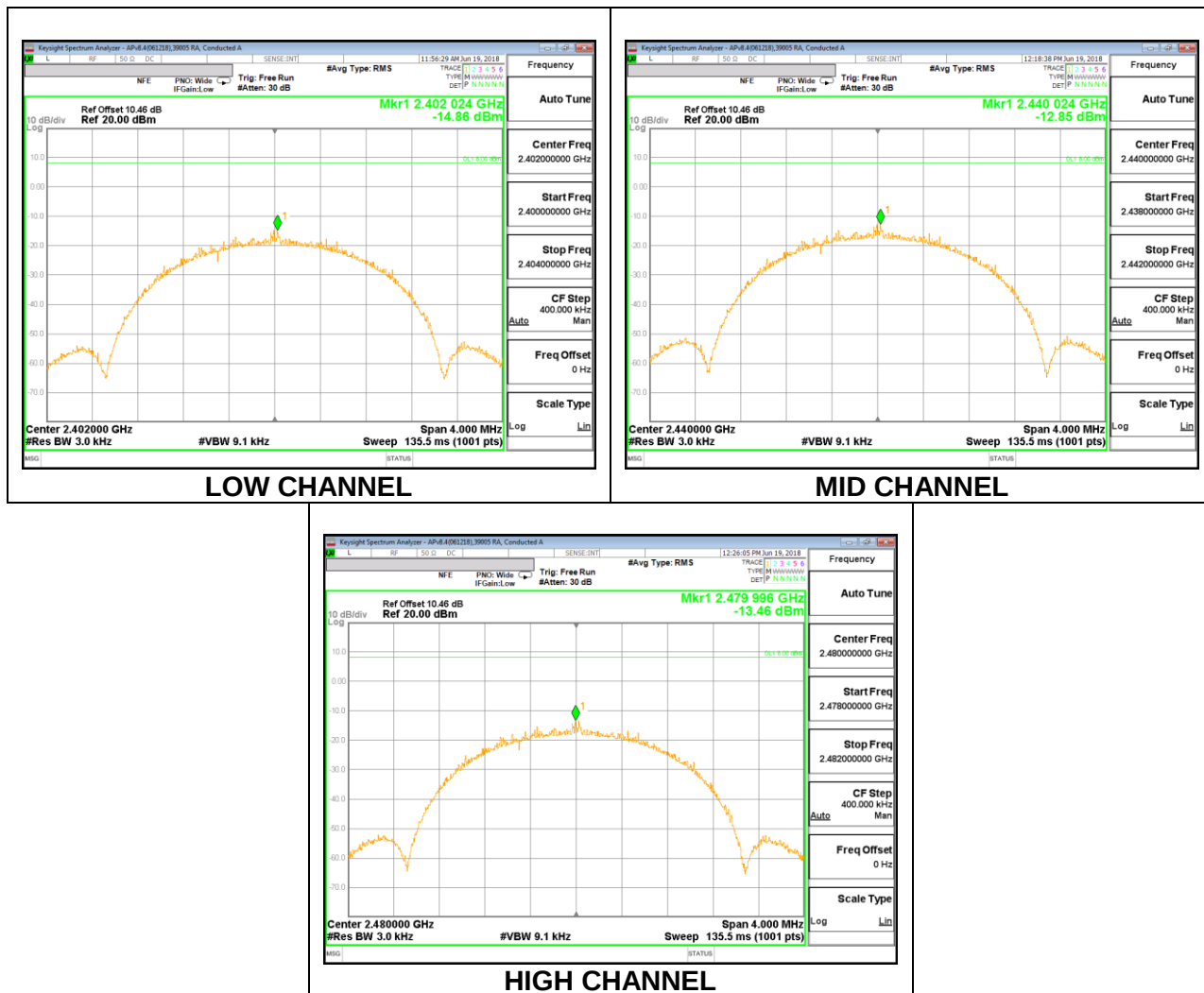
### 8.6.1. BLE (1Mbps)

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low     | 2402            | -12.40         | 8                | -20.40      |
| Middle  | 2440            | <b>-10.38</b>  | 8                | -18.38      |
| High    | 2480            | -11.03         | 8                | -19.03      |



## 8.6.2. BLE (2Mbps)

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low     | 2402            | -14.86         | 8                | -22.86      |
| Middle  | 2440            | <b>-12.85</b>  | 8                | -20.85      |
| High    | 2480            | -13.46         | 8                | -21.46      |



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## **8.7. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

FCC §15.247 (d)

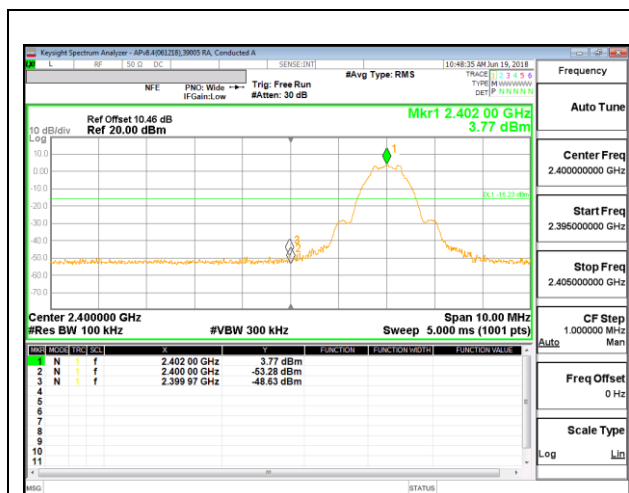
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

### **TEST PROCEDURE**

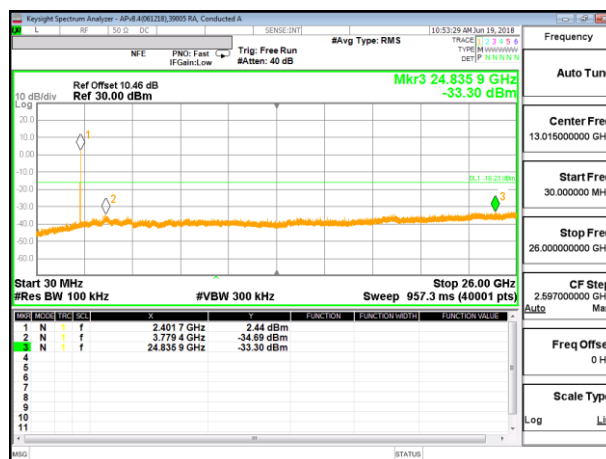
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

### **RESULTS**

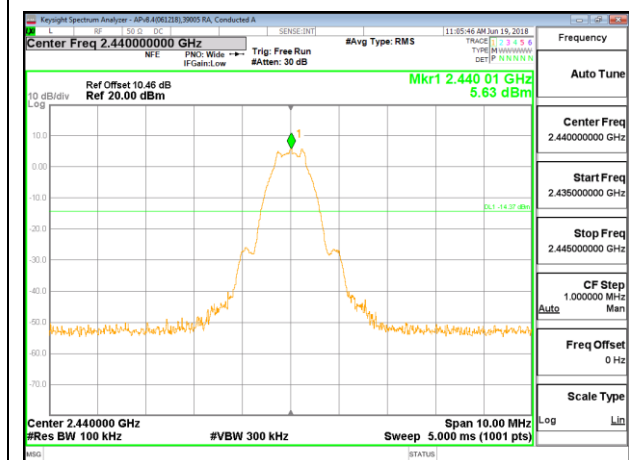
### 8.7.1. BLE (1Mbps)



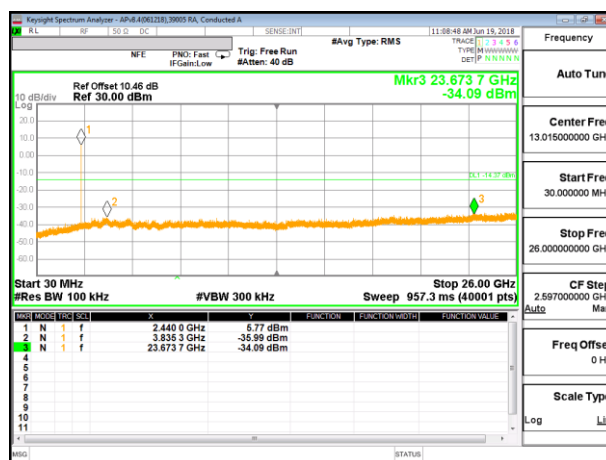
LOW CHANNEL BANDEDGE



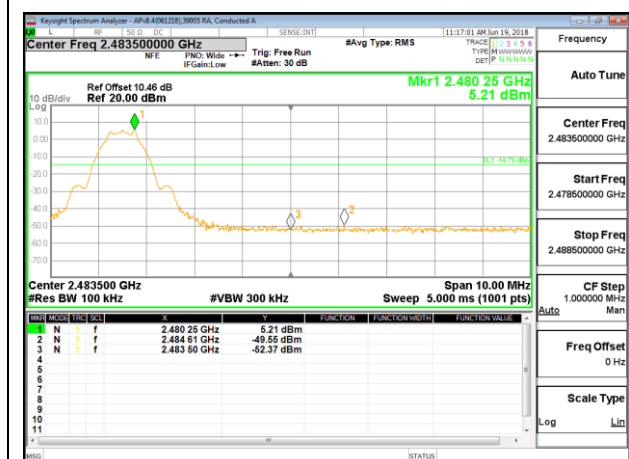
OUT-OF-BAND LOW CHANNEL



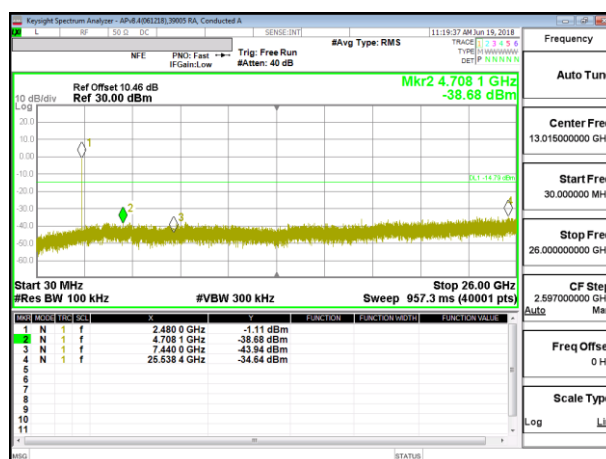
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL

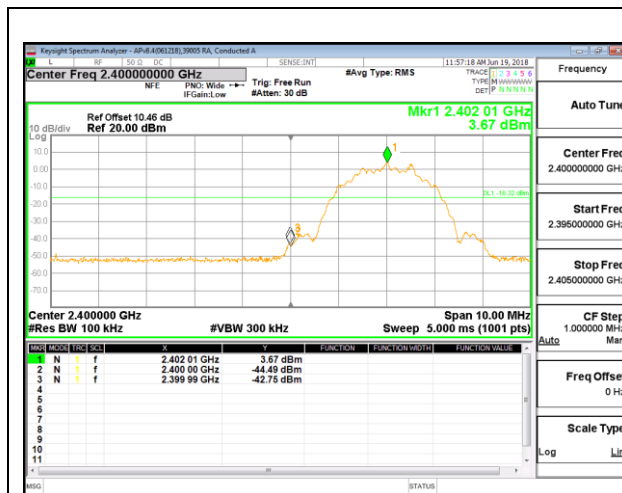


HIGH CHANNEL BANDEDGE

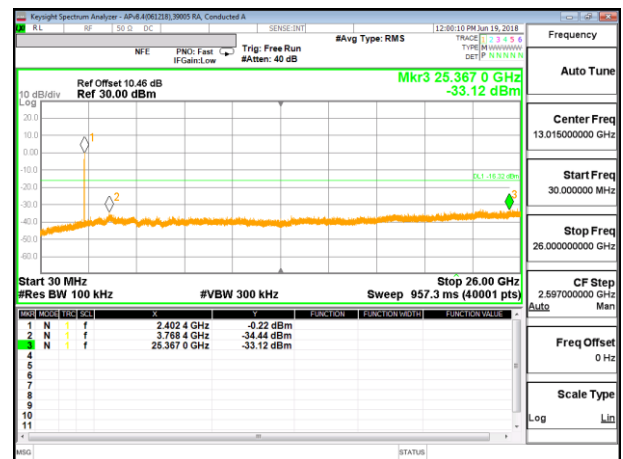


OUT-OF-BAND HIGH CHANNEL

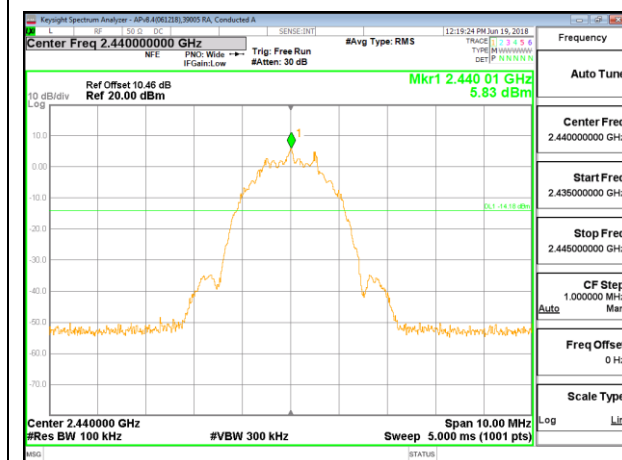
## 8.7.2. BLE (2Mbps)



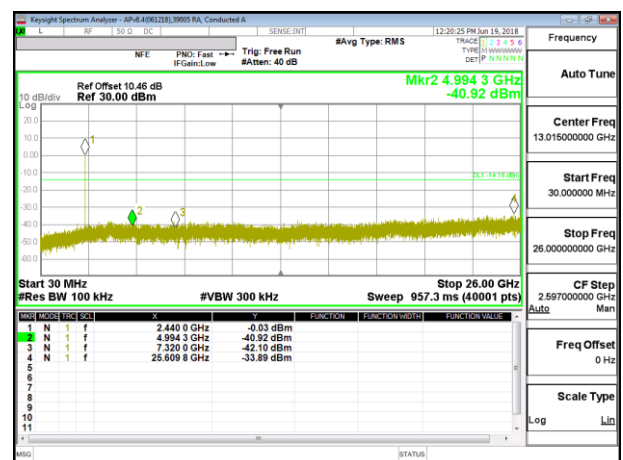
LOW CHANNEL BANDEDGE



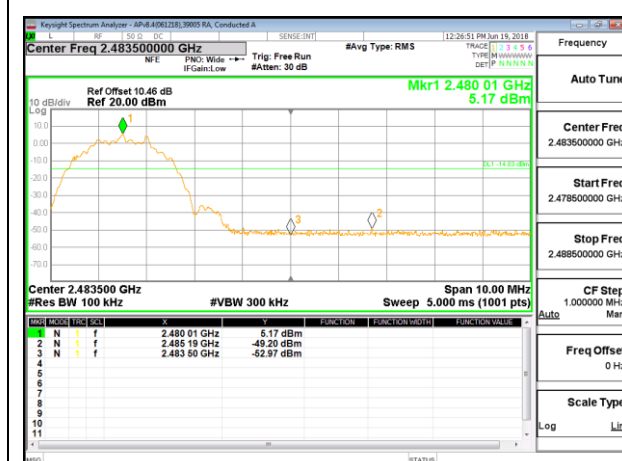
OUT-OF-BAND LOW CHANNEL



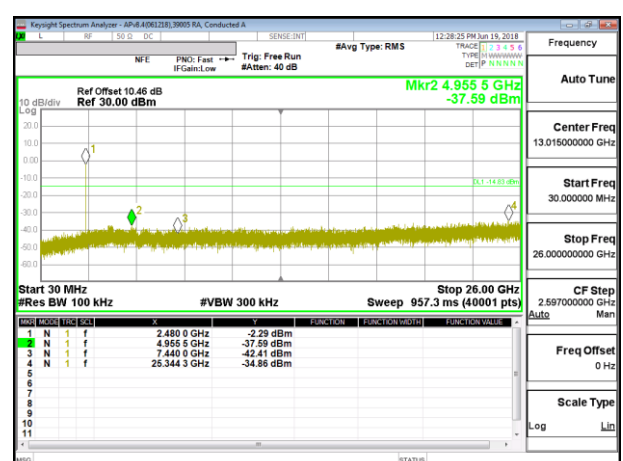
IN-BAND REFERENCE LEVEL



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

| 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.

