



# **CERTIFICATION TEST REPORT**

**Report Number. :** R13158070-E4

**Applicant :** Braun GMBH  
T-QTA Frankfurter Strasses 145  
Kronberg TS, D-61476  
Germany

**Model :** 3783

**FCC ID :** 2AG9A51910

**EUT Description :** Wireless Toothbrush Charging Base

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

**Date Of Issue:**

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**Prepared by:**

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NVLAP Lab code: 200246-0

## REPORT REVISION HISTORY

| Rev. | Issue<br>Date | Revisions     | Revised By |
|------|---------------|---------------|------------|
| –    | 3/20/2020     | Initial Issue |            |

## TABLE OF CONTENTS

|                                              |    |
|----------------------------------------------|----|
| REPORT REVISION HISTORY .....                | 2  |
| TABLE OF CONTENTS .....                      | 3  |
| 1. ATTESTATION OF TEST RESULTS .....         | 5  |
| 2. TEST METHODOLOGY .....                    | 6  |
| 3. FACILITIES AND ACCREDITATION .....        | 6  |
| 4. CALIBRATION AND UNCERTAINTY .....         | 7  |
| 4.1. MEASURING INSTRUMENT CALIBRATION .....  | 7  |
| 4.2. SAMPLE CALCULATION .....                | 7  |
| 4.3. MEASUREMENT UNCERTAINTY .....           | 7  |
| 5. EQUIPMENT UNDER TEST .....                | 8  |
| 5.1. EUT DESCRIPTION .....                   | 8  |
| 5.2. MAXIMUM OUTPUT POWER .....              | 8  |
| 5.3. DESCRIPTION OF AVAILABLE ANTENNAS ..... | 9  |
| 5.4. SOFTWARE AND FIRMWARE .....             | 9  |
| 5.5. WORST-CASE CONFIGURATION AND MODE ..... | 9  |
| 5.6. DESCRIPTION OF TEST SETUP .....         | 10 |
| 6. MEASUREMENT METHOD .....                  | 11 |
| 7. TEST AND MEASUREMENT EQUIPMENT .....      | 12 |
| 8. ANTENNA PORT TEST RESULTS .....           | 15 |
| 8.1. ON TIME AND DUTY CYCLE .....            | 15 |
| 8.2. 99% BANDWIDTH .....                     | 17 |
| 8.2.1. 802.11b MODE .....                    | 18 |
| 8.2.2. 802.11g MODE .....                    | 19 |
| 8.2.3. 802.11n HT20 MODE .....               | 20 |
| 8.2.4. 802.11n HT40 MODE .....               | 21 |
| 8.3. 6 dB BANDWIDTH .....                    | 22 |
| 8.3.1. 802.11b MODE .....                    | 23 |
| 8.3.2. 802.11g MODE .....                    | 24 |
| 8.3.3. 802.11n HT20 MODE .....               | 25 |
| 8.3.4. 802.11n HT40 MODE .....               | 26 |
| 8.4. OUTPUT POWER .....                      | 27 |
| 8.4.1. 802.11b MODE .....                    | 28 |
| 8.4.2. 802.11g MODE .....                    | 28 |

|         |                                                            |    |
|---------|------------------------------------------------------------|----|
| 8.4.3.  | 802.11n HT20 MODE .....                                    | 28 |
| 8.4.4   | 802.11n HT40 MODE .....                                    | 29 |
| 8.5.    | AVERAGE POWER .....                                        | 30 |
| 8.5.1.  | 802.11b MODE .....                                         | 30 |
| 8.5.2.  | 802.11g MODE .....                                         | 30 |
| 8.5.3.  | 802.11n HT20 MODE .....                                    | 31 |
| 8.5.4   | 802.11n HT40 MODE .....                                    | 31 |
| 8.6.    | POWER SPECTRAL DENSITY .....                               | 32 |
| 8.6.1.  | 802.11b MODE .....                                         | 33 |
| 8.6.2.  | 802.11g MODE .....                                         | 34 |
| 8.6.3.  | 802.11n HT20 MODE .....                                    | 35 |
| 8.6.4.  | 802.11n HT40 MODE .....                                    | 36 |
| 8.7.    | CONDUCTED SPURIOUS EMISSIONS .....                         | 37 |
| 8.7.1.  | 802.11b MODE .....                                         | 38 |
| 8.7.2.  | 802.11g MODE .....                                         | 39 |
| 8.7.3.  | 802.11n HT20 MODE .....                                    | 40 |
| 8.7.4.  | 802.11n HT40 MODE .....                                    | 41 |
| 9.      | RADIATED TEST RESULTS .....                                | 42 |
| 9.1.    | TRANSMITTER ABOVE 1 GHz .....                              | 44 |
| 9.1.1.  | TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND .....      | 44 |
| 9.1.2.  | TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND .....      | 54 |
| 9.1.3.  | TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND ..... | 64 |
| 9.1.4.  | TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 2.4 GHz BAND ..... | 74 |
| 9.2.    | WORST CASE BELOW 30MHZ .....                               | 84 |
| 9.3.    | WORST CASE BELOW 1 GHZ .....                               | 85 |
| 9.4.    | WORST CASE 18-26 GHZ .....                                 | 87 |
| 10.     | AC POWER LINE CONDUCTED EMISSIONS .....                    | 89 |
| 10.1.1. | AC Power Line Norm .....                                   | 90 |
| 11.     | SETUP PHOTOS .....                                         | 92 |

## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Braun GMBH  
T-QTA Frankfurter Strasses 145  
Kronberg TS, D-61476  
Germany

**EUT DESCRIPTION:** Wireless Toothbrush Charging Base

**MODEL:** 3783

**SERIAL NUMBER:** Charging base: BW012969000010

**DATE RECEIVED:** 2019-12-19

**DATE TESTED:** 2019-12-31 to 2020-01-21

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

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

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

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

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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Drive, Research Triangle Park, NC 27709, USA and 2800 Perimeter Park Dr., Suite B, Morrisville, NC 27560, USA. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

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

The above test sites and facilities are covered under FCC Test Firm Registration # 703469

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

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. SAMPLE CALCULATION

#### **RADIATED EMISSIONS**

Where relevant, the following sample calculation is provided:

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

#### **MAINS CONDUCTED EMISSIONS**

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.  
 $36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$

### 4.3. MEASUREMENT UNCERTAINTY

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

| PARAMETER                                | UNCERTAINTY                 |
|------------------------------------------|-----------------------------|
| Radio Frequency (Spectrum Analyzer)      | 141.2 Hz                    |
| Occupied Channel Bandwidth               | 2.00%                       |
| RF output power, conducted               | 1.3 dB (PK)<br>0.45 dB (AV) |
| RF output power, radiated (SAC)          | 4.52 dB                     |
| Power Spectral Density, conducted        | 2.47 dB                     |
| Unwanted Emissions, conducted            | 2.50 dB                     |
| All emissions, radiated                  | 4.88 dB                     |
| Conducted Emissions (0.150-30MHz) - LISN | 3.07 dB                     |
| Temperature                              | 2.26°C                      |
| Humidity                                 | 6.79%                       |
| DC Supply voltages                       | 1.70%                       |
| Time                                     | 3.39%                       |

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

## 5. EQUIPMENT UNDER TEST

### 5.1. EUT DESCRIPTION

The EUT is a wireless toothbrush charging base with a BT/BLE/2.4/5GHz WLAN radio and a WPT radio that operates from 30-47 kHz. This reports covers the 2.4GHz WIFI function of the device.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

#### 2.4GHz BAND

| Frequency Range<br>(MHz) | Mode         | Output Power<br>(dBm) | Output Power<br>(mW) |
|--------------------------|--------------|-----------------------|----------------------|
| 2412 - 2462              | 802.11b      | 17.64                 | 58.08                |
| 2412 - 2462              | 802.11g      | 23.15                 | 206.54               |
| 2412 - 2462              | 802.11n HT20 | 23.51                 | 224.39               |
| 2422 - 2452              | 802.11n HT40 | 22.01                 | 158.85               |



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

The radio utilizes an FPC antenna, with a maximum gain of 2.66 dBi.

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

The EUT firmware installed during testing was Type 3782 firmware version:V12, Type 3783 firmware version: V20.

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

Radiated emissions in the range of 1-18GHz were tested with the EUT continuously transmitting on low, mid, and high channels.

AC Mains Line Conducted and radiated emissions in the ranges of 0.009-30MHz, 30-1000MHz, and 18-26GHz were tested at worst-case channel based on power and PSD.

EUT only intended to operate in one orientation. Therefore all testing performed with EUT in its intended orientation.

Worst-case data rates as provided by the client were:

802.11b mode: 1 Mbps

802.11g mode: 6 Mbps

802.11n HT20mode: MCS0

802.11n HT40mode: MCS0

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

| Support Equipment List |              |       |                |         |
|------------------------|--------------|-------|----------------|---------|
| Description            | Manufacturer | Model | Serial Number  | FCC ID  |
| Toothbrush             | Braun        | 3765  | BC811081911    | USQ3765 |
| Toothbrush             | Braun        | 3765  | BC811081913    | USQ3765 |
| Power supply           | Braun        | 3780  | Non-serialized | N/A     |

### I/O CABLES

| I/O Cable List |      |                      |                     |                  |                  |         |
|----------------|------|----------------------|---------------------|------------------|------------------|---------|
| Cable No.      | Port | # of Identical Ports | Connector Type      | Cable Type       | Cable Length (m) | Remarks |
| 1              | 1    | 1                    | Proprietary 2 prong | 2 conductor wire | <3               | None    |

### TEST SETUP

The EUT is powered by a power supply. The EUT begins charging as soon as powered up.

### SETUP DIAGRAMS

Please refer to R13158070-EP2 for setup diagrams

## 6. MEASUREMENT METHOD

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

6 dB BW: ANSI C63.10 Subclause 11.8.1

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

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

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

Out-of-band emissions in non-restricted bands: ANSI C63.10-2013 Section 11.11 & 6.10.4

Out-of-band emissions in restricted bands: ANSI C63.10-2013 Section 11.12.1 & 6.10.5 and KDB 558074 D01 15.247 Section 11. FAQ 3c

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

AC Line Conducted Emissions: ANSI C63.10:2013 Sections 6.2

## 7. TEST AND MEASUREMENT EQUIPMENT

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

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

| Equip. ID                        | Description                                       | Manufacturer      | Model Number                 | Last Cal.  | Next Cal.  |
|----------------------------------|---------------------------------------------------|-------------------|------------------------------|------------|------------|
| <b>1-18 GHz</b>                  |                                                   |                   |                              |            |            |
| AT0067                           | Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz | ETS Lindgren      | 3117                         | 2019-03-22 | 2020-03-22 |
| <b>Gain-Loss Chains</b>          |                                                   |                   |                              |            |            |
| N-SAC03                          | Gain-loss string: 1-18GHz                         | Various           | Various                      | 2019-03-15 | 2020-03-15 |
| <b>Receiver &amp; Software</b>   |                                                   |                   |                              |            |            |
| SA0026                           | Spectrum Analyzer                                 | Agilent           | N9030A                       | 2019-03-19 | 2020-03-19 |
| SOFTEMI                          | EMI Software                                      | UL                | Version 9.5<br>June 15, 2019 | NA         | NA         |
| <b>Additional Equipment used</b> |                                                   |                   |                              |            |            |
| s/n 181474341                    | Environmental Meter                               | Fisher Scientific | 15-077-963                   | 2018-07-27 | 2020-07-27 |

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 (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>18-40 GHz</b>                                       |                                                   |                                    |                                                  |            |            |
| AT0076                                                 | Horn Antenna, 18-26.5GHz                          | ARA                                | MWH-1826/B                                       | 2019-11-07 | 2020-11-07 |
| AT0077                                                 | Horn Antenna, 26-40GHz                            | ARA                                | MWH-2640/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                                          | 2019-03-13 | 2020-03-13 |
| S62/AMP017/CBL2<br>69426-001<br>(Effective 09/20/2019) | Gain-loss string: 18-40GHz                        | Huber+Suhner<br>Miteq<br>MegaPhase | SUCOFLEX 102EA<br>TTA1840-35-HG<br>NC12-K1K1-216 | 2019-03-21 | 2020-03-21 |
| <b>Receiver &amp; Software</b>                         |                                                   |                                    |                                                  |            |            |
| SA0025                                                 | Spectrum Analyzer                                 | Agilent                            | N9030A                                           | 2019-02-28 | 2020-02-28 |
| SA0027<br>(18-40GHz RSE)                               | Spectrum Analyzer                                 | Agilent                            | N9030A                                           | 2019-05-15 | 2020-05-15 |
| SOFTEMI                                                | EMI Software                                      | UL                                 | Version 9.5<br>June 15, 2019                     | NA         | NA         |

