



# **TEST REPORT**

**Report Number:** 13129294-E1V3

**Applicant :** Microsoft Corporation  
One Microsoft Way  
Redmond, WA 98052-6399  
USA

**Model :** 1930

**FCC ID :** C3K1930

**IC :** 3048A-1930

**EUT Description :** Phablet Device

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

**Date Of Issue:**

June 11, 2020

**Prepared by:**

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NVLAP Lab code: 200065-0

NVLAP Lab code: 200246-0

## REPORT REVISION HISTORY

| Rev. | Issue Date | Revisions           | Revised By    |
|------|------------|---------------------|---------------|
| V1   | 5/4/2020   | Initial Issue       | ---           |
| V2   | 6/9/2020   | Updated the EUT     | Grace Rincand |
| V3   | 6/11/2020  | Section 6.5 updated | Henry Lau     |

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Microsoft Corporation  
One Microsoft Way  
Redmond, WA 98052-6399  
USA

**EUT DESCRIPTION:** Phablet Device

**MODEL:** 1930

**SERIAL NUMBER:** 900086500465, 900039701165 (Radiated)  
901245700365(Conducted)

**DATE TESTED:** January 16, 2020 – April 17, 2020

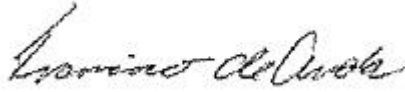
| APPLICABLE STANDARDS     |              |
|--------------------------|--------------|
| STANDARD                 | TEST RESULTS |
| CFR 47 Part 15 Subpart C | Complies     |
| ISED RSS-247 Issue 2     | Complies     |
| ISED RSS-GEN Issue 5     | Complies     |

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

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

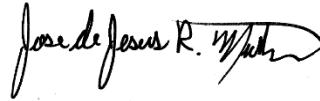
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Consumer Technology Division  
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## 2. TEST RESULTS SUMMARY

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

\*Testing performed at 47173 Benicia Street Fremont, California, 94538 USA facility.

\*\*Testing performed at 12 Laboratory Dr., Research Triangle Park, NC 27709 U.S.A. facility.

## 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, RSS-GEN Issue 5, and RSS-247 Issue 2.

## 4. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 & 47266 Benicia Street, 47658 Kato Road, Fremont, California, USA, 12 Laboratory Drive, Research Triangle Park and 2800 Perimeter Park Dr, Suite B, Morrisville, North Carolina, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

| 12 Laboratory Dr.                      | 2800 Suite Perimeter Park Dr.                     |
|--|---|
| <input type="checkbox"/> Chamber A RTP | <input type="checkbox"/> North Chamber            |
| <input type="checkbox"/> Chamber C RTP | <input checked="" type="checkbox"/> South Chamber |

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

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0

## 5. DECISION RULES AND MEASUREMENT UNCERTAINTY

### 5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

### 5.2. DECISION RULES

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

### 5.3. MEASUREMENT UNCERTAINTY

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

| PARAMETER   | U <sub>Lab</sub> |
|---|------------------|
| Worst Case Conducted Disturbance, 9KHz to 0.15 MHz  | 3.39 dB          |
| Worst Case Conducted Disturbance, 0.15 to 30 MHz    | 3.07 dB          |
| Worst Case Radiated Disturbance, 9KHz to 30 MHz     | 2.52 dB          |
| Worst Case Radiated Disturbance, 30 to 1000 MHz     | 4.88 dB          |
| Worst Case Radiated Disturbance, 1000 to 18000 MHz  | 4.24 dB          |
| Worst Case Radiated Disturbance, 18000 to 26000 MHz | 4.37 dB          |
| Worst Case Radiated Disturbance, 26000 to 40000 MHz | 5.17 dB          |

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

### 5.4. SAMPLE CALCULATION

#### RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

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

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

#### MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

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

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



## 6. EQUIPMENT UNDER TEST

### 6.1. EUT DESCRIPTION

The EUT is a Phablet Device with 802.11 a/b/g/n/ac 2x2 WLAN, Bluetooth, Bluetooth LE, GSM, WCDMA, and LTE radios.

### 6.2. MAXIMUM OUTPUT POWER

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

| Frequency Range (MHz) | Mode | Output Power (dBm) | Output Power (mW) |
|-----------------------|------|--------------------|-------------------|
| 2402 - 2480           | BLE  | 6.12               | 4.09              |

### 6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a PIFA antenna, with a maximum gain of 1.1 dBi.

### 6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was Android version 10, Build Number b1 developer-generic 2020.311.4.

The test utility software used during testing was QRCT v4.0-00123.

### 6.5. WORST-CASE CONFIGURATION AND MODE

Radiated emissions below 1GHz, above 18GHz, and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Band edge and radiated emissions between 1GHz and 18GHz were performed with the EUT set to transmit at the highest power on low, middle and high channels.

The EUT was investigated in three orthogonal orientations X/Y/Z. Additionally, the EUT was investigated in four configurations with both screens: folded and closed/open 90 degrees/flat 180 degrees/folded and open. It was determined that the EUT in flat 180 degrees with X (Flatbed) orientation was worst-case orientation therefore all final radiated testing was performed with the EUT in 180 degrees flat at X(Flatbed).

Output Power for 125kbps, 500kbps, 1Mbps, and 2Mbps are the same therefore 500kbps & 1Mbps are covered by 125kbps & 2Mbps with 125kbps having worst case PSD and 2Mbps having worst case bandwidth.

Data rates provided by the client were:

BLE mode: 125kbps  
 BLE mode: 500kbps  
 BLE mode: 1Mbps  
 BLE mode: 2Mbps

## 6.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Support Equipment List |              |             |                             |        |
|------------------------|--------------|-------------|-----------------------------|--------|
| Description            | Manufacturer | Model       | Serial Number               | FCC ID |
| AC/DC Adapter          | Lenovo       | ADLX45NCC2A | 8SSA10E75794C1SG8<br>5N14BE | DoC    |
| Laptop                 | Lenovo       | Yoga 11e    | R9-0R7KPR                   | DoC    |

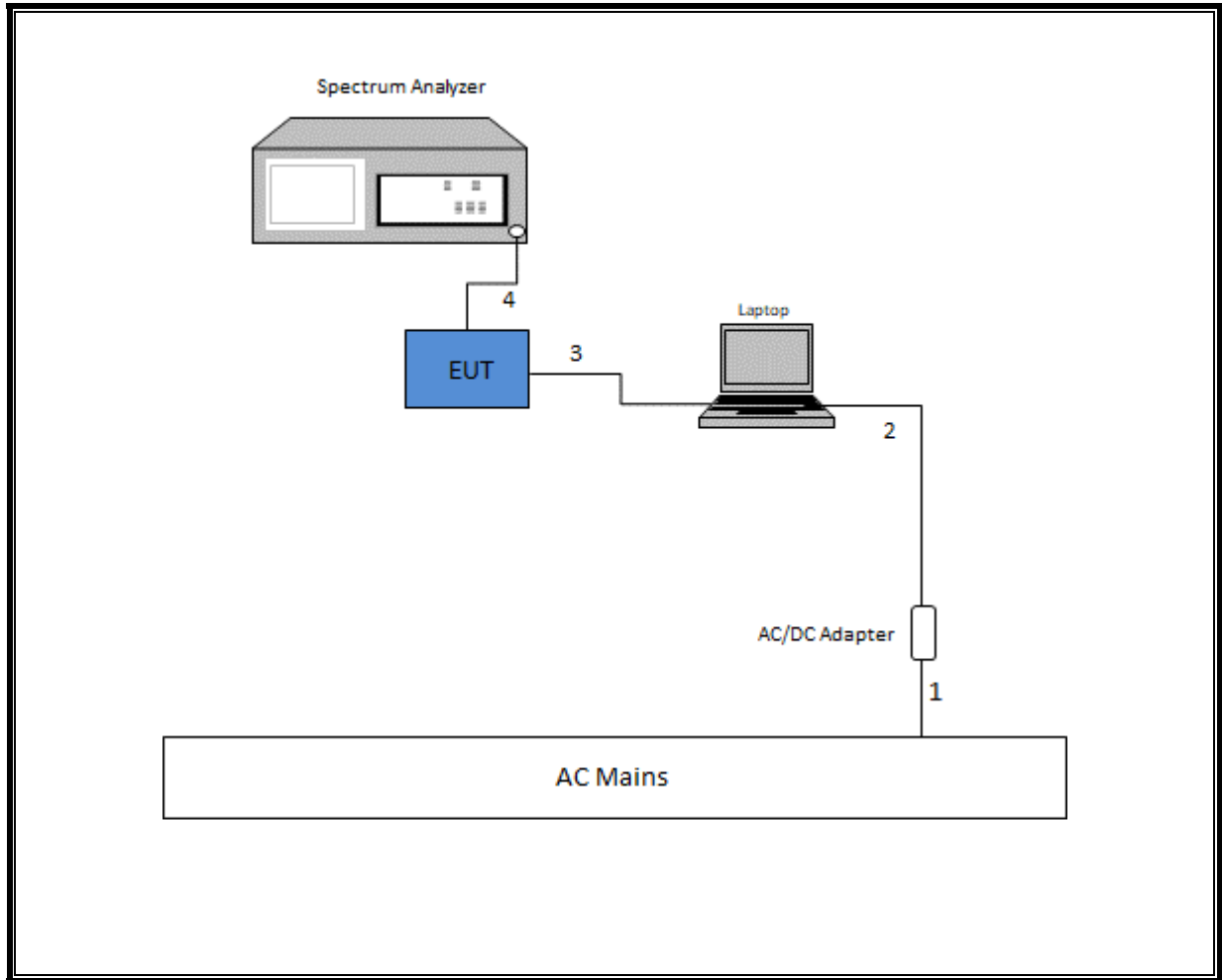
### I/O CABLES

| I/O Cable List |         |                      |                |             |                  |                  |
|----------------|---------|----------------------|----------------|-------------|------------------|------------------|
| Cable No       | Port    | # of identical ports | Connector Type | Cable Type  | Cable Length (m) | Remarks          |
| 1              | AC      | 1                    | AC             | Un-Shielded | 1                | to AC/DC Adapter |
| 2              | DC      | 1                    | DC             | Shielded    | 1                | to Laptop        |
| 3              | USB     | 1                    | Type C         | Shielded    | 0.1              | to EUT           |
| 4              | Antenna | 1                    | SMA            | Un-Shielded | 0.2              | to Analyzer      |

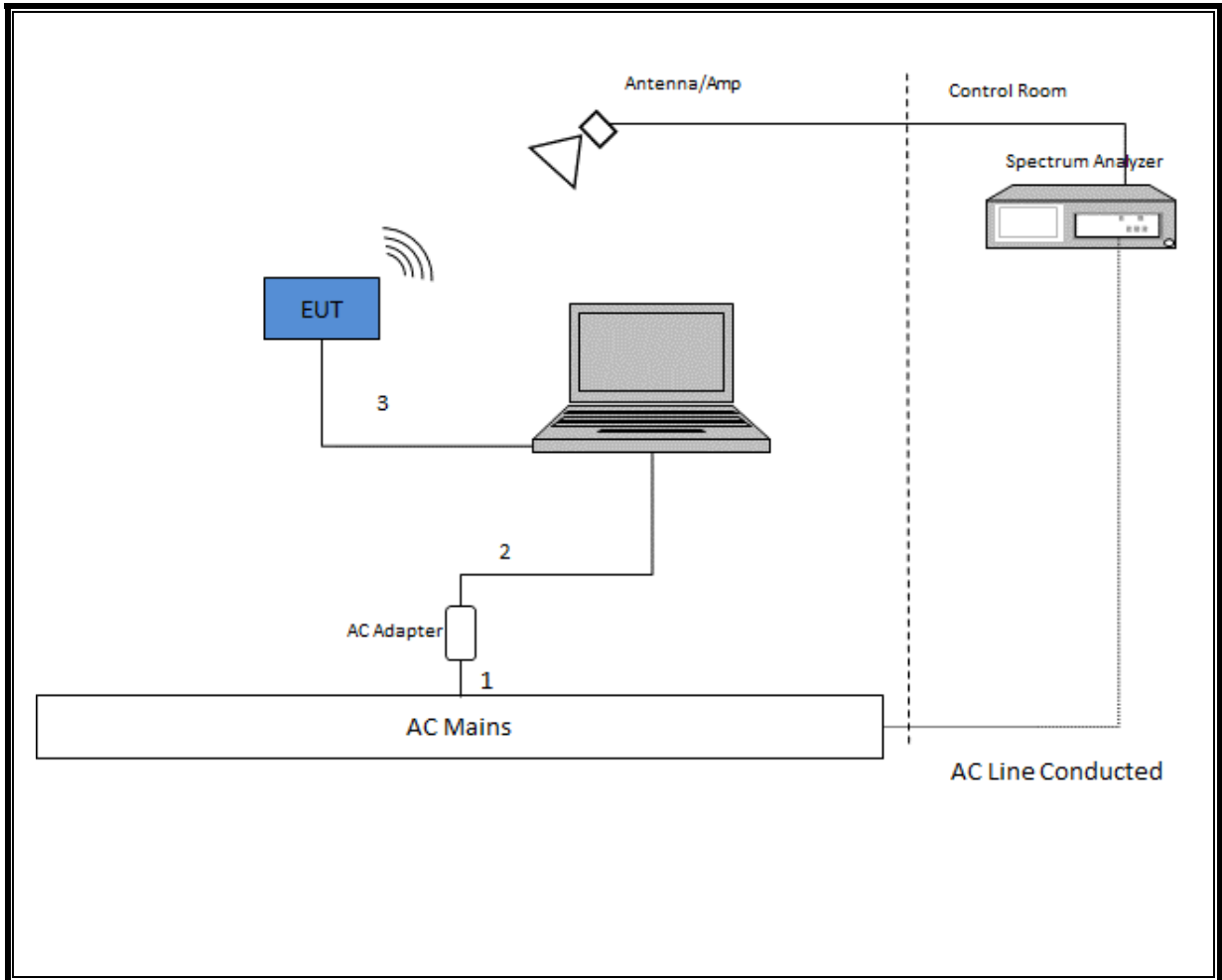
### TEST SETUP

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

**CONDUCTED TEST SETUP DIAGRAM**



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



## 7. MEASUREMENT METHOD

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

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

6 dB BW: ANSI C63.10 Subclause -11.8.1

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

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

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

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

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

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

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

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

## 8. TEST AND MEASUREMENT EQUIPMENT

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

| TEST EQUIPMENT LIST                                |                           |        |              |             |
|--|---------------------------|--------|--------------|-------------|
| Description  | Manufacturer              | Model  | Asset        | Cal Due     |
| Spectrum Analyzer, PSA, 3Hz to 44GHz               | Keysight Technologies Inc | E4446A | T146         | 01/29/2021  |
| Power Meter, P-series single channel               | Keysight Technologies Inc | N1911A | T1264        | 01/21/2021  |
| Power Sensor, P - series, 50MHz to 18GHz, Wideband | Keysight Technologies Inc | N1921A | T1223        | 02/25/2020* |
| UL AUTOMATION SOFTWARE                             |                           |        |              |             |
| Antenna Port Software                              | UL                        | UL RF  | Ver 2020.1.8 |             |

\*Equipment listed above that has a calibration due date during the testing period, the testing is completed before equipment expiration date.

### Test Equipment Used - Radiated Disturbance Emissions Test Equipment (Morrisville - South Chamber)

| Equip. ID     | Description                                       | Manufacturer         | Model Number | Last Cal.  | Next Cal.  |
|---------------|---|----------------------|--------------|------------|------------|
|               | <b>0.009-30MHz</b>                                | <b>(Loop Ant.)</b>   |              |            |            |
| AT0079        | Active Loop Antenna                               | ETS-Lindgren         | 6502         | 2019-08-08 | 2020-08-08 |
|               | <b>30-1000 MHz</b>                                |                      |              |            |            |
| AT0074        | Hybrid Broadband Antenna                          | Sunol Sciences Corp. | JB3          | 2019-07-16 | 2020-07-16 |
|               | <b>1-18 GHz</b>                                   |                      |              |            |            |
| AT0072        | Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz | ETS Lindgren         | 3117         | 2019-04-22 | 2020-04-22 |
|               | <b>18-26 GHz</b>                                  |                      |              |            |            |
| AT0076        | Horn Antenna, 18-26.5GHz                          | ARA                  | MWH-1826/B   | 2019-11-07 | 2020-11-07 |
|               | <b>Gain-Loss Chains</b>                           |                      |              |            |            |
| S-SAC01       | Gain-loss string: 0.009-30MHz                     | Various              | Various      | 2019-05-02 | 2020-05-02 |
| S-SAC02       | Gain-loss string: 25-1000MHz                      | Various              | Various      | 2019-05-02 | 2020-05-02 |
| S-SAC03       | Gain-loss string: 1-18GHz                         | Various              | Various      | 2020-03-17 | 2021-03-17 |
| S-SAC04       | Gain-loss string: 18-40GHz                        | Various              | Various      | 2020-03-23 | 2021-03-23 |
|               | <b>Receiver &amp; Software</b>                    |                      |              |            |            |
| SA0027        | Spectrum Analyzer                                 | Agilent              | N9030A       | 2019-05-15 | 2020-05-15 |
| SOFTEMI       | EMI Software                                      | UL                   | Version 9.5  | NA         | NA         |
|               | <b>Additional Equipment used</b>                  |                      |              |            |            |
| s/n 181474409 | Environmental Meter                               | Fisher Scientific    | 15-077-963   | 2018-07-27 | 2020-07-27 |

Test Equipment Used - Wireless Conducted Measurement Equipment

| Equipment ID           | Description-<br>Common Equipment<br>Conducted Room 2 | Manufacturer               | Model Number                 | Last Cal.  | Next Cal.  |
|------------------------|--|----------------------------|------------------------------|------------|------------|
| T177<br>(PRE0079253)   | Spectrum Analyzer                                    | Agilent<br>Technologies    | E4446A                       | 2019-04-22 | 2020-04-22 |
| PWM002<br>(PRE0137344) | RF Power Meter                                       | Keysight<br>Technologies   | N1911A                       | 2019-08-23 | 2020-08-23 |
| PWS003<br>(PRE0126443) | Peak and Avg Power Sensor,<br>50MHz to 6GHz          | Keysight<br>Technologies   | E9323A                       | 2019-08-23 | 2020-08-23 |
| 76023<br>(EC0225)      | Temp/Humid Chamber                                   | Cincinnati Sub-<br>Zero    | ZPH-8-3.5-SCT/AC             | 2019-06-14 | 2020-06-14 |
| SN 181474341           | Environmental Meter                                  | Fisher Scientific          | 15-077-963                   | 2018-07-27 | 2020-07-27 |
| 76021                  | DC Regulated Power Supply                            | CircuitSpecialists.<br>Com | CSI3005X5                    | N/A        | N/A        |
| SOFTEMI                | EMC Software   | UL                         | Version 10.3<br>(2019-09-24) | NA         | NA         |

Test Equipment Used - Line-Conducted Emissions – Voltage (Morrisville – Conducted 1)

| Equipment ID          | Description                                      | Manufacturer           | Model Number                 | Last Cal.  | Next Cal.  |
|-----------------------|--|------------------------|------------------------------|------------|------------|
| CBL087                | Coax cable, RG223, N-male to<br>BNC-male, 20-ft. | Pasternack             | PE3W06143-240                | 2020-03-26 | 2021-03-26 |
| s/n 181562858         | Environmental Meter                              | Fisher Scientific      | 14-650-118                   | 2018-09-04 | 2020-09-04 |
| LISN003               | LISN, 50-ohm/50-uH, 2-conductor,<br>25A          | Fischer Custom<br>Com. | FCC-LISN-50-25-2-01-<br>550V | 2019-08-19 | 2020-08-19 |
| 75141<br>(PRE0101521) | EMI Test Receiver 9kHz-7GHz                      | Rohde & Schwarz        | ESCI 7                       | 2019-08-20 | 2020-08-20 |
| ATA222                | Transient Limiter, 0.009-100MHz                  | Electro-Metrics        | EM-7600                      | 2020-03-26 | 2021-03-26 |
| PS214                 | AC Power Source                                  | Elgar                  | CW2501M<br>(s/n 1523A02396)  | NA         | NA         |
| SOFTEMI               | EMI Software                                     | UL                     | Version 9.5                  | NA         | NA         |
|                       | <b>Miscellaneous (if needed)</b>                 |                        |                              |            |            |
| CDECABLE001           | ANSI C63.4 1m extension cable.                   | UL                     | Per Annex B of ANSI<br>C63.4 | 2019-07-10 | 2020-07-10 |

## 9. ANTENNA PORT TEST RESULTS

### 9.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

#### PROCEDURE

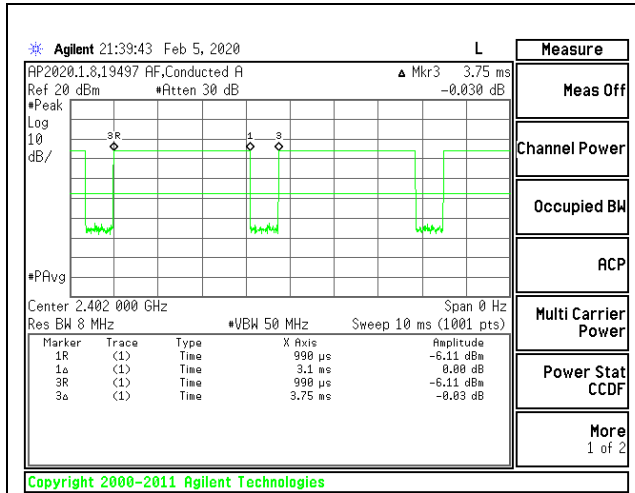
KDB 558074 Zero-Span Spectrum Analyzer Method.