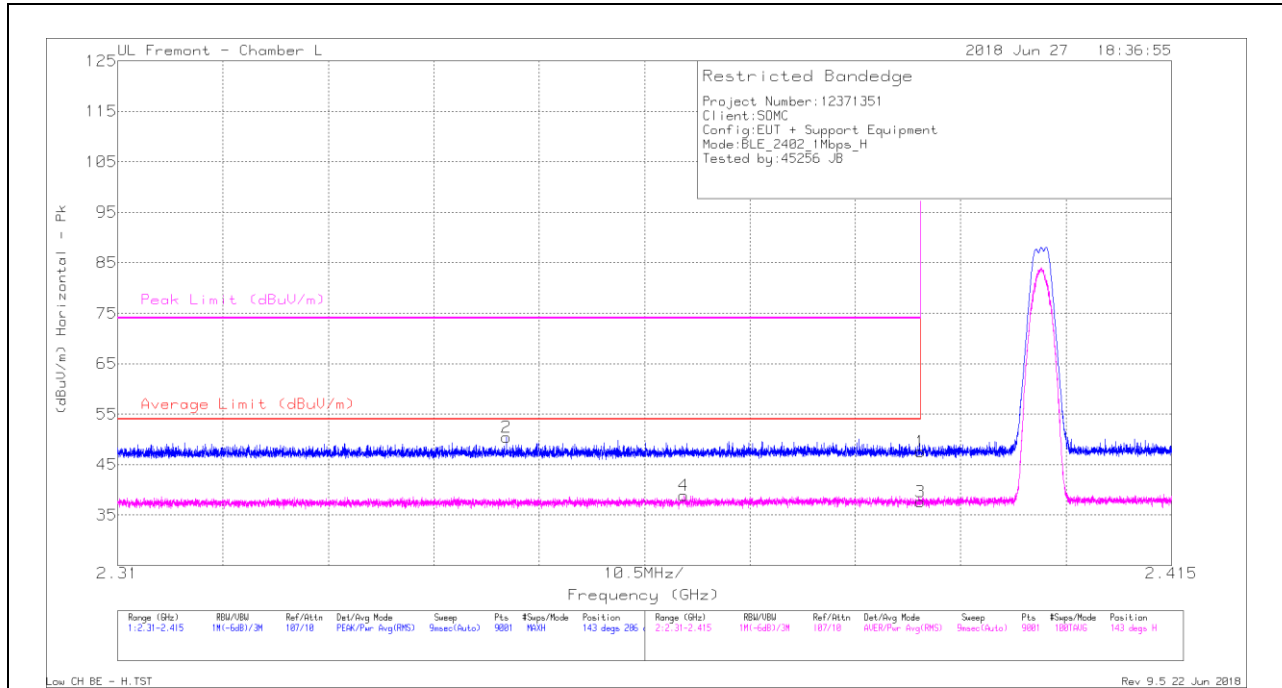
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

## 9.2. TRANSMITTER ABOVE 1 GHz

### 9.2.1. BLE (1Mbps)

#### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT



#### Trace Markers

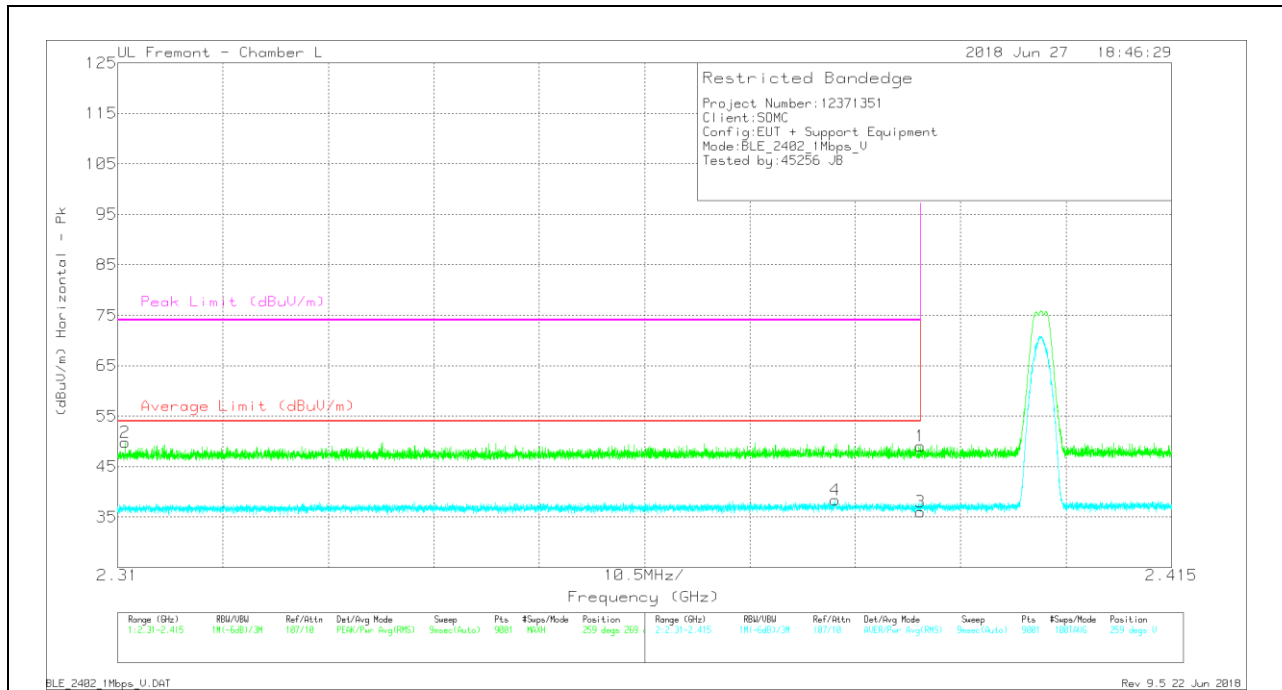
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF EMC4294 (dB/m) | Amp/Cbl/Fitr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 38.63                | Pk  | 31.8              | -22.9                 | 0            | 47.53                      | -                      | -           | 74                  | -26.47         | 143            | 286         | H        |
| 2      | * 2.349         | 41.92                | Pk  | 31.5              | -23                   | 0            | 50.42                      | -                      | -           | 74                  | -23.58         | 143            | 286         | H        |
| 3      | * 2.39          | 28.03                | RMS | 31.8              | -22.9                 | .68          | 37.61                      | 54                     | -16.39      | -                   | -              | 143            | 286         | H        |
| 4      | * 2.366         | 29.51                | RMS | 31.6              | -22.9                 | .68          | 38.89                      | 54                     | -15.11      | -                   | -              | 143            | 286         | H        |

\* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

RMS - RMS detection

## VERTICAL RESULT



### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF EMC4294 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 40.11                | Pk  | 31.8              | -22.9                  | 0            | 49.01                      | -                      | -           | 74                  | -24.99         | 259            | 269         | V        |
| 2      | * 2.311         | 41.44                | Pk  | 31.5              | -23.1                  | 0            | 49.84                      | -                      | -           | 74                  | -24.16         | 259            | 269         | V        |
| 3      | * 2.39          | 27.16                | RMS | 31.8              | -22.9                  | .68          | 36.74                      | 54                     | -17.26      | -                   | -              | 259            | 269         | V        |
| 4      | * 2.381         | 29.53                | RMS | 31.7              | -22.9                  | .68          | 39.01                      | 54                     | -14.99      | -                   | -              | 259            | 269         | V        |

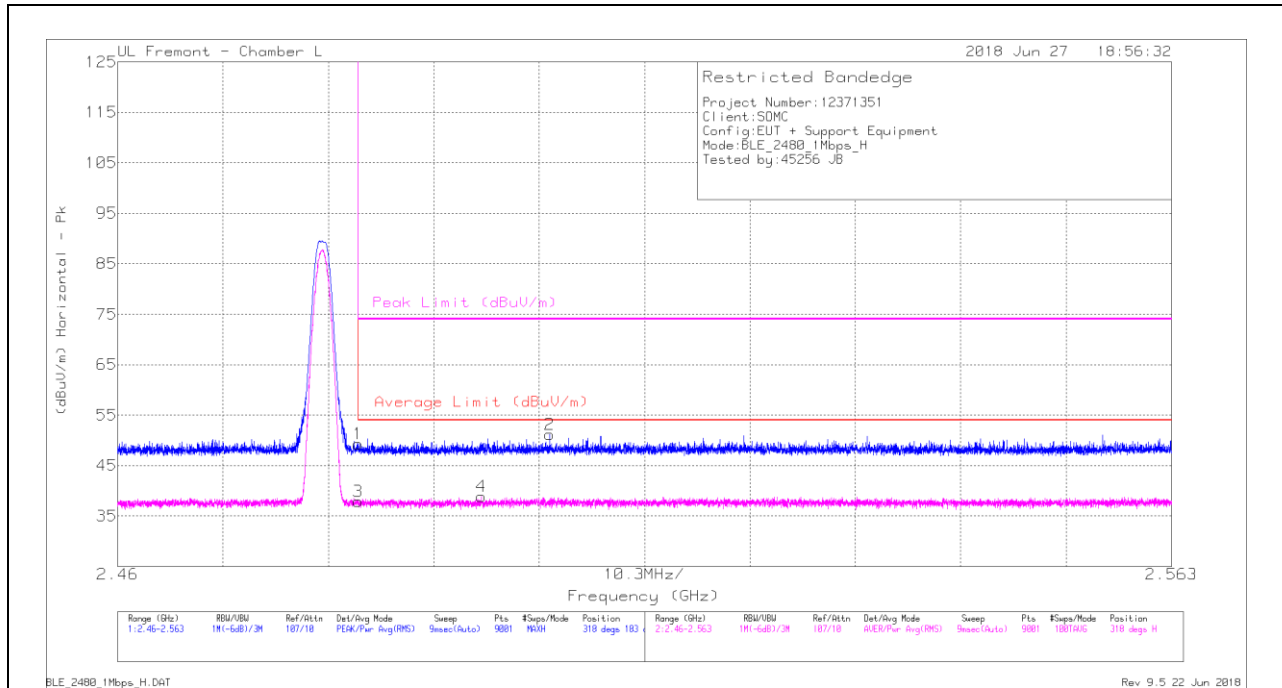
\* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

RMS - RMS detection

## BANDEDGE (HIGH CHANNEL)

### HORIZONTAL RESULT



### Trace Markers

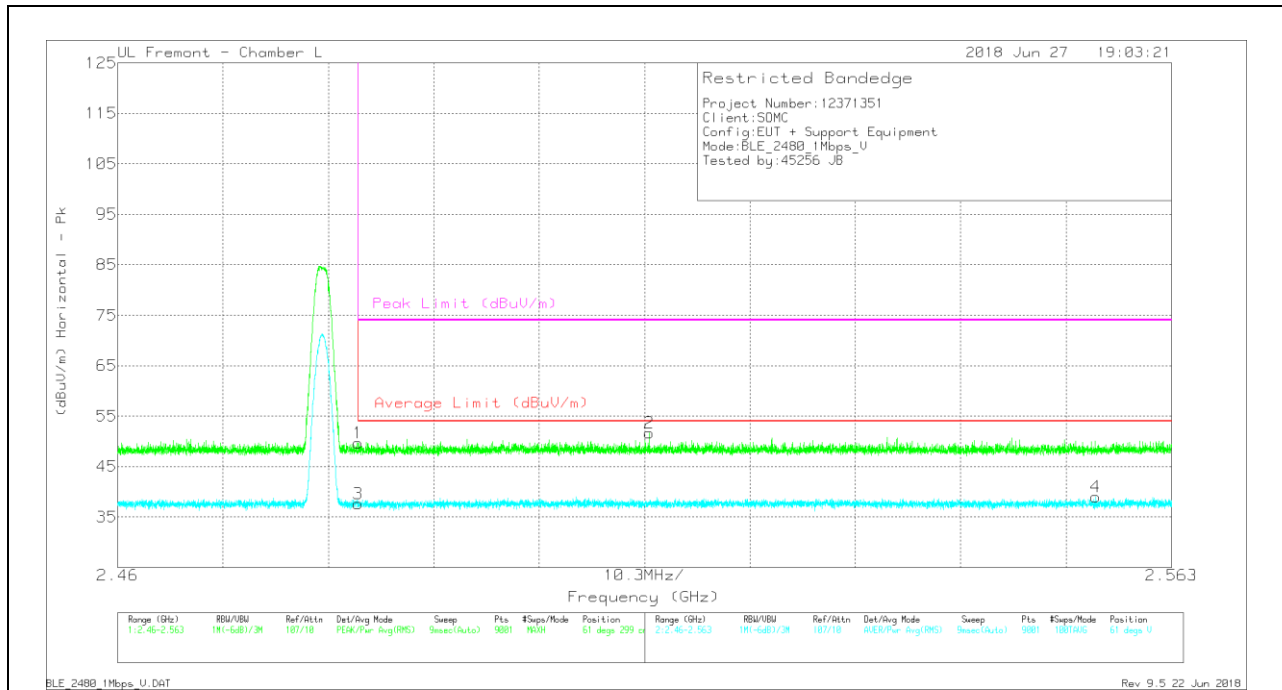
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF EMC4294 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.484         | 39.65                | Pk  | 32.3              | -22.7                  | 0            | 49.25                      | -                      | -           | 74                  | -24.75         | 318            | 183         | H        |
| 2      | 2.502           | 41.48                | Pk  | 32.3              | -22.6                  | 0            | 51.18                      | -                      | -           | 74                  | -22.82         | 318            | 183         | H        |
| 3      | * 2.484         | 28.23                | RMS | 32.3              | -22.7                  | .68          | 38.51                      | 54                     | -15.49      | -                   | -              | 318            | 183         | H        |
| 4      | * 2.496         | 29.28                | RMS | 32.3              | -22.7                  | .68          | 39.56                      | 54                     | -14.44      | -                   | -              | 318            | 183         | H        |

\* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

RMS - RMS detection

## VERTICAL RESULT



### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF EMC4294 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.484         | 40.08                | Pk  | 32.3              | -22.7                  | 0            | 49.68                      | -                      | -           | 74                  | -24.32         | 61             | 299         | V        |
| 2      | 2.512           | 41.93                | Pk  | 32.3              | -22.6                  | 0            | 51.63                      | -                      | -           | 74                  | -22.37         | 61             | 299         | V        |
| 3      | * 2.484         | 28.03                | RMS | 32.3              | -22.7                  | .68          | 38.31                      | 54                     | -15.69      | -                   | -              | 61             | 299         | V        |
| 4      | 2.556           | 29.32                | RMS | 32.4              | -22.7                  | .68          | 39.7                       | 54                     | -14.3       | -                   | -              | 61             | 299         | V        |