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

| Equip. ID             | Description                                   | Manufacturer        | Model Number                 | Last Cal.  | Next Cal.  |
|-----------------------|-----------------------------------------------|---------------------|------------------------------|------------|------------|
| CBL087                | Coax cable, RG223, N-male to BNC-male, 20-ft. | Pasternack          | PE3W06143-240                | 2019-05-29 | 2020-05-29 |
| CDECABLE001           | ANSI C63.4 1m extension cable.                | UL                  | Per Annex B of ANSI C63.4    | 2019-07-10 | 2020-07-10 |
| s/n 181562858         | Environmental Meter                           | Fisher Scientific   | 14-650-118                   | 2018-09-04 | 2020-09-04 |
| LISN003               | LISN, 50-ohm/50-uH, 2-conductor, 25A          | Fischer Custom Com. | FCC-LISN-50-25-2-01-550V     | 2019-08-19 | 2020-08-19 |
| 75141<br>(PRE0101521) | EMI Test Receiver 9kHz-7GHz                   | Rohde & Schwarz     | ESCI 7                       | 2019-08-20 | 2020-08-20 |
| TL001                 | Transient Limiter, 0.009-30MHz                | Com-Power           | LIT-930A                     | 2019-05-29 | 2020-05-29 |
| PS215                 | AC Power Source                               | Elgar               | CW2501M<br>(s/n 1523A02397)  | NA         | NA         |
| SOFTEMI               | EMI Software                                  | UL                  | Version 9.5<br>June 15, 2019 | NA         | NA         |

Test Equipment Used - Wireless Conducted Measurement Equipment

| Equip. ID               | Description                              | Manufacturer          | Model Number       | Last Cal.  | Next Cal.  |
|-------------------------|------------------------------------------|-----------------------|--------------------|------------|------------|
| <b>Conducted Room 2</b> |                                          |                       |                    |            |            |
| T177<br>(PRE0079253)    | Spectrum Analyzer                        | Agilent Technologies  | E4446A             | 2019-04-22 | 2020-04-22 |
| PWM005<br>(PRE0136341)  | RF Power Meter                           | Keysight Technologies | N1912A             | 2019-07-08 | 2020-07-08 |
| PWS005                  | Peak and Avg Power Sensor, 50MHz to 6GHz | Keysight Technologies | N1921A             | 2019-05-06 | 2020-05-06 |
| SN 181474341            | Environmental Meter                      | Fisher Scientific     | 15-077-963         | 2018-07-27 | 2020-07-27 |
| SOFTEMI                 | EMC Software                             | UL                    | Version 2019-11-13 | NA         | NA         |

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

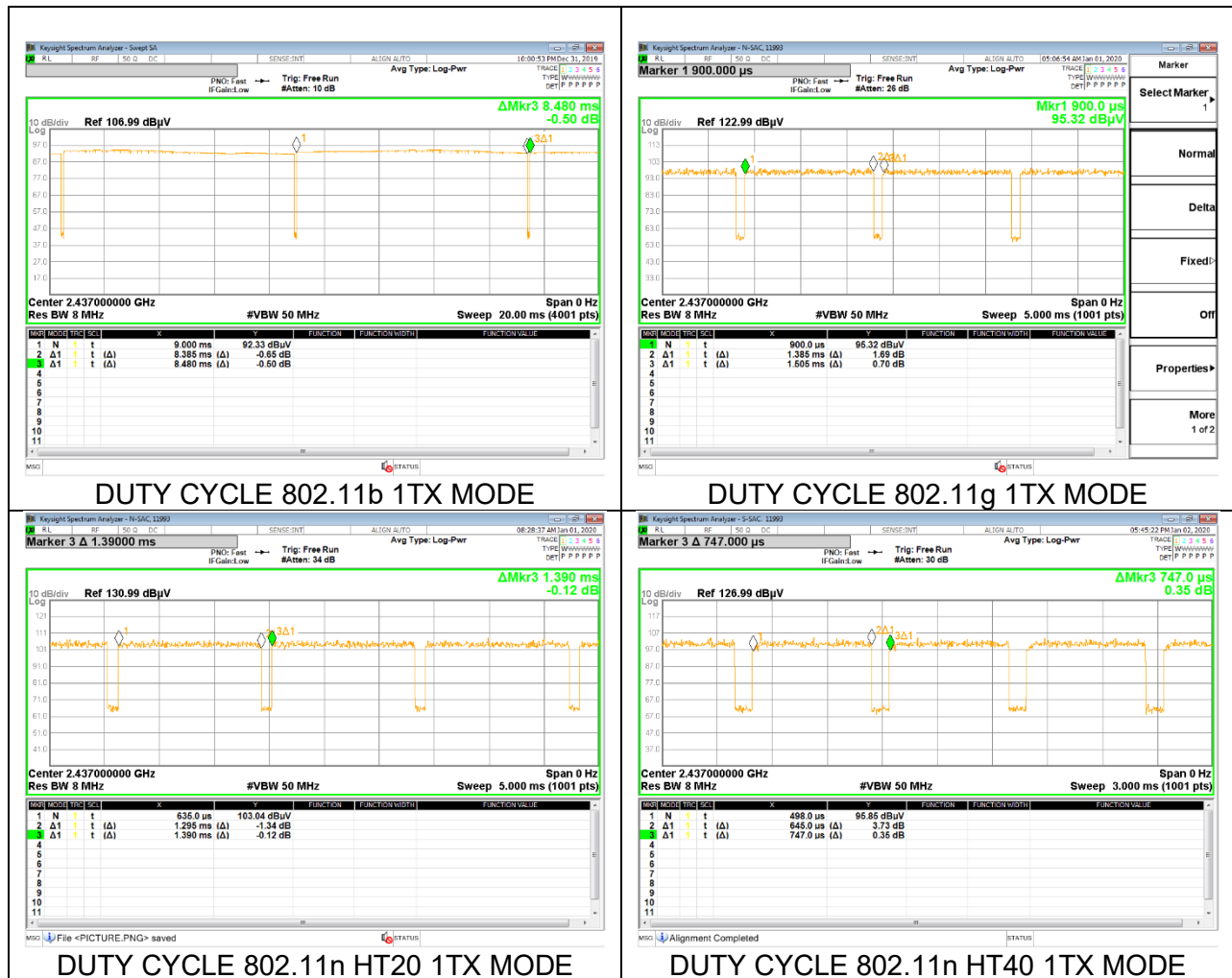
#### PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

#### ON TIME AND DUTY CYCLE RESULTS

| Mode               | ON Time<br>B<br>(msec) | Period<br>(msec) | Duty Cycle<br>x<br>(linear) | Duty<br>Cycle<br>(%) | Duty Cycle<br>Correction Factor<br>(dB) | 1/B<br>Minimum VBW<br>(kHz) |
|--------------------|------------------------|------------------|-----------------------------|----------------------|-----------------------------------------|-----------------------------|
| <b>2.4GHz Band</b> |                        |                  |                             |                      |                                         |                             |
| 802.11b            | 8.385                  | 8.480            | 0.989                       | 98.88%               | 0.00                                    | 0.010                       |
| 802.11g 1TX        | 1.385                  | 1.505            | 0.920                       | 92.03%               | 0.72                                    | 0.722                       |
| 802.11n HT20 1TX   | 1.295                  | 1.390            | 0.932                       | 93.17%               | 0.61                                    | 0.772                       |
| 802.11n HT40 1TX   | 0.645                  | 0.747            | 0.863                       | 86.35%               | 1.28                                    | 1.550                       |

## DUTY CYCLE PLOTS





## **8.2. 99% BANDWIDTH**

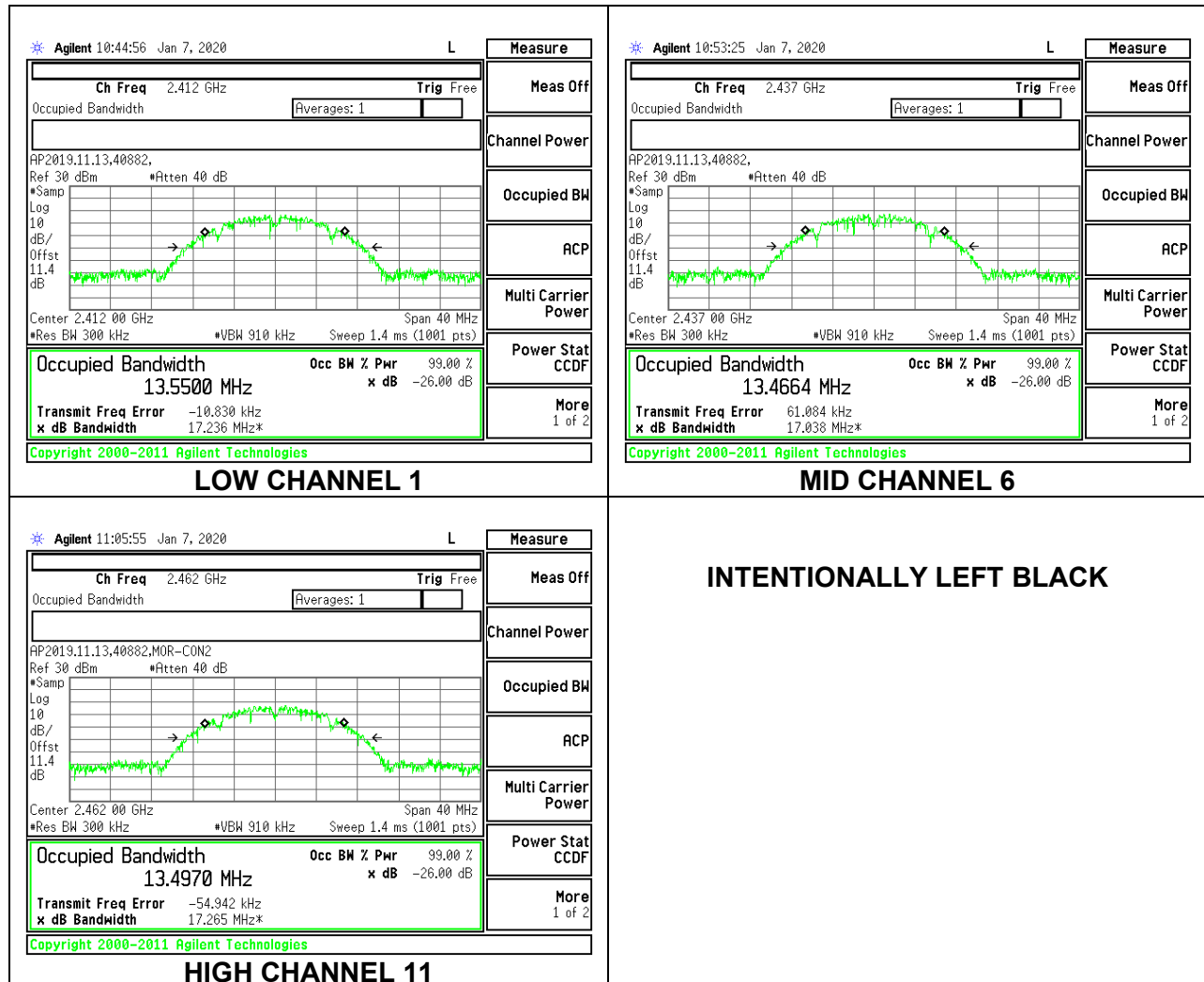
### **LIMITS**

None; for reporting purposes only.

### **RESULTS**

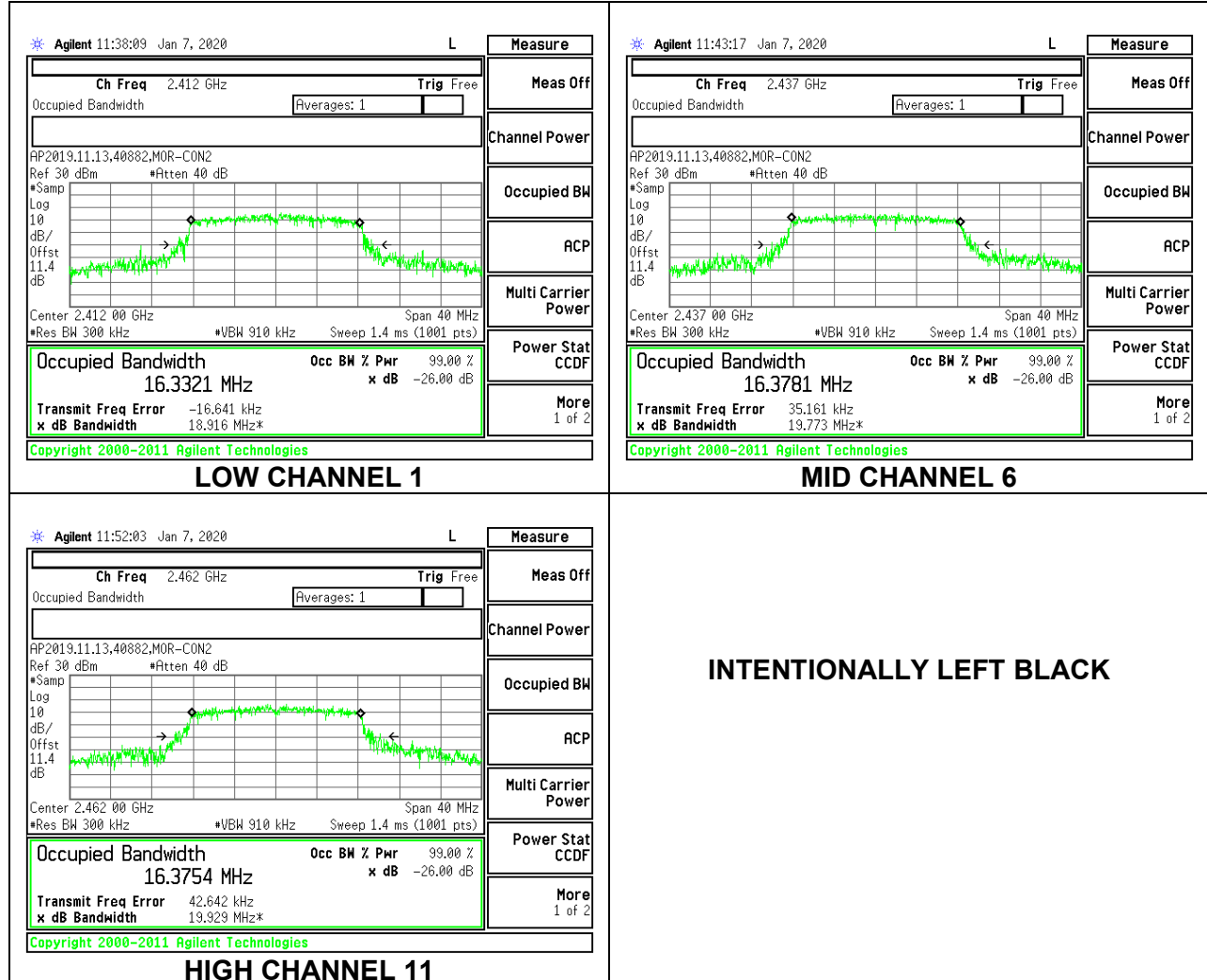
## 8.2.1. 802.11b MODE

| Channel | Frequency | 99% Bandwidth |
|---------|-----------|---------------|
|         | (MHz)     | (MHz)         |
| Low 1   | 2412      | 13.5500       |
| Mid 6   | 2437      | 13.4664       |
| High 11 | 2462      | 13.4970       |