#### ON TIME AND DUTY CYCLE RESULTS

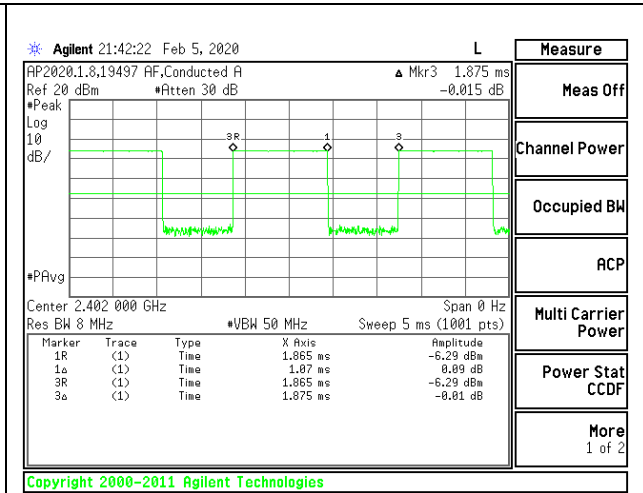
| Mode               | ON Time<br>B<br>(msec) | Period<br>(msec) | Duty Cycle<br>x<br>(linear) | Duty<br>Cycle<br>(%) | Duty Cycle<br>Correction Factor | 1/B<br>Minimum VBW<br>(kHz) |
|--------------------|------------------------|------------------|-----------------------------|----------------------|---------------------------------|-----------------------------|
| <b>2.4GHz Band</b> |                        |                  |                             |                      |                                 |                             |
| BLE 125Kbps        | 3.100                  | 3.750            | 0.827                       | 82.67%               | 1.65                            | 0.323                       |
| BLE 500Kbps        | 1.070                  | 1.875            | 0.571                       | 57.07%               | 4.87                            | 0.935                       |
| BLE 1Mbps          | 0.390                  | 0.625            | 0.624                       | 62.40%               | 4.10                            | 2.564                       |
| BLE 2Mbps          | 0.205                  | 0.625            | 0.328                       | 32.80%               | 9.68                            | 4.878                       |



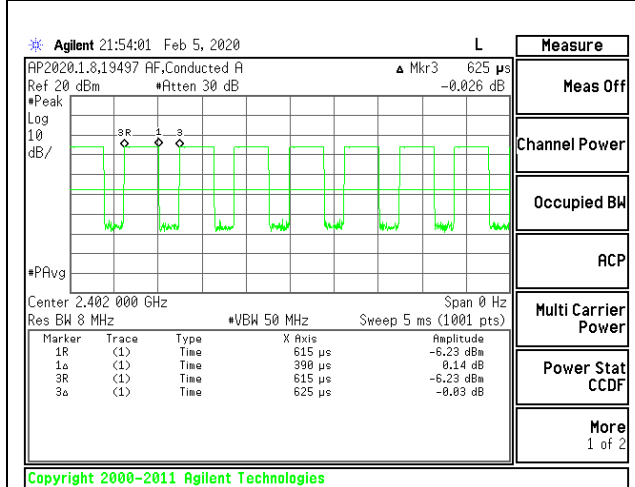
DUTY CYCLE PLOTS



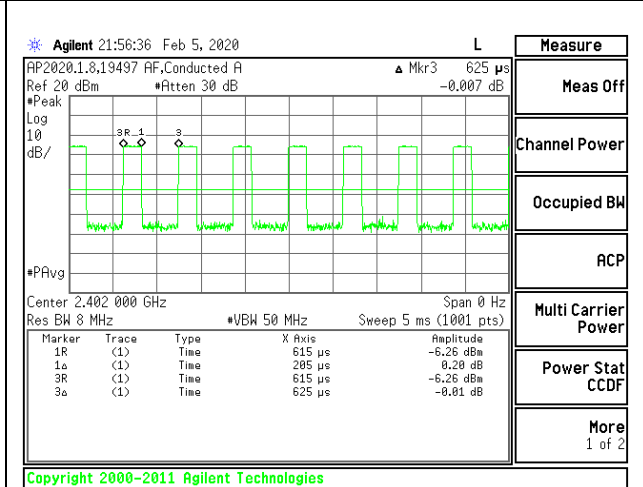
BLE 125Kbps



BLE 500Kbps



BLE 1Mbps



BLE 2Mbps

## **9.2. 99% BANDWIDTH**

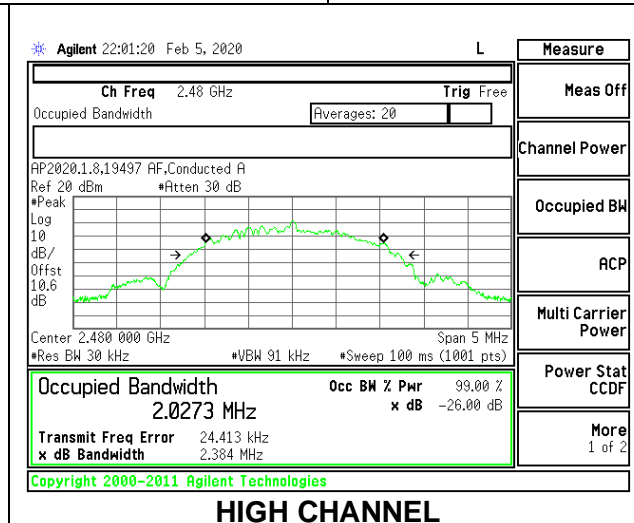
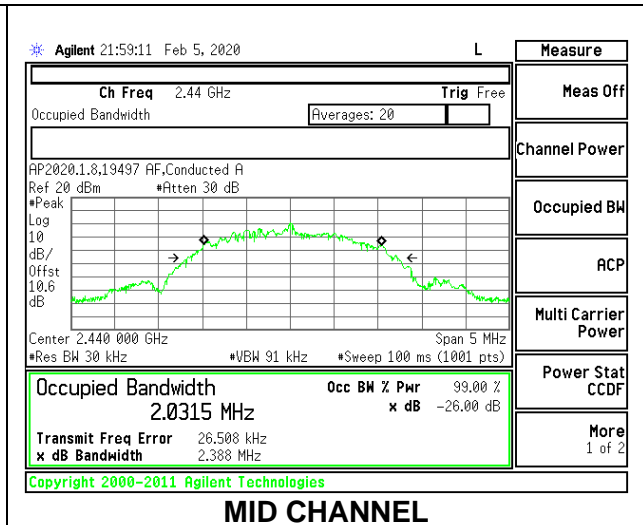
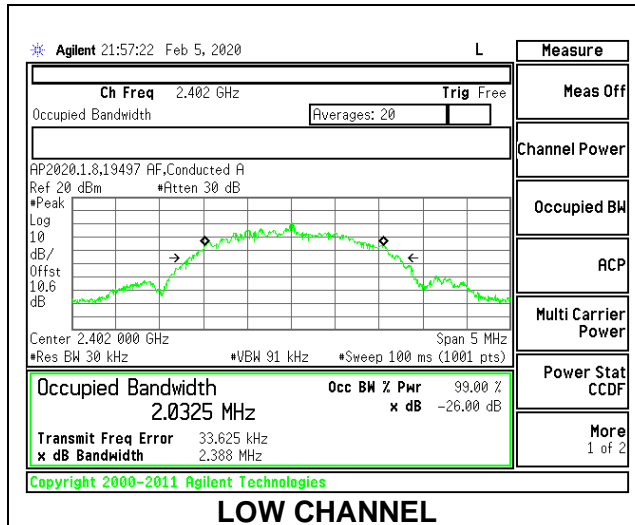
### **LIMITS**

None; for reporting purposes only.

### **RESULTS**

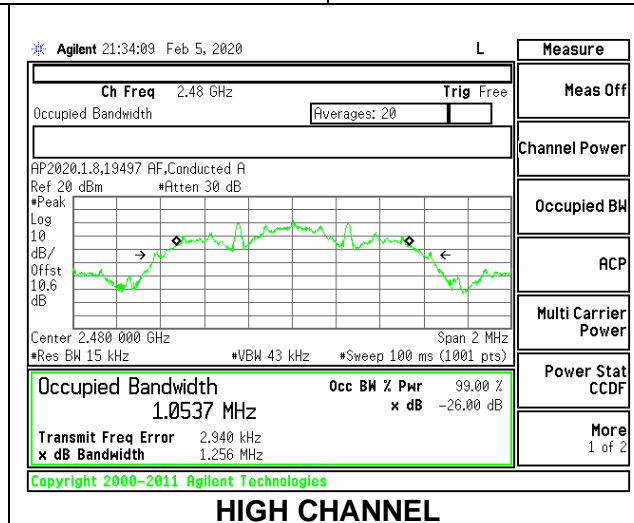
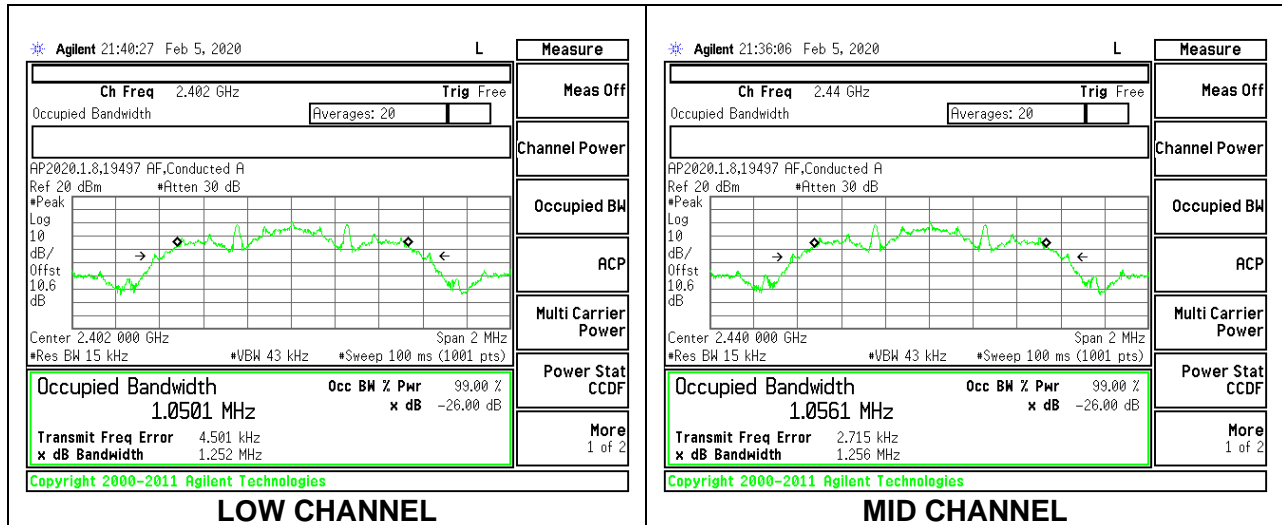
### 9.2.1. BLE (2Mbps)

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|---------|-----------------|---------------------|
| Low     | 2402            | 2.0325              |
| Middle  | 2440            | 2.0315              |
| High    | 2480            | 2.0273              |



### 9.2.2. BLE (125Kbps)

| Frequency (MHz) | 99% Bandwidth (MHz) |
|-----------------|---------------------|
| 2402            | 1.0501              |
| 2440            | 1.0561              |
| 2480            | 1.0537              |



### **9.3. 6 dB BANDWIDTH**

#### **LIMITS**

FCC §15.247 (a) (2)

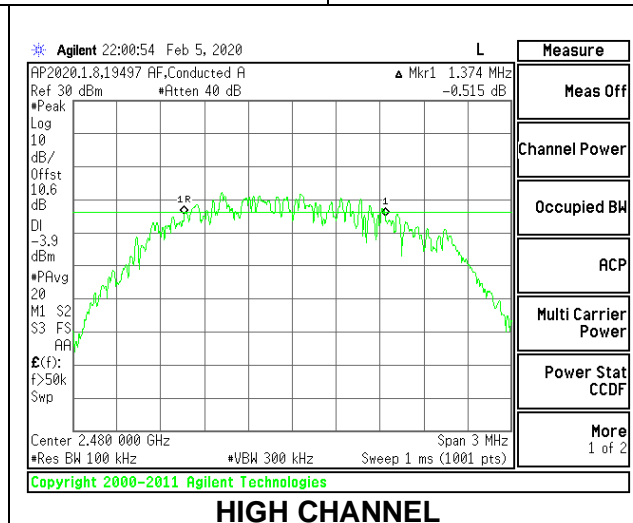
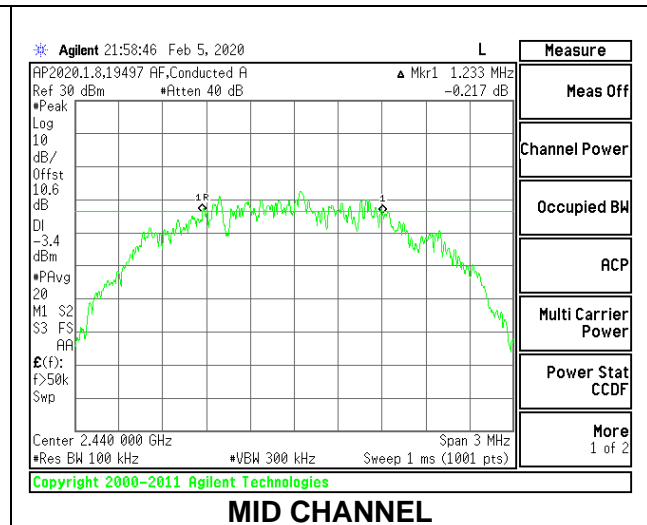
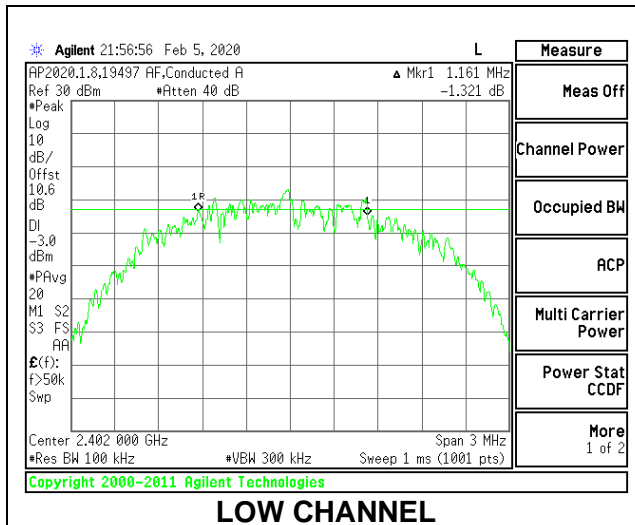
RSS-247 5.2 (a)

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

#### **RESULTS**

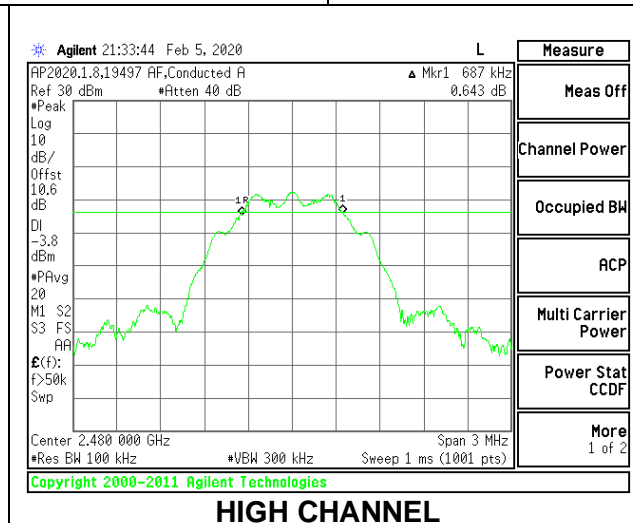
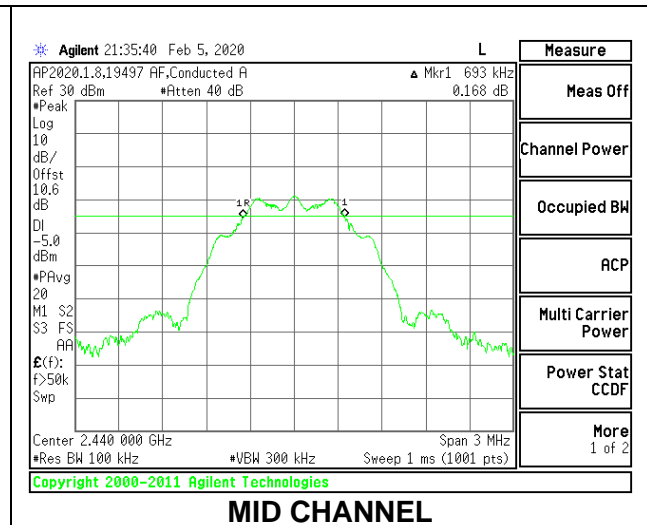
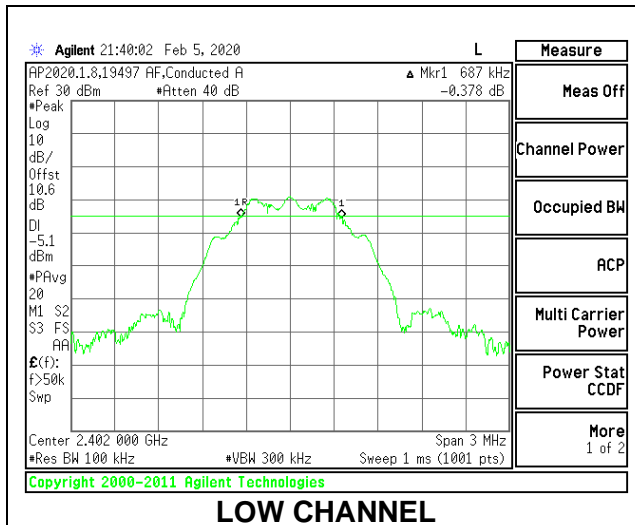
### 9.3.1. BLE (2Mbps)

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low     | 2402            | 1.161                | 0.5                 |
| Middle  | 2440            | 1.233                | 0.5                 |
| High    | 2480            | 1.374                | 0.5                 |



### 9.3.2. BLE (125Kbps)

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) |
|---------|-----------------|----------------------|---------------------|
| Low     | 2402            | 0.687                | 0.5                 |
| Middle  | 2440            | 0.693                | 0.5                 |
| High    | 2480            | 0.687                | 0.5                 |



## **9.4. OUTPUT POWER**

### **LIMITS**

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

### **TEST PROCEDURE**

The transmitter output is connected to a power meter.

The cable assembly insertion loss was entered as an offset in the power meter to allow for a gated peak reading of power.

### **RESULTS**



### 9.4.1. BLE (2Mbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 16080 ZS  |
| <b>Date:</b>      | 1/16/2020 |

| <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                       | 5.03                                    | 30                     | -24.970                |
| Middle         | 2440                       | 4.94                                    | 30                     | -25.060                |
| High           | 2480                       | 6.12                                    | 30                     | -23.880                |

### 9.4.2. BLE (1Mbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 16080 ZS  |
| <b>Date:</b>      | 1/16/2020 |

| <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                       | 4.96                                    | 30                     | -25.040                |
| Middle         | 2440                       | 4.92                                    | 30                     | -25.080                |
| High           | 2480                       | 6.06                                    | 30                     | -23.940                |

### 9.4.3. BLE (500Kbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 16080 ZS  |
| <b>Date:</b>      | 1/16/2020 |

| <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                       | 5.01                                    | 30                     | -24.990                |
| Middle         | 2440                       | 4.92                                    | 30                     | -25.080                |
| High           | 2480                       | 6.07                                    | 30                     | -23.930                |

### 9.4.4. BLE (125Kbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 16080 ZS  |
| <b>Date:</b>      | 1/16/2020 |

| <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                       | 4.96                                    | 30                     | -25.040                |
| Middle         | 2440                       | 4.89                                    | 30                     | -25.110                |
| High           | 2480                       | 6.03                                    | 30                     | -23.970                |

## **9.5. 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**

### 9.5.1. BLE (2Mbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 16080 ZS  |
| <b>Date:</b>      | 1/16/2020 |

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>AV power<br/>(dBm)</b> |
|----------------|----------------------------|---------------------------|
| Low            | 2402                       | 4.92                      |
| Middle         | 2440                       | 4.84                      |
| High           | 2480                       | 6.01                      |

### 9.5.2. BLE (1Mbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 16080 ZS  |
| <b>Date:</b>      | 1/16/2020 |

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>AV power<br/>(dBm)</b> |
|----------------|----------------------------|---------------------------|
| Low            | 2402                       | 4.86                      |
| Middle         | 2440                       | 4.81                      |
| High           | 2480                       | 5.97                      |

### 9.5.3. BLE (500Kbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 16080 ZS  |
| <b>Date:</b>      | 1/16/2020 |

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>AV power<br/>(dBm)</b> |
|----------------|----------------------------|---------------------------|
| Low            | 2402                       | 4.88                      |
| Middle         | 2440                       | 4.83                      |
| High           | 2480                       | 6                         |

### 9.5.4. BLE (125Kbps)

|                   |           |
|-------------------|-----------|
| <b>Tested By:</b> | 16080 ZS  |
| <b>Date:</b>      | 1/16/2020 |

| <b>Channel</b> | <b>Frequency<br/>(MHz)</b> | <b>AV power<br/>(dBm)</b> |
|----------------|----------------------------|---------------------------|
| Low            | 2402                       | 4.87                      |
| Middle         | 2440                       | 4.78                      |
| High           | 2480                       | 5.96                      |

## **9.6. POWER SPECTRAL DENSITY**

### **LIMITS**

FCC §15.247 (e)

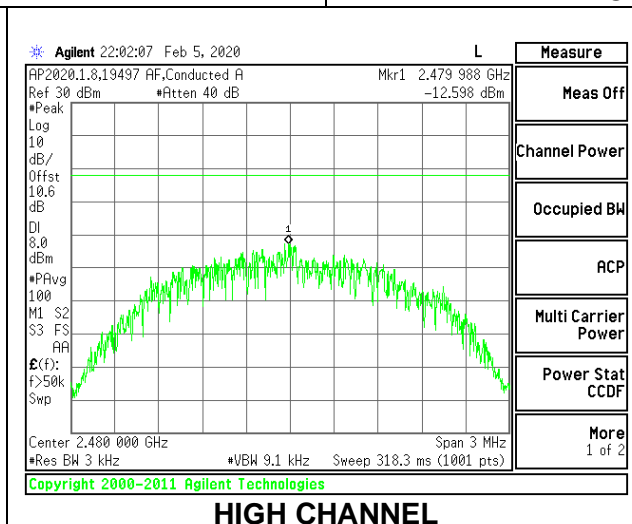
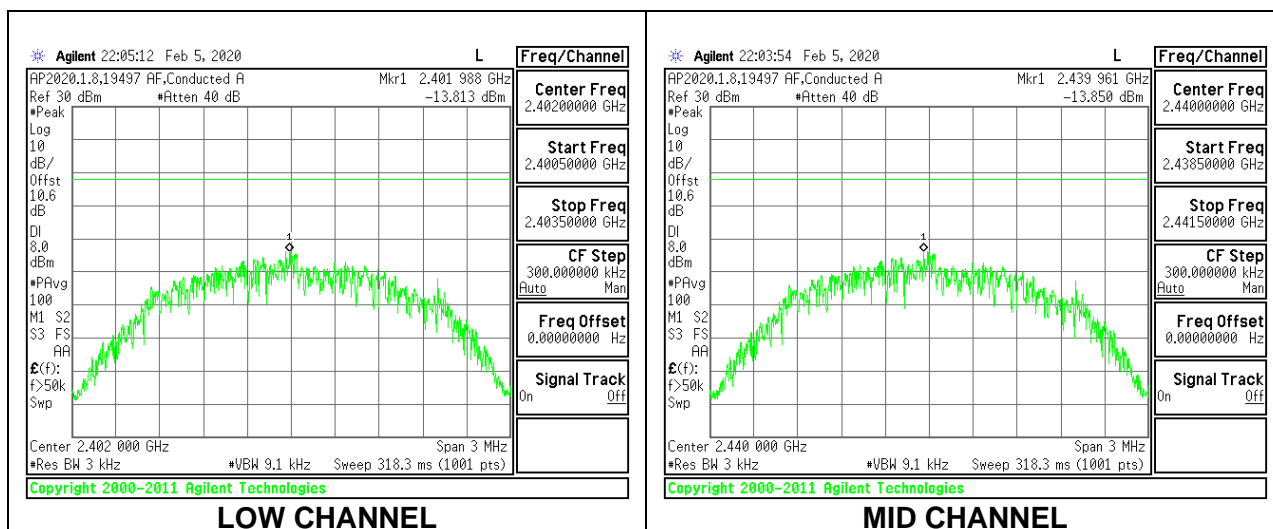
RSS-247 (5.2) (b)