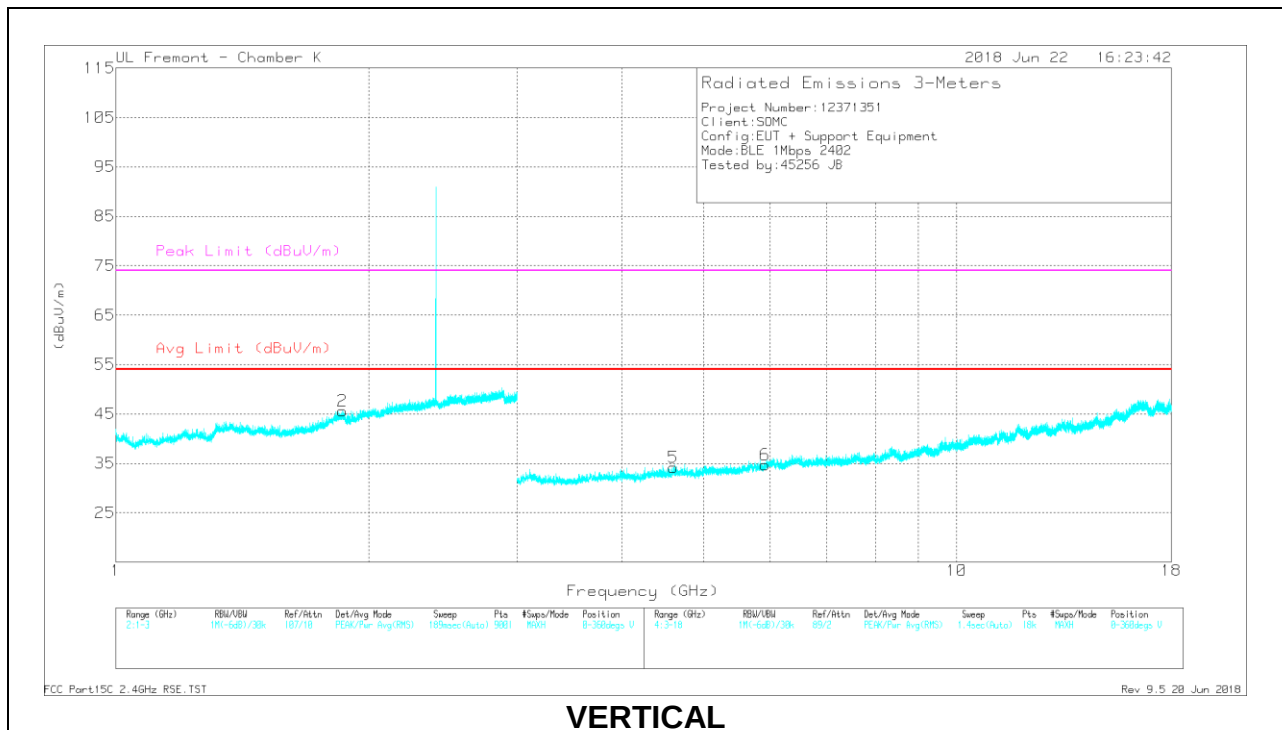
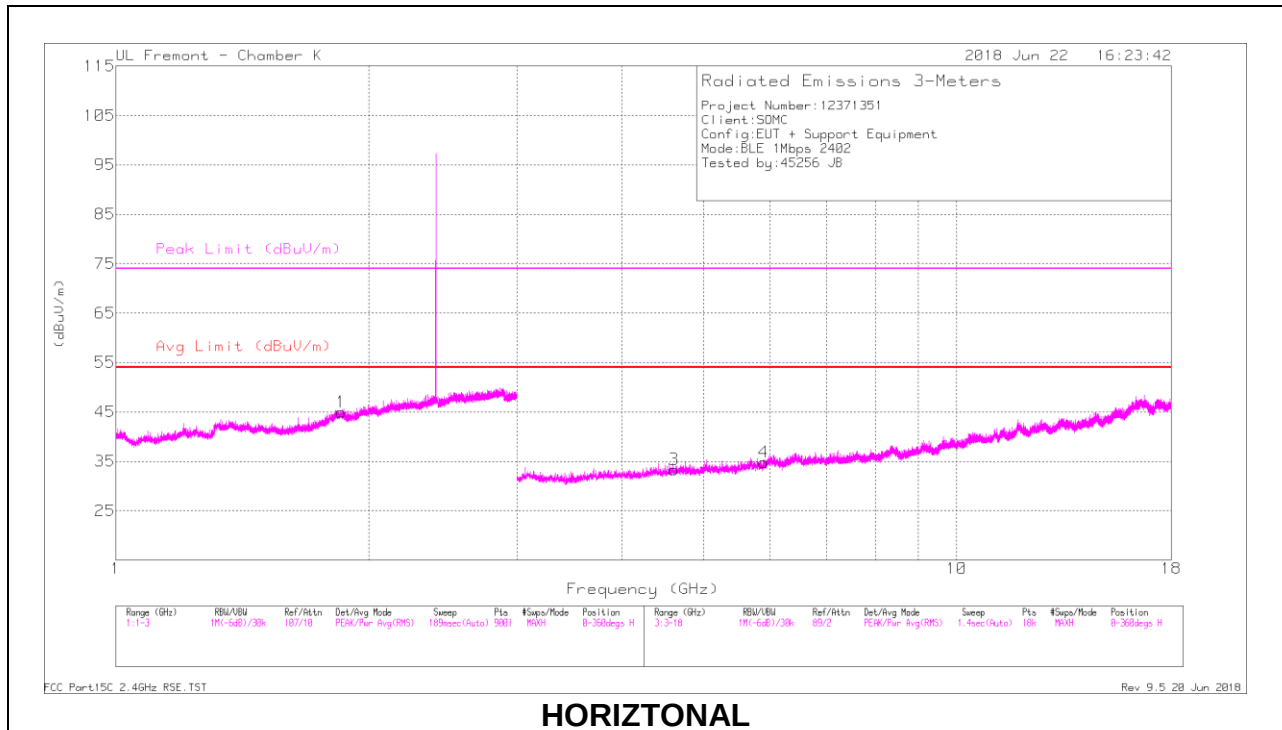
\* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

RMS - RMS detection

## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL RESULTS



## RADIATED EMISSIONS

### Radiated Emissions

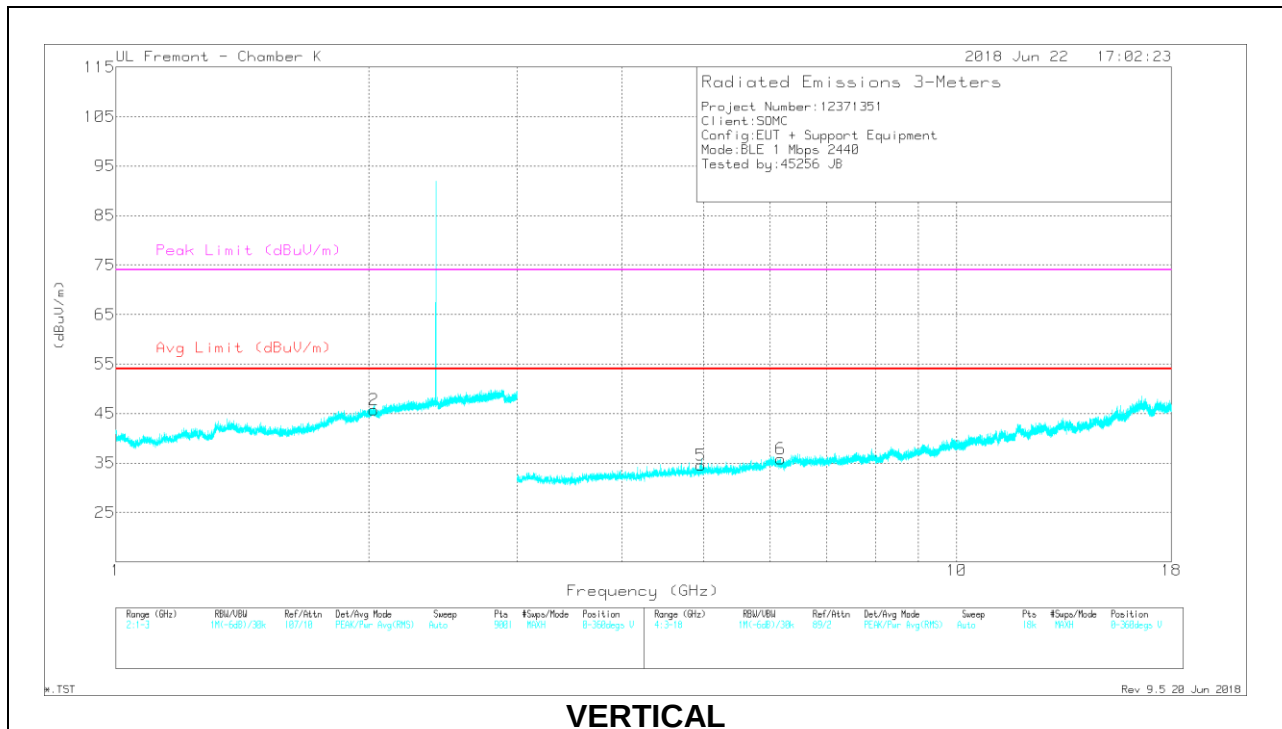
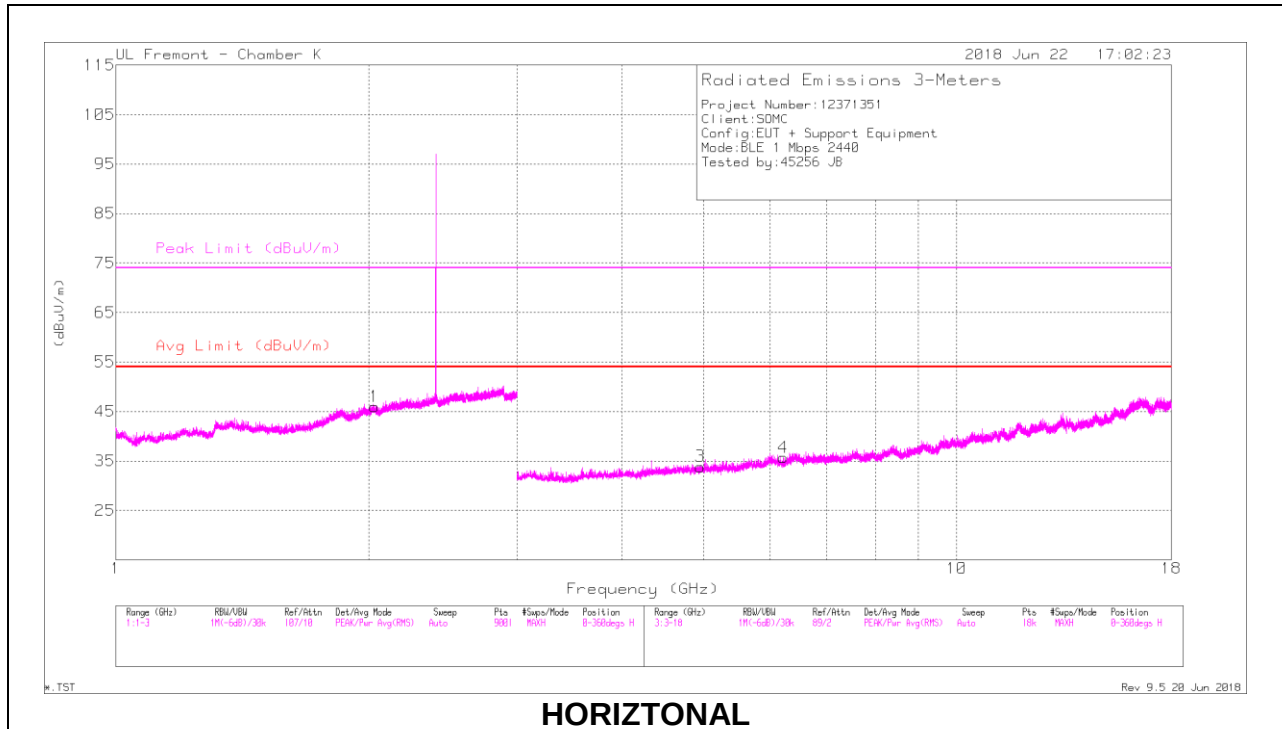
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF T344 (dB) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|--------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | 1.853           | 30.25                | PK2  | 30.4         | -9                     | 0            | 51.65                      | -                  | -           | -                   | -              | 31             | 157         | H        |
| 2      | 1.861           | 30.1                 | PK2  | 30.4         | -9.1                   | 0            | 51.4                       | -                  | -           | -                   | -              | 12             | 246         | V        |
| 3      | * 4.613         | 38.04                | PK2  | 34.1         | -31.4                  | 0            | 40.74                      | -                  | -           | 74                  | -33.26         | 51             | 244         | H        |
|        | * 4.614         | 28.73                | MAv1 | 34.1         | -31.5                  | .68          | 32.01                      | 54                 | -21.99      | -                   | -              | 51             | 244         | H        |
| 4      | 5.896           | 36.78                | PK2  | 35.1         | -29.3                  | 0            | 42.58                      | -                  | -           | -                   | -              | 259            | 300         | H        |
| 5      | * 4.602         | 38.64                | PK2  | 34.1         | -31.5                  | 0            | 41.24                      | -                  | -           | 74                  | -32.76         | 352            | 167         | V        |
|        | * 4.602         | 29.09                | MAv1 | 34.1         | -31.5                  | .68          | 32.37                      | 54                 | -21.63      | -                   | -              | 352            | 167         | V        |
| 6      | 5.918           | 36.5                 | PK2  | 35.1         | -29.2                  | 0            | 42.4                       | -                  | -           | -                   | -              | 132            | 310         | V        |

\* - indicates frequency in CFR47 Pt 15 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## MID CHANNEL RESULTS