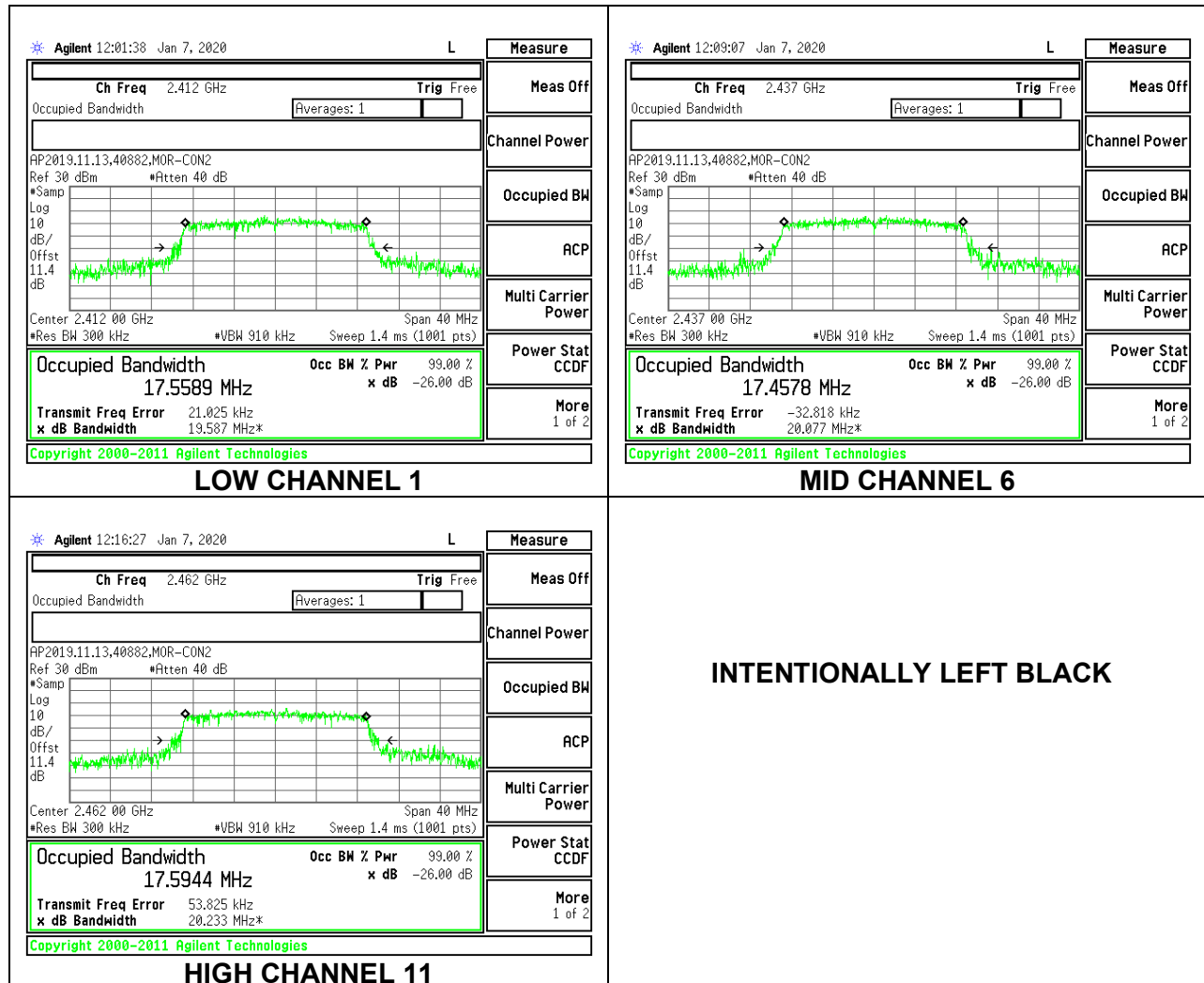
## 8.2.2. 802.11g MODE

| Channel | Frequency | 99% Bandwidth |
|---------|-----------|---------------|
|         | (MHz)     | (MHz)         |
| Low 1   | 2412      | 16.3321       |
| Mid 6   | 2437      | 16.3781       |
| High 11 | 2462      | 16.3754       |



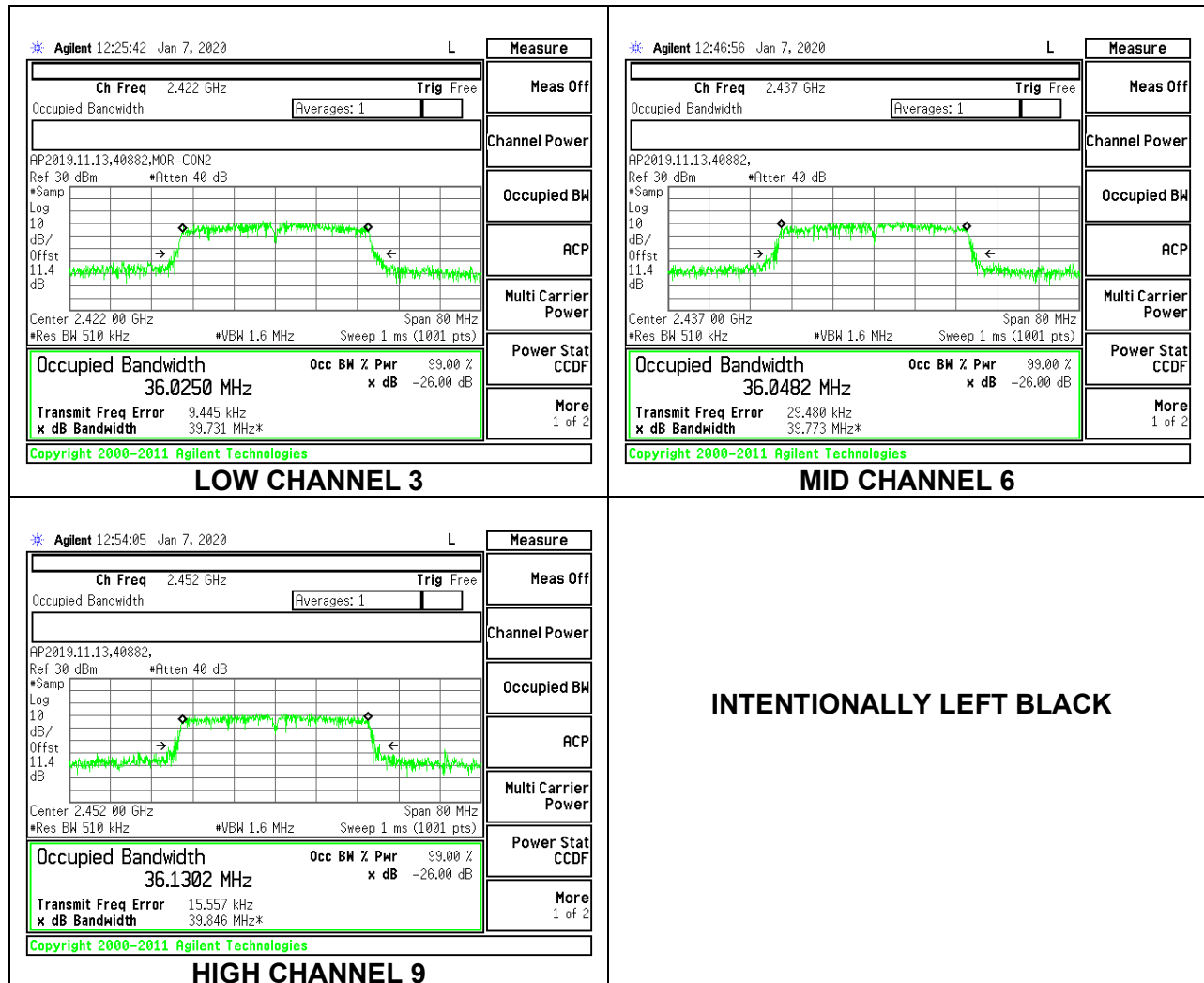
### 8.2.3. 802.11n HT20 MODE

| Channel | Frequency | 99% Bandwidth |
|---------|-----------|---------------|
|         | (MHz)     | (MHz)         |
| Low 1   | 2412      | 17.5589       |
| Mid 6   | 2437      | 17.4578       |
| High 11 | 2462      | 17.5944       |



## 8.2.4. 802.11n HT40 MODE

| Channel | Frequency | 99% Bandwidth |
|---------|-----------|---------------|
|         | (MHz)     | (MHz)         |
| Low 3   | 2422      | 36.0250       |
| Mid 6   | 2437      | 36.0482       |
| High 9  | 2452      | 36.1302       |



### **8.3. 6 dB BANDWIDTH**

#### **LIMITS**

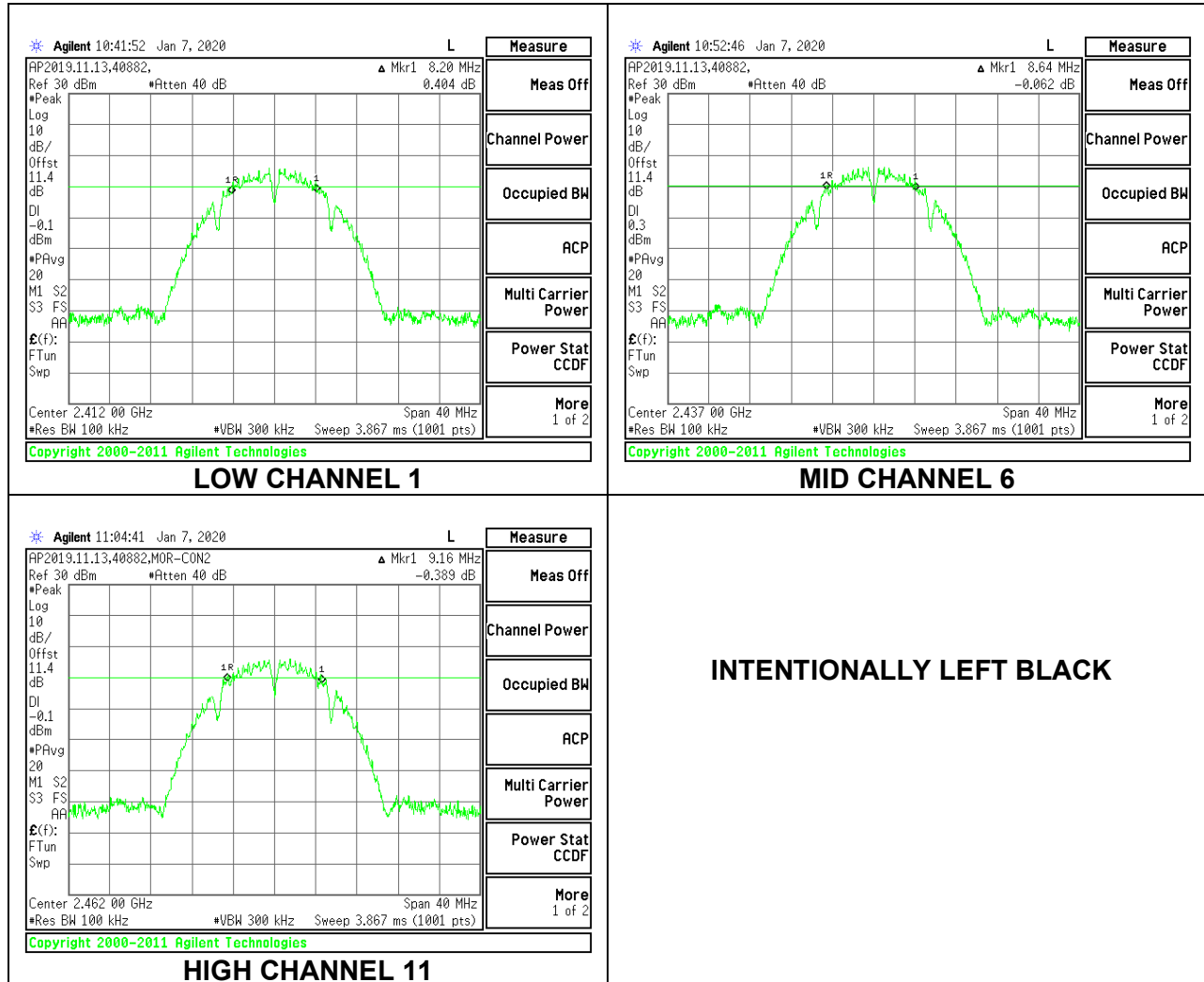
FCC §15.247 (a) (2)