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

### **RESULTS**

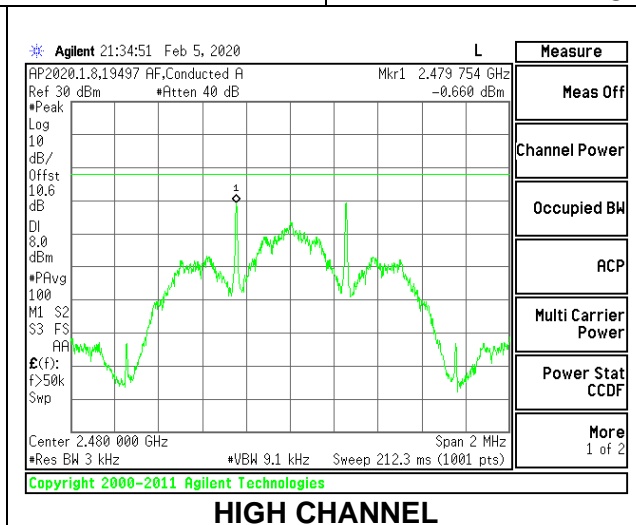
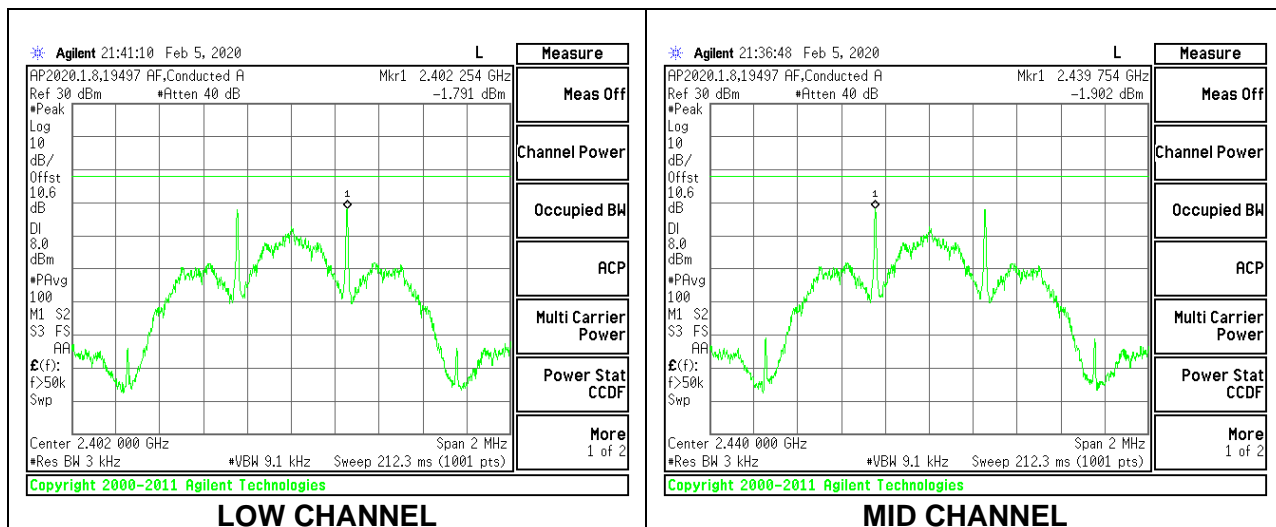
### 9.6.1. BLE (2Mbps)

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low     | 2402            | -13.813        | 8                | -21.81      |
| Middle  | 2440            | -13.850        | 8                | -21.85      |
| High    | 2480            | -12.598        | 8                | -20.60      |



### 9.6.2. BLE (125Kbps)

| Channel | Frequency (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|---------|-----------------|----------------|------------------|-------------|
| Low     | 2402            | -1.791         | 8                | -9.79       |
| Middle  | 2440            | -1.902         | 8                | -9.90       |
| High    | 2480            | -0.660         | 8                | -8.66       |





## **9.7. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

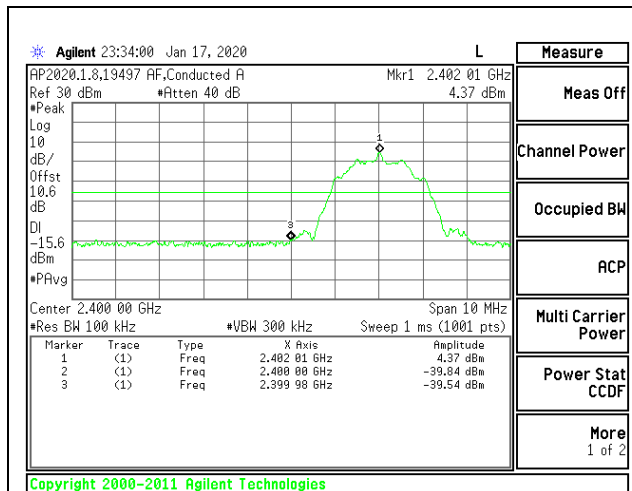
FCC §15.247 (d)

RSS-247 5.5

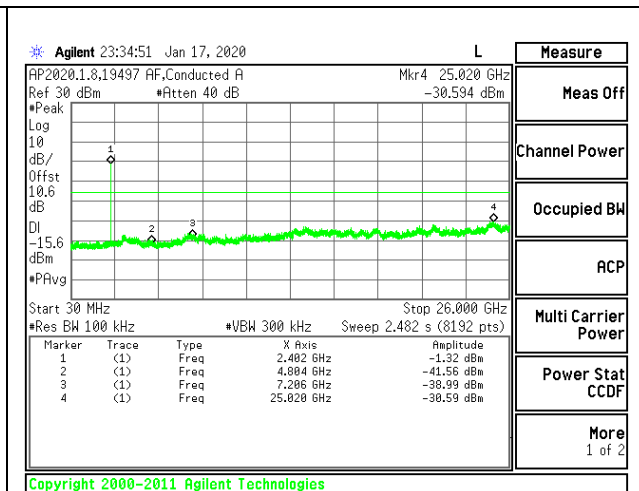
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

### **RESULTS**

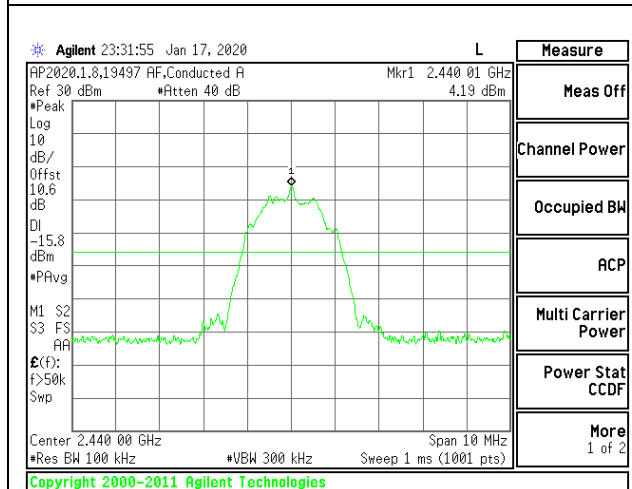
### 9.7.1. BLE (2Mbps)



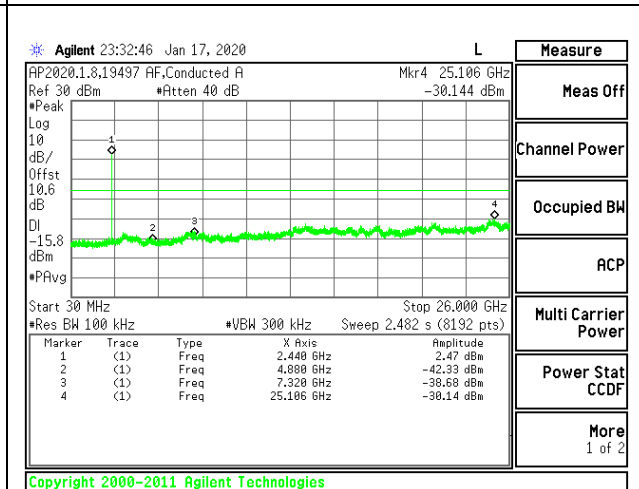
**LOW CHANNEL BANDEDGE**



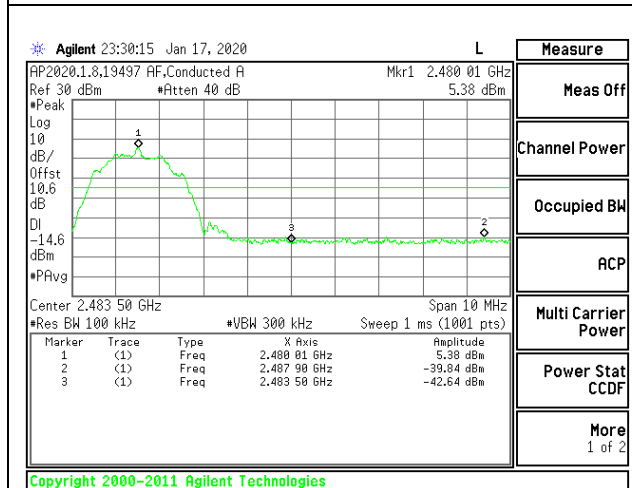
**OUT-OF-BAND LOW CHANNEL**



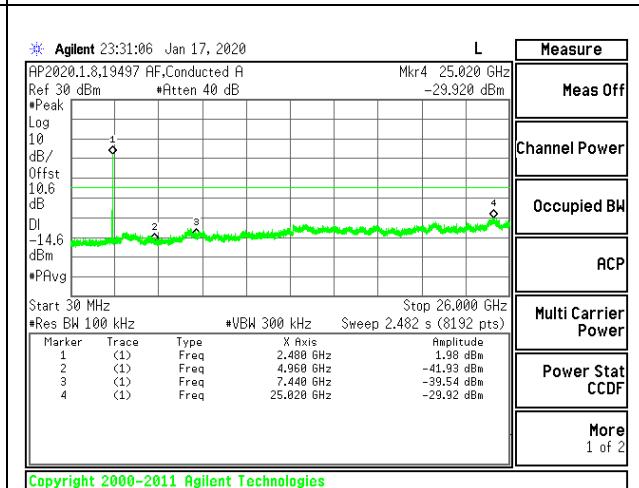
**IN-BAND REFERENCE LEVEL**



**OUT-OF-BAND MID CHANNEL**

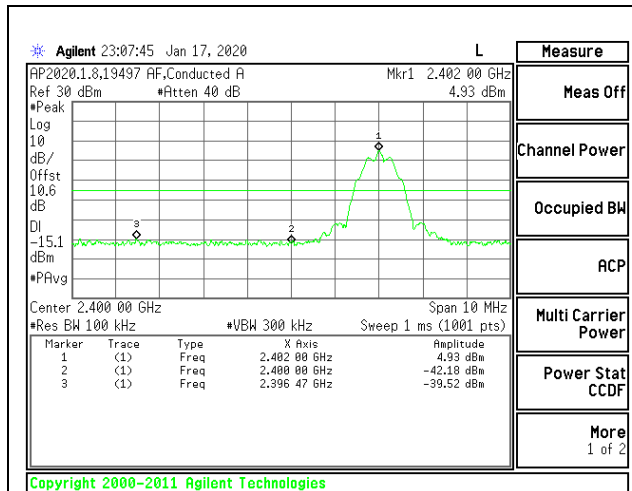


**HIGH CHANNEL BANDEDGE**

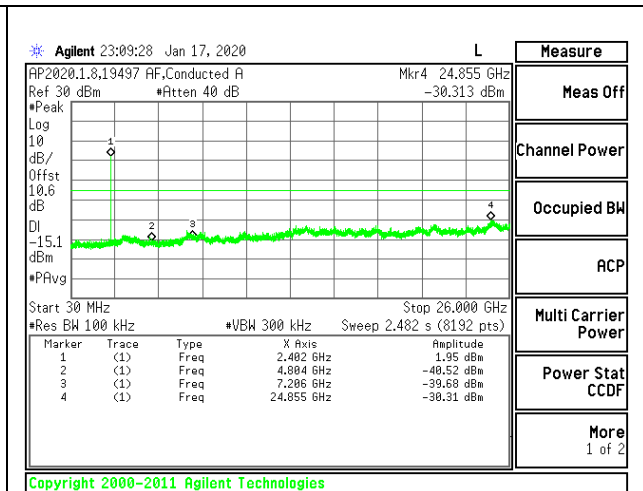


**OUT-OF-BAND HIGH CHANNEL**

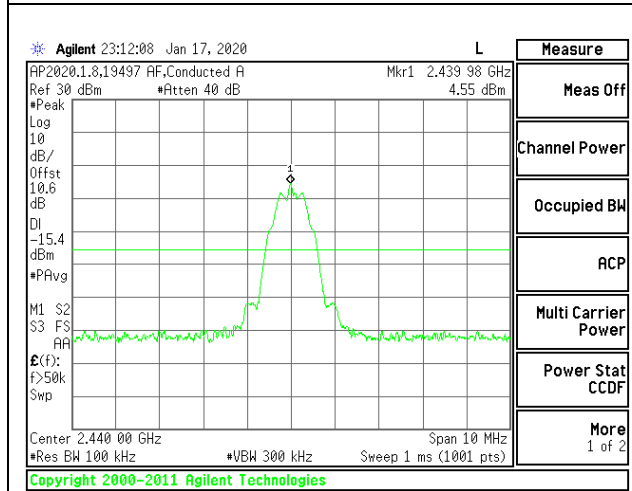
### 9.7.2. BLE (125Kbps)



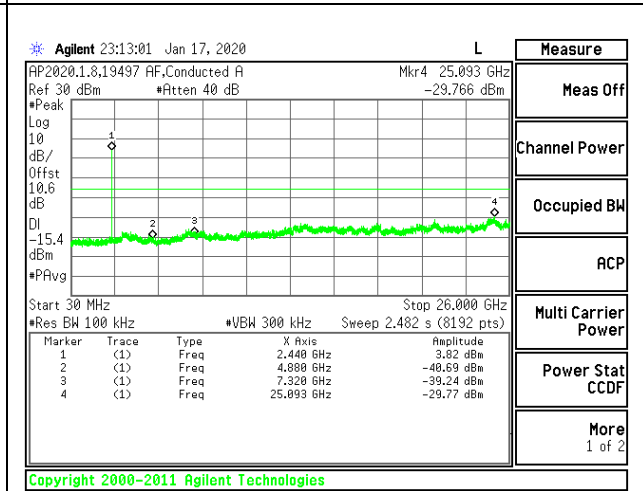
LOW CHANNEL BANDEDGE



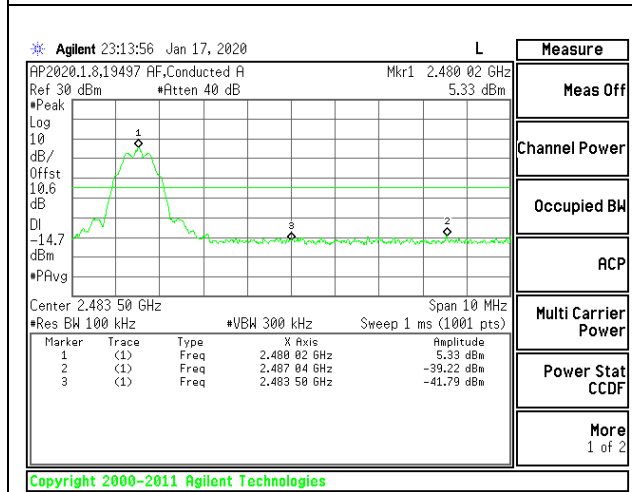
OUT-OF-BAND LOW CHANNEL



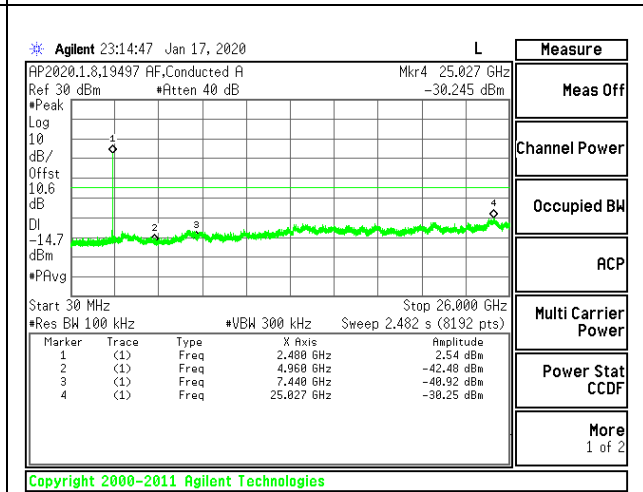
IN-BAND REFERENCE LEVEL



OUT-OF-BAND MID CHANNEL



HIGH CHANNEL BANDEDGE



OUT-OF-BAND HIGH CHANNEL

## 10. RADIATED TEST RESULTS

### 10.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205 and §15.209

RSS-GEN, Section 8.9 and 8.10.

| Frequency Range (MHz) | Field Strength Limit (uV/m) at 3 m | Field Strength Limit (dBuV/m) at 3 m |
|-----------------------|------------------------------------|--------------------------------------|
| 0.009-0.490           | 2400/F(kHz) @ 300 m                | -                                    |
| 0.490-1.705           | 24000/F(kHz) @ 30 m                | -                                    |
| 1.705 - 30            | 30 @ 30m                           | -                                    |
| 30 - 88               | 100                                | 40                                   |
| 88 - 216              | 150                                | 43.5                                 |
| 216 - 960             | 200                                | 46                                   |
| Above 960             | 500                                | 54                                   |

#### TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 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 30MHz, Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

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

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

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

#### **KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification**

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

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

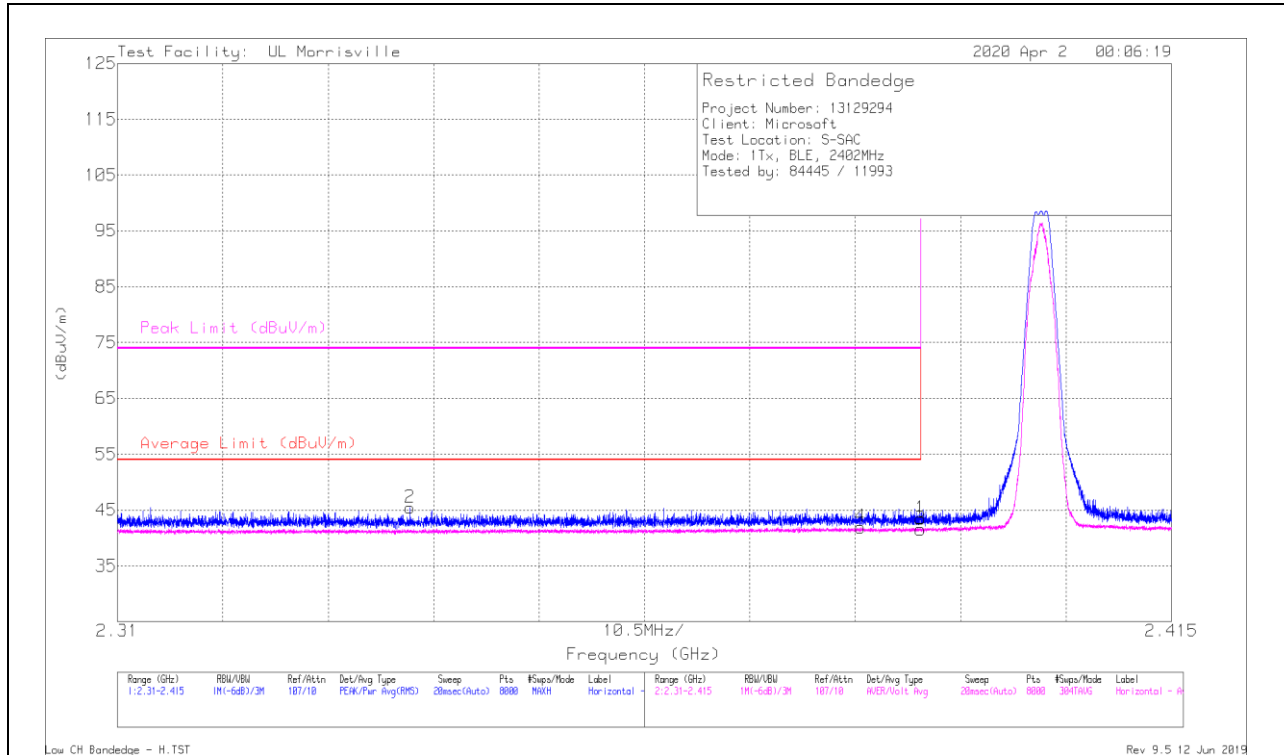
## 10.2. TRANSMITTER ABOVE 1 GHz

### 10.2.1. BLE (2Mbps)

#### Antenna 1

#### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT



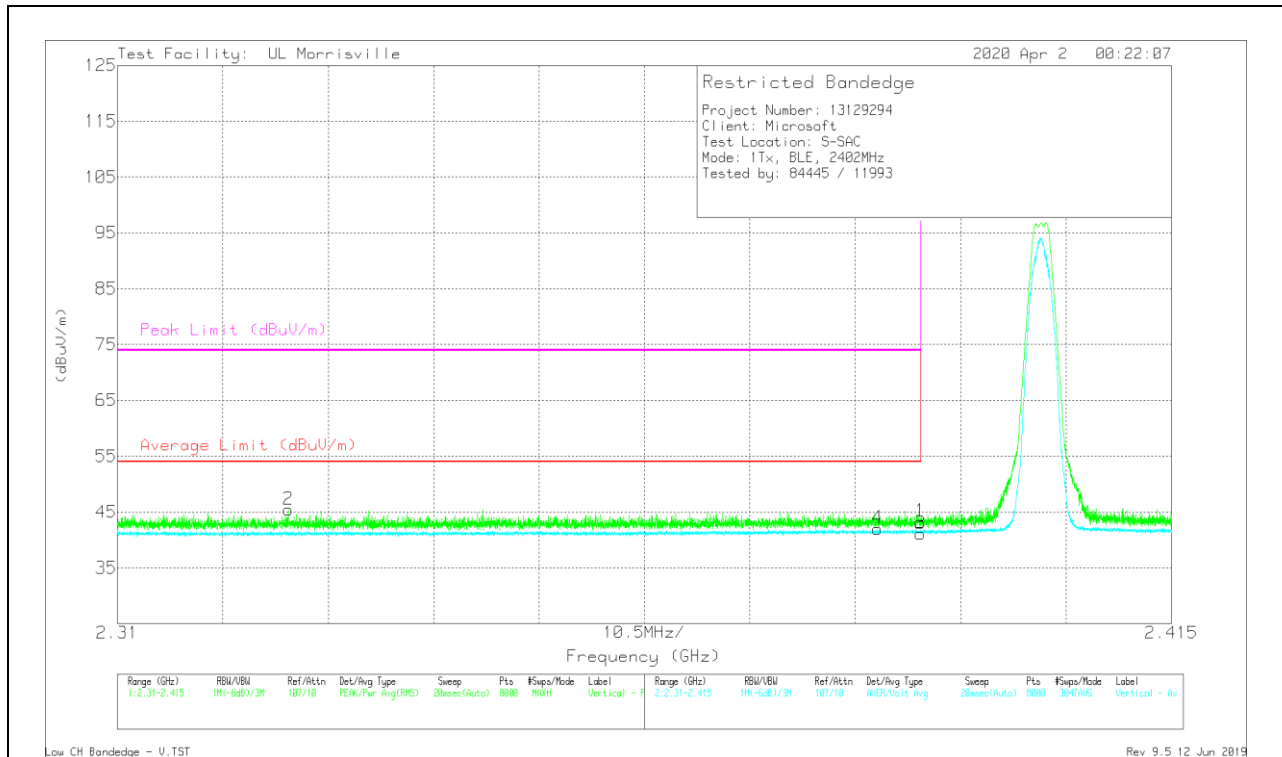
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dBm) | Amp/CbI/Filt/P ad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 35.15                | Pk  | 31.9         | -23.6                  | 0            | 43.45                      | -                      | -           | 74                  | -30.55         | 10             | 238         | H        |
| 2      | * 2.33914       | 37.25                | Pk  | 31.6         | -23.4                  | 0            | 45.45                      | -                      | -           | 74                  | -28.55         | 10             | 238         | H        |
| 3      | * 2.39          | 23.58                | ADV | 31.9         | -23.6                  | 9.68         | 41.56                      | 54                     | -12.44      | -                   | -              | 10             | 238         | H        |
| 4      | * 2.38404       | 23.95                | ADV | 31.9         | -23.6                  | 9.68         | 41.93                      | 54                     | -12.07      | -                   | -              | 10             | 238         | H        |