## RADIATED EMISSIONS

### Radiated Emissions

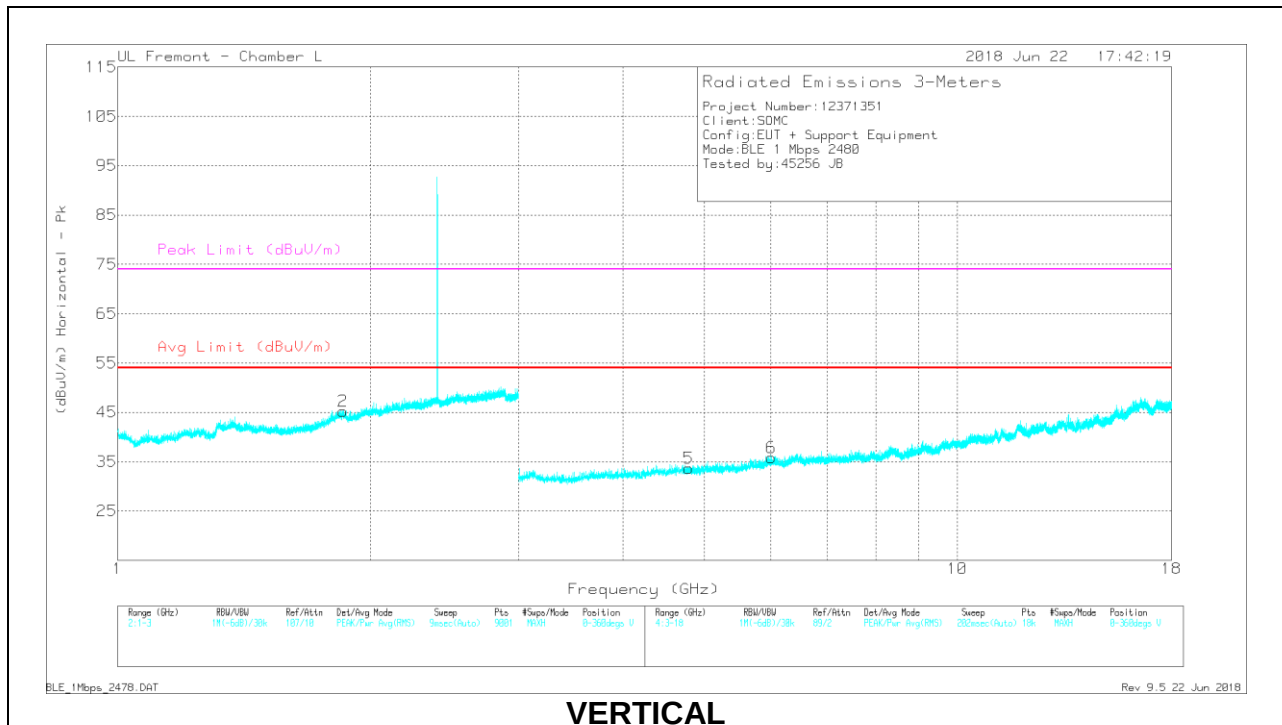
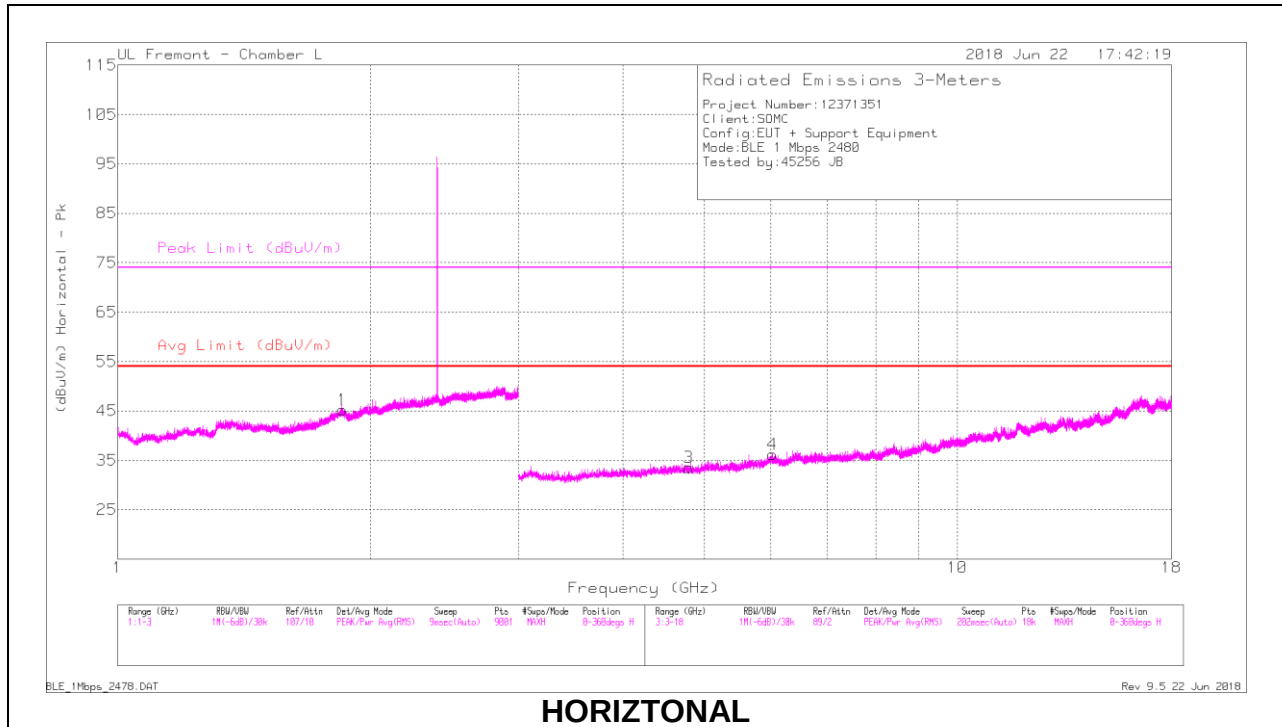
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF T344 (dB) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|--------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | 2.033           | 29.19                | PK2  | 31.2         | -8.6                   | 0            | 51.79                      | -                  | -           | -                   | -              | 281            | 291         | H        |
| 2      | 2.027           | 28.91                | PK2  | 31.1         | -8.5                   | 0            | 51.51                      | -                  | -           | -                   | -              | 38             | 107         | V        |
| 3      | * 4.954         | 38.05                | PK2  | 34.2         | -31.2                  | 0            | 41.05                      | -                  | -           | 74                  | -32.95         | 298            | 108         | H        |
|        | * 4.954         | 28.59                | MAv1 | 34.2         | -31.2                  | .68          | 32.27                      | 54                 | -21.73      | -                   | -              | 298            | 108         | H        |
| 4      | 6.217           | 36.25                | PK2  | 35.2         | -28.6                  | 0            | 42.85                      | -                  | -           | -                   | -              | 280            | 276         | H        |
| 5      | * 4.968         | 38.23                | PK2  | 34.2         | -31.2                  | 0            | 41.23                      | -                  | -           | 74                  | -32.77         | 187            | 268         | V        |
|        | * 4.967         | 28.99                | MAv1 | 34.2         | -31.2                  | .68          | 32.67                      | 54                 | -21.33      | -                   | -              | 187            | 268         | V        |
| 6      | 6.175           | 37.24                | PK2  | 35.3         | -28.4                  | 0            | 44.14                      | -                  | -           | -                   | -              | 205            | 363         | V        |

\* - indicates frequency in CFR47 Pt 15 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 T344 (dB) | 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      | 1.852           | 31.38                | PK2  | 30.4         | -9                     | 0            | 52.78                      | -                  | -           | -                   | -              | 351            | 170         | H        |
| 2      | 1.856           | 30.23                | PK2  | 30.4         | -9.1                   | 0            | 51.53                      | -                  | -           | -                   | -              | 140            | 322         | V        |
| 3      | * 4.793         | 37.7                 | PK2  | 34.2         | -30.8                  | 0            | 41.1                       | -                  | -           | 74                  | -32.9          | 110            | 158         | H        |
|        | * 4.791         | 28.09                | MAv1 | 34.2         | -30.8                  | .68          | 32.17                      | 54                 | -21.83      | -                   | -              | 110            | 158         | H        |
| 4      | 6.025           | 35.45                | PK2  | 35.2         | -28.1                  | 0            | 42.55                      | -                  | -           | -                   | -              | 101            | 392         | H        |
| 5      | * 4.79          | 38.01                | PK2  | 34.2         | -30.7                  | 0            | 41.51                      | -                  | -           | 74                  | -32.49         | 349            | 147         | V        |
|        | * 4.789         | 28.01                | MAv1 | 34.2         | -30.7                  | .68          | 32.19                      | 54                 | -21.81      | -                   | -              | 349            | 147         | V        |
| 6      | 6.008           | 35.93                | PK2  | 35.2         | -28.1                  | 0            | 43.03                      | -                  | -           | -                   | -              | 0              | 232         | V        |

\* - indicates frequency in CFR47 Pt 15 Restricted Band

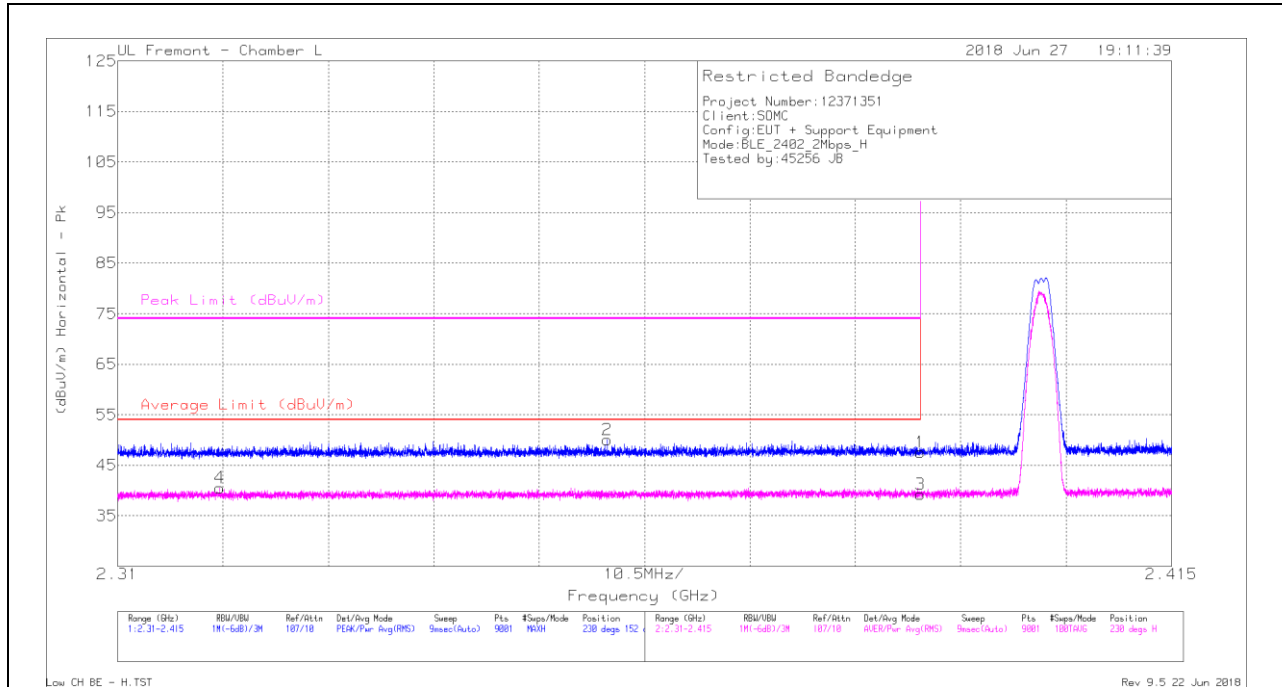
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## 9.2.2. BLE (2Mbps)

### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT



#### Trace Markers

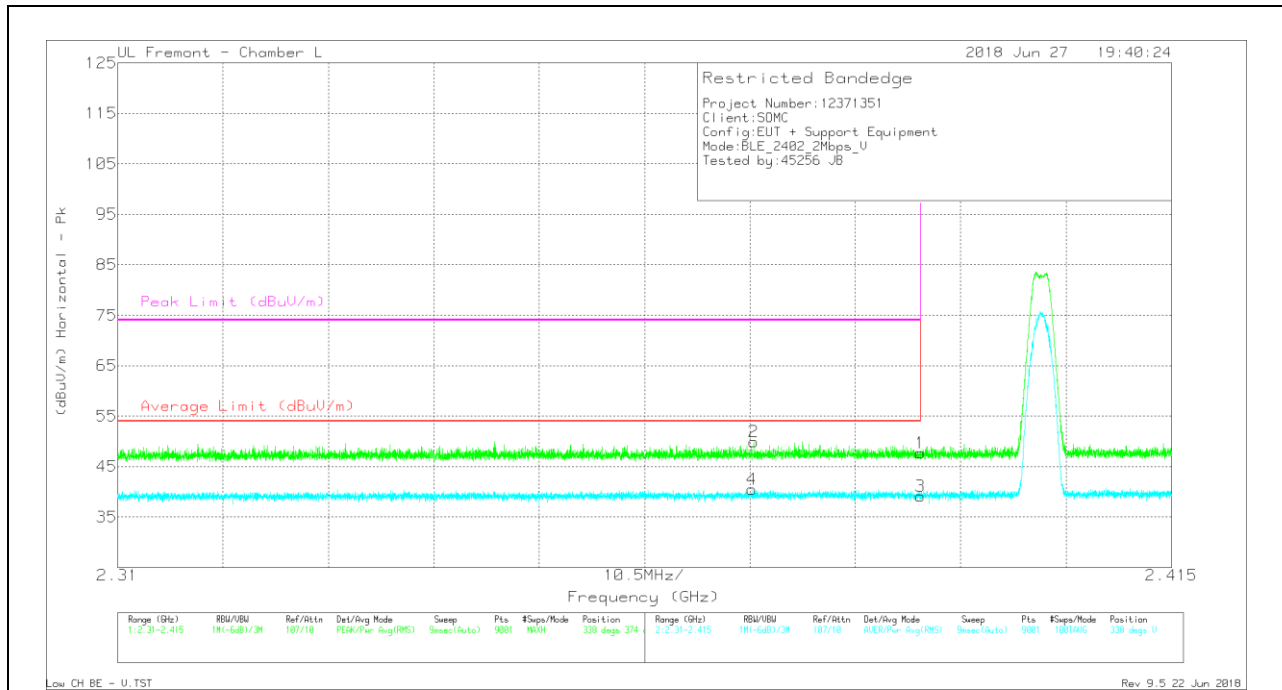
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF EMC4294 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 38.68                | Pk  | 31.8              | -22.9                  | 0            | 47.58                      | -                      | -           | 74                  | -26.42         | 230            | 152         | H        |
| 2      | * 2.359         | 41.35                | Pk  | 31.6              | -22.9                  | 0            | 50.05                      | -                      | -           | 74                  | -23.95         | 230            | 152         | H        |
| 3      | * 2.39          | 27.95                | RMS | 31.8              | -22.9                  | 2.41         | 39.26                      | 54                     | -14.74      | -                   | -              | 230            | 152         | H        |
| 4      | * 2.32          | 29.73                | RMS | 31.5              | -23.1                  | 2.41         | 40.54                      | 54                     | -13.46      | -                   | -              | 230            | 152         | H        |

\* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

RMS - RMS detection

## VERTICAL RESULT



## Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF EMC4294 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 38.77                | Pk  | 31.8              | -22.9                  | 0            | 47.67                      | -                      | -           | 74                  | -26.33         | 338            | 374         | V        |
| 2      | * 2.373         | 41.14                | Pk  | 31.7              | -22.9                  | 0            | 49.94                      | -                      | -           | 74                  | -24.06         | 338            | 374         | V        |
| 3      | * 2.39          | 27.86                | RMS | 31.8              | -22.9                  | 2.41         | 39.17                      | 54                     | -14.83      | -                   | -              | 338            | 374         | V        |
| 4      | * 2.373         | 29.28                | RMS | 31.7              | -22.9                  | 2.41         | 40.49                      | 54                     | -13.51      | -                   | -              | 338            | 374         | V        |