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

#### **RESULTS**

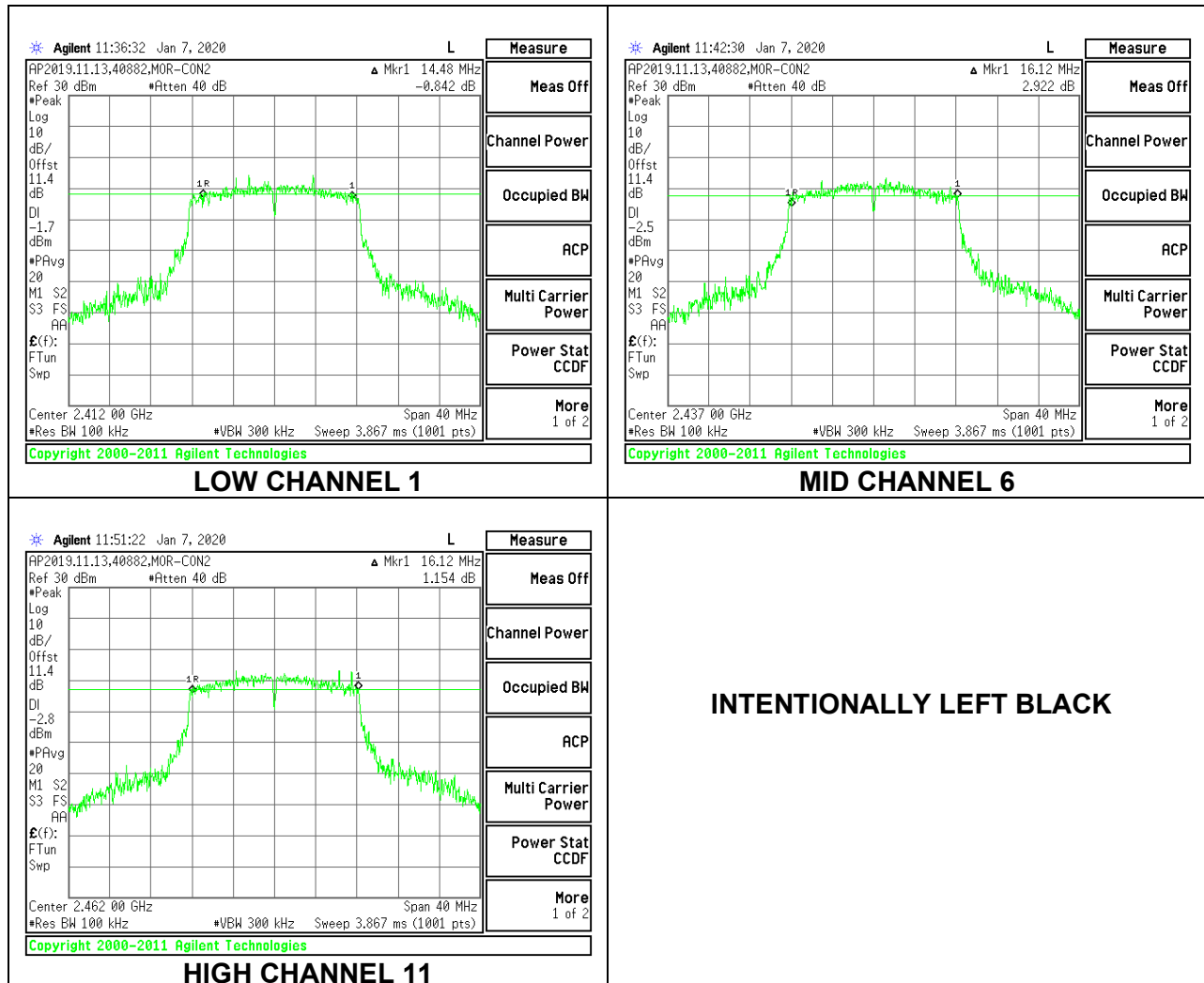
### 8.3.1. 802.11b MODE

| Channel | Frequency | 6 dB Bandwidth | Minimum Limit |
|---------|-----------|----------------|---------------|
|         | (MHz)     | (MHz)          | (MHz)         |
| Low 1   | 2412      | 8.2000         | 0.5           |
| Mid 6   | 2437      | 8.6400         | 0.5           |
| High 11 | 2462      | 9.1600         | 0.5           |



### 8.3.2. 802.11g MODE

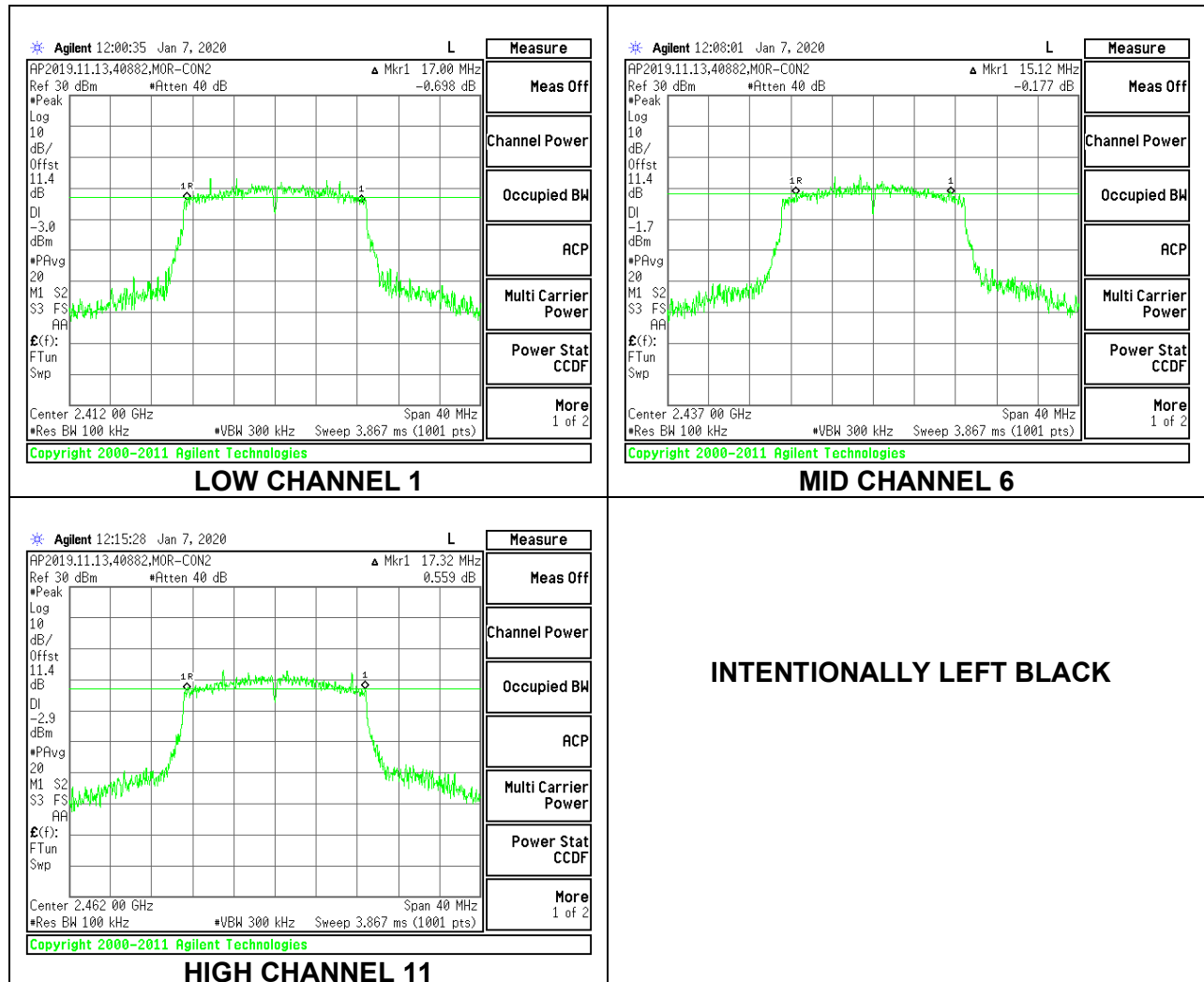
| Channel | Frequency | 6 dB Bandwidth | Minimum Limit |
|---------|-----------|----------------|---------------|
|         | (MHz)     | (MHz)          | (MHz)         |
| Low 1   | 2412      | 14.4800        | 0.5           |
| Mid 6   | 2437      | 16.1200        | 0.5           |
| High 11 | 2462      | 16.1200        | 0.5           |





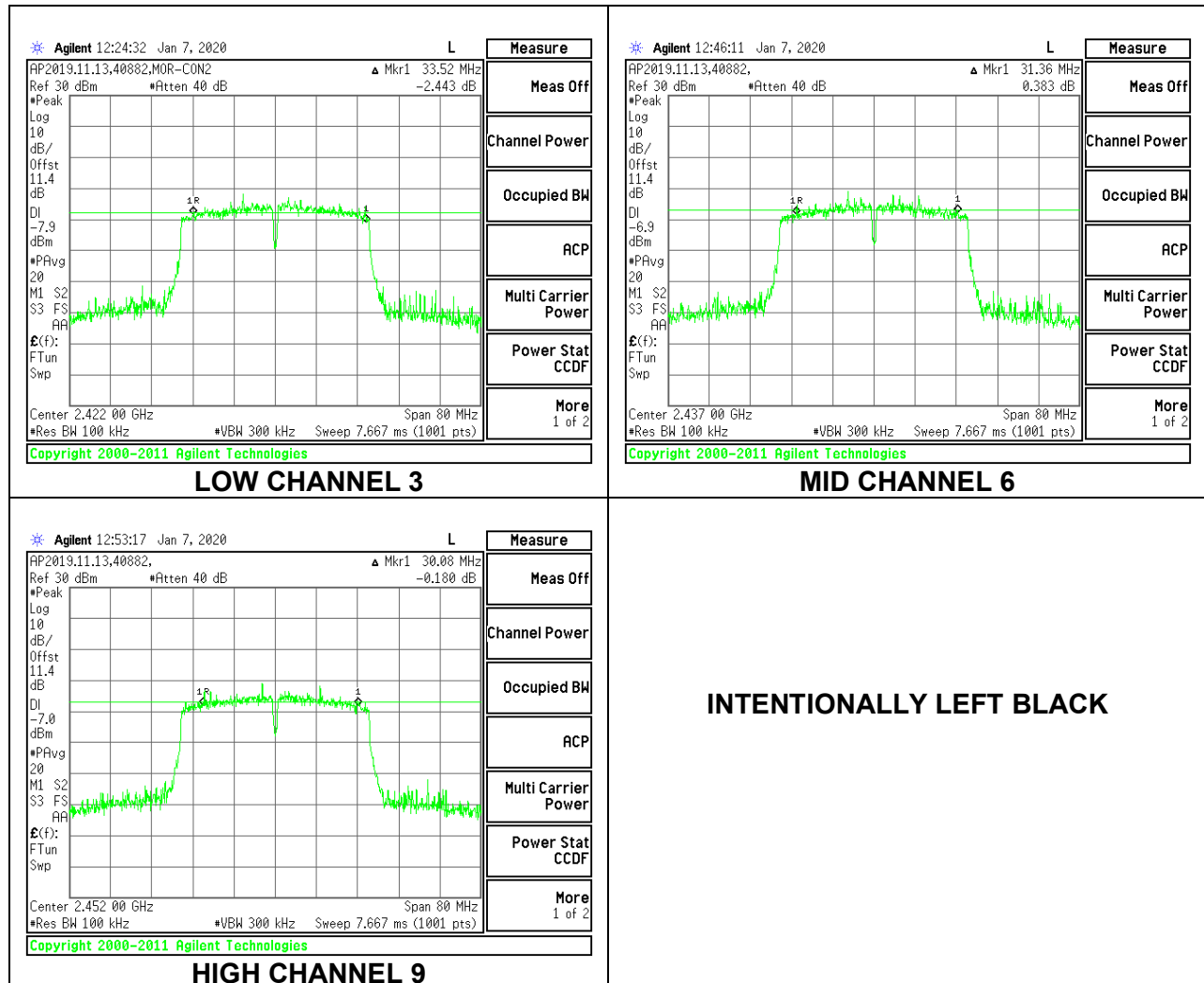
### 8.3.3. 802.11n HT20 MODE

| Channel | Frequency | 6 dB Bandwidth | Minimum Limit |
|---------|-----------|----------------|---------------|
|         | (MHz)     | (MHz)          | (MHz)         |
| Low 1   | 2412      | 17.0000        | 0.5           |
| Mid 6   | 2437      | 15.1200        | 0.5           |
| High 11 | 2462      | 17.3200        | 0.5           |



### 8.3.4. 802.11n HT40 MODE

| Channel | Frequency | 6 dB Bandwidth | Minimum Limit |
|---------|-----------|----------------|---------------|
|         | (MHz)     | (MHz)          | (MHz)         |
| Low 3   | 2422      | 33.5200        | 0.5           |
| Mid 6   | 2437      | 31.3600        | 0.5           |
| High 9  | 2452      | 30.0800        | 0.5           |



## **8.4. OUTPUT POWER**

### **LIMITS**

FCC §15.247 (b) (3)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### **TEST PROCEDURE**

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10.6 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for a Peak reading of power.