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

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

### VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dBm) | Amp(Cal/Fit)/Psd (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Acimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 34.98                | Pk  | 31.9         | -23.6                 | 0            | 43.28                      | -                      | -           | 74                  | -30.72         | 155            | 325         | V        |
| 2      | * 2.32704       | 37.14                | Pk  | 31.7         | -23.4                 | 0            | 45.44                      | -                      | -           | 74                  | -28.56         | 155            | 325         | V        |
| 3      | * 2.39          | 23.12                | ADV | 31.9         | -23.6                 | 9.68         | 41.1                       | 54                     | -12.9       | -                   | -              | 155            | 325         | V        |
| 4      | * 2.38574       | 24.05                | ADV | 31.9         | -23.6                 | 9.68         | 42.03                      | 54                     | -11.97      | -                   | -              | 155            | 325         | V        |

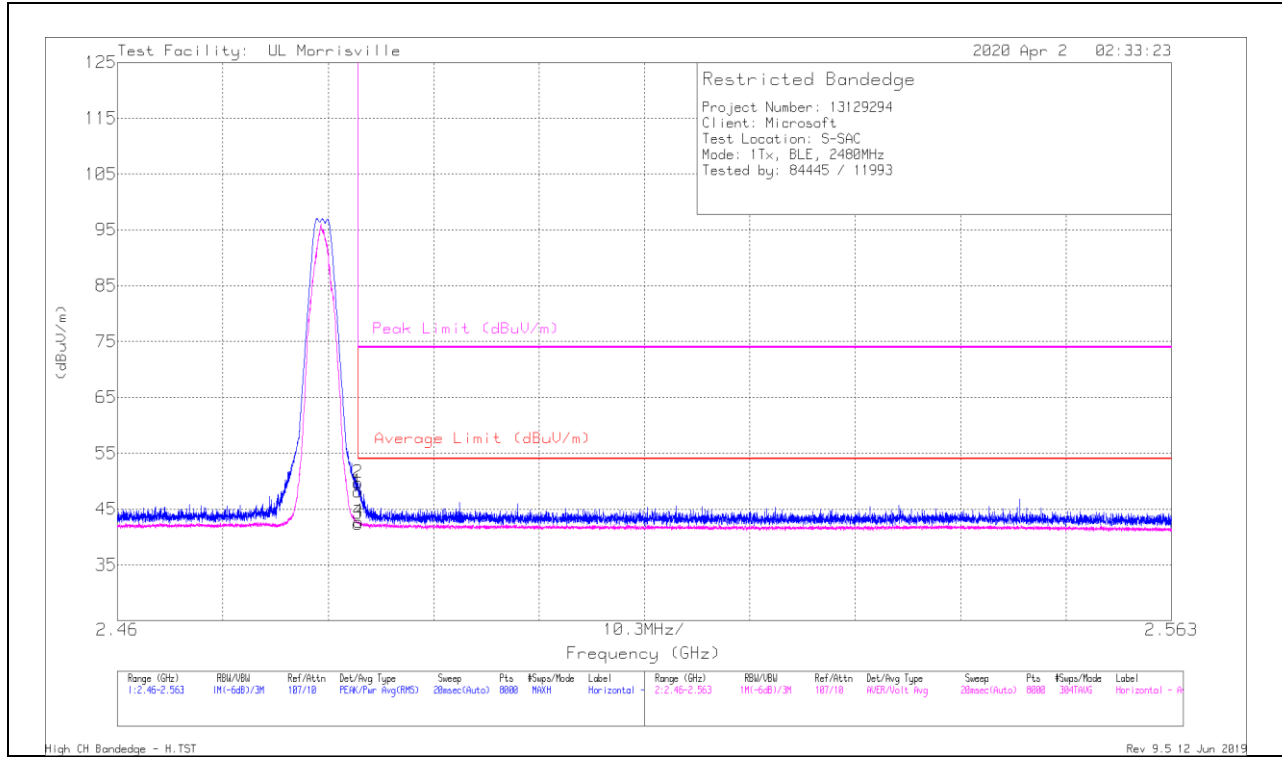
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

**BANDEDGE (HIGH CHANNEL)**

**HORIZONTAL RESULT**

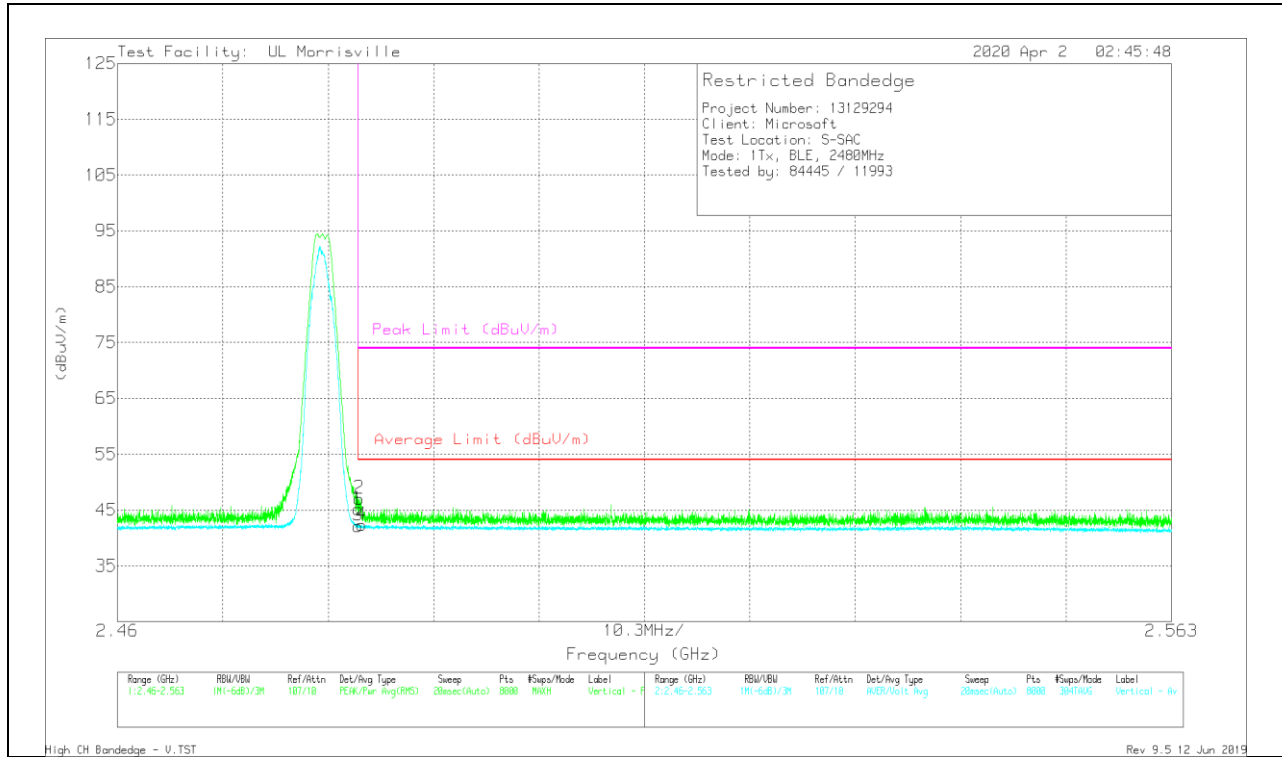


| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/CbI/Ftr/P ad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.4835        | 39.92                | Pk  | 32.3          | -24.1                 | 0            | 48.12                      | -                      | -           | 74                  | -25.88         | 46             | 124         | H        |
| 2      | * 2.48351       | 41.51                | Pk  | 32.3          | -24.1                 | 0            | 49.71                      | -                      | -           | 74                  | -24.29         | 46             | 124         | H        |
| 3      | * 2.4835        | 24.53                | ADV | 32.3          | -24.1                 | 9.68         | 42.41                      | 54                     | -11.59      | -                   | -              | 46             | 124         | H        |
| 4      | * 2.48355       | 24.84                | ADV | 32.3          | -24.1                 | 9.68         | 42.72                      | 54                     | -11.28      | -                   | -              | 46             | 124         | H        |

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



### VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dBm) | Amp(Cal/Fit)/Psd (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Acimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.4835        | 36.98                | Pk  | 32.3         | -24.1                 | 0            | 45.18                      | -                      | -           | 74                  | -28.82         | 45             | 360         | V        |
| 2      | * 2.4836        | 38.86                | Pk  | 32.3         | -24.1                 | 0            | 47.06                      | -                      | -           | 74                  | -26.94         | 45             | 360         | V        |
| 3      | * 2.4835        | 24.29                | ADV | 32.3         | -24.1                 | 9.68         | 42.17                      | 54                     | -11.83      | -                   | -              | 45             | 360         | V        |
| 4      | * 2.48389       | 24.49                | ADV | 32.3         | -24.1                 | 9.68         | 42.37                      | 54                     | -11.63      | -                   | -              | 45             | 360         | V        |

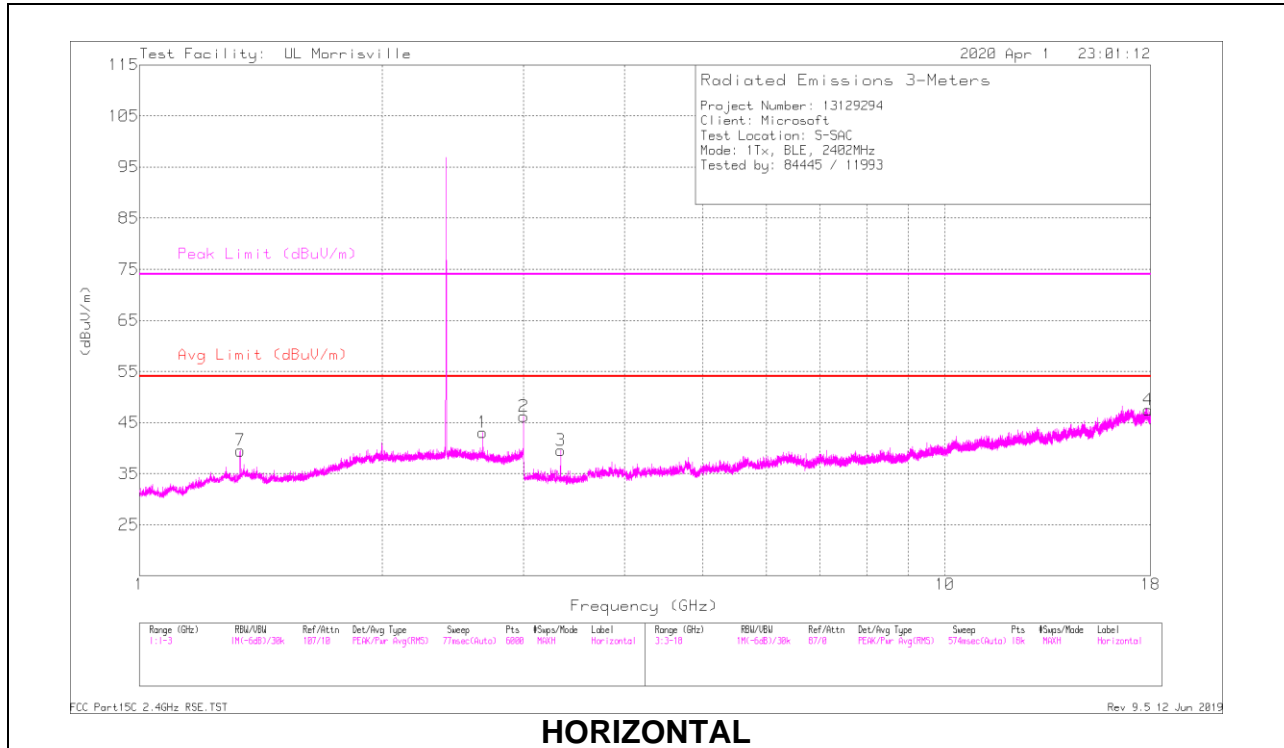
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

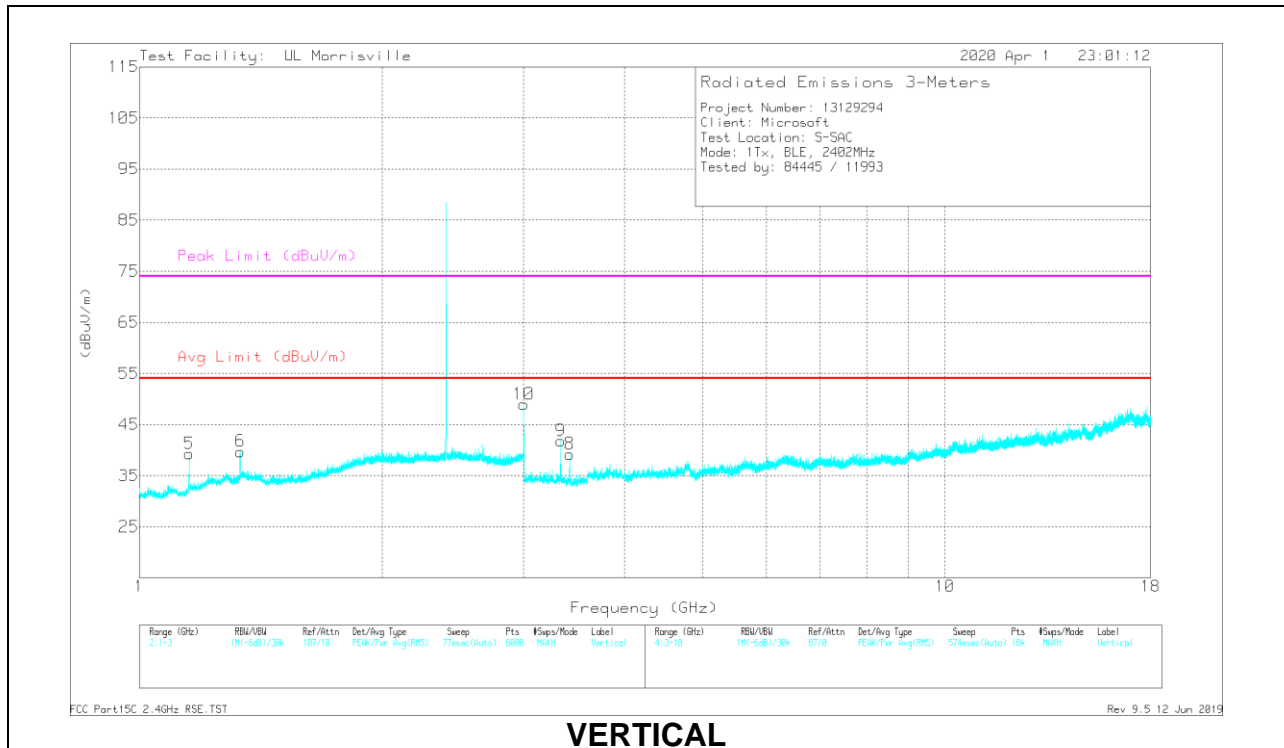
ADV - U-NII AD primary method, Linear Voltage Average

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL RESULTS



**HORIZONTAL**



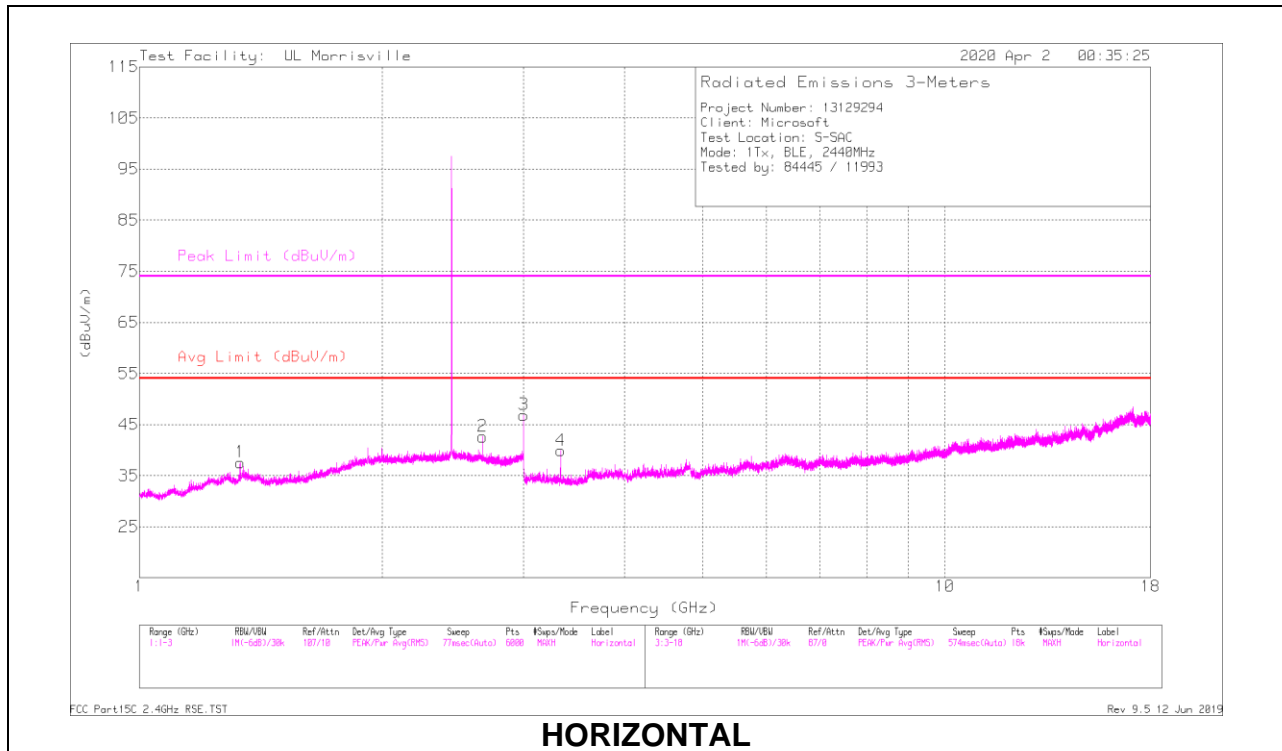
**VERTICAL**

**RADIATED EMISSIONS**

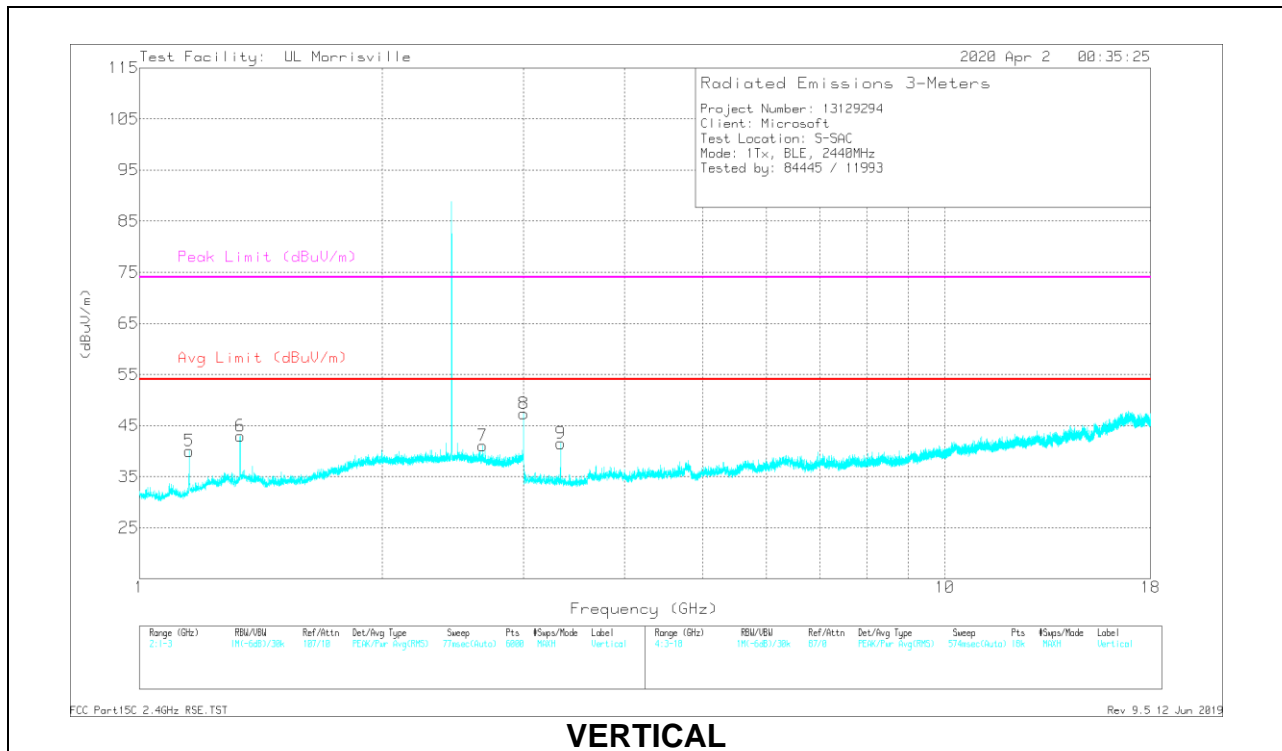
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/Fi tr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.66673       | 45.79                | PK2 | 32.4          | -25.2                  | 0            | 52.99                      | -                  | -           | 74                  | -21.01         | 237            | 196         | H        |
|        | * 2.66656       | 25.78                | ADV | 32.4          | -25.2                  | 9.68         | 42.66                      | 54                 | -11.34      | -                   | -              | 237            | 196         | H        |
| 7      | * 1.3332        | 42.34                | PK2 | 29            | -22.7                  | 0            | 48.64                      | -                  | -           | 74                  | -25.36         | 58             | 201         | H        |
|        | * 1.33332       | 24.96                | ADV | 29            | -22.7                  | 9.68         | 40.94                      | 54                 | -13.06      | -                   | -              | 58             | 201         | H        |
| 5      | * 1.15265       | 41.38                | PK2 | 27.8          | -23.7                  | 0            | 45.48                      | -                  | -           | 74                  | -28.52         | 215            | 202         | V        |
|        | * 1.15264       | 31.34                | ADV | 27.8          | -23.7                  | 9.68         | 45.12                      | 54                 | -8.88       | -                   | -              | 215            | 202         | V        |
| 6      | * 1.33321       | 43.33                | PK2 | 29            | -22.7                  | 0            | 49.63                      | -                  | -           | 74                  | -24.37         | 0              | 192         | V        |
|        | * 1.3333        | 29.52                | ADV | 29            | -22.7                  | 9.68         | 45.5                       | 54                 | -8.5        | -                   | -              | 0              | 192         | V        |
| 3      | * 3.33316       | 44.37                | PK2 | 32.9          | -32.2                  | 0            | 45.07                      | -                  | -           | 74                  | -28.93         | 89             | 200         | H        |
|        | * 3.33321       | 36.98                | ADV | 32.9          | -32.2                  | 9.68         | 47.36                      | 54                 | -6.64       | -                   | -              | 89             | 200         | H        |
| 4      | * 17.87159      | 33.26                | PK2 | 41.2          | -20.2                  | 0            | 54.26                      | -                  | -           | 74                  | -19.74         | 223            | 369         | H        |
|        | * 17.87108      | 19.79                | ADV | 41.2          | -20.2                  | 9.68         | 50.47                      | 54                 | -3.53       | -                   | -              | 223            | 369         | H        |
| 9      | * 3.33329       | 46.54                | PK2 | 32.9          | -32.2                  | 0            | 47.24                      | -                  | -           | 74                  | -26.76         | 177            | 217         | V        |
|        | * 3.33318       | 40.62                | ADV | 32.9          | -32.2                  | 9.68         | 51                         | 54                 | -3          | -                   | -              | 177            | 217         | V        |
| 2      | 3               | 38.71                | Pk  | 33            | -25.5                  | 0            | 46.21                      | -                  | -           | -                   | -              | 0-360          | 199         | H        |
| 10     | 3               | 48.17                | Pk  | 33            | -32.2                  | 0            | 48.97                      | -                  | -           | -                   | -              | 0-360          | 199         | V        |
| 8      | 3.42002         | 38.72                | Pk  | 32.8          | -32.3                  | 0            | 39.22                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |

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

### MID CHANNEL RESULTS



**HORIZONTAL**



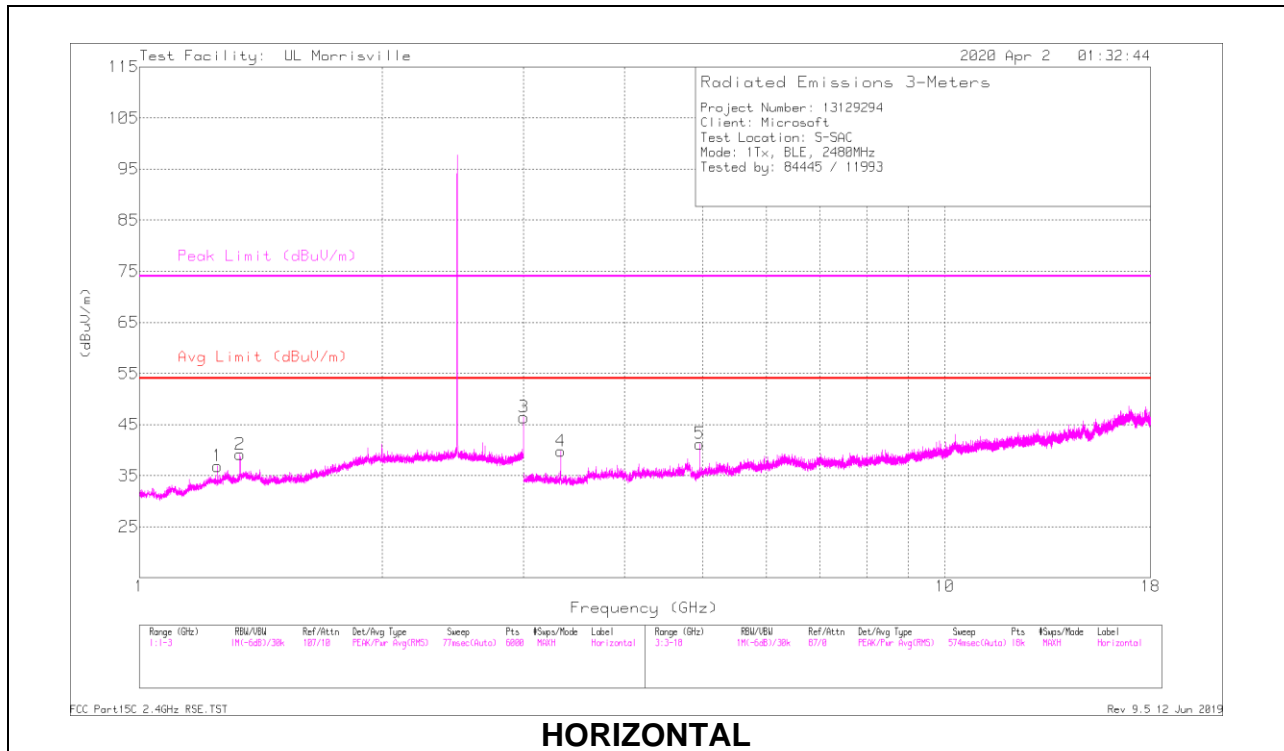
**VERTICAL**

**RADIATED EMISSIONS**

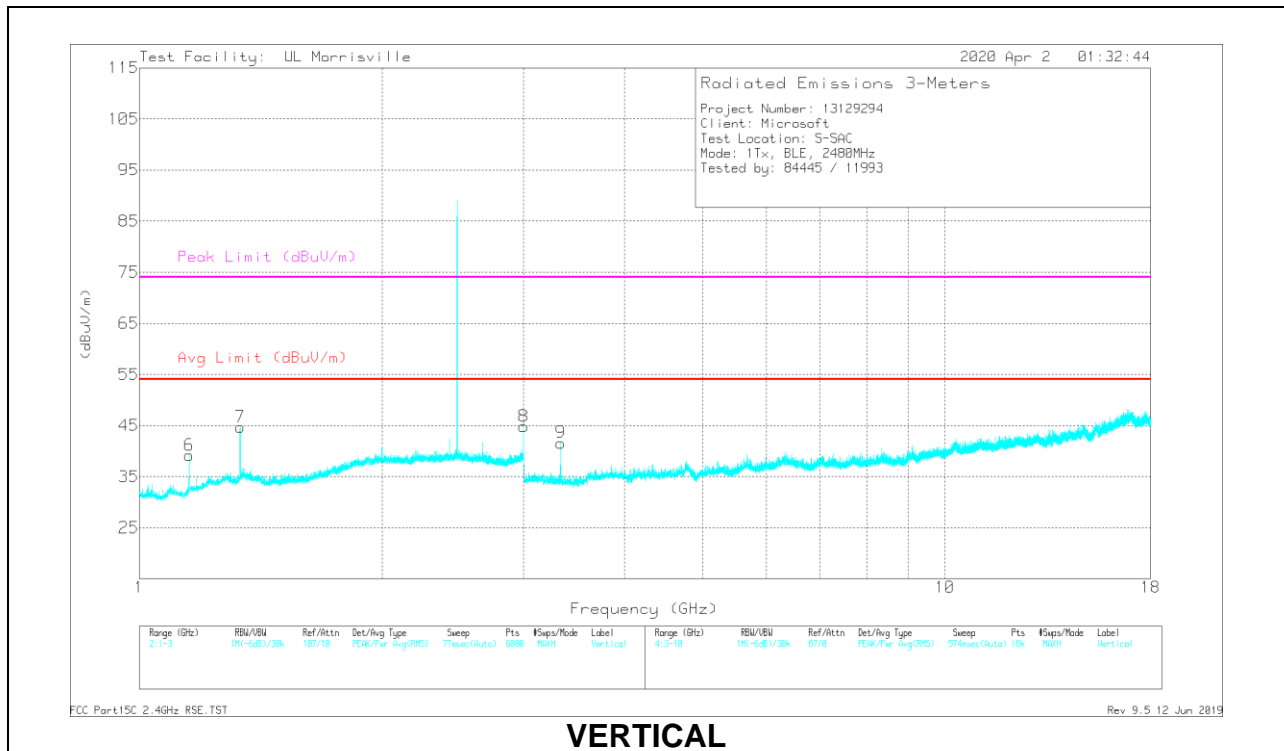
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/FI tr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 1.33318       | 43.34                | PK2 | 29            | -22.7                  | 0            | 49.64                      | -                  | -           | 74                  | -24.36         | 181            | 286         | H        |
|        | * 1.33332       | 25.13                | ADV | 29            | -22.7                  | 9.68         | 41.11                      | 54                 | -12.89      | -                   | -              | 181            | 286         | H        |
| 2      | * 2.66665       | 43.22                | PK2 | 32.4          | -25.2                  | 0            | 50.42                      | -                  | -           | 74                  | -23.58         | 105            | 229         | H        |
|        | * 2.66662       | 26.99                | ADV | 32.4          | -25.2                  | 9.68         | 43.87                      | 54                 | -10.13      | -                   | -              | 105            | 229         | H        |
| 5      | * 1.15271       | 41.5                 | PK2 | 27.8          | -23.7                  | 0            | 45.6                       | -                  | -           | 74                  | -28.4          | 205            | 211         | V        |
|        | * 1.15264       | 31.03                | ADV | 27.8          | -23.7                  | 9.68         | 44.81                      | 54                 | -9.19       | -                   | -              | 205            | 211         | V        |
| 6      | * 1.33333       | 44.56                | PK2 | 29            | -22.7                  | 0            | 50.86                      | -                  | -           | 74                  | -23.14         | 354            | 247         | V        |
|        | * 1.33326       | 32.29                | ADV | 29            | -22.7                  | 9.68         | 48.27                      | 54                 | -5.73       | -                   | -              | 354            | 247         | V        |
| 7      | * 2.6665        | 48.39                | PK2 | 32.4          | -25.2                  | 0            | 55.59                      | -                  | -           | 74                  | -18.41         | 198            | 148         | V        |
|        | * 2.66656       | 29.88                | ADV | 32.4          | -25.2                  | 9.68         | 46.76                      | 54                 | -7.24       | -                   | -              | 198            | 148         | V        |
| 4      | * 3.33322       | 44.65                | PK2 | 32.9          | -32.2                  | 0            | 45.35                      | -                  | -           | 74                  | -28.65         | 106            | 203         | H        |
|        | * 3.3332        | 37.26                | ADV | 32.9          | -32.2                  | 9.68         | 47.64                      | 54                 | -6.36       | -                   | -              | 106            | 203         | H        |
| 9      | * 3.33325       | 46.63                | PK2 | 32.9          | -32.2                  | 0            | 47.33                      | -                  | -           | 74                  | -26.67         | 229            | 226         | V        |
|        | * 3.33318       | 39.84                | ADV | 32.9          | -32.2                  | 9.68         | 50.22                      | 54                 | -3.78       | -                   | -              | 229            | 226         | V        |
| 3      | 3               | 39.4                 | Pk  | 33            | -25.5                  | 0            | 46.9                       | -                  | -           | -                   | -              | 0-360          | 199         | H        |
| 8      | 3               | 39.82                | Pk  | 33            | -25.5                  | 0            | 47.32                      | -                  | -           | -                   | -              | 0-360          | 199         | V        |

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

### HIGH CHANNEL RESULTS



**HORIZONTAL**



**VERTICAL**

**RADIATED EMISSIONS**

| Markers | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/Fi tr/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       | * 1.24969       | 35.77                | PK2 | 28.9          | -23.1                  | 0            | 41.57                      | -                  | -           | 74                  | -32.43         | 229            | 232         | H        |
|         | * 1.24983       | 22.04                | ADV | 28.9          | -23.1                  | 9.68         | 37.52                      | 54                 | -16.48      | -                   | -              | 229            | 232         | H        |
| 2       | * 1.33331       | 42.1                 | PK2 | 29            | -22.7                  | 0            | 48.4                       | -                  | -           | 74                  | -25.6          | 61             | 206         | H        |
|         | * 1.33327       | 24.76                | ADV | 29            | -22.7                  | 9.68         | 40.74                      | 54                 | -13.26      | -                   | -              | 61             | 206         | H        |
| 6       | * 1.15297       | 41.46                | PK2 | 27.8          | -23.7                  | 0            | 45.56                      | -                  | -           | 74                  | -28.44         | 217            | 198         | V        |
|         | * 1.1527        | 31.46                | ADV | 27.8          | -23.7                  | 9.68         | 45.24                      | 54                 | -8.76       | -                   | -              | 217            | 198         | V        |
| 7       | * 1.33337       | 45.3                 | PK2 | 29            | -22.7                  | 0            | 51.6                       | -                  | -           | 74                  | -22.4          | 358            | 244         | V        |
|         | * 1.33329       | 32.48                | ADV | 29            | -22.7                  | 9.68         | 48.46                      | 54                 | -5.54       | -                   | -              | 358            | 244         | V        |
| 4       | * 3.33322       | 44.62                | PK2 | 32.9          | -32.2                  | 0            | 45.32                      | -                  | -           | 74                  | -28.68         | 84             | 276         | H        |
|         | * 3.33324       | 36.9                 | ADV | 32.9          | -32.2                  | 9.68         | 47.28                      | 54                 | -6.72       | -                   | -              | 84             | 276         | H        |
| 5       | * 4.95898       | 43.19                | PK2 | 34.1          | -30.6                  | 0            | 46.69                      | -                  | -           | 74                  | -27.31         | 6              | 117         | H        |
|         | * 4.95911       | 28.47                | ADV | 34.1          | -30.6                  | 9.68         | 41.65                      | 54                 | -12.35      | -                   | -              | 6              | 117         | H        |
| 9       | * 3.33339       | 45.87                | PK2 | 32.9          | -32.2                  | 0            | 46.57                      | -                  | -           | 74                  | -27.43         | 234            | 235         | V        |
|         | * 3.33323       | 39.25                | ADV | 32.9          | -32.2                  | 9.68         | 49.63                      | 54                 | -4.37       | -                   | -              | 234            | 235         | V        |
| 3       | 3               | 38.91                | Pk  | 33            | -25.5                  | 0            | 46.41                      | -                  | -           | -                   | -              | 0-360          | 199         | H        |
| 8       | 3               | 37.35                | Pk  | 33            | -25.5                  | 0            | 44.85                      | -                  | -           | -                   | -              | 0-360          | 199         | V        |

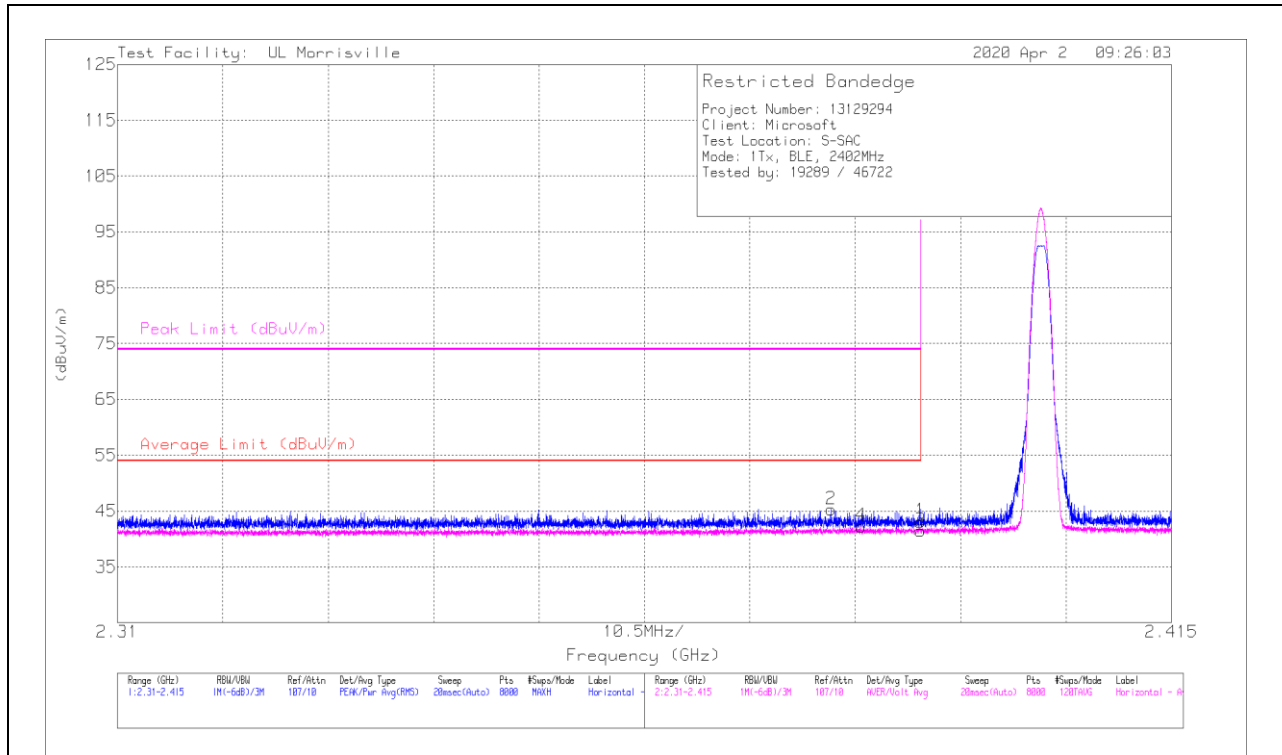
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK2 - KDB558074 Method: Maximum Peak  
 ADV - U-NII AD primary method, Linear Voltage Average  
 Pk - Peak detector

### 10.2.2. BLE (125Kbps)

#### Antenna 1

#### BANDEDGE (LOW CHANNEL)

#### HORIZONTAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dBm) | Amp/Chl/Ftr/P ad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 34.83                | Pk  | 31.9         | -23.6                 | 0            | 43.13                      | -                      | -           | 74                  | -30.87         | 163            | 181         | H        |
| 2      | * 2.38111       | 37                   | Pk  | 31.9         | -23.6                 | 0            | 45.3                       | -                      | -           | 74                  | -28.7          | 163            | 181         | H        |
| 3      | * 2.39          | 31.53                | ADV | 31.9         | -23.6                 | 1.65         | 41.48                      | 54                     | -12.52      | -                   | -              | 163            | 181         | H        |
| 4      | * 2.3841        | 32.32                | ADV | 31.9         | -23.6                 | 1.65         | 42.27                      | 54                     | -11.73      | -                   | -              | 163            | 181         | H        |

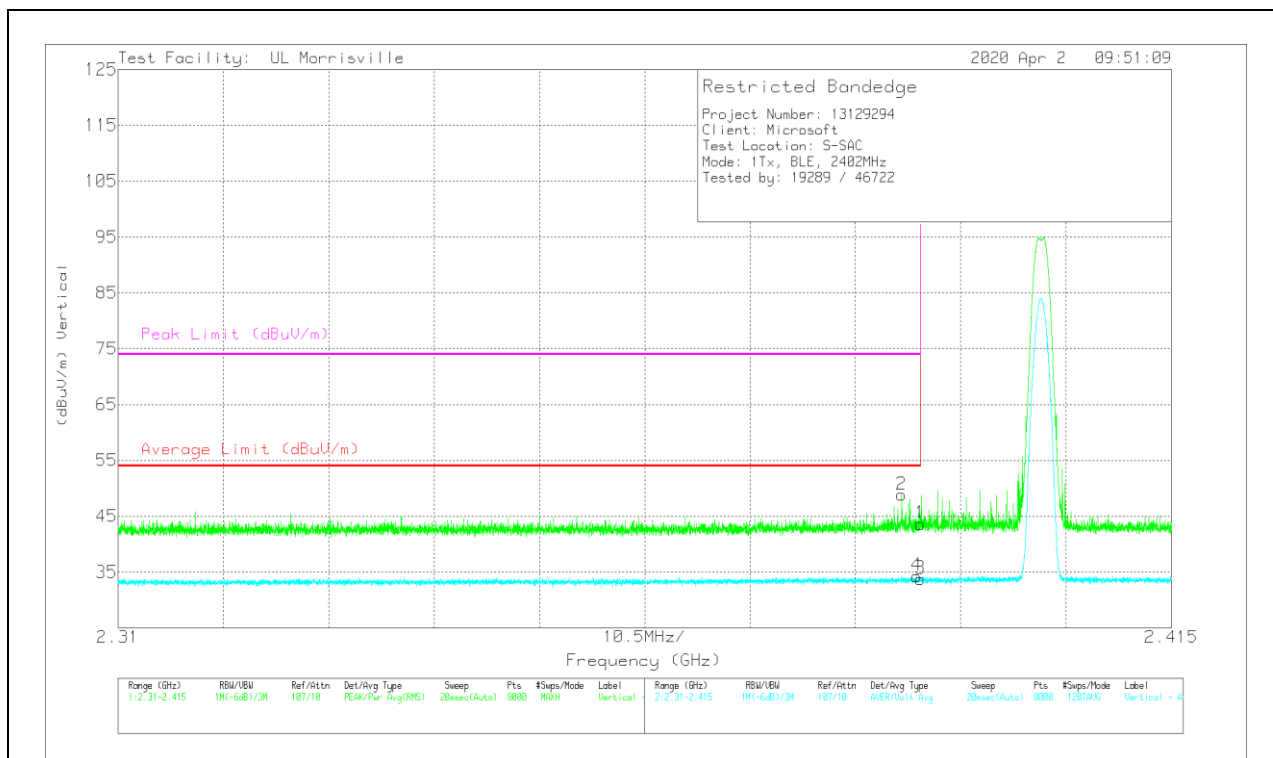
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average



### VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dBm) | Amp(Cal)/Ftr/Psd (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Acimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.39          | 35.37                | Pk  | 31.9         | -23.6                 | 0            | 43.67                      | -                      | -           | 74                  | -30.33         | 263            | 163         | V        |
| 2      | * 2.38812       | 40.56                | Pk  | 31.9         | -23.6                 | 0            | 48.86                      | -                      | -           | 74                  | -25.14         | 263            | 163         | V        |
| 3      | * 2.39          | 23.84                | ADV | 31.9         | -23.6                 | 1.65         | 33.79                      | 54                     | -20.21      | -                   | -              | 263            | 163         | V        |
| 4      | * 2.38962       | 24.33                | ADV | 31.9         | -23.6                 | 1.65         | 34.28                      | 54                     | -19.72      | -                   | -              | 263            | 163         | V        |

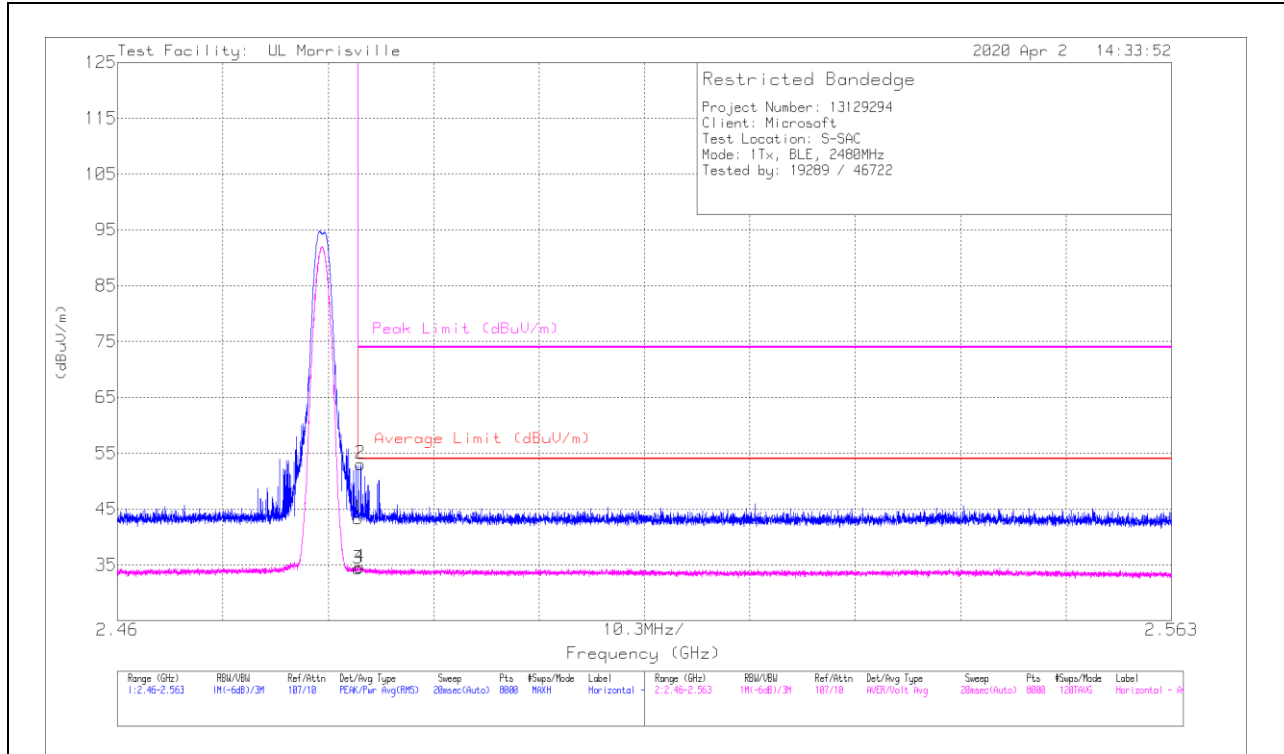
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

**BANDEDGE (HIGH CHANNEL)**

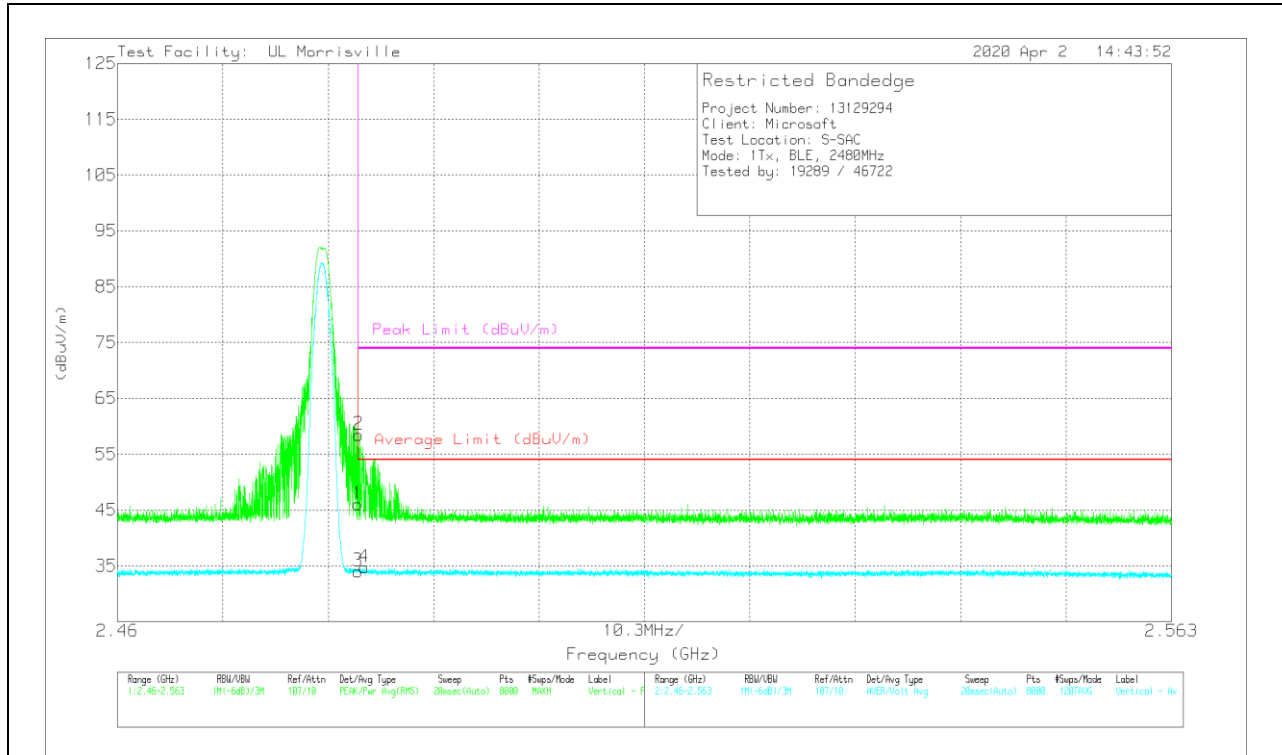
**HORIZONTAL RESULT**



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/CbI/Ftr/P ad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.4835        | 35.1                 | Pk  | 32.3          | -24.1                 | 0            | 43.3                       | -                      | -           | 74                  | -30.7          | 34             | 246         | H        |
| 2      | * 2.48373       | 44.91                | Pk  | 32.3          | -24.1                 | 0            | 53.11                      | -                      | -           | 74                  | -20.89         | 34             | 246         | H        |
| 3      | * 2.4835        | 24.51                | ADV | 32.3          | -24.1                 | 1.65         | 34.36                      | 54                     | -19.64      | -                   | -              | 34             | 246         | H        |
| 4      | * 2.48369       | 24.71                | ADV | 32.3          | -24.1                 | 1.65         | 34.56                      | 54                     | -19.44      | -                   | -              | 34             | 246         | H        |

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

### VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dBm) | Amp(Cal/Fit)/Psd (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Acimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 2.4835        | 37.83                | Pk  | 32.3         | -24.1                 | 0            | 46.03                      | -                      | -           | 74                  | -27.97         | 43             | 294         | V        |
| 2      | * 2.48358       | 50.31                | Pk  | 32.3         | -24.1                 | 0            | 58.51                      | -                      | -           | 74                  | -15.49         | 43             | 294         | V        |
| 3      | * 2.4835        | 24.17                | ADV | 32.3         | -24.1                 | 1.65         | 34.02                      | 54                     | -19.98      | -                   | -              | 43             | 294         | V        |
| 4      | * 2.48411       | 24.88                | ADV | 32.3         | -24.1                 | 1.65         | 34.73                      | 54                     | -19.27      | -                   | -              | 43             | 294         | V        |

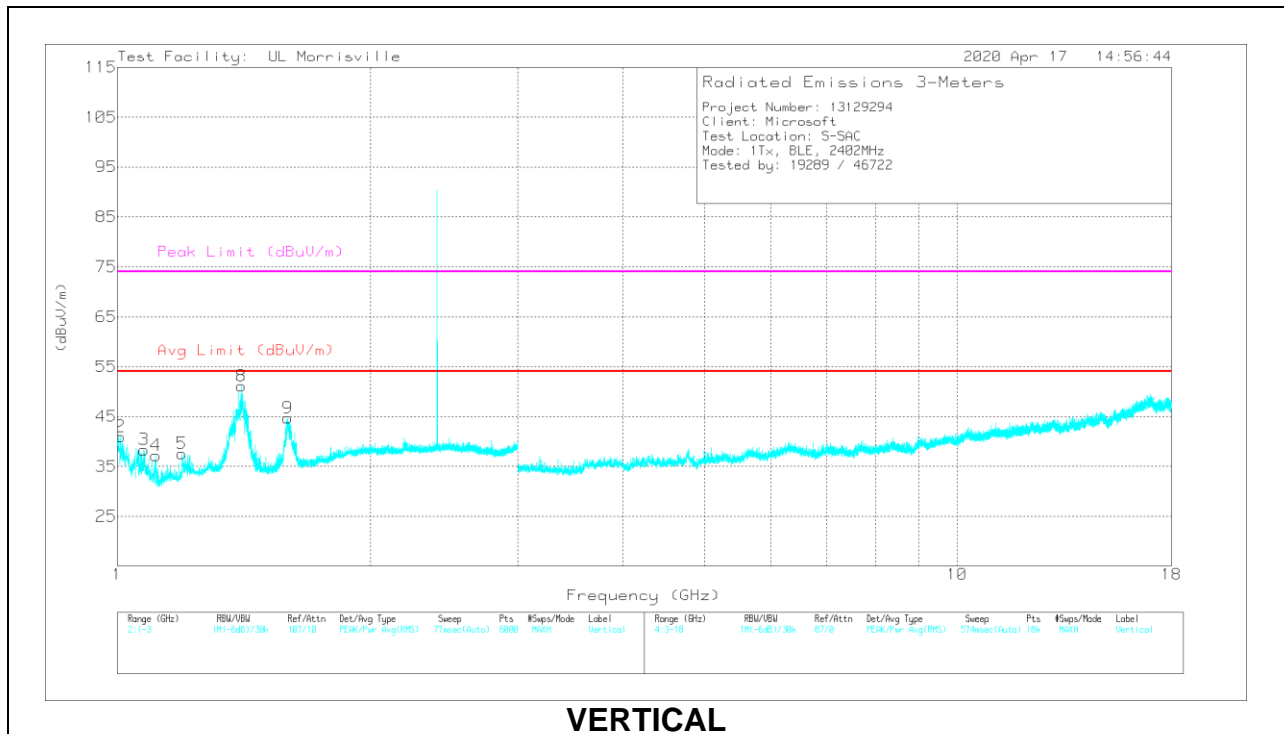
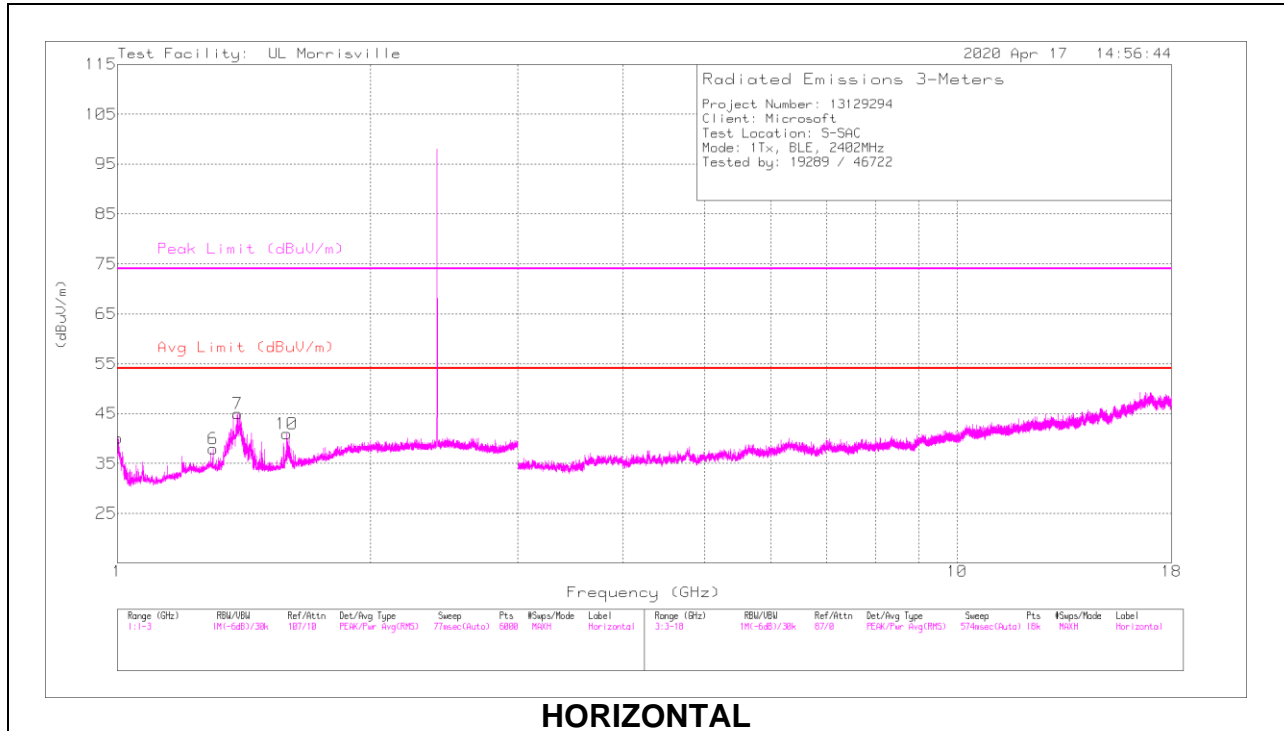
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

ADV - U-NII AD primary method, Linear Voltage Average

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL RESULTS

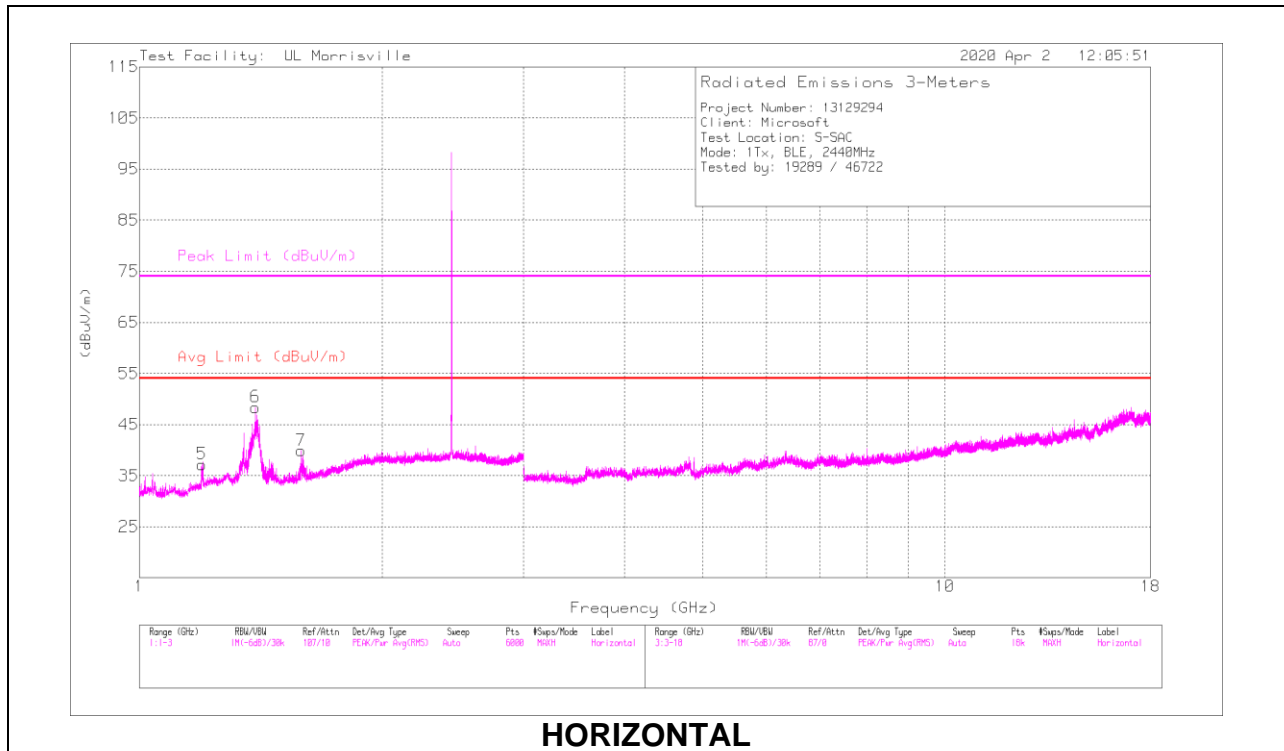


**RADIATED EMISSIONS**

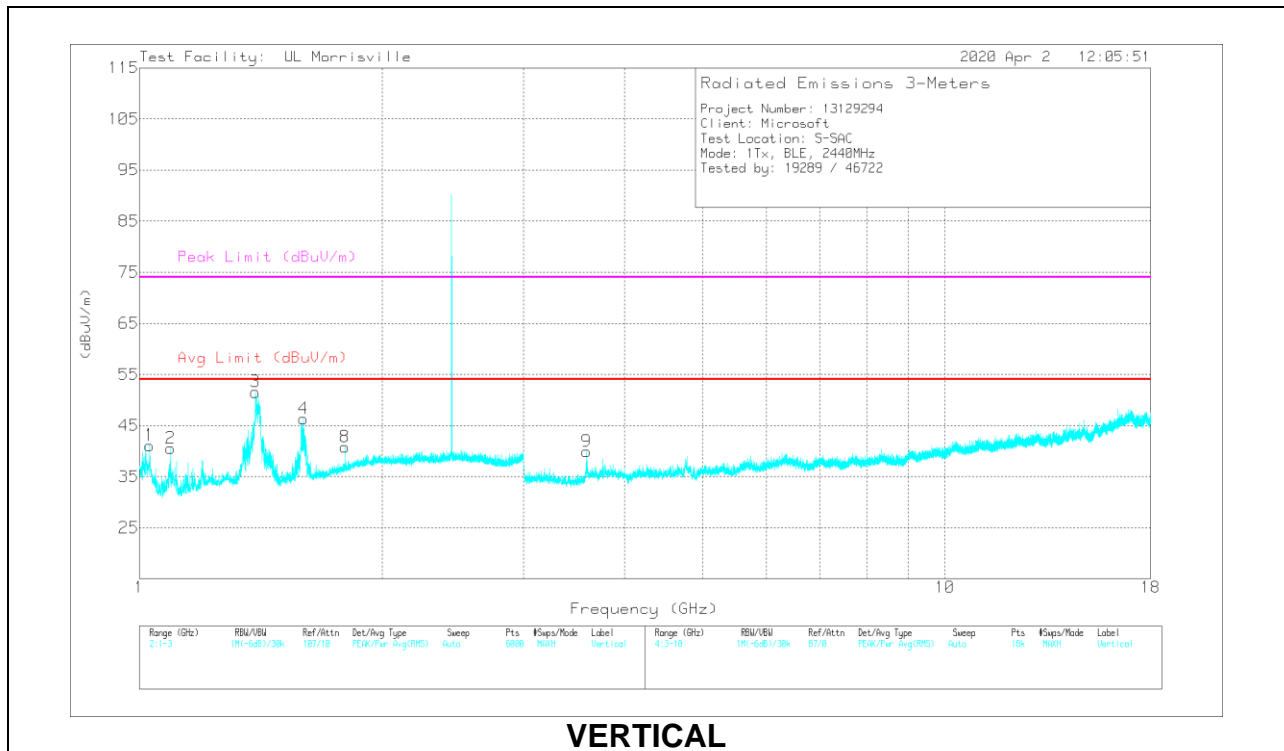
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/FI tr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 1.00221       | 44.72                | PK2 | 27.9          | -24.6                  | 0            | 48.02                      | -                  | -           | 74                  | -25.98         | 74             | 372         | H        |
|        | * 1.00291       | 23.56                | ADV | 27.9          | -24.6                  | 1.65         | 28.51                      | 54                 | -25.49      | -                   | -              | 74             | 372         | H        |
| 7      | * 1.39224       | 50.37                | PK2 | 28.8          | -22.5                  | 0            | 56.67                      | -                  | -           | 74                  | -17.33         | 350            | 248         | H        |
|        | * 1.38886       | 24.48                | ADV | 28.9          | -22.5                  | 1.65         | 32.53                      | 54                 | -21.47      | -                   | -              | 350            | 248         | H        |
| 10     | * 1.59137       | 42.9                 | PK2 | 27.8          | -21.9                  | 0            | 48.8                       | -                  | -           | 74                  | -25.2          | 59             | 203         | H        |
|        | * 1.59042       | 23.4                 | ADV | 27.8          | -21.9                  | 1.65         | 30.95                      | 54                 | -23.05      | -                   | -              | 59             | 203         | H        |
| 6      | * 1.29857       | 37.31                | PK2 | 28.9          | -22.9                  | 0            | 43.31                      | -                  | -           | 74                  | -30.69         | 354            | 242         | H        |
|        | * 1.29824       | 22.55                | ADV | 28.9          | -22.9                  | 1.65         | 30.2                       | 54                 | -23.8       | -                   | -              | 354            | 242         | H        |
| 2      | * 1.00785       | 48.59                | PK2 | 27.8          | -24.6                  | 0            | 51.79                      | -                  | -           | 74                  | -22.21         | 193            | 236         | V        |
|        | * 1.00758       | 24.84                | ADV | 27.8          | -24.6                  | 1.65         | 29.69                      | 54                 | -24.31      | -                   | -              | 193            | 236         | V        |
| 3      | * 1.07363       | 46.85                | PK2 | 27.3          | -24.2                  | 0            | 49.95                      | -                  | -           | 74                  | -24.05         | 229            | 179         | V        |
|        | * 1.07585       | 24.04                | ADV | 27.3          | -24.2                  | 1.65         | 28.79                      | 54                 | -25.21      | -                   | -              | 229            | 179         | V        |
| 4      | * 1.1124        | 40.59                | PK2 | 27.6          | -24                    | 0            | 44.19                      | -                  | -           | 74                  | -29.81         | 229            | 194         | V        |
|        | * 1.11446       | 22.47                | ADV | 27.6          | -24                    | 1.65         | 27.72                      | 54                 | -26.28      | -                   | -              | 229            | 194         | V        |
| 5      | * 1.19474       | 43.67                | PK2 | 28.5          | -23.5                  | 0            | 48.67                      | -                  | -           | 74                  | -25.33         | 164            | 238         | V        |
|        | * 1.19314       | 22.17                | ADV | 28.5          | -23.5                  | 1.65         | 28.82                      | 54                 | -25.18      | -                   | -              | 164            | 238         | V        |
| 8      | * 1.40406       | 52.75                | PK2 | 28.6          | -22.4                  | 0            | 58.95                      | -                  | -           | 74                  | -15.05         | 233            | 206         | V        |
|        | * 1.4034        | 24.77                | ADV | 28.6          | -22.4                  | 1.65         | 32.62                      | 54                 | -21.38      | -                   | -              | 233            | 206         | V        |
| 9      | * 1.5952        | 50.77                | PK2 | 27.8          | -21.9                  | 0            | 56.67                      | -                  | -           | 74                  | -17.33         | 204            | 168         | V        |
|        | * 1.59565       | 24.42                | ADV | 27.8          | -21.9                  | 1.65         | 31.97                      | 54                 | -22.03      | -                   | -              | 204            | 168         | V        |