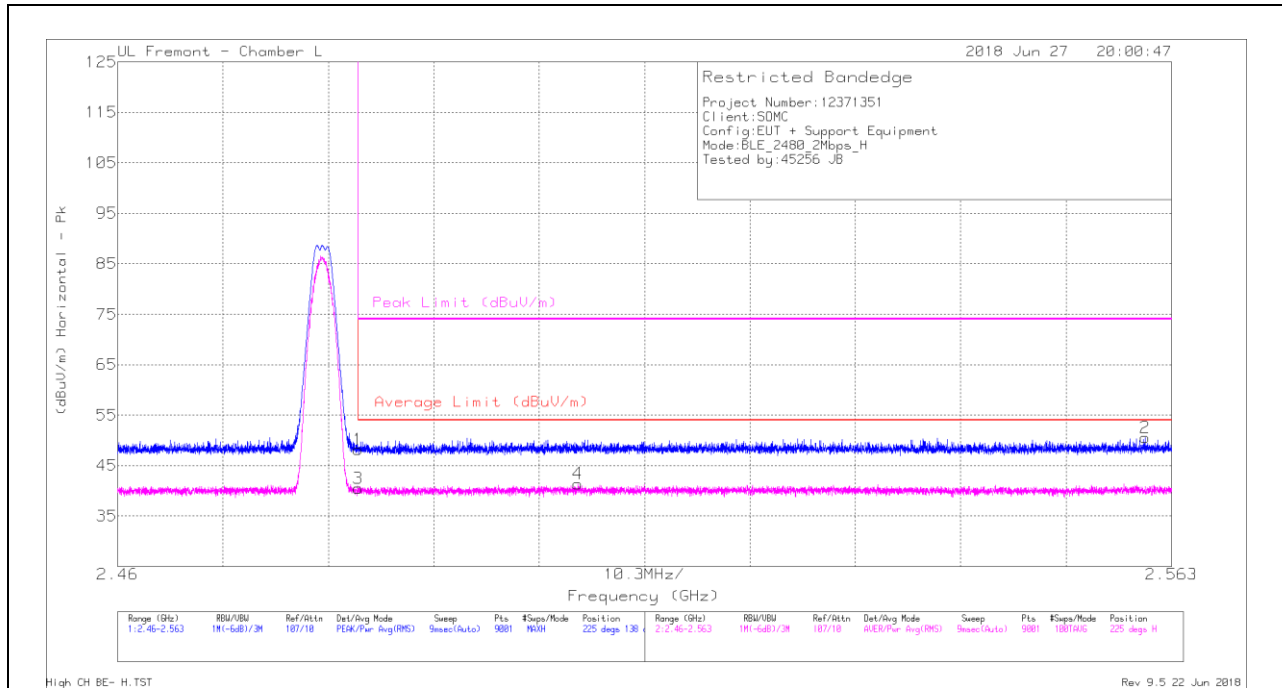
\* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

RMS - RMS detection

## BANDEDGE (HIGH CHANNEL)

### HORIZONTAL RESULT



### Trace Markers

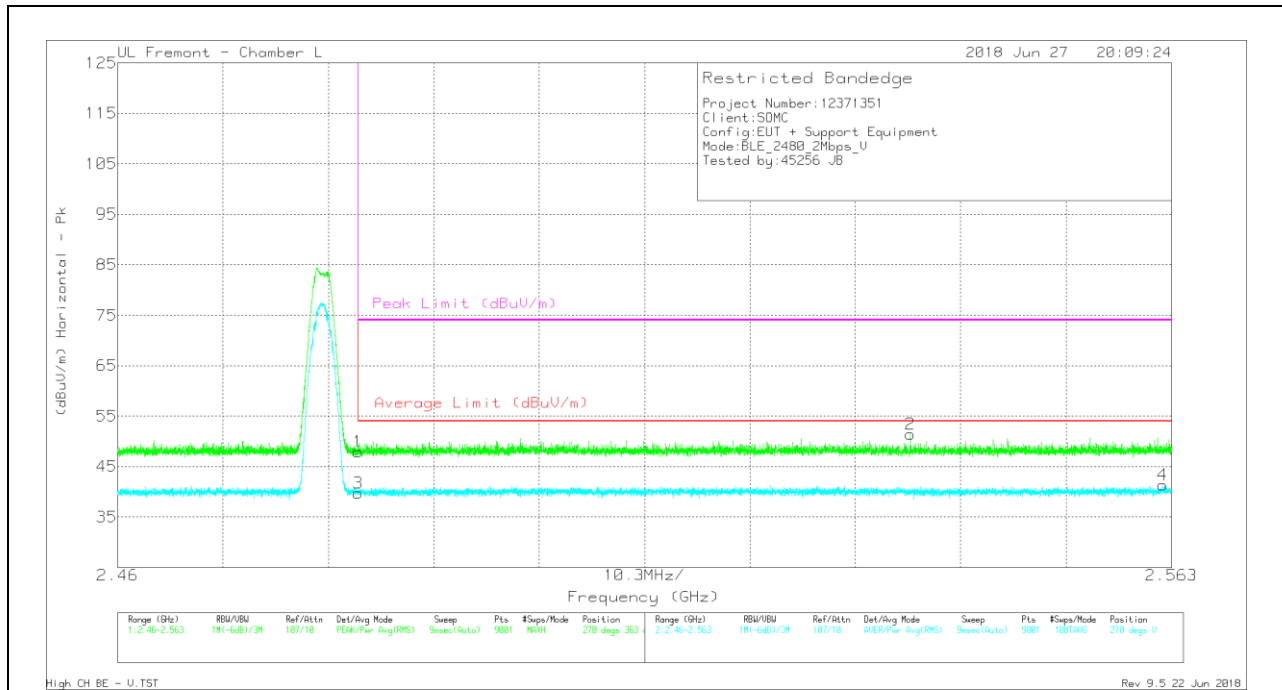
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF EMC4294 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.484         | 38.6                 | Pk  | 32.3              | -22.7                  | 0            | 48.2                       | -                      | -           | 74                  | -25.8          | 225            | 138         | H        |
| 2      | 2.56            | 40.77                | Pk  | 32.4              | -22.6                  | 0            | 50.57                      | -                      | -           | 74                  | -23.43         | 225            | 138         | H        |
| 3      | * 2.484         | 28.43                | RMS | 32.3              | -22.7                  | 2.41         | 40.44                      | 54                     | -13.56      | -                   | -              | 225            | 138         | H        |
| 4      | 2.505           | 29.3                 | RMS | 32.3              | -22.6                  | 2.41         | 41.41                      | 54                     | -12.59      | -                   | -              | 225            | 138         | H        |

\* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

RMS - RMS detection

## VERTICAL RESULT



### Trace Markers

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF EMC4294 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.484         | 38.36                | Pk  | 32.3              | -22.7                  | 0            | 47.96                      | -                      | -           | 74                  | -26.04         | 270            | 363         | V        |
| 2      | 2.537           | 41.81                | Pk  | 32.3              | -22.7                  | 0            | 51.41                      | -                      | -           | 74                  | -22.59         | 270            | 363         | V        |
| 3      | * 2.484         | 27.73                | RMS | 32.3              | -22.7                  | 2.41         | 39.74                      | 54                     | -14.26      | -                   | -              | 270            | 363         | V        |
| 4      | 2.562           | 29.17                | RMS | 32.4              | -22.6                  | 2.41         | 41.38                      | 54                     | -12.62      | -                   | -              | 270            | 363         | V        |

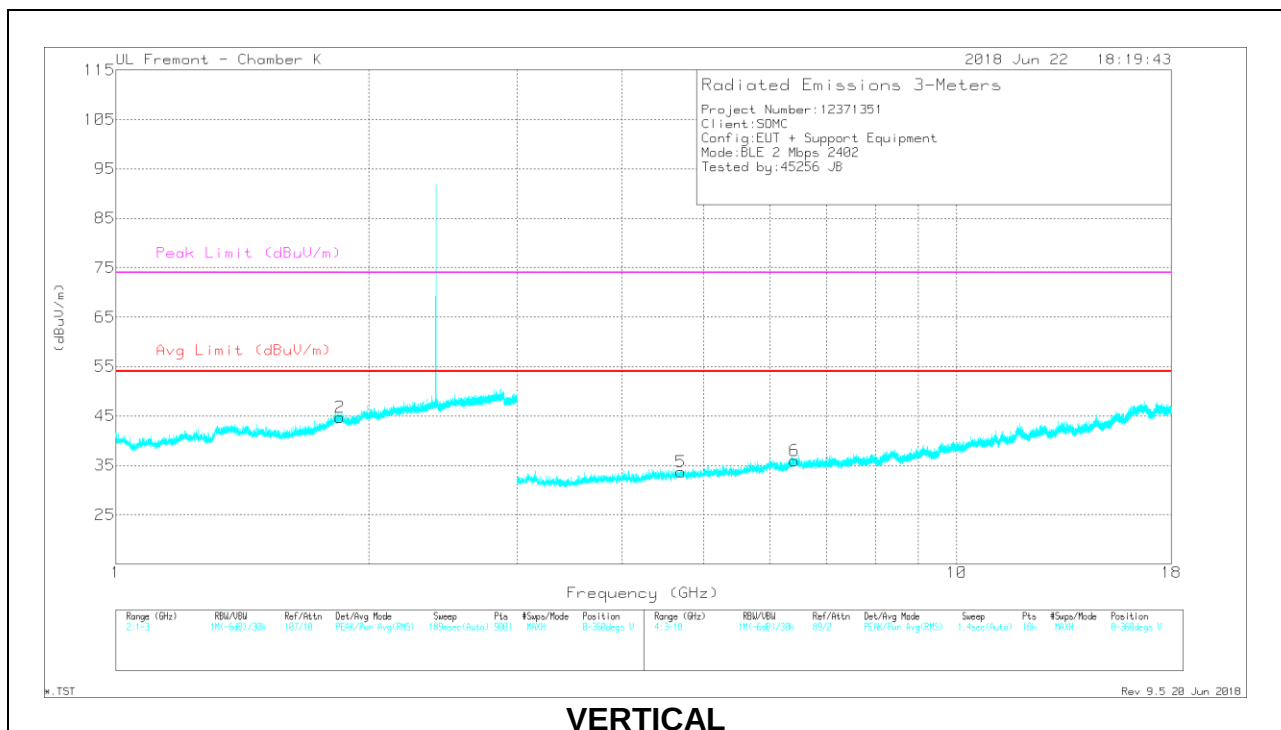
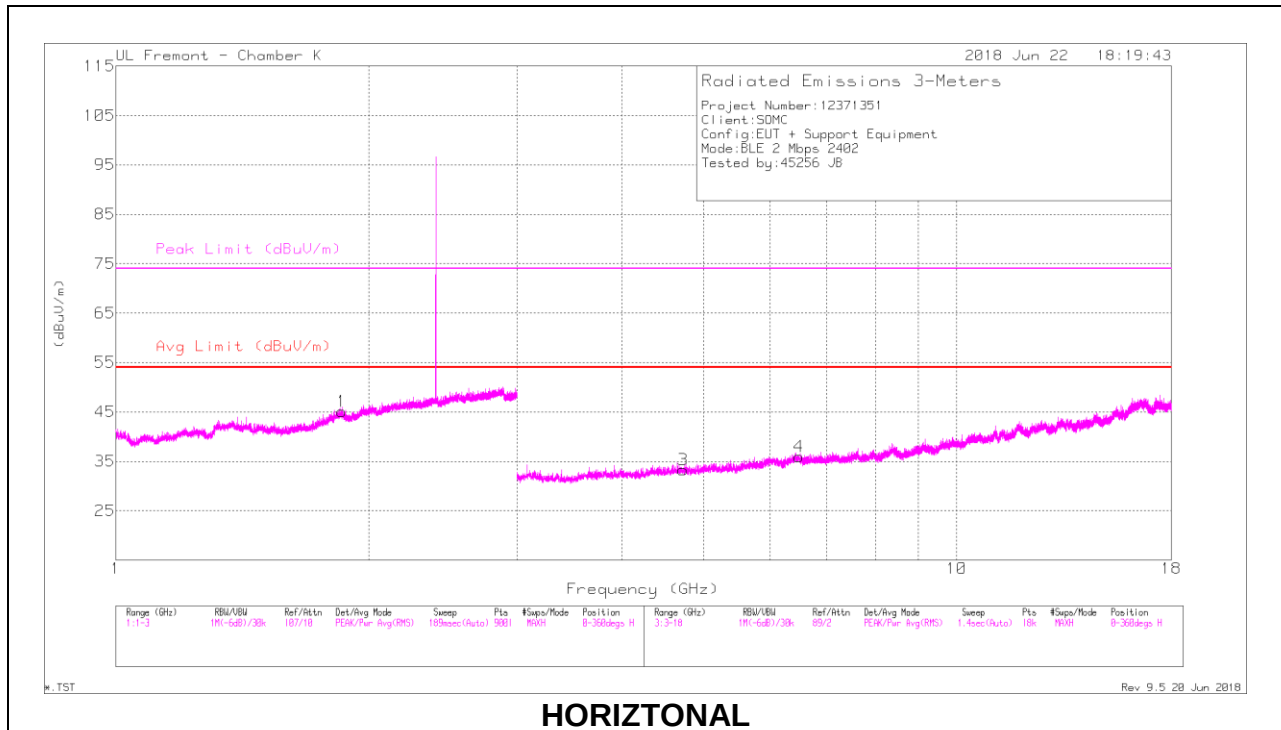
\* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