### **DIRECTIONAL ANTENNA GAIN**

For 1 TX:

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

## RESULTS

### 8.4.1. 802.11b MODE

|                   |             |
|-------------------|-------------|
| <b>Tested By:</b> | 11993/44389 |
| <b>Date:</b>      | 2019-12-30  |

| Channel | Frequency<br>(MHz) | Peak Power<br>Reading<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low     | 2412               | 17.25                          | 30             | -12.75         |
| Middle  | 2437               | 17.34                          | 30             | -12.66         |
| High    | 2462               | 17.64                          | 30             | -12.36         |

### 8.4.2. 802.11g MODE

|                   |             |
|-------------------|-------------|
| <b>Tested By:</b> | 11993/44389 |
| <b>Date:</b>      | 2019-12-30  |

| Channel | Frequency<br>(MHz) | Peak Power<br>Reading<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low     | 2412               | 23.00                          | 30             | -7.00          |
| Middle  | 2437               | 23.15                          | 30             | -6.85          |
| High    | 2462               | 23.12                          | 30             | -6.88          |

### 8.4.3. 802.11n HT20 MODE

|                   |                           |
|-------------------|---------------------------|
| <b>Tested By:</b> | 11993/44389 and 40882     |
| <b>Date:</b>      | 2019-12-30 and 2020-01-21 |

| Channel | Frequency<br>(MHz) | Peak Power<br>Reading<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|--------------------------------|----------------|----------------|
| Low     | 2412               | 23.51                          | 30             | -6.49          |
| Middle  | 2437               | 22.83                          | 30             | -7.17          |
| High    | 2462               | 23.33                          | 30             | -6.67          |

#### 8.4.4 802.11n HT40 MODE

|                   |                           |
|-------------------|---------------------------|
| <b>Tested By:</b> | 11993/40882 and 40882     |
| <b>Date:</b>      | 2019-12-30 and 2020-01-17 |

| <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            | 2422                       | 21.35                                   | 30                     | -8.65                  |
| Mid            | 2437                       | 22.01                                   | 30                     | -7.99                  |
| High           | 2452                       | 20.93                                   | 30                     | -9.07                  |

## 8.5. AVERAGE POWER

### LIMITS

None; for reporting purposes only

### TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10.6 dB pad and 0.8 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power

### RESULTS

#### 8.5.1. 802.11b MODE

|                   |             |
|-------------------|-------------|
| <b>Tested By:</b> | 11993/44389 |
| <b>Date:</b>      | 2019-12-30  |

| Channel | Frequency<br>(MHz) | Average Power<br>Reading<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|-----------------------------------|----------------|----------------|
| Low     | 2412               | 14.93                             | 30             | -15.07         |
| Middle  | 2437               | 15.07                             | 30             | -14.93         |
| High    | 2462               | 15.38                             | 30             | -14.62         |

#### 8.5.2. 802.11g MODE

|                   |             |
|-------------------|-------------|
| <b>Tested By:</b> | 11993/44389 |
| <b>Date:</b>      | 2019-12-30  |

| Channel | Frequency<br>(MHz) | Average Power<br>Reading<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|-----------------------------------|----------------|----------------|
| Low     | 2412               | 15.06                             | 30             | -14.94         |
| Middle  | 2437               | 14.97                             | 30             | -15.03         |
| High    | 2462               | 15.36                             | 30             | -14.64         |

### 8.5.3. 802.11n HT20 MODE

|                   |                           |
|-------------------|---------------------------|
| <b>Tested By:</b> | 11993/44389 and 10882     |
| <b>Date:</b>      | 2019-12-30 and 2020-01-21 |

| Channel | Frequency<br>(MHz) | Average Power<br>Reading<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|-----------------------------------|----------------|----------------|
| Low     | 2412               | 14.67                             | 30             | -15.33         |
| Middle  | 2437               | 14.73                             | 30             | -15.27         |
| High    | 2462               | 14.49                             | 30             | -15.51         |

### 8.5.4 802.11n HT40 MODE

|                   |                           |
|-------------------|---------------------------|
| <b>Tested By:</b> | 11993/44389 and 40882     |
| <b>Date:</b>      | 2019-12-30 and 2020-01-21 |

| Channel | Frequency<br>(MHz) | Average Power<br>Reading<br>(dBm) | Limit<br>(dBm) | Margin<br>(dB) |
|---------|--------------------|-----------------------------------|----------------|----------------|
| Low     | 2422               | 10.61                             | 30             | -19.39         |
| Middle  | 2437               | 11.81                             | 30             | -18.19         |
| High    | 2452               | 11.47                             | 30             | -18.53         |

## **8.6. POWER SPECTRAL DENSITY**

### **LIMITS**

FCC §15.247 (e)

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

### **RESULTS**

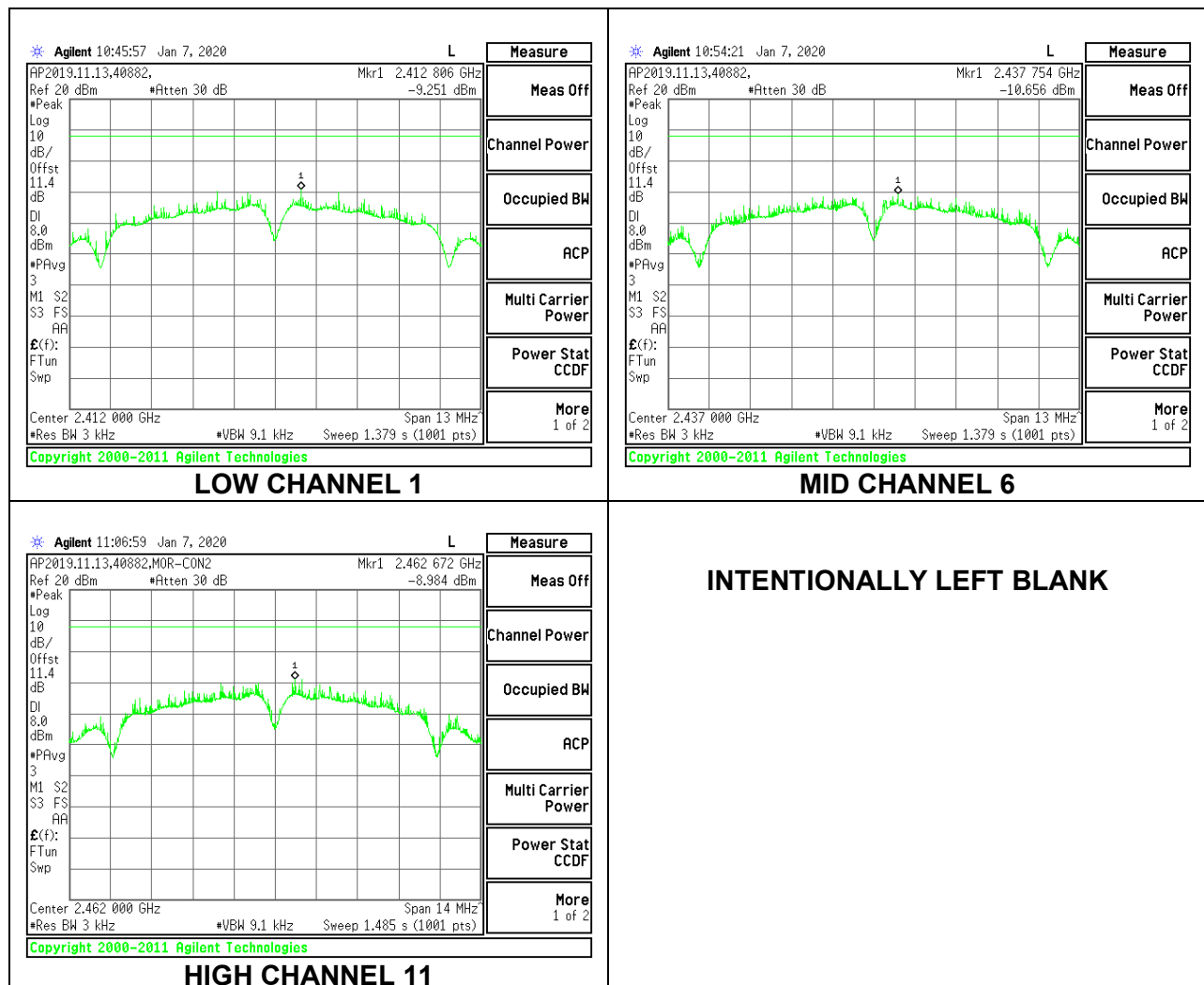


### 8.6.1. 802.11b MODE

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

#### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>(dBm/<br>3kHz) | Total<br>Corr'd<br>PSD<br>(dBm/<br>3kHz) | Limit<br>(dBm/<br>3kHz) | Margin<br>(dB) |
|---------|--------------------|-----------------------------------|------------------------------------------|-------------------------|----------------|
| Low 1   | 2412               | -9.25                             | -9.25                                    | 8.0                     | -17.3          |
| Mid 6   | 2437               | -10.66                            | -10.66                                   | 8.0                     | -18.7          |
| High 11 | 2462               | -8.98                             | -8.98                                    | 8.0                     | -17.0          |

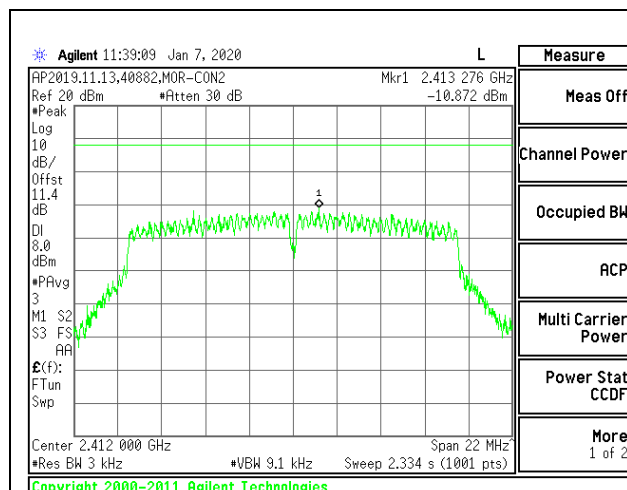


## 8.6.2. 802.11g MODE

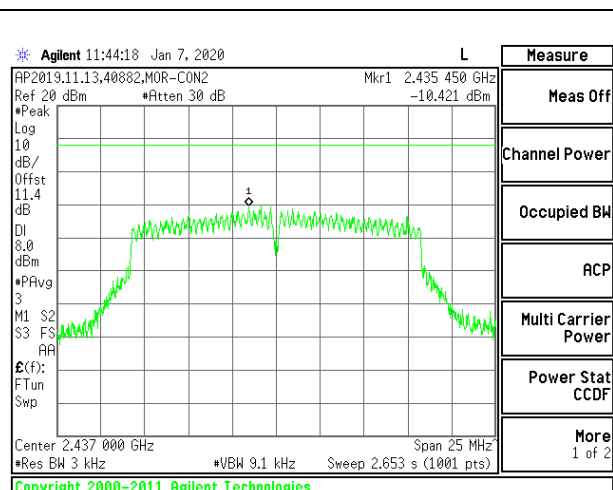
|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

### PSD Results

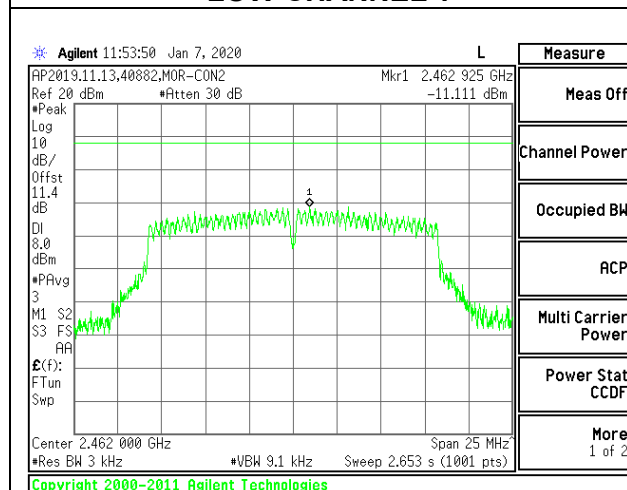
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>(dBm/<br>3kHz) | Total<br>Corr'd<br>PSD<br>(dBm/<br>3kHz) | Limit<br>(dBm/<br>3kHz) | Margin<br>(dB) |
|---------|--------------------|-----------------------------------|------------------------------------------|-------------------------|----------------|
| Low 1   | 2412               | -10.87                            | -10.87                                   | 8.0                     | -18.9          |
| Mid 6   | 2437               | -10.42                            | -10.42                                   | 8.0                     | -18.4          |
| High 11 | 2462               | -11.11                            | -11.11                                   | 8.0                     | -19.1          |