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

### MID CHANNEL RESULTS



**HORIZONTAL**



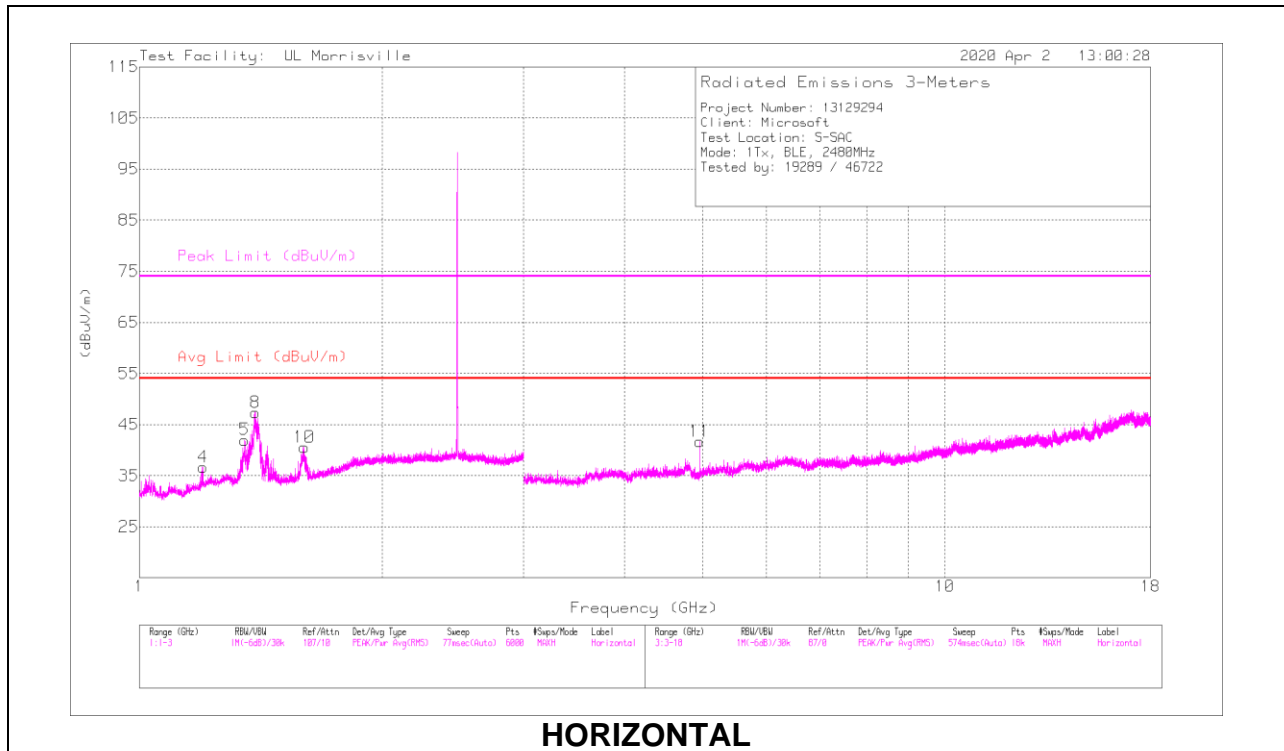
**VERTICAL**

**RADIATED EMISSIONS**

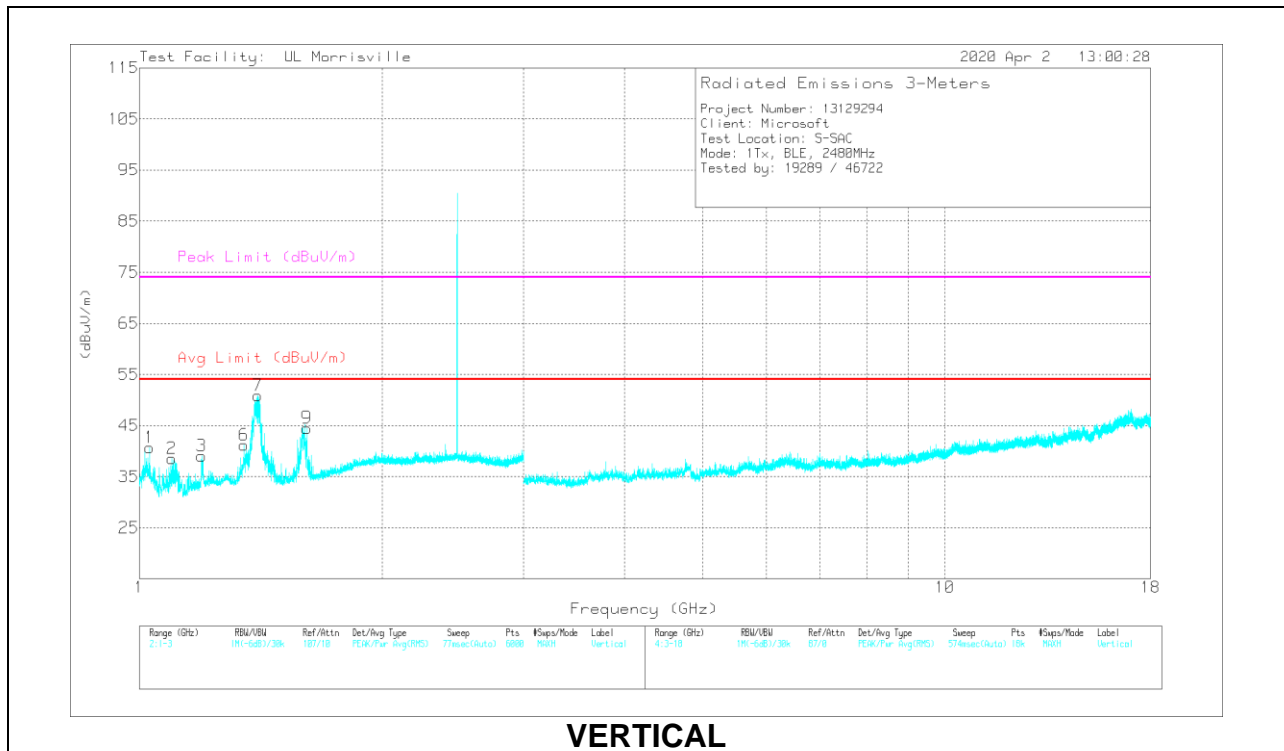
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/FI tr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 5      | * 1.19499       | 39.96                | PK2 | 28.5          | -23.5                  | 0            | 44.96                      | -                  | -           | 74                  | -29.04         | 92             | 224         | H        |
|        | * 1.1952        | 21.98                | ADV | 28.5          | -23.5                  | 1.65         | 28.63                      | 54                 | -25.37      | -                   | -              | 92             | 224         | H        |
| 6      | * 1.39348       | 51.9                 | PK2 | 28.8          | -22.5                  | 0            | 58.2                       | -                  | -           | 74                  | -15.8          | 282            | 289         | H        |
|        | * 1.39436       | 24.7                 | ADV | 28.8          | -22.5                  | 1.65         | 32.65                      | 54                 | -21.35      | -                   | -              | 282            | 289         | H        |
| 7      | * 1.59104       | 44.39                | PK2 | 27.8          | -21.9                  | 0            | 50.29                      | -                  | -           | 74                  | -23.71         | 141            | 379         | H        |
|        | * 1.58966       | 23.28                | ADV | 27.9          | -21.9                  | 1.65         | 30.93                      | 54                 | -23.07      | -                   | -              | 141            | 379         | H        |
| 1      | * 1.03443       | 47.64                | PK2 | 27.1          | -24.4                  | 0            | 50.34                      | -                  | -           | 74                  | -23.66         | 185            | 239         | V        |
|        | * 1.03432       | 24.68                | ADV | 27.1          | -24.4                  | 1.65         | 29.03                      | 54                 | -24.97      | -                   | -              | 185            | 239         | V        |
| 2      | * 1.09355       | 45.98                | PK2 | 27.6          | -24.1                  | 0            | 49.48                      | -                  | -           | 74                  | -24.52         | 225            | 197         | V        |
|        | * 1.09556       | 23.76                | ADV | 27.6          | -24                    | 1.65         | 29.01                      | 54                 | -24.99      | -                   | -              | 225            | 197         | V        |
| 3      | * 1.39222       | 57.49                | PK2 | 28.8          | -22.5                  | 0            | 63.79                      | -                  | -           | 74                  | -10.21         | 223            | 230         | V        |
|        | * 1.39183       | 27.43                | ADV | 28.9          | -22.5                  | 1.65         | 35.48                      | 54                 | -18.52      | -                   | -              | 223            | 230         | V        |
| 4      | * 1.59477       | 51.82                | PK2 | 27.8          | -21.9                  | 0            | 57.72                      | -                  | -           | 74                  | -16.28         | 213            | 192         | V        |
|        | * 1.59497       | 25.52                | ADV | 27.8          | -21.9                  | 1.65         | 33.07                      | 54                 | -20.93      | -                   | -              | 213            | 192         | V        |
| 9      | * 3.58901       | 46.26                | PK2 | 32.9          | -31.4                  | 0            | 47.76                      | -                  | -           | 74                  | -26.24         | 185            | 155         | V        |
|        | * 3.58956       | 27.52                | ADV | 32.9          | -31.4                  | 1.65         | 30.67                      | 54                 | -23.33      | -                   | -              | 185            | 155         | V        |
| 8      | 1.78947         | 32.67                | Pk  | 30.1          | -22                    | 0            | 40.77                      | -                  | -           | -                   | -              | 0-360          | 199         | V        |

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

### HIGH CHANNEL RESULTS



**HORIZONTAL**



**VERTICAL**



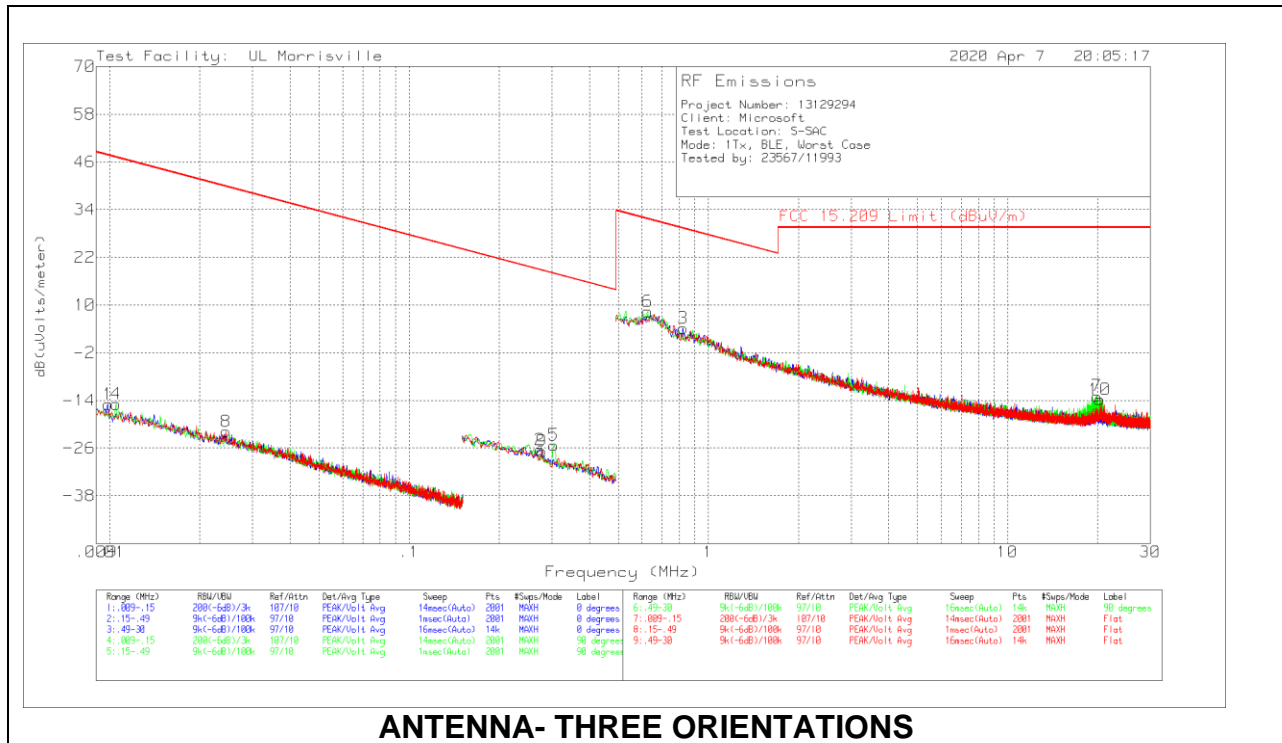
**RADIATED EMISSIONS**

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/FI tr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 4      | * 1.19811       | 37.57                | PK2 | 28.6          | -23.4                  | 0            | 42.77                      | -                  | -           | 74                  | -31.23         | 208            | 234         | H        |
|        | * 1.20076       | 22                   | ADV | 28.6          | -23.4                  | 1.65         | 28.85                      | 54                 | -25.15      | -                   | -              | 208            | 234         | H        |
| 5      | * 1.34864       | 43.58                | PK2 | 29.2          | -22.7                  | 0            | 50.08                      | -                  | -           | 74                  | -23.92         | 168            | 246         | H        |
|        | * 1.34976       | 23.55                | ADV | 29.2          | -22.7                  | 1.65         | 31.7                       | 54                 | -22.3       | -                   | -              | 168            | 246         | H        |
| 8      | * 1.39385       | 51.99                | PK2 | 28.8          | -22.5                  | 0            | 58.29                      | -                  | -           | 74                  | -15.71         | 285            | 232         | H        |
|        | * 1.39327       | 25.51                | ADV | 28.8          | -22.5                  | 1.65         | 33.46                      | 54                 | -20.54      | -                   | -              | 285            | 232         | H        |
| 10     | * 1.60043       | 42.14                | PK2 | 27.8          | -21.9                  | 0            | 48.04                      | -                  | -           | 74                  | -25.96         | 68             | 264         | H        |
|        | * 1.60033       | 22.91                | ADV | 27.8          | -21.9                  | 1.65         | 30.46                      | 54                 | -23.54      | -                   | -              | 68             | 264         | H        |
| 1      | * 1.02969       | 44.4                 | PK2 | 27.1          | -24.4                  | 0            | 47.1                       | -                  | -           | 74                  | -26.9          | 209            | 147         | V        |
|        | * 1.03005       | 23.99                | ADV | 27.1          | -24.4                  | 1.65         | 28.34                      | 54                 | -25.66      | -                   | -              | 209            | 147         | V        |
| 2      | * 1.09879       | 46.37                | PK2 | 27.6          | -24                    | 0            | 49.97                      | -                  | -           | 74                  | -24.03         | 225            | 184         | V        |
|        | * 1.09725       | 24.38                | ADV | 27.6          | -24                    | 1.65         | 29.63                      | 54                 | -24.37      | -                   | -              | 225            | 184         | V        |
| 3      | * 1.19536       | 44.35                | PK2 | 28.5          | -23.5                  | 0            | 49.35                      | -                  | -           | 74                  | -24.65         | 161            | 171         | V        |
|        | * 1.19444       | 22.85                | ADV | 28.5          | -23.5                  | 1.65         | 29.5                       | 54                 | -24.5       | -                   | -              | 161            | 171         | V        |
| 6      | * 1.3451        | 45.65                | PK2 | 29.2          | -22.7                  | 0            | 52.15                      | -                  | -           | 74                  | -21.85         | 231            | 317         | V        |
|        | * 1.34616       | 23.92                | ADV | 29.2          | -22.7                  | 1.65         | 32.07                      | 54                 | -21.93      | -                   | -              | 231            | 317         | V        |
| 7      | * 1.40607       | 54.4                 | PK2 | 28.6          | -22.4                  | 0            | 60.6                       | -                  | -           | 74                  | -13.4          | 254            | 302         | V        |
|        | * 1.40318       | 26.72                | ADV | 28.7          | -22.4                  | 1.65         | 34.67                      | 54                 | -19.33      | -                   | -              | 254            | 302         | V        |
| 9      | * 1.61128       | 43.47                | PK2 | 27.9          | -21.9                  | 0            | 49.47                      | -                  | -           | 74                  | -24.53         | 40             | 245         | V        |
|        | * 1.61394       | 23.31                | ADV | 27.9          | -21.9                  | 1.65         | 30.96                      | 54                 | -23.04      | -                   | -              | 40             | 245         | V        |
| 11     | * 4.96049       | 43.69                | PK2 | 34.1          | -30.6                  | 0            | 47.19                      | -                  | -           | 74                  | -26.81         | 1              | 113         | H        |
|        | * 4.96015       | 33.64                | ADV | 34.1          | -30.6                  | 1.65         | 38.79                      | 54                 | -15.21      | -                   | -              | 1              | 113         | H        |

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

### 10.3. WORST CASE BELOW 30MHZ

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



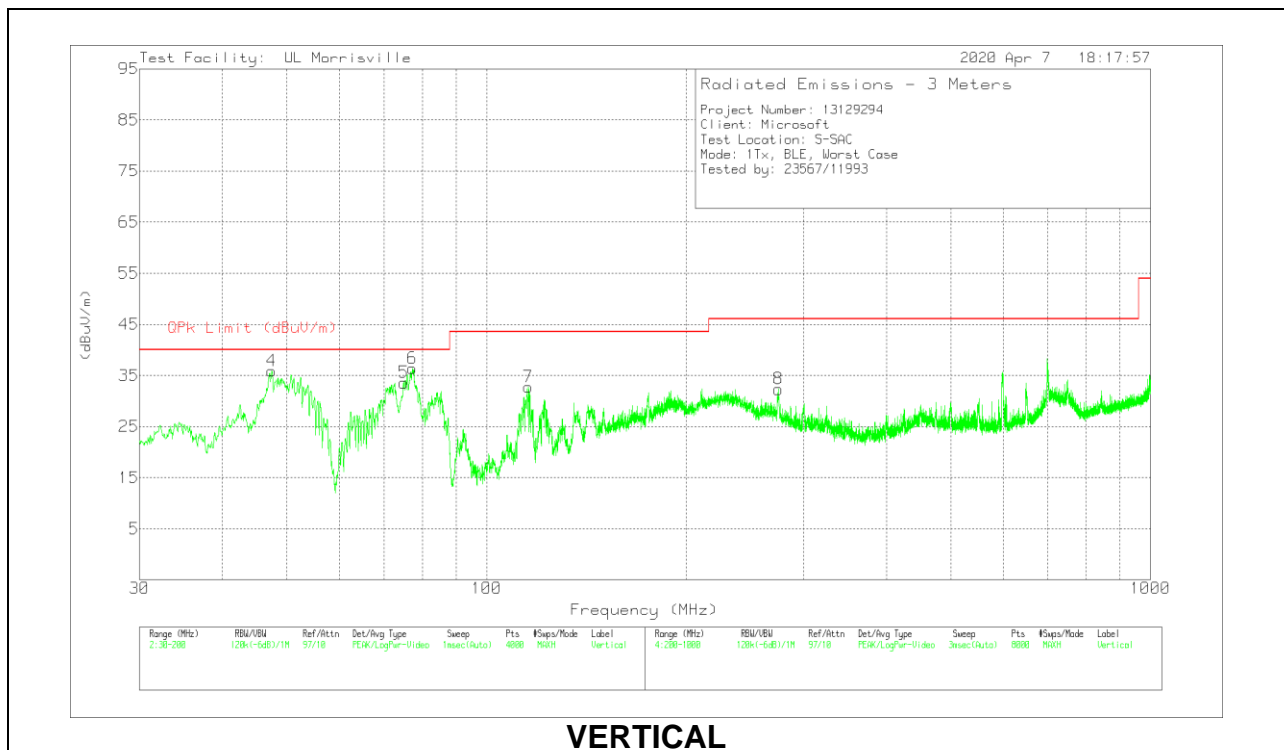
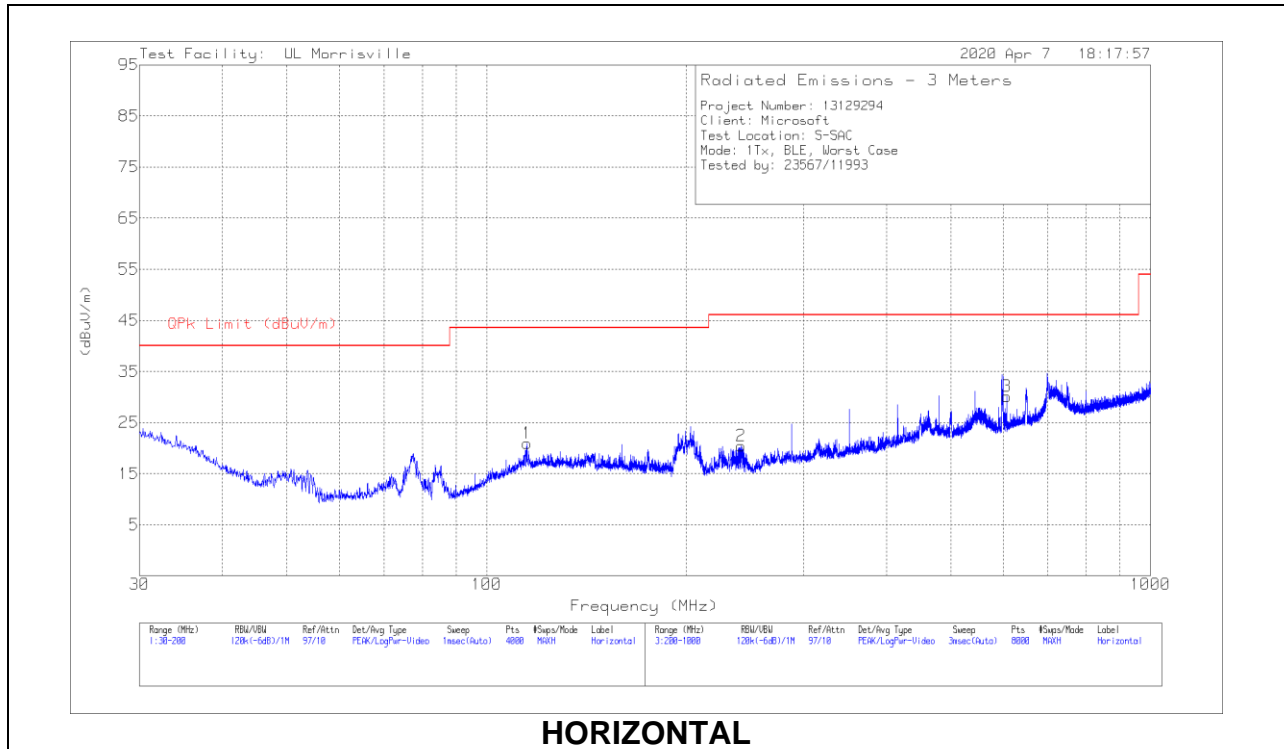
**Below 30MHz Data**