RMS - RMS detection

## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL RESULTS



## RADIATED EMISSIONS

### Radiated Emissions

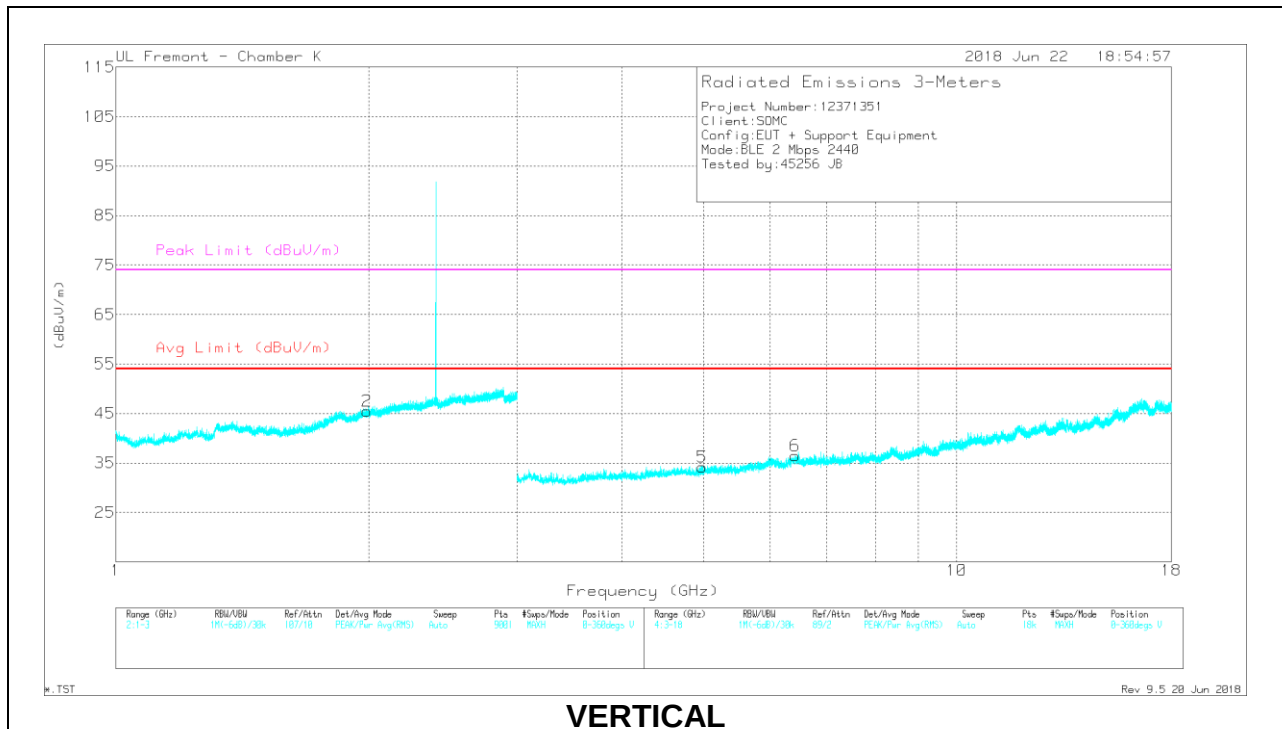
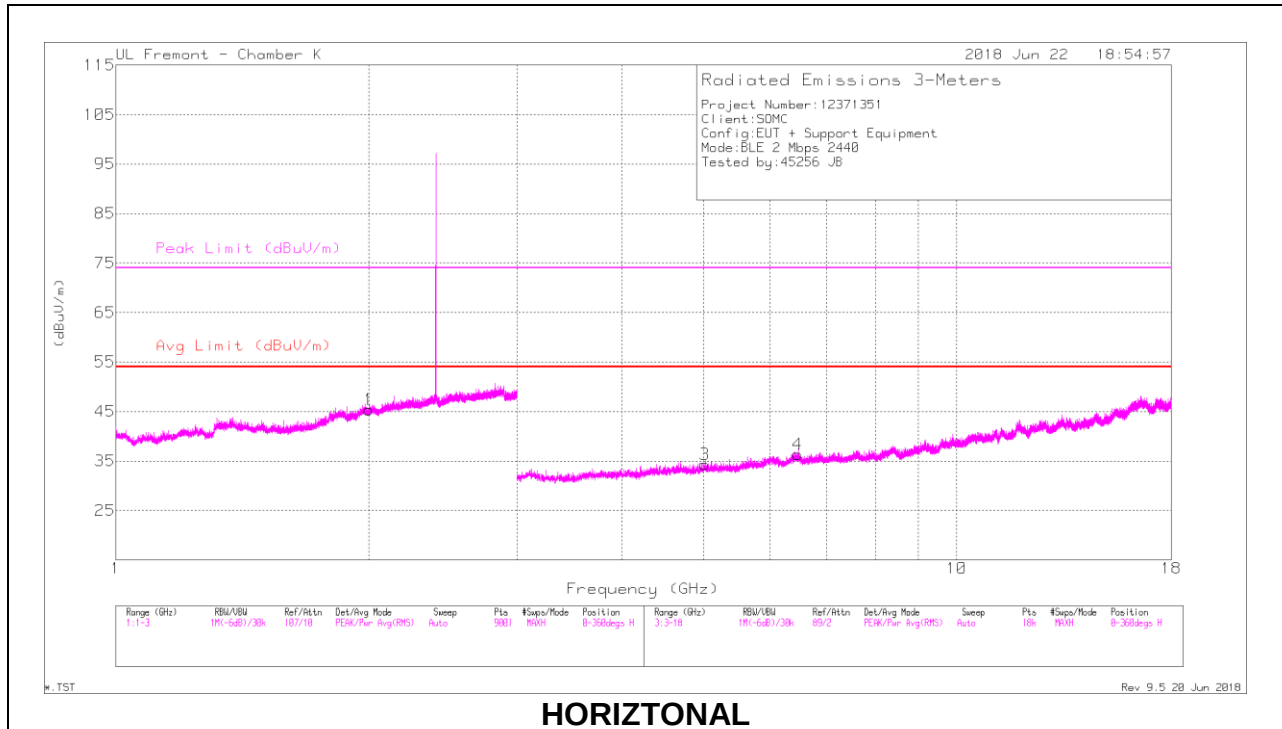
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF T344 (dB) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|--------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | 1.857           | 30.64                | PK2  | 30.4         | -9.1                   | 0            | 51.94                      | -                  | -           | -                   | -              | 29             | 124         | H        |
| 2      | 1.845           | 29.71                | PK2  | 30.4         | -9                     | 0            | 51.11                      | -                  | -           | -                   | -              | 342            | 274         | V        |
| 3      | * 4.726         | 37.38                | PK2  | 34.1         | -30.8                  | 0            | 40.68                      | -                  | -           | 74                  | -33.32         | 95             | 289         | H        |
|        | * 4.728         | 28.38                | MAv1 | 34.1         | -30.7                  | 2.41         | 34.19                      | 54                 | -19.81      | -                   | -              | 95             | 289         | H        |
| 4      | 6.494           | 34.9                 | PK2  | 35.4         | -27                    | 0            | 43.3                       | -                  | -           | -                   | -              | 260            | 178         | H        |
| 5      | * 4.7           | 38.24                | PK2  | 34.1         | -31.1                  | 0            | 41.24                      | -                  | -           | 74                  | -32.76         | 248            | 272         | V        |
|        | * 4.698         | 28.36                | MAv1 | 34.1         | -31.1                  | 2.41         | 33.77                      | 54                 | -20.23      | -                   | -              | 248            | 272         | V        |
| 6      | 6.413           | 35.01                | PK2  | 35.4         | -27                    | 0            | 43.41                      | -                  | -           | -                   | -              | 186            | 109         | V        |

\* - indicates frequency in CFR47 Pt 15 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

## MID CHANNEL RESULTS



## RADIATED EMISSIONS

### Radiated Emissions

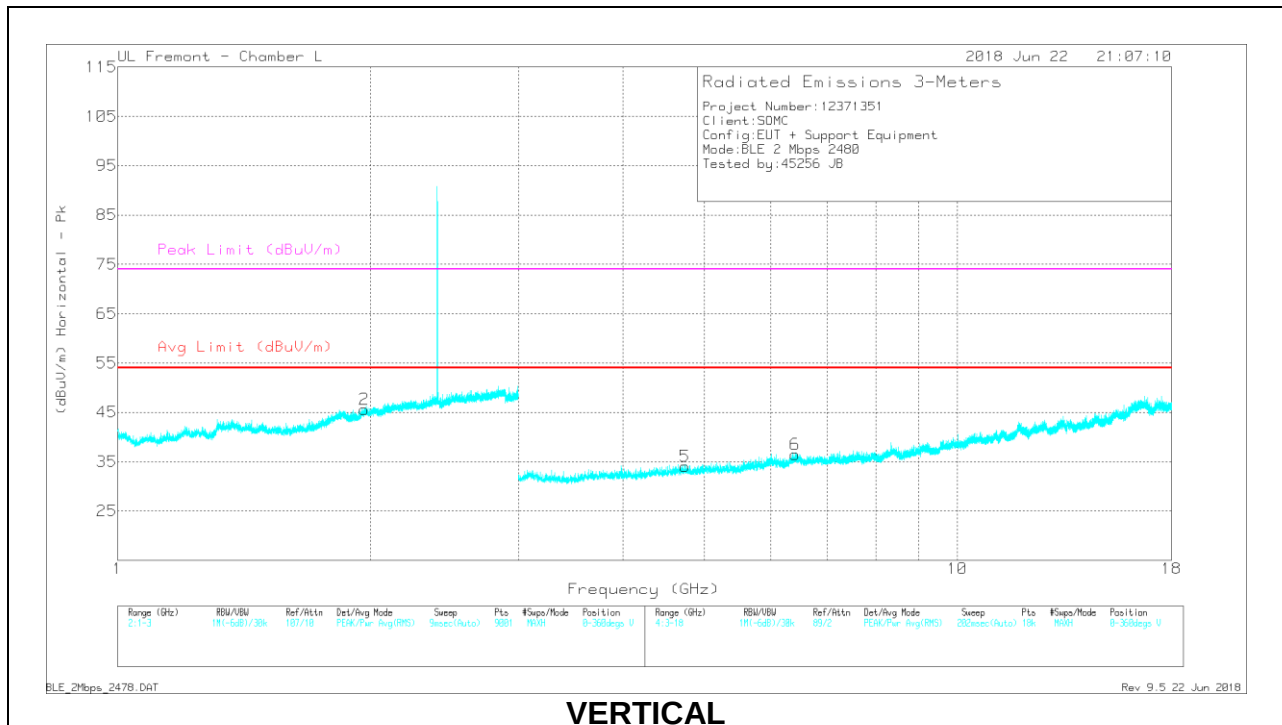
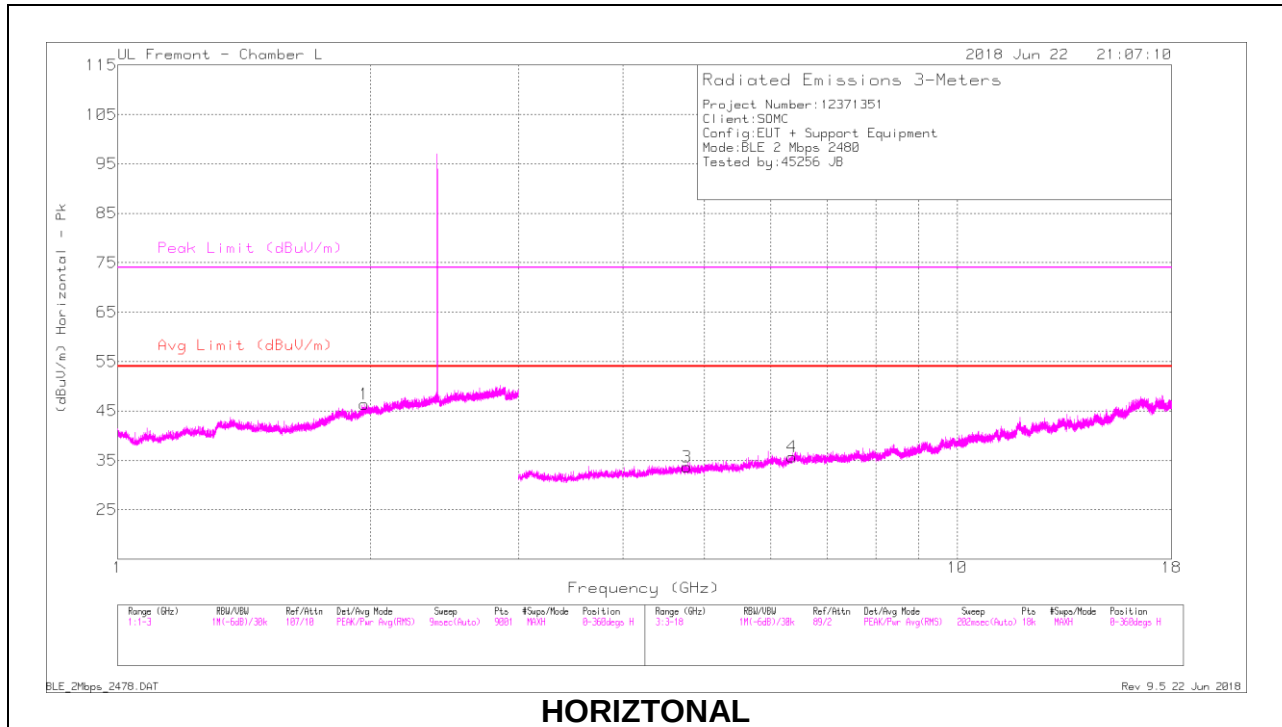
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det  | AF T344 (dB) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|------|--------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | 2               | 31.09                | PK2  | 31           | -8.6                   | 0            | 53.49                      | -                  | -           | -                   | -              | 310            | 236         | H        |
| 2      | 1.991           | 29.48                | PK2  | 31           | -8.8                   | 0            | 51.68                      | -                  | -           | -                   | -              | 235            | 351         | V        |
| 3      | * 5.015         | 37.7                 | PK2  | 34.3         | -31                    | 0            | 41                         | -                  | -           | 74                  | -33            | 45             | 322         | H        |
|        | * 5.015         | 28.87                | MAv1 | 34.3         | -31                    | 2.41         | 34.58                      | 54                 | -19.42      | -                   | -              | 45             | 322         | H        |
| 4      | 6.47            | 34.67                | PK2  | 35.4         | -27                    | 0            | 43.07                      | -                  | -           | -                   | -              | 197            | 258         | H        |
| 5      | * 4.98          | 37.72                | PK2  | 34.2         | -31                    | 0            | 40.92                      | -                  | -           | 74                  | -33.08         | 303            | 204         | V        |
|        | * 4.98          | 28.32                | MAv1 | 34.2         | -31                    | 2.41         | 33.93                      | 54                 | -20.07      | -                   | -              | 303            | 204         | V        |
| 6      | 6.424           | 34.68                | PK2  | 35.4         | -26.9                  | 0            | 43.18                      | -                  | -           | -                   | -              | 230            | 179         | V        |

\* - indicates frequency in CFR47 Pt 15 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 T344 (dB) | 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      | 1.966           | 29.62                | PK2  | 30.9         | -8.6                   | 0            | 51.92                      | -                  | -           | -                   | -              | 28             | 217         | H        |
| 2      | 1.964           | 29.18                | PK2  | 30.9         | -8.7                   | 0            | 51.38                      | -                  | -           | -                   | -              | 242            | 262         | V        |
| 3      | * 4.763         | 38.17                | PK2  | 34.1         | -30.8                  | 0            | 41.47                      | -                  | -           | 74                  | -32.53         | 33             | 302         | H        |
|        | * 4.762         | 28.45                | MAv1 | 34.1         | -30.8                  | 2.41         | 34.16                      | 54                 | -19.84      | -                   | -              | 33             | 302         | H        |
| 4      | 6.357           | 35.35                | PK2  | 35.4         | -27.6                  | 0            | 43.15                      | -                  | -           | -                   | -              | 296            | 276         | H        |
| 5      | * 4.735         | 37.65                | PK2  | 34.1         | -30.9                  | 0            | 40.85                      | -                  | -           | 74                  | -33.15         | 255            | 226         | V        |
|        | * 4.738         | 28.23                | MAv1 | 34.1         | -30.9                  | 2.41         | 33.84                      | 54                 | -20.16      | -                   | -              | 255            | 226         | V        |
| 6      | 6.413           | 35.95                | PK2  | 35.4         | -27                    | 0            | 44.35                      | -                  | -           | -                   | -              | 197            | 236         | V        |