LOW CHANNEL 1



MID CHANNEL 6



HIGH CHANNEL 11

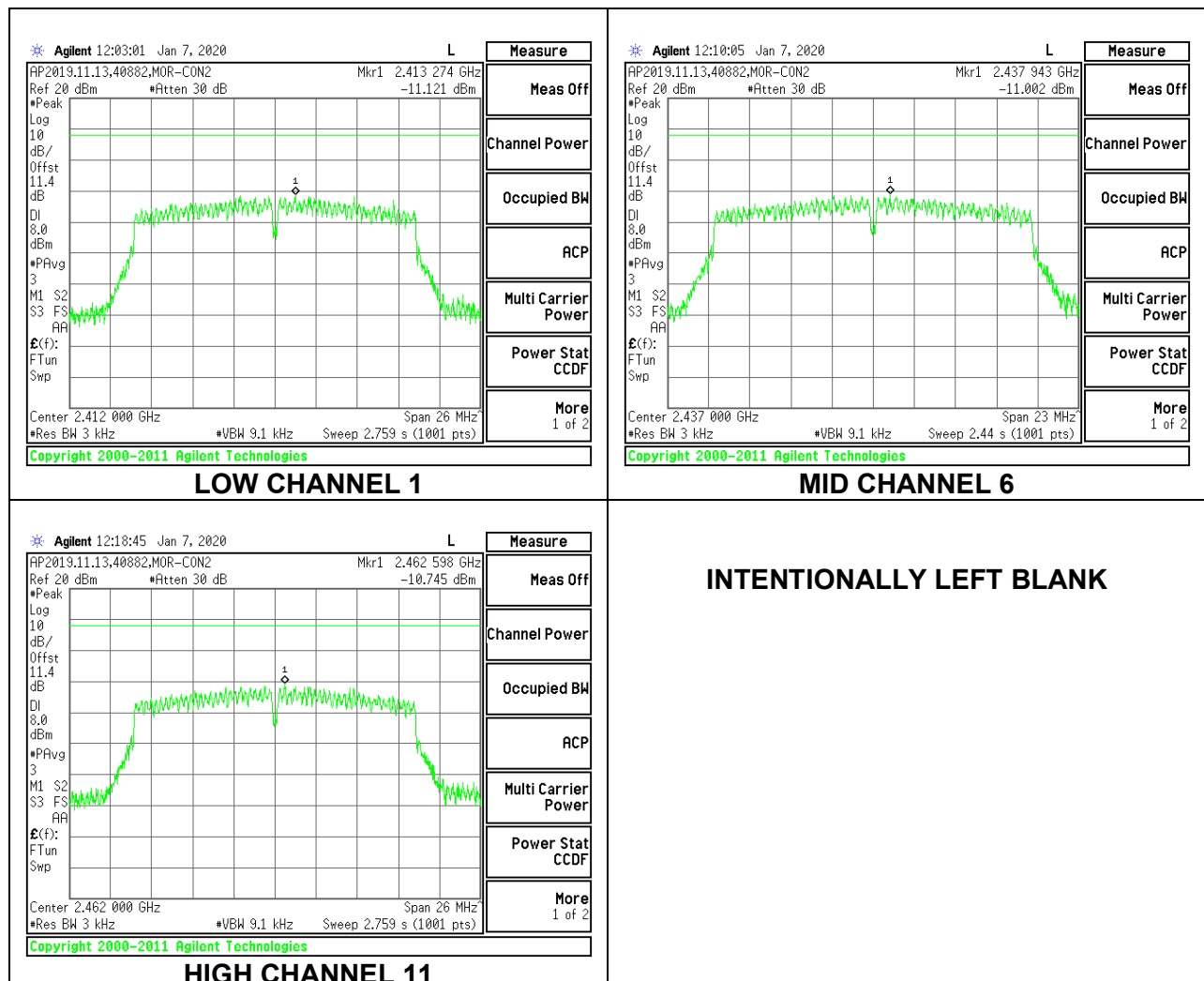
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### 8.6.3. 802.11n HT20 MODE

|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

#### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>(dBm/<br>3kHz) | Total<br>Corr'd<br>PSD<br>(dBm/<br>3kHz) | Limit<br>(dBm/<br>3kHz) | Margin<br>(dB) |
|---------|--------------------|-----------------------------------|------------------------------------------|-------------------------|----------------|
| Low 1   | 2412               | -11.12                            | -11.12                                   | 8.0                     | -19.1          |
| Mid 6   | 2437               | -11.00                            | -11.00                                   | 8.0                     | -19.0          |
| High 11 | 2462               | -10.74                            | -10.74                                   | 8.0                     | -18.7          |

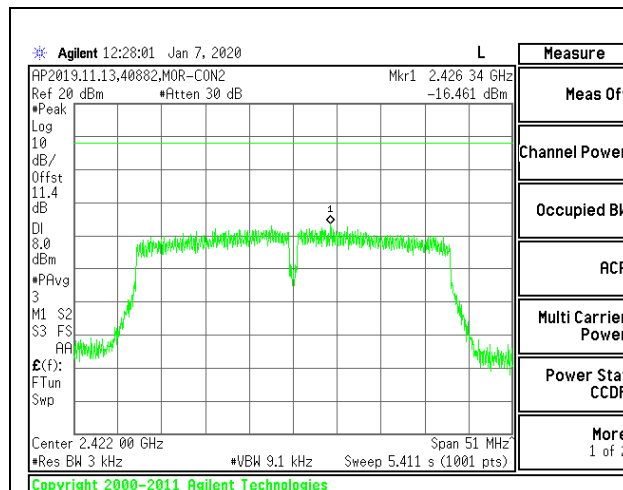


### 8.6.4. 802.11n HT40 MODE

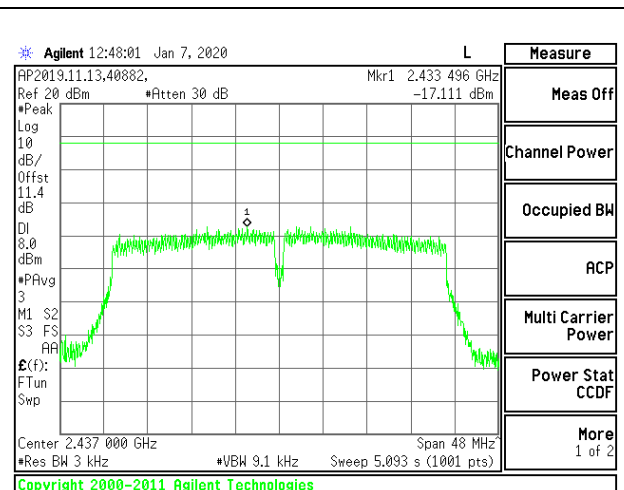
|                    |      |                                        |
|--------------------|------|----------------------------------------|
| Duty Cycle CF (dB) | 0.00 | Included in Calculations of Corr'd PSD |
|--------------------|------|----------------------------------------|

#### PSD Results

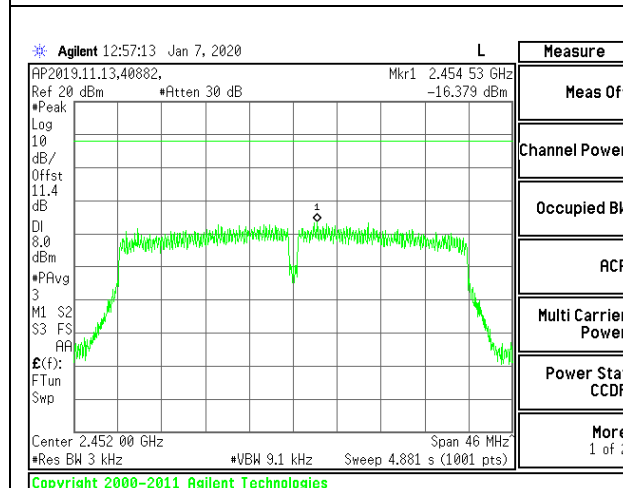
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>(dBm/<br>3kHz) | Total<br>Corr'd<br>PSD<br>(dBm/<br>3kHz) | Limit<br>(dBm/<br>3kHz) | Margin<br>(dB) |
|---------|--------------------|-----------------------------------|------------------------------------------|-------------------------|----------------|
| Low 3   | 2422               | -16.46                            | -16.46                                   | 8.0                     | -24.5          |
| Mid 6   | 2437               | -17.11                            | -17.11                                   | 8.0                     | -25.1          |
| High 9  | 2452               | -16.38                            | -16.38                                   | 8.0                     | -24.4          |



LOW CHANNEL 3



MID CHANNEL 6



HIGH CHANNEL 9

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## **8.7. CONDUCTED SPURIOUS EMISSIONS**

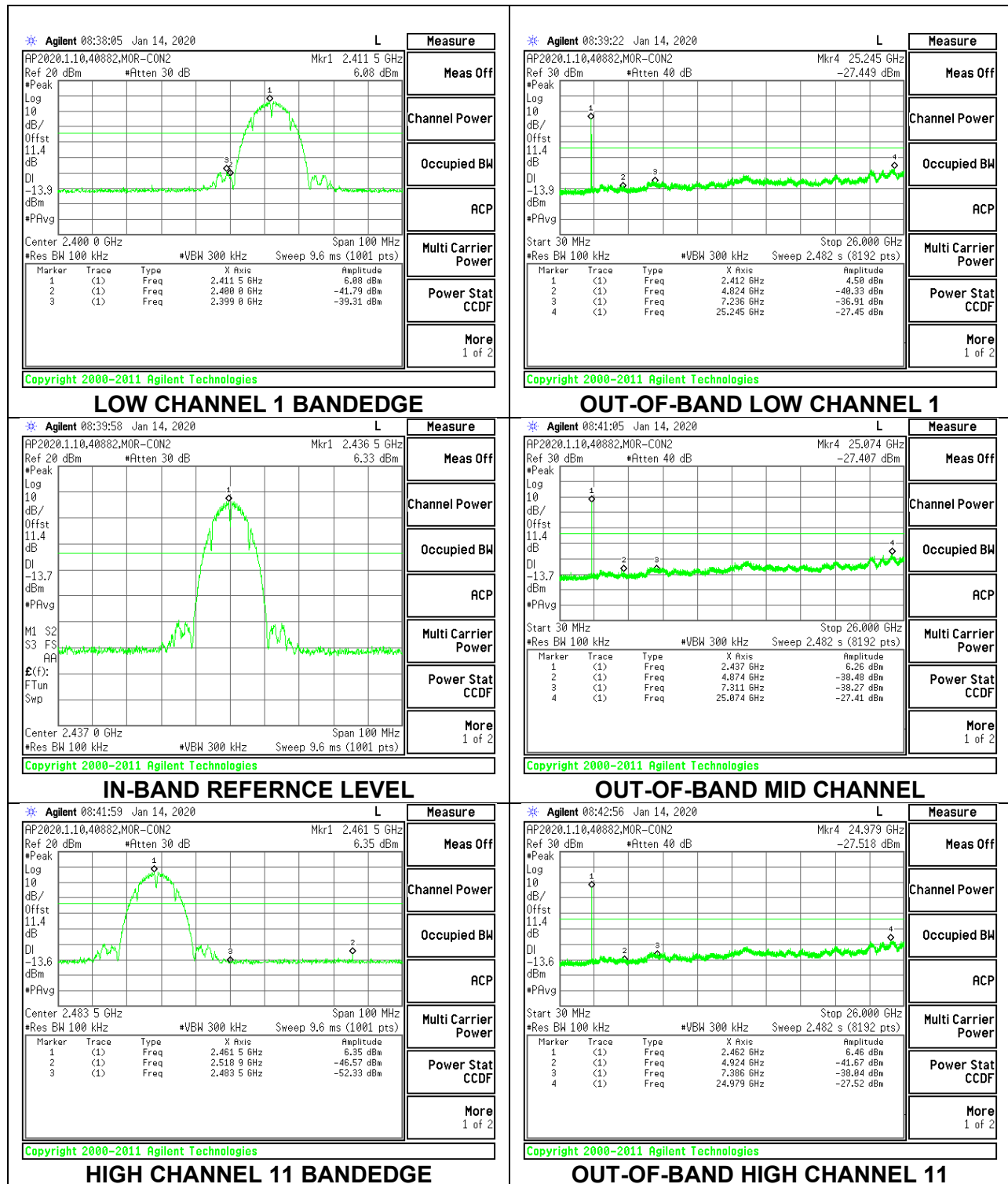
### **LIMITS**

FCC §15.247 (d)