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AT0079 AF (dB/m) | Cbl (dB) | Dist. Corr. Factor (dB) | Corrected Reading dB(uVolts/meter) | FCC 15.209 Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) |
|--------|-----------------|----------------------|-----|------------------|----------|-------------------------|------------------------------------|---------------------------|-------------|----------------|
| 1      | .00985          | 46.59                | Pk  | 18.3             | .1       | -80                     | -15.01                             | 47.73                     | -62.74      | 0-360          |
| 4      | .01049          | 47                   | Pk  | 18               | .1       | -80                     | -14.9                              | 47.19                     | -62.09      | 0-360          |
| 8      | .02448          | 44.44                | Pk  | 13.6             | .1       | -80                     | -21.86                             | 39.83                     | -61.69      | 0-360          |
| 2      | .27419          | 42.47                | Pk  | 11               | .1       | -80                     | -26.43                             | 18.84                     | -45.27      | 0-360          |
| 9      | .2775           | 42.13                | Pk  | 11               | .1       | -80                     | -26.77                             | 18.74                     | -45.51      | 0-360          |
| 5      | .30479          | 43.66                | Pk  | 11               | .1       | -80                     | -25.24                             | 17.92                     | -43.16      | 0-360          |
| 6      | .62702          | 37.26                | Pk  | 11               | .1       | -40                     | 8.36                               | 31.66                     | -23.3       | 0-360          |
| 3      | .82306          | 33.06                | Pk  | 11               | .1       | -40                     | 4.16                               | 29.3                      | -25.14      | 0-360          |
| 7      | 19.85198        | 16.92                | Pk  | 9.4              | .8       | -40                     | -12.88                             | 29.54                     | -42.42      | 0-360          |
| 10     | 20.3305         | 16.13                | Pk  | 9.3              | .8       | -40                     | -13.77                             | 29.54                     | -43.31      | 0-360          |

Pk - Peak detector

### 10.4. WORST CASE BELOW 1 GHZ

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



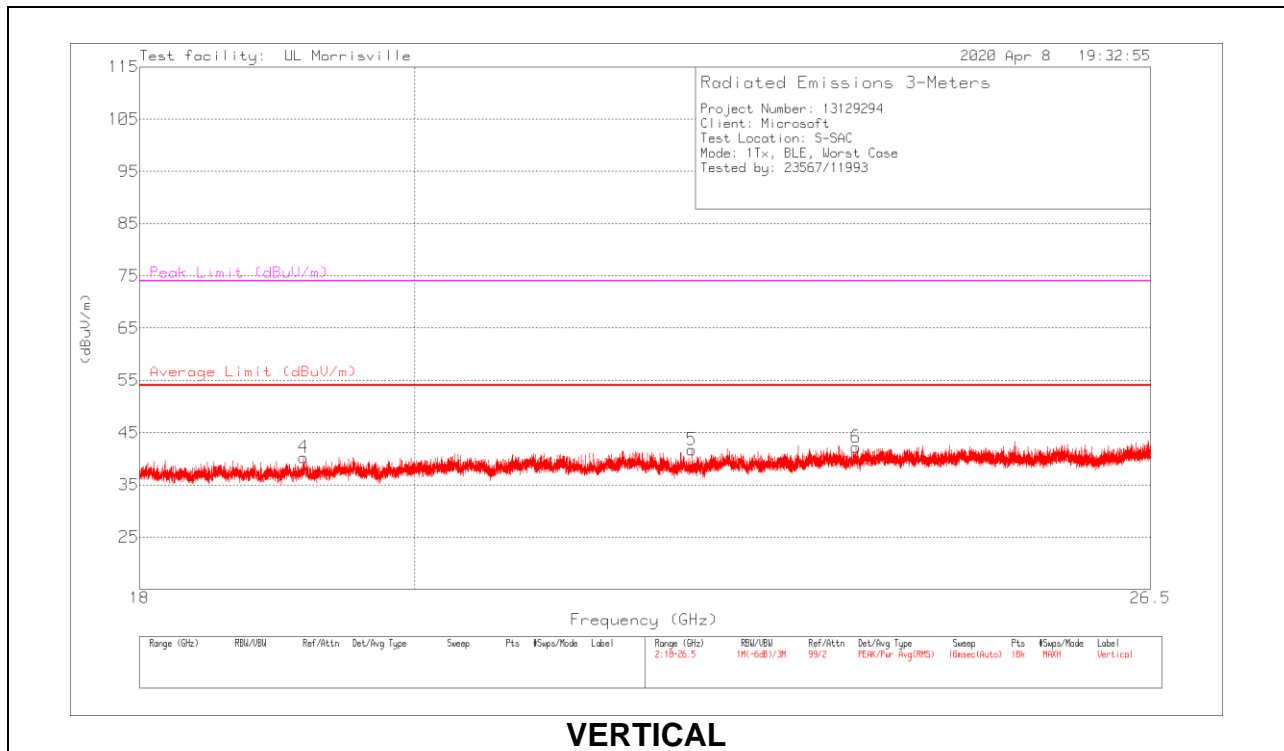
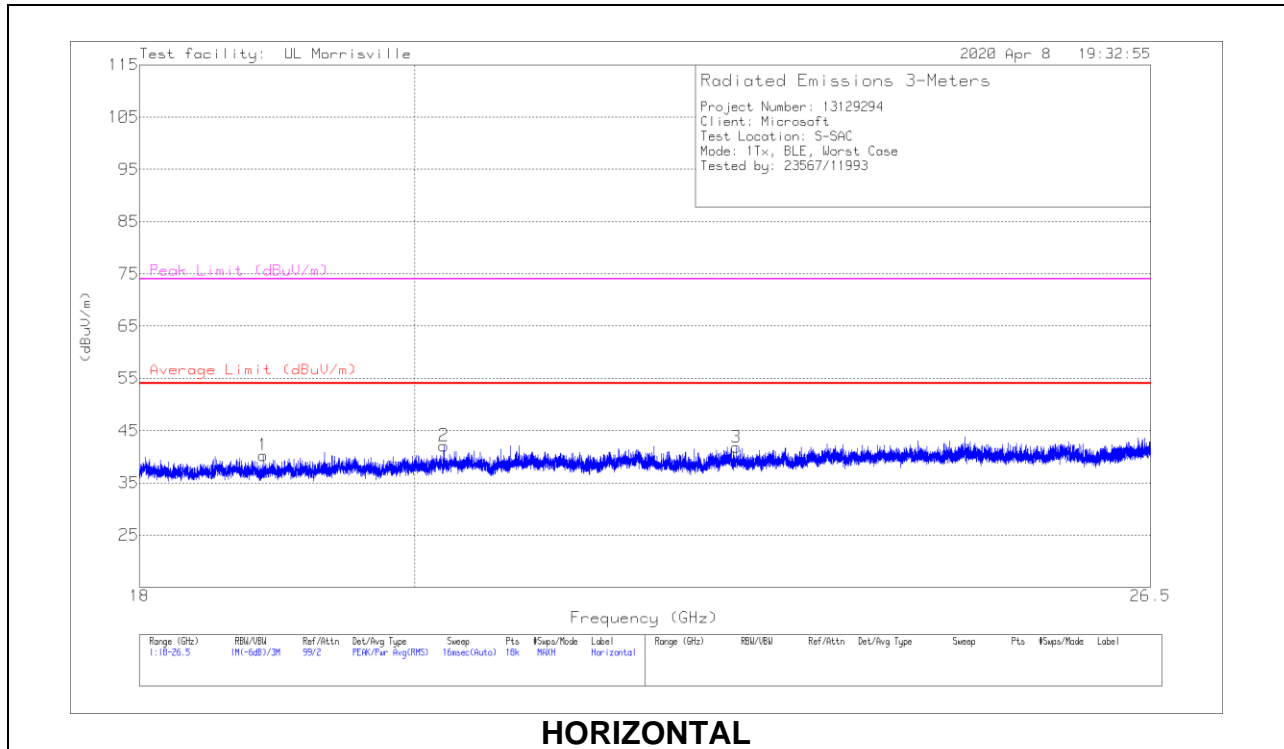
**Below 1GHz Data**

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AT0074 AF (dB/m) | Cbl/Amp | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|------------------|---------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 1      | * 114.9795      | 32.24                | Pk  | 19.5             | -30.8   | 20.94                      | 43.52              | -22.58      | 0-360          | 298         | H        |
| 5      | * 75.0191       | 50.78                | Pk  | 14               | -31.2   | 33.58                      | 40                 | -6.42       | 0-360          | 101         | V        |
| 7      | * 115.6172      | 43.91                | Pk  | 19.6             | -30.8   | 32.71                      | 43.52              | -10.81      | 0-360          | 101         | V        |
| 2      | * 241.9054      | 32.6                 | Pk  | 17.7             | -29.9   | 20.4                       | 46.02              | -25.62      | 0-360          | 101         | H        |
| 3      | * 608.053       | 34.2                 | Pk  | 24.7             | -28.8   | 30.1                       | 46.02              | -15.92      | 0-360          | 298         | H        |
| 8      | * 275.1098      | 42.62                | Pk  | 19.4             | -29.7   | 32.32                      | 46.02              | -13.7       | 0-360          | 102         | V        |
| 4      | 47.472          | 52.36                | Pk  | 15               | -31.5   | 35.86                      | -                  | -           | 0-360          | 101         | V        |
| 6      | 77.3147         | 53.88                | Pk  | 13.8             | -31.3   | 36.38                      | -                  | -           | 0-360          | 101         | V        |

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

### 10.5. WORST CASE 18-26 GHZ

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



**18 – 26GHz DATA**

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0076 AF (dB/m) | Amp/Cbl (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|------------------|--------------|----------------------------|------------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1      | * 18.87271      | 45.78                | Pk  | 32.6             | -38.1        | 40.28                      | 54                     | -13.72      | 74                  | -33.72      | 0-360          | 148         | H        |
| 2      | * 20.22287      | 46.72                | Pk  | 32.9             | -37.5        | 42.12                      | 54                     | -11.88      | 74                  | -31.88      | 0-360          | 248         | H        |
| 3      | * 22.61481      | 45.23                | Pk  | 33.4             | -36.8        | 41.83                      | 54                     | -12.17      | 74                  | -32.17      | 0-360          | 298         | H        |
| 4      | * 19.16598      | 45.47                | Pk  | 32.7             | -37.9        | 40.27                      | 54                     | -13.73      | 74                  | -33.73      | 0-360          | 202         | V        |
| 5      | * 22.2337       | 45.24                | Pk  | 33.5             | -37          | 41.74                      | 54                     | -12.26      | 74                  | -32.26      | 0-360          | 202         | V        |
| 6      | * 23.67642      | 44.62                | Pk  | 34               | -36.4        | 42.22                      | 54                     | -11.78      | 74                  | -31.78      | 0-360          | 202         | V        |

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

## 11. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 8.8

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

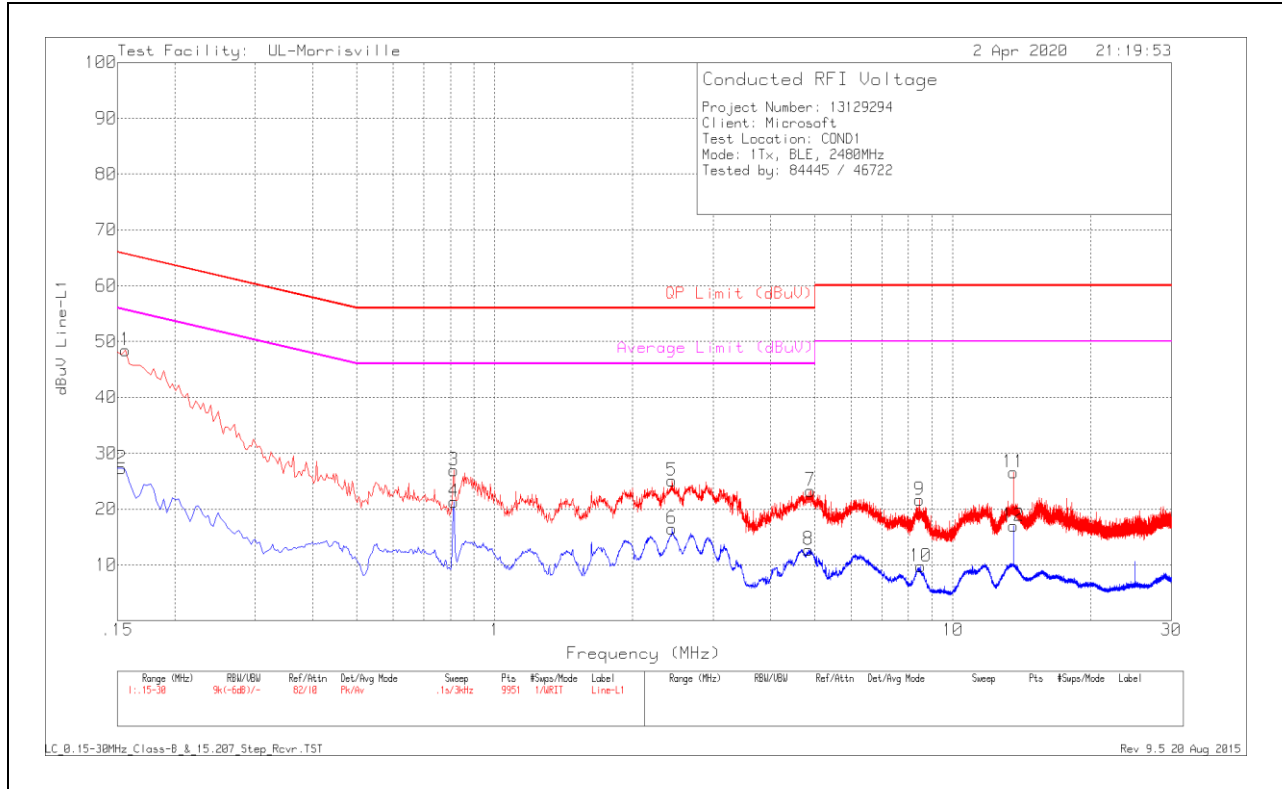
\*Decreases with the logarithm of the frequency.

### RESULTS



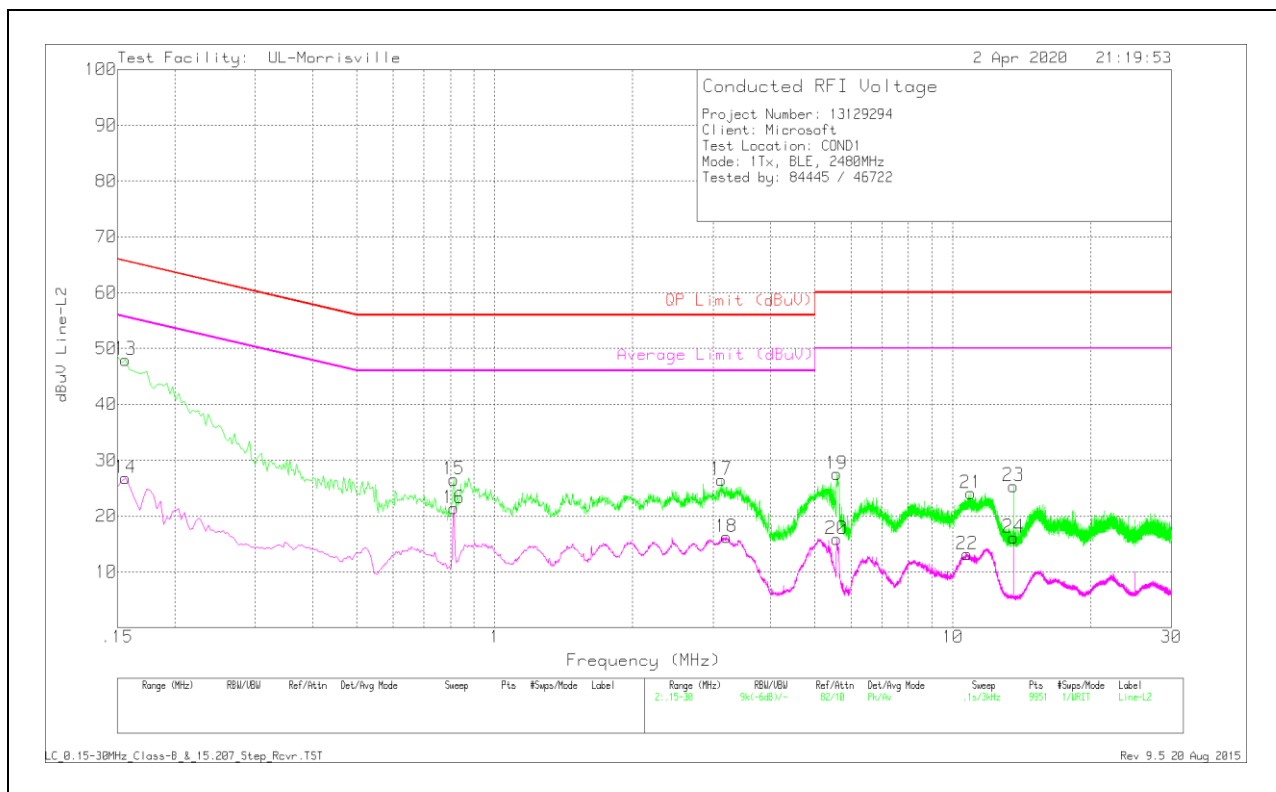
**11.1.1. AC Power Line Norm**

**LINE 1 RESULTS**



| Range 1: Line-L1 .15 - 30MHz |                 |                      |     |               |                  |                        |                 |             |                      |             |
|------------------------------|-----------------|----------------------|-----|---------------|------------------|------------------------|-----------------|-------------|----------------------|-------------|
| Marker                       | Frequency (MHz) | Meter Reading (dBuV) | Det | LISN VCF (dB) | Cbl/Limiter (dB) | Corrected Reading dBuV | QP Limit (dBuV) | Margin (dB) | Average Limit (dBuV) | Margin (dB) |
| 1                            | .156            | 38.53                | Pk  | .2            | 9.7              | 48.43                  | 65.67           | -17.24      | -                    | -           |
| 2                            | .153            | 17.39                | Av  | .2            | 9.7              | 27.29                  | -               | -           | 55.84                | -28.55      |
| 3                            | .813            | 17.11                | Pk  | 0             | 9.8              | 26.91                  | 56              | -29.09      | -                    | -           |
| 4                            | .813            | 11.5                 | Av  | 0             | 9.8              | 21.3                   | -               | -           | 46                   | -24.7       |
| 5                            | 2.439           | 15.3                 | Pk  | 0             | 9.8              | 25.1                   | 56              | -30.9       | -                    | -           |
| 6                            | 2.439           | 6.66                 | Av  | 0             | 9.8              | 16.46                  | -               | -           | 46                   | -29.54      |
| 7                            | 4.89            | 13.29                | Pk  | .1            | 9.9              | 23.29                  | 56              | -32.71      | -                    | -           |
| 8                            | 4.845           | 2.72                 | Av  | .1            | 9.9              | 12.72                  | -               | -           | 46                   | -33.28      |
| 9                            | 8.451           | 11.56                | Pk  | .1            | 10               | 21.66                  | 60              | -38.34      | -                    | -           |
| 10                           | 8.499           | -.37                 | Av  | .1            | 10               | 9.73                   | -               | -           | 50                   | -40.27      |
| 11                           | 13.563          | 16.46                | Pk  | .1            | 10               | 26.56                  | 60              | -33.44      | -                    | -           |
| 12                           | 13.56           | 6.85                 | Av  | .1            | 10               | 16.95                  | -               | -           | 50                   | -33.05      |

### LINE 2 RESULTS



| Range 2: Line-L2 .15 - 30MHz |                 |                      |     |               |                  |                        |                 |             |                      |             |
|------------------------------|-----------------|----------------------|-----|---------------|------------------|------------------------|-----------------|-------------|----------------------|-------------|
| Marker                       | Frequency (MHz) | Meter Reading (dBuV) | Det | LISN VCF (dB) | Cbl/Limiter (dB) | Corrected Reading dBuV | QP Limit (dBuV) | Margin (dB) | Average Limit (dBuV) | Margin (dB) |
| 13                           | .156            | 38.11                | Pk  | .2            | 9.7              | 48.01                  | 65.67           | -17.66      | -                    | -           |
| 14                           | .156            | 16.88                | Av  | .2            | 9.7              | 26.78                  | -               | -           | 55.67                | -28.89      |
| 15                           | .813            | 16.73                | Pk  | 0             | 9.8              | 26.53                  | 56              | -29.47      | -                    | -           |
| 16                           | .813            | 11.61                | Av  | 0             | 9.8              | 21.41                  | -               | -           | 46                   | -24.59      |
| 17                           | 3.123           | 16.7                 | Pk  | 0             | 9.8              | 26.5                   | 56              | -29.5       | -                    | -           |
| 18                           | 3.201           | 6.43                 | Av  | 0             | 9.8              | 16.23                  | -               | -           | 46                   | -29.77      |
| 19                           | 5.58            | 17.57                | Pk  | .1            | 9.9              | 27.57                  | 60              | -32.43      | -                    | -           |
| 20                           | 5.571           | 5.9                  | Av  | .1            | 9.9              | 15.9                   | -               | -           | 50                   | -34.1       |
| 21                           | 10.956          | 14.01                | Pk  | .1            | 10               | 24.11                  | 60              | -35.89      | -                    | -           |
| 22                           | 10.746          | 3.07                 | Av  | .1            | 10               | 13.17                  | -               | -           | 50                   | -36.83      |
| 23                           | 13.56           | 15.29                | Pk  | .1            | 10               | 25.39                  | 60              | -34.61      | -                    | -           |
| 24                           | 13.563          | 6.06                 | Av  | .1            | 10               | 16.16                  | -               | -           | 50                   | -33.84      |