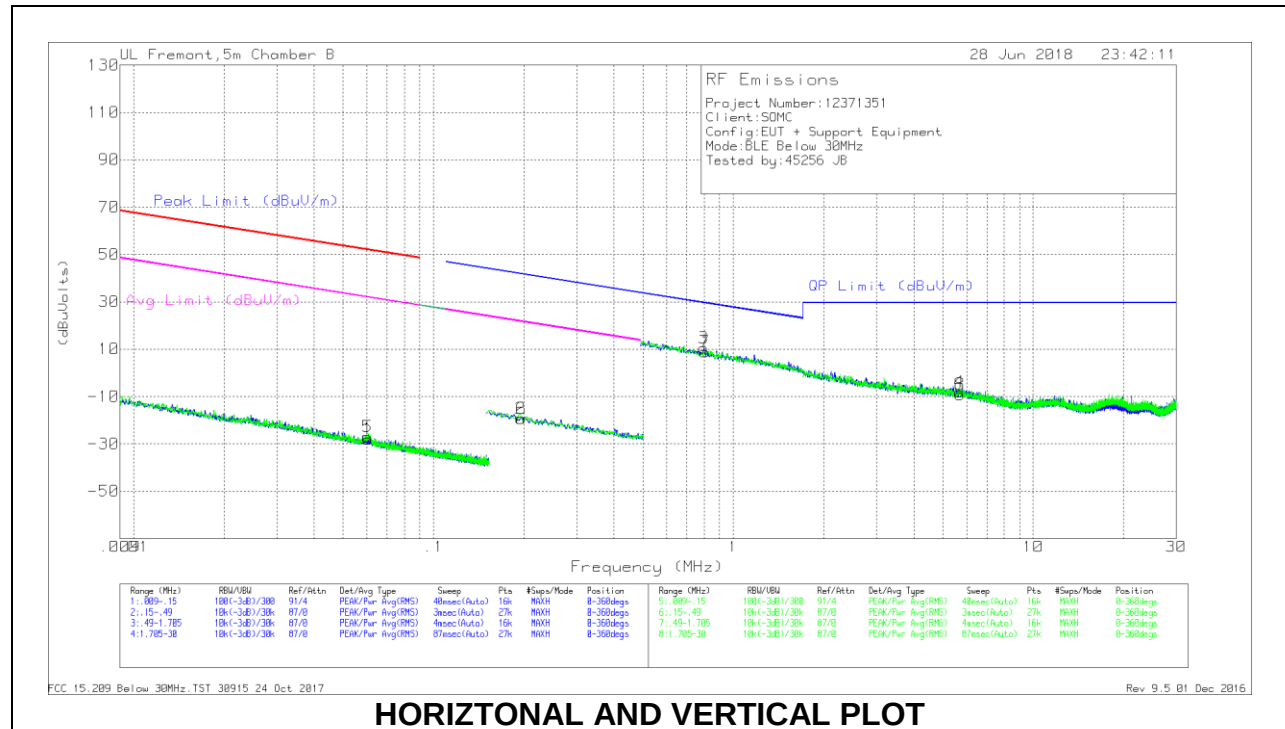
\* - indicates frequency in CFR47 Pt 15 Restricted Band

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

### 9.3. Worst Case Below 30 MHz

#### SPURIOUS EMISSIONS 9 kHz TO 30 MHz (WORST-CASE CONFIGURATION)



HORIZTONTAL AND VERTICAL PLOT

#### Below 30 MHz Data

#### Trace Markers

| 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) |
|--------|-----------------|----------------------|-----|---------------------|----------|----------------|------------------------------|---------------------|-------------|--------------------|-------------|---------------------|-------------|--------------------|-------------|----------------|
| 5      | .06022          | 37.07                | Pk  | 14.5                | 1.4      | -80            | -27.03                       | 51.99               | -79.02      | 31.99              | -59.02      | -                   | -           | -                  | -           | 0-360          |
| 1      | .06056          | 36.17                | Pk  | 14.5                | 1.4      | -80            | -27.93                       | 51.94               | -79.87      | 31.94              | -59.87      | -                   | -           | -                  | -           | 0-360          |
| 2      | .19532          | 45.33                | Pk  | 13.9                | 1.5      | -80            | -19.27                       | -                   | -           | -                  | -           | 41.8                | -61.07      | 21.8               | -41.07      | 0-360          |
| 6      | .19635          | 45.36                | Pk  | 13.9                | 1.5      | -80            | -19.24                       | -                   | -           | -                  | -           | 41.76               | -61         | 21.76              | -41         | 0-360          |

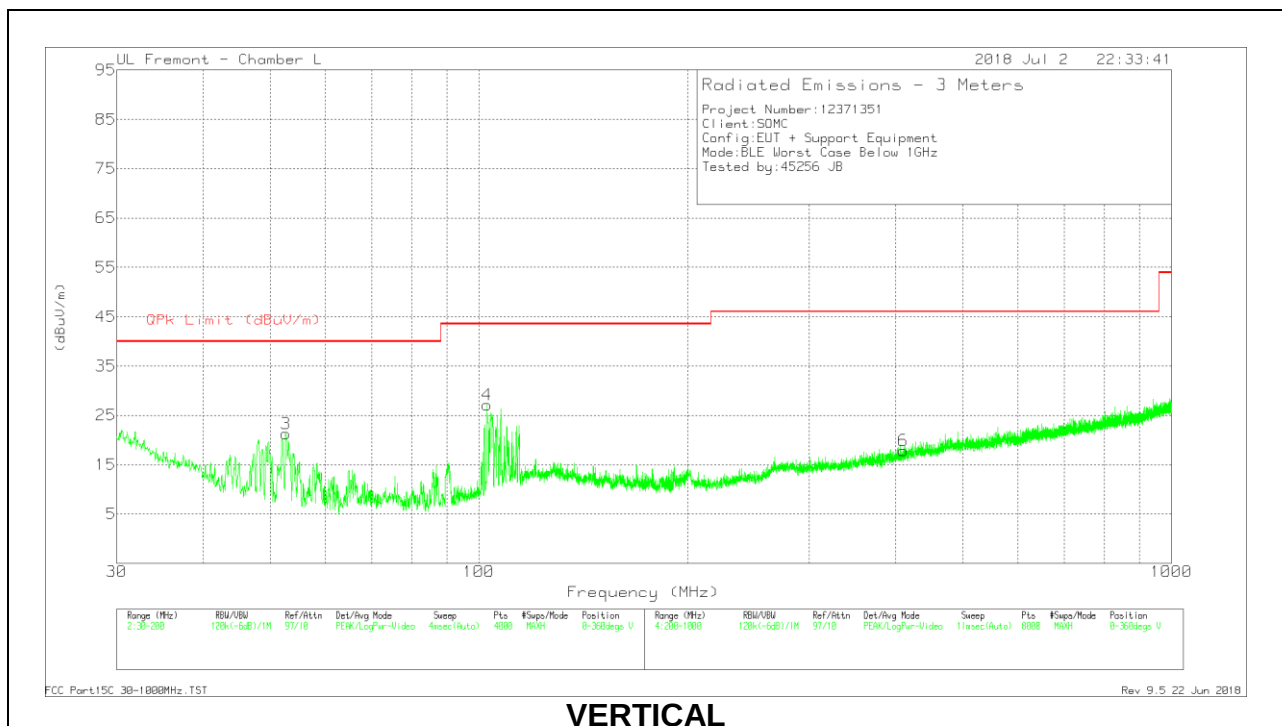
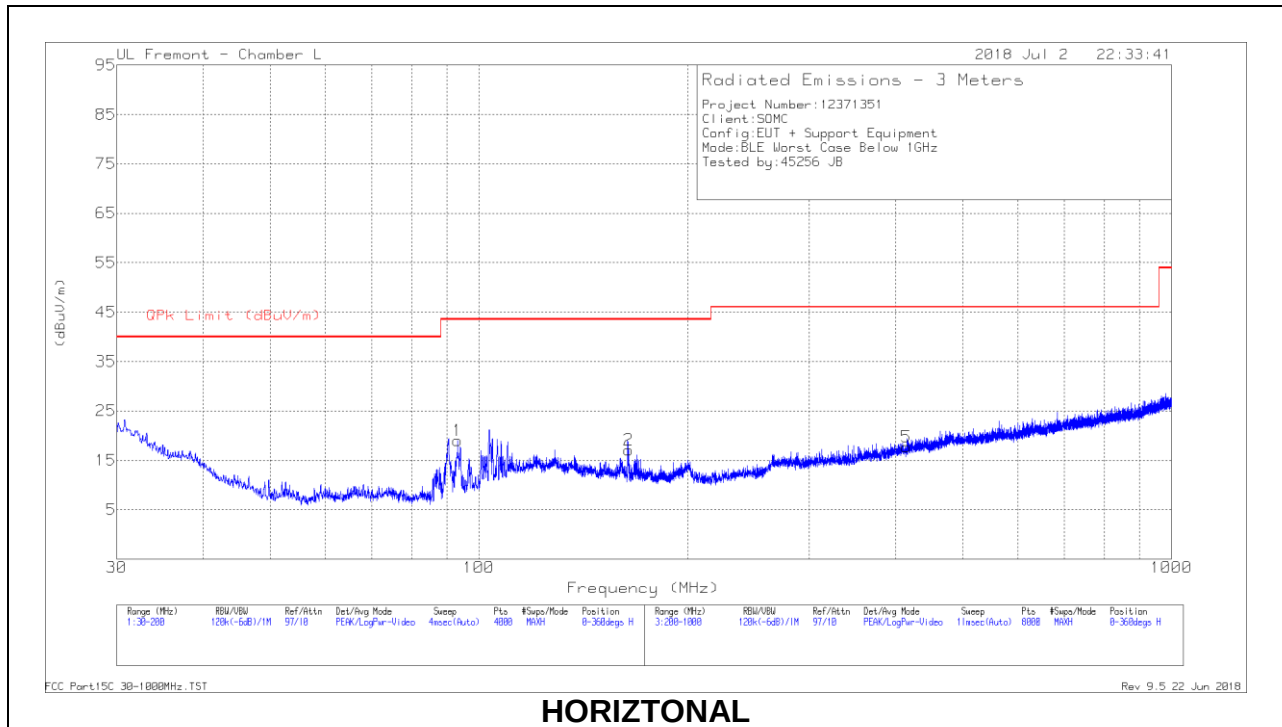
#### Pk - Peak detector

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | Loop Antenna (dB/m) | Cbl (dB) | Dist Corr (dB) 40Log | Corrected Reading (dBuVolts) | QP Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Avg Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|---------------------|----------|----------------------|------------------------------|-------------------|-------------|---------------------|-------------|--------------------|-------------|----------------|
| 3      | .79715          | 35.07                | Pk  | 14                  | 1.5      | -40                  | 10.57                        | 29.59             | -19.02      | -                   | -           | -                  | -           | 0-360          |
| 7      | .80399          | 33.36                | Pk  | 14                  | 1.5      | -40                  | 8.86                         | 29.51             | -20.65      | -                   | -           | -                  | -           | 0-360          |
| 4      | 5.66225         | 15.99                | Pk  | 14.4                | 1.5      | -40                  | -8.11                        | 29.5              | -37.61      | -                   | -           | -                  | -           | 0-360          |
| 8      | 5.70417         | 15.04                | Pk  | 14.4                | 1.5      | -40                  | -9.06                        | 29.5              | -38.56      | -                   | -           | -                  | -           | 0-360          |

#### Pk - Peak detector

## 9.4. Worst Case Below 1 GHz

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



## Below 1GHz Data

### Trace Markers

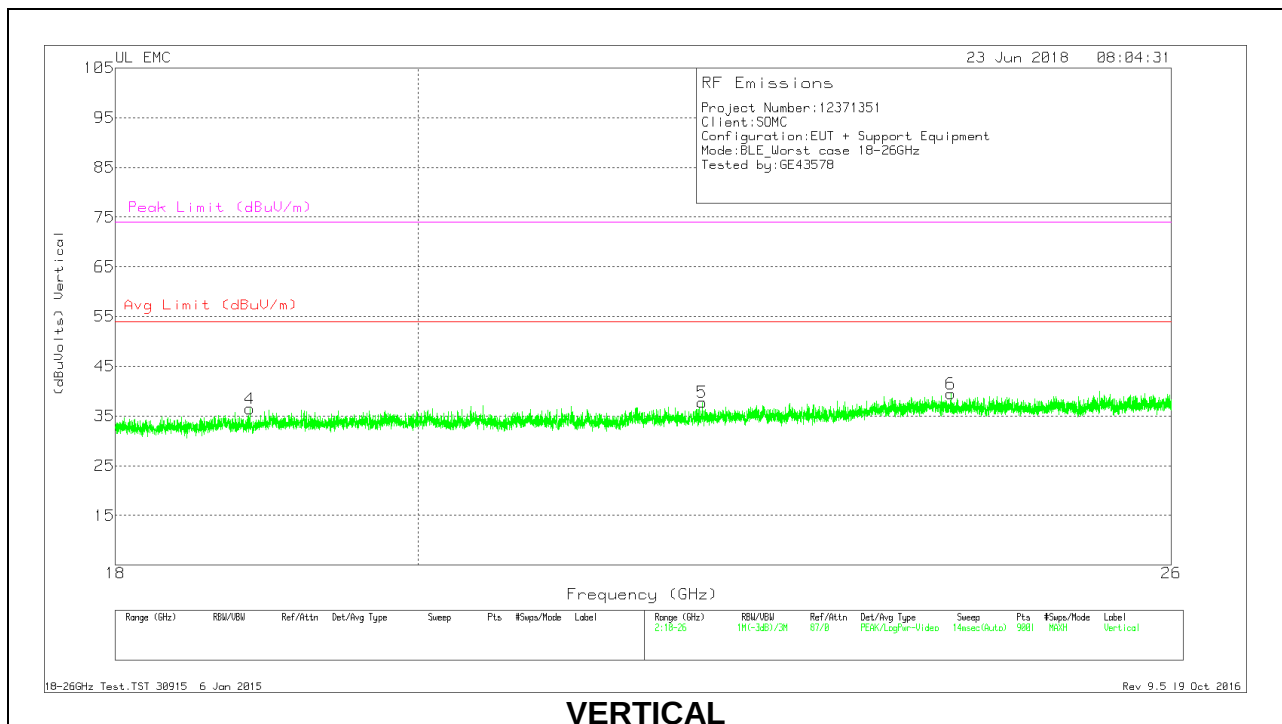
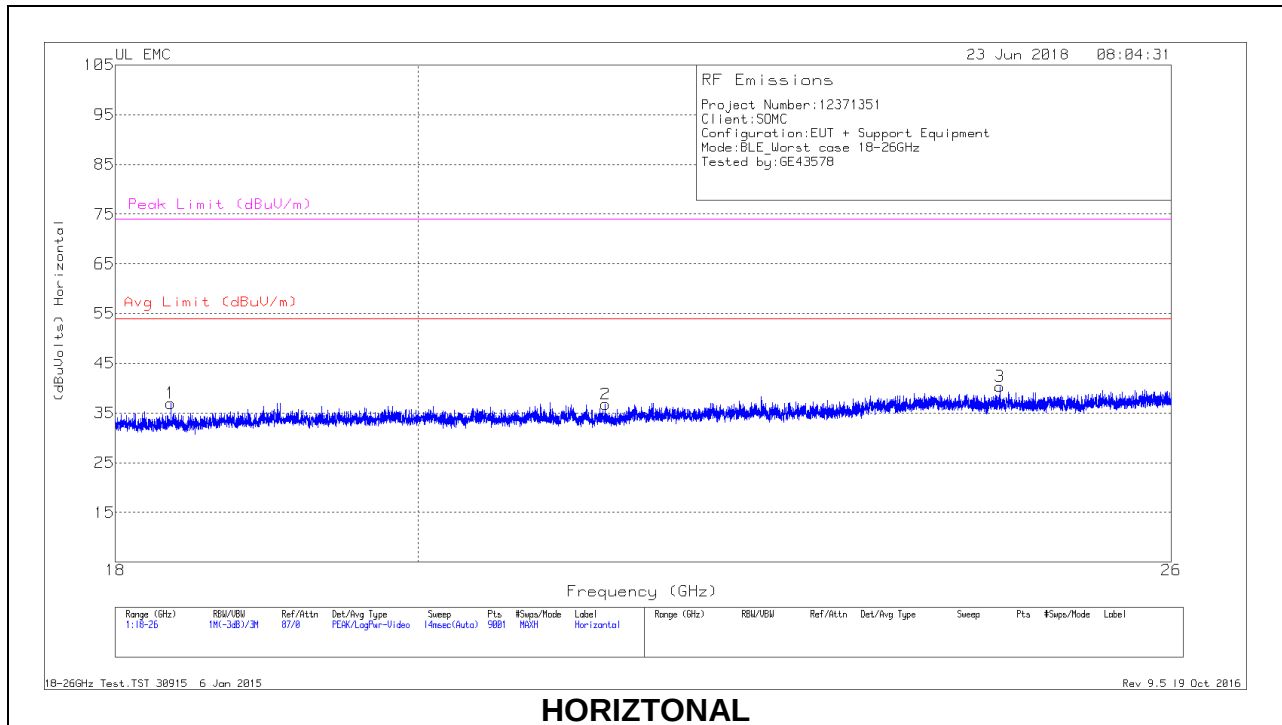
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AF T477 (dB/m) | Amp/Cbl (dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|----------------|--------------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 1      | 93.1713         | 37.24                | Pk  | 12.8           | -31          | 19.04                      | 43.52              | -24.48      | 0-360          | 199         | H        |
| 2      | * 164.5898      | 31.17                | Pk  | 16.4           | -30.5        | 17.07                      | 43.52              | -26.45      | 0-360          | 199         | H        |
| 3      | 52.6159         | 40.51                | Pk  | 12.1           | -31.3        | 21.31                      | 40                 | -18.69      | 0-360          | 100         | V        |
| 4      | 102.7363        | 42.72                | Pk  | 15.4           | -31          | 27.12                      | 43.52              | -16.4       | 0-360          | 100         | V        |
| 5      | 414.0278        | 27.16                | Pk  | 20.3           | -29.7        | 17.76                      | 46.02              | -28.26      | 0-360          | 199         | H        |
| 6      | 410.2273        | 27.26                | Pk  | 20.3           | -29.7        | 17.86                      | 46.02              | -28.16      | 0-360          | 100         | V        |