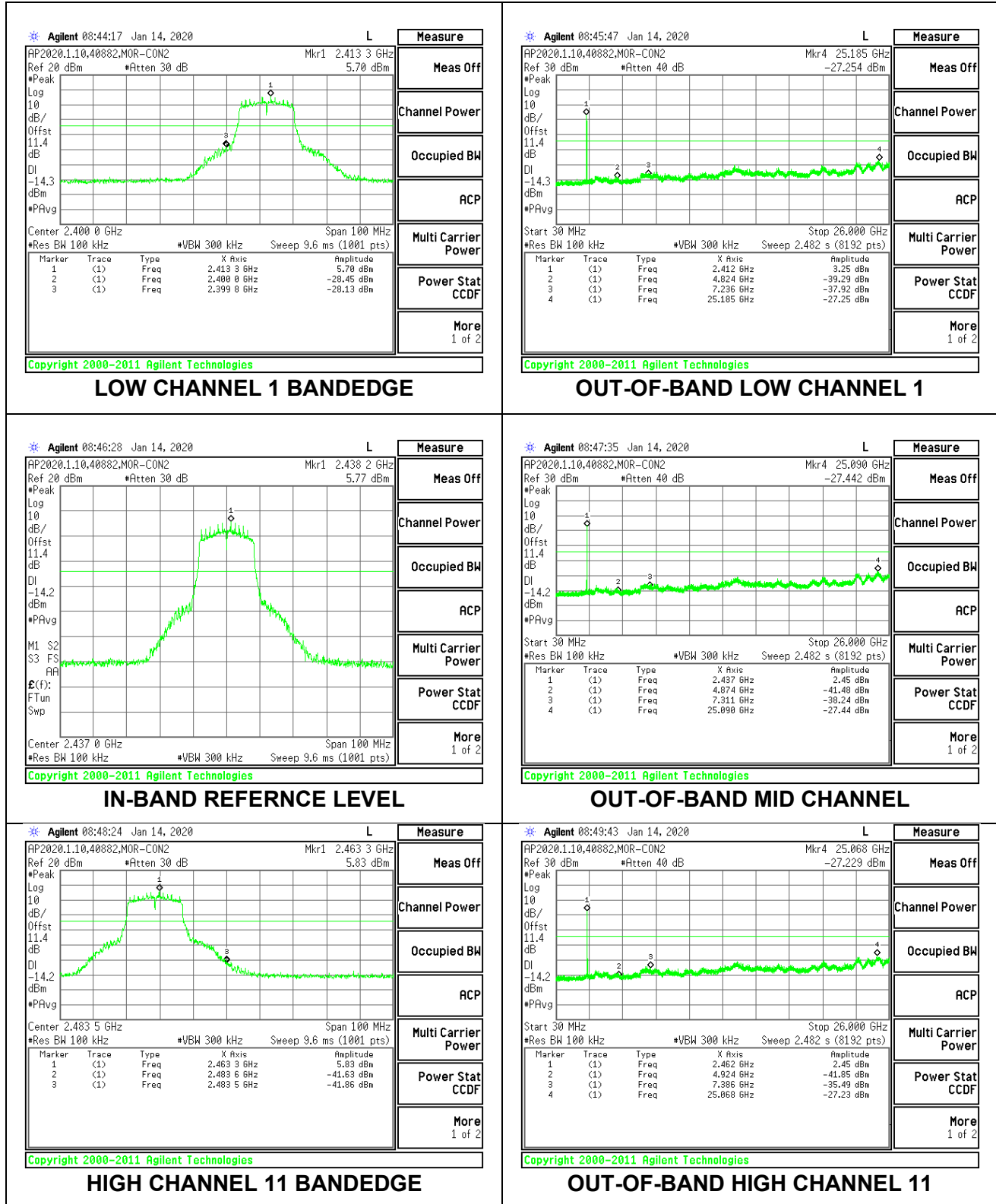
Output power was measured based on the use of peak measurement, therefore the required attenuation is 20 dB.

### **RESULTS**

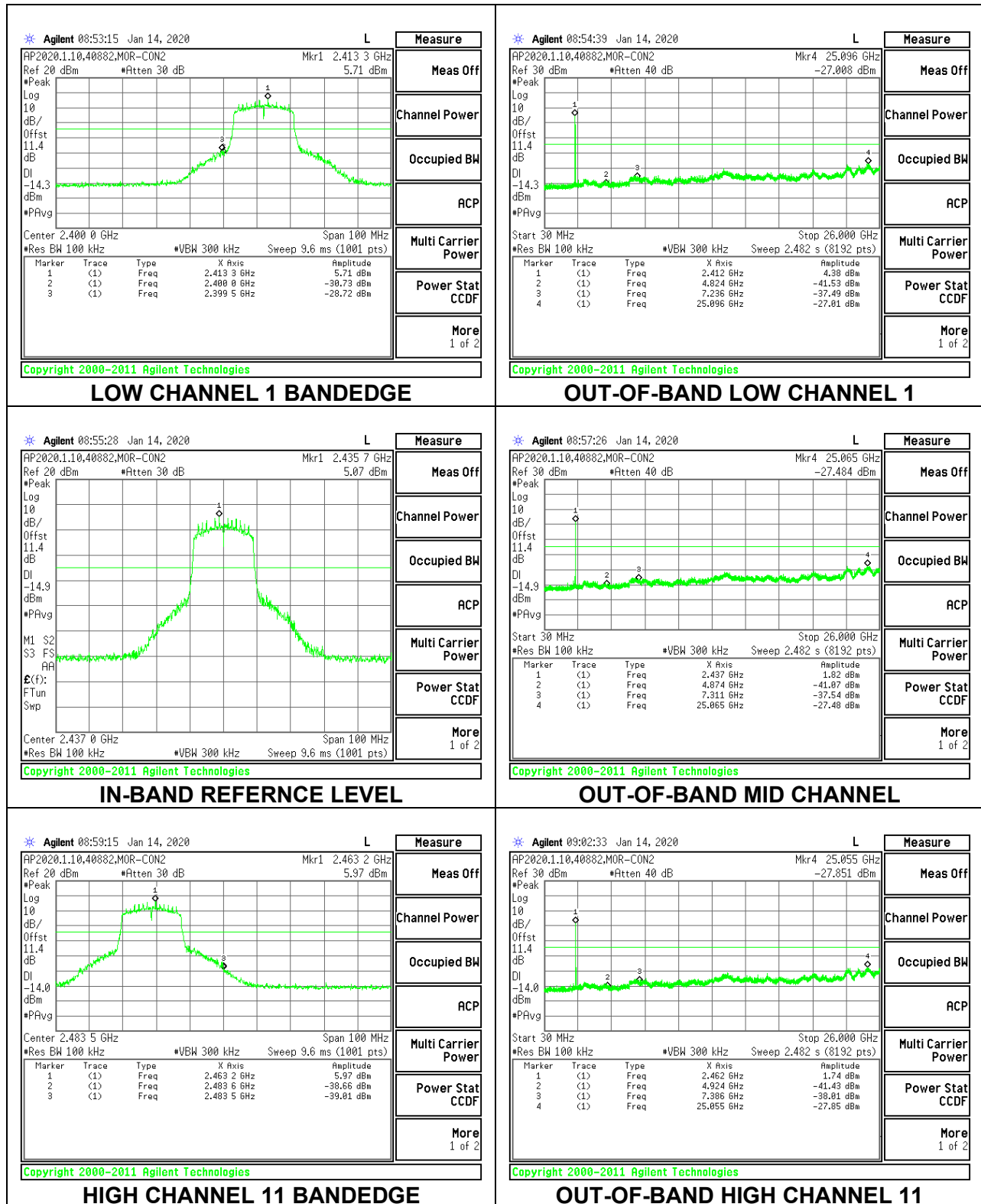
### 8.7.1. 802.11b MODE



## 8.7.2. 802.11g MODE

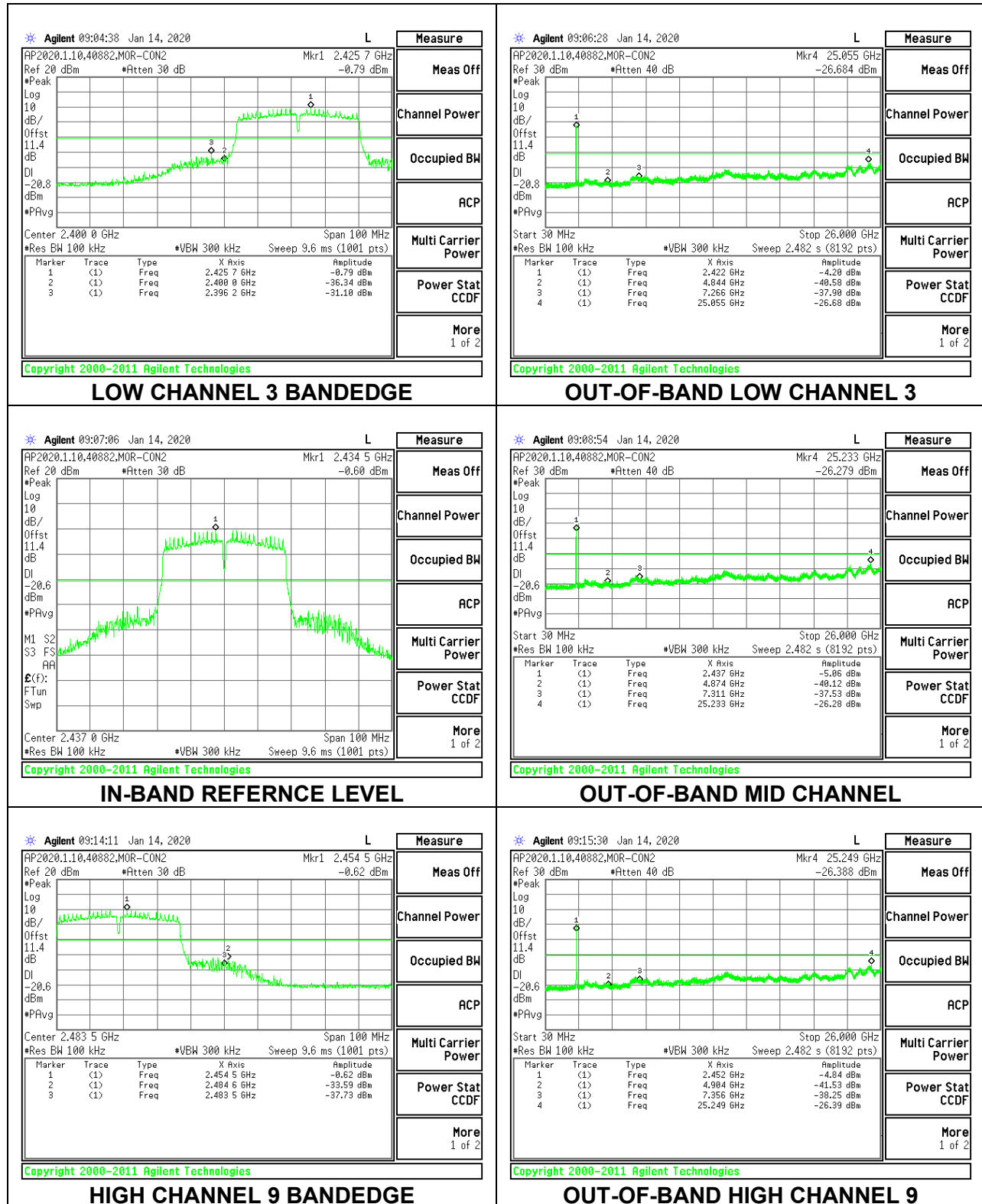


### 8.7.3. 802.11n HT20 MODE





# 8.7.4. 802.11n HT40 MODE



## 9. RADIATED TEST RESULTS

### LIMITS

FCC §15.205 and §15.209

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

### TEST PROCEDURE

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

For measurements below 1 GHz the resolution bandwidth is set to 120 kHz for peak and/or quasi-peak detection measurements in the 30-1000MHz range, 9kHz for peak and/or quasi-peak detection measurements in the 0.15-30MHz range and 200Hz for peak and/or quasi-peak detection measurements in the 9 to 150kHz range. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements. For average measurements above 1GHz, the resolution bandwidth and video bandwidth are set as described in ANSI C63.10:2013 for the applicable measurement. The particular averaging method used for this test program was voltage averaging.

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

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

3D antenna use - For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel).

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

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

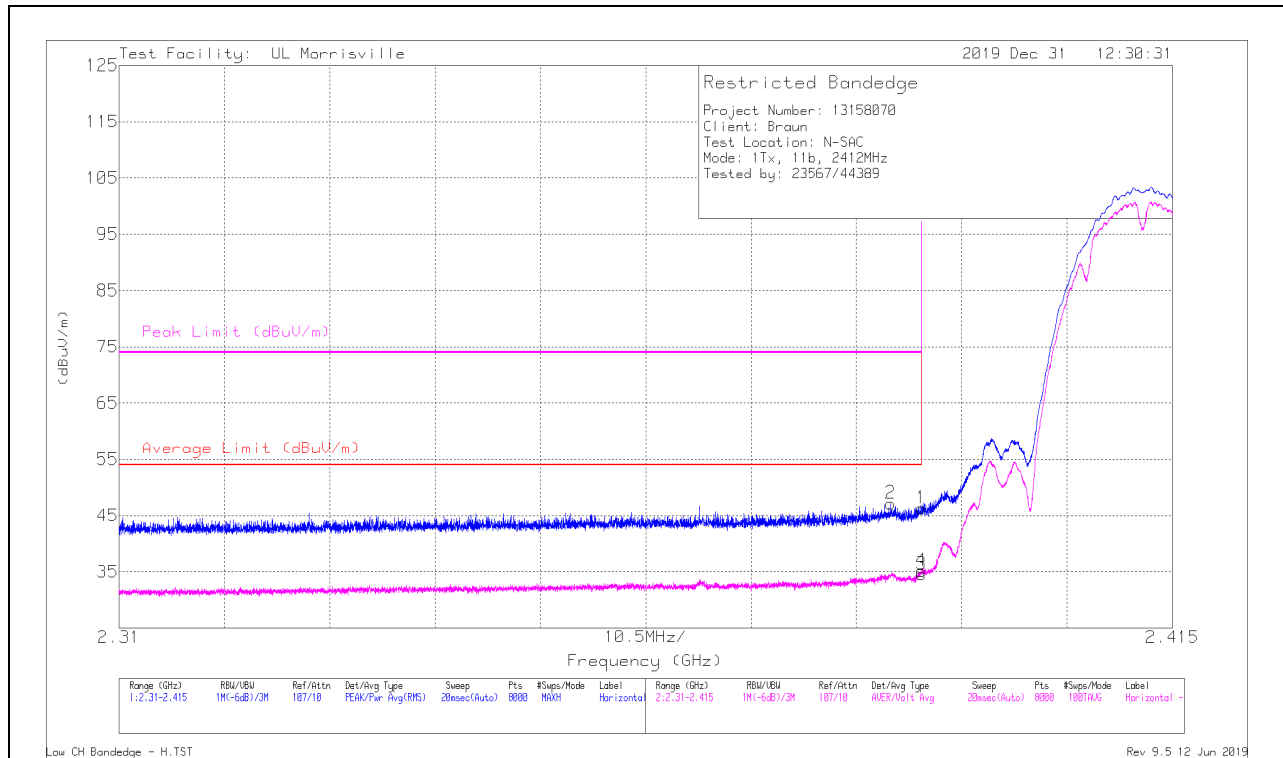
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