\* - indicates frequency in CFR47 Pt 15 Restricted Band

Pk - Peak detector

## 9.5. Worst Case 18-26 GHz

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



## 18 – 26GHz DATA

### Trace Markers

| Marker | Frequency<br>(GHz) | Meter<br>Reading<br>(dBuV) | Det | T89 AF<br>(dB/m) | Amp/Cbl<br>(dB) | Dist<br>Corr<br>(dB) | Corrected<br>Reading<br>(dBuVolts) | Avg Limit<br>(dBuV/m) | Margin<br>(dB) | Peak Limit<br>(dBuV/m) | PK<br>Margin<br>(dB) |
|--------|--------------------|----------------------------|-----|------------------|-----------------|----------------------|------------------------------------|-----------------------|----------------|------------------------|----------------------|
| 1      | 18.35              | 39.33                      | Pk  | 32.3             | -25.2           | -9.5                 | 36.93                              | 54                    | -17.07         | 74                     | -37.07               |
| 2      | 21.349             | 38.67                      | Pk  | 33.1             | -25.5           | -9.5                 | 36.77                              | 54                    | -17.23         | 74                     | -37.23               |
| 3      | 24.492             | 40.12                      | Pk  | 34               | -24.3           | -9.5                 | 40.32                              | 54                    | -13.68         | 74                     | -33.68               |
| 4      | 18.862             | 38.76                      | Pk  | 32.4             | -25.2           | -9.5                 | 36.46                              | 54                    | -17.54         | 74                     | -37.54               |
| 5      | 22.081             | 39.23                      | Pk  | 33.4             | -25.4           | -9.5                 | 37.73                              | 54                    | -16.27         | 74                     | -36.27               |
| 6      | 24.077             | 39.36                      | Pk  | 33.9             | -24.3           | -9.5                 | 39.46                              | 54                    | -14.54         | 74                     | -34.54               |

Pk - Peak detector

## 10. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

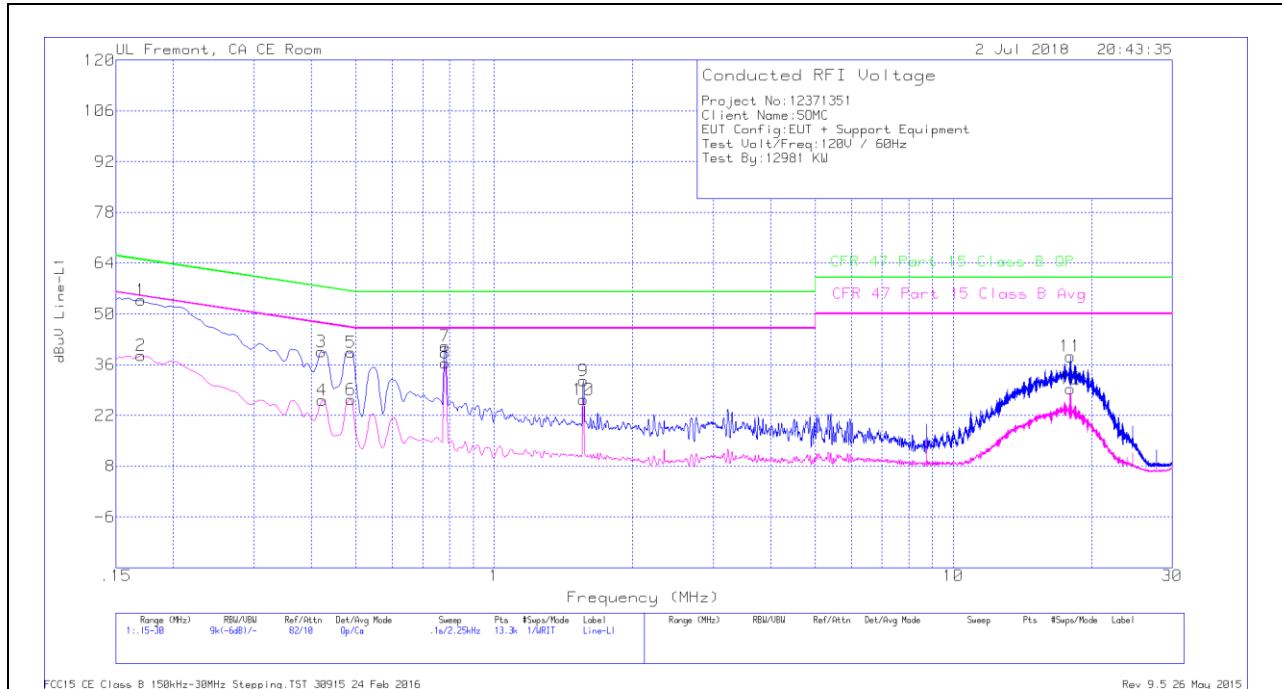
| Frequency of Emission (MHz) | Conducted Limit (dBuV) |            |
|-----------------------------|------------------------|------------|
|                             | Quasi-peak             | Average    |
| 0.15-0.5                    | 66 to 56 *             | 56 to 46 * |
| 0.5-5             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

\* Decreases with the logarithm of the frequency.

### RESULTS

## 10.1.1. AC Power Line Norm

### LINE 1 RESULTS



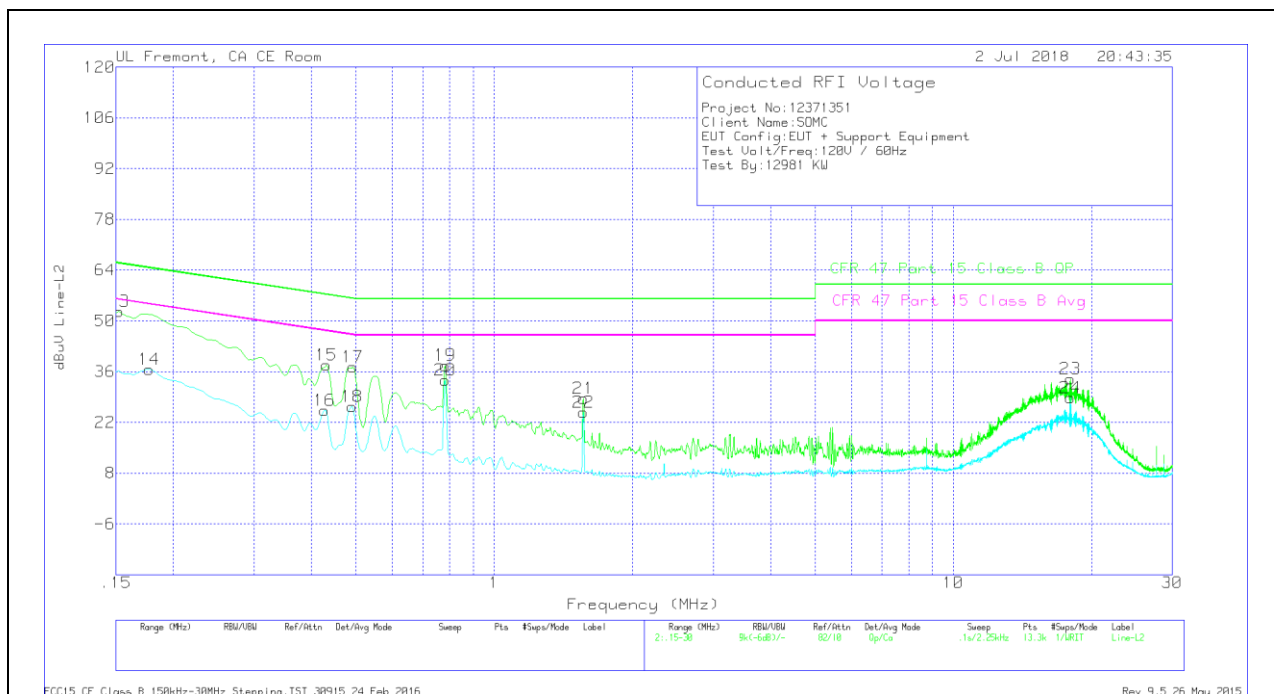
#### Trace Markers

| Range 1: Line-L1 .15 - 30MHz |                 |                      |     |         |                 |              |                        |                           |                |                            |                       |
|------------------------------|-----------------|----------------------|-----|---------|-----------------|--------------|------------------------|---------------------------|----------------|----------------------------|-----------------------|
| Marker                       | Frequency (MHz) | Meter Reading (dBuV) | Det | LISN L1 | LC Cables C1&C3 | Limiter (dB) | Corrected Reading dBuV | CFR 47 Part 15 Class B QP | QP Margin (dB) | CFR 47 Part 15 Class B Avg | Av(CISPR) Margin (dB) |
| 1                            | .17025          | 43.66                | Qp  | 0       | 0               | 10.1         | 53.76                  | 64.95                     | -11.19         | -                          | -                     |
| 2                            | .17025          | 28.37                | Ca  | 0       | 0               | 10.1         | 38.47                  | -                         | -              | 54.95                      | -16.48                |
| 3                            | .42             | 29.5                 | Qp  | 0       | 0               | 10.1         | 39.6                   | 57.45                     | -17.85         | -                          | -                     |
| 4                            | .42225          | 16.01                | Ca  | 0       | 0               | 10.1         | 26.11                  | -                         | -              | 47.4                       | -21.29                |
| 5                            | .4875           | 29.24                | Qp  | 0       | 0               | 10.1         | 39.34                  | 56.21                     | -16.87         | -                          | -                     |
| 6                            | .4875           | 16.3                 | Ca  | 0       | 0               | 10.1         | 26.4                   | -                         | -              | 46.21                      | -19.81                |
| 7                            | .78225          | 31.11                | Qp  | 0       | 0               | 10.1         | 41.21                  | 56                        | -14.79         | -                          | -                     |
| 8                            | .78225          | 26.4                 | Ca  | 0       | 0               | 10.1         | 36.5                   | -                         | -              | 46                         | -9.5                  |
| 9                            | 1.563           | 21.39                | Qp  | 0       | .1              | 10.1         | 31.59                  | 56                        | -24.41         | -                          | -                     |
| 10                           | 1.56525         | 16.18                | Ca  | 0       | .1              | 10.1         | 26.38                  | -                         | -              | 46                         | -19.62                |
| 11                           | 17.988          | 27.57                | Qp  | .1      | .3              | 10.3         | 38.27                  | 60                        | -21.73         | -                          | -                     |
| 12                           | 17.988          | 18.7                 | Ca  | .1      | .3              | 10.3         | 29.4                   | -                         | -              | 50                         | -20.6                 |

Qp - Quasi-Peak detector

Ca - CISPR average detection

## LINE 2 RESULTS



### Trace Markers

| Range 2: Line-L2 .15 - 30MHz |                 |                      |     |         |                 |              |                        |                           |                |                            |                       |
|------------------------------|-----------------|----------------------|-----|---------|-----------------|--------------|------------------------|---------------------------|----------------|----------------------------|-----------------------|
| Marker                       | Frequency (MHz) | Meter Reading (dBuV) | Det | LISN L2 | LC Cables C2&C3 | Limiter (dB) | Corrected Reading dBuV | CFR 47 Part 15 Class B QP | QP Margin (dB) | CFR 47 Part 15 Class B Avg | Av(CISPR) Margin (dB) |
| 13                           | .15225          | 42.48                | Qp  | .1      | 0               | 10.1         | 52.68                  | 65.88                     | -13.2          | -                          | -                     |
| 14                           | .177            | 26.59                | Ca  | 0       | 0               | 10.1         | 36.69                  | -                         | -              | 54.63                      | -17.94                |
| 15                           | .43125          | 27.68                | Qp  | 0       | 0               | 10.1         | 37.78                  | 57.23                     | -19.45         | -                          | -                     |
| 16                           | .42675          | 15.18                | Ca  | 0       | 0               | 10.1         | 25.28                  | -                         | -              | 47.32                      | -22.04                |
| 17                           | .492            | 27.17                | Qp  | 0       | 0               | 10.1         | 37.27                  | 56.13                     | -18.86         | -                          | -                     |
| 18                           | .48975          | 16.25                | Ca  | 0       | 0               | 10.1         | 26.35                  | -                         | -              | 46.17                      | -19.82                |
| 19                           | .78225          | 27.64                | Qp  | 0       | 0               | 10.1         | 37.74                  | 56                        | -18.26         | -                          | -                     |
| 20                           | .78225          | 23.59                | Ca  | 0       | 0               | 10.1         | 33.69                  | -                         | -              | 46                         | -12.31                |
| 21                           | 1.563           | 18.44                | Qp  | 0       | .1              | 10.1         | 28.64                  | 56                        | -27.36         | -                          | -                     |
| 22                           | 1.563           | 14.54                | Ca  | 0       | .1              | 10.1         | 24.74                  | -                         | -              | 46                         | -21.26                |
| 23                           | 17.99925        | 23.38                | Qp  | .1      | .3              | 10.3         | 34.08                  | 60                        | -25.92         | -                          | -                     |
| 24                           | 17.99925        | 18.03                | Ca  | .1      | .3              | 10.3         | 28.73                  | -                         | -              | 50                         | -21.27                |

Qp - Quasi-Peak detector

Ca - CISPR average detection