## 9.1. TRANSMITTER ABOVE 1 GHz

### 9.1.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

#### BANDEDGE (LOW CHANNEL, CH 1)

#### HORIZONTAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.39       | 38.65                | Pk  | 32                 | -24.4                  | 46.25                      | -                      | -           | 74                  | -27.75         | 100            | 194         | H        |
| 2      | * ** 2.3869     | 39.53                | Pk  | 32                 | -24.4                  | 47.13                      | -                      | -           | 74                  | -26.87         | 100            | 194         | H        |
| 3      | * ** 2.39       | 26.92                | ADV | 32                 | -24.4                  | 34.52                      | 54                     | -19.48      | -                   | -              | 100            | 194         | H        |
| 4      | * ** 2.3898     | 27.55                | ADV | 32                 | -24.4                  | 35.15                      | 54                     | -18.85      | -                   | -              | 100            | 194         | H        |

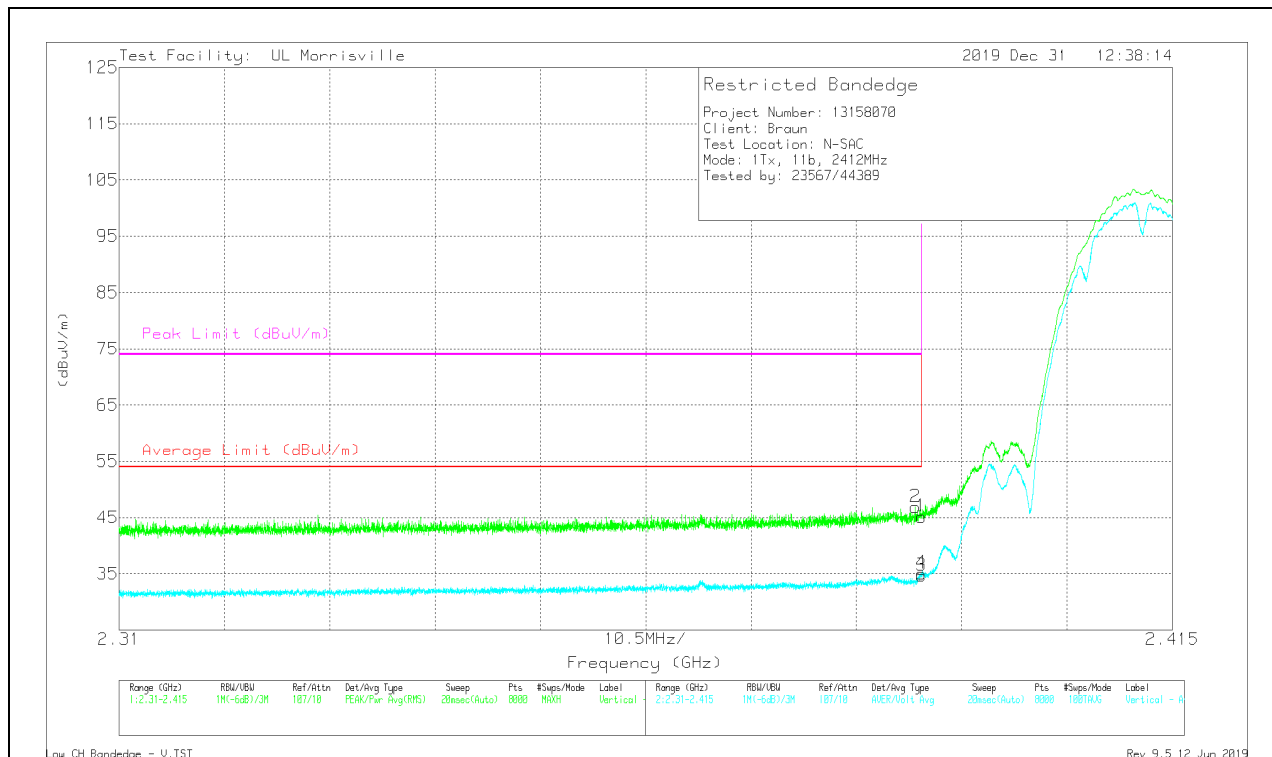
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * * * 2.39      | 37.55                | Pk  | 32                 | -24.4                  | 45.15                      | -                      | -           | 74                  | -28.85         | 48             | 276         | V        |
| 2      | * * * 2.38938   | 39.28                | Pk  | 32                 | -24.4                  | 46.88                      | -                      | -           | 74                  | -27.12         | 48             | 276         | V        |
| 3      | * * * 2.39      | 27.07                | ADV | 32                 | -24.4                  | 34.67                      | 54                     | -19.33      | -                   | -              | 48             | 275         | V        |
| 4      | * * * 2.38997   | 27.46                | ADV | 32                 | -24.4                  | 35.06                      | 54                     | -18.94      | -                   | -              | 48             | 275         | V        |

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

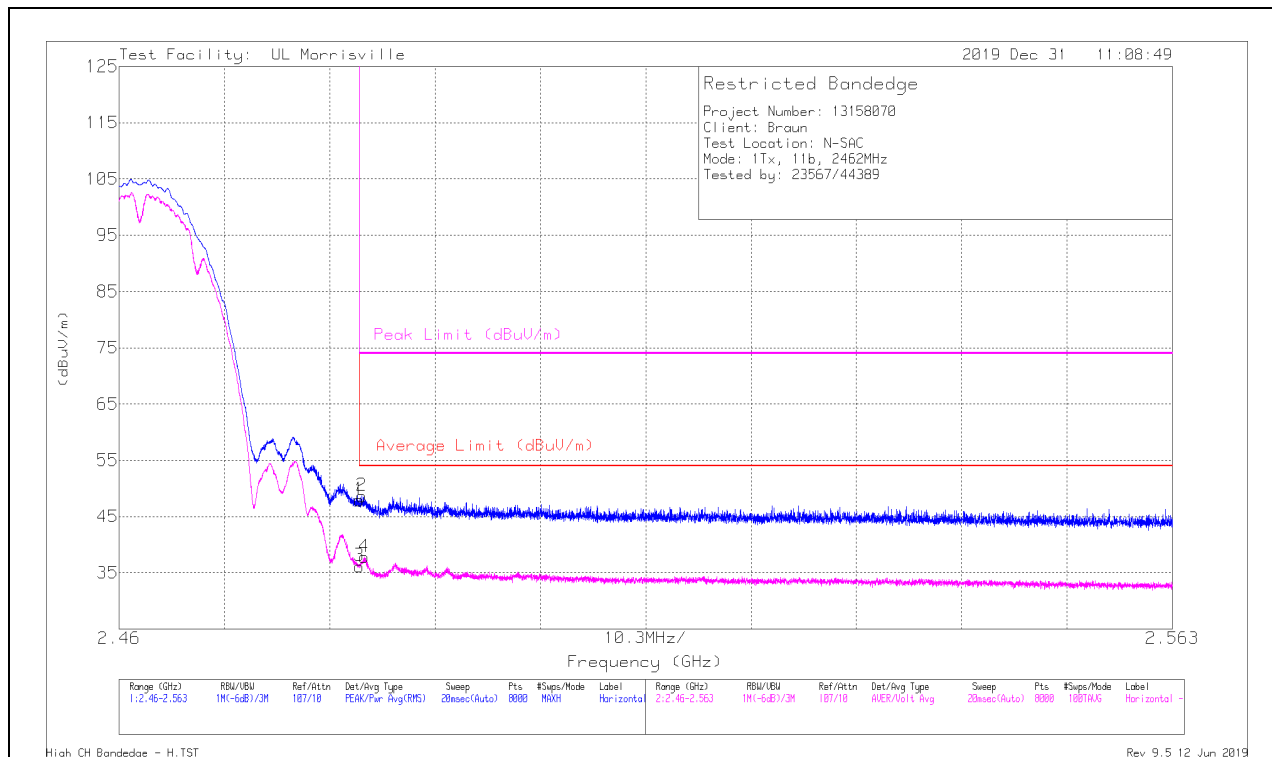
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## BANDEDGE (HIGH CHANNEL, CH 11)

### HORIZONTAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.4835     | 39.83                | Pk  | 32.4               | -24.3                  | 47.93                      | -                      | -           | 74                  | -26.07         | 103            | 116         | H        |
| 2      | * ** 2.48372    | 40.56                | Pk  | 32.4               | -24.3                  | 48.66                      | -                      | -           | 74                  | -25.34         | 103            | 116         | H        |
| 3      | * ** 2.4835     | 28.08                | ADV | 32.4               | -24.3                  | 36.18                      | 54                     | -17.82      | -                   | -              | 103            | 116         | H        |
| 4      | * ** 2.48396    | 29.7                 | ADV | 32.4               | -24.3                  | 37.8                       | 54                     | -16.2       | -                   | -              | 103            | 116         | H        |

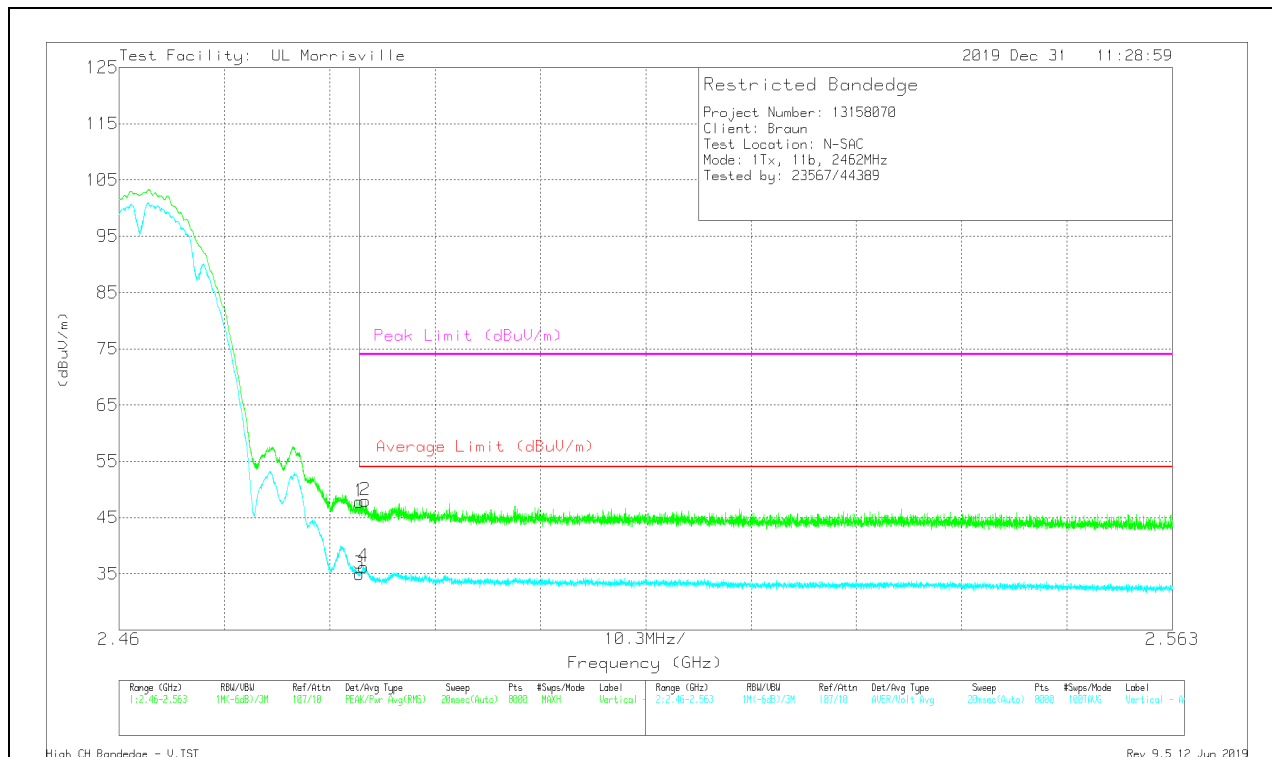
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.4835     | 39.7                 | Pk  | 32.4               | -24.3                  | 47.8                       | -                      | -           | 74                  | -26.2          | 134            | 150         | V        |
| 2      | * ** 2.48407    | 39.92                | Pk  | 32.4               | -24.3                  | 48.02                      | -                      | -           | 74                  | -25.98         | 134            | 150         | V        |
| 3      | * ** 2.4835     | 26.9                 | ADV | 32.4               | -24.3                  | 35                         | 54                     | -19         | -                   | -              | 134            | 150         | V        |
| 4      | * ** 2.48393    | 28.15                | ADV | 32.4               | -24.3                  | 36.25                      | 54                     | -17.75      | -                   | -              | 134            | 150         | V        |

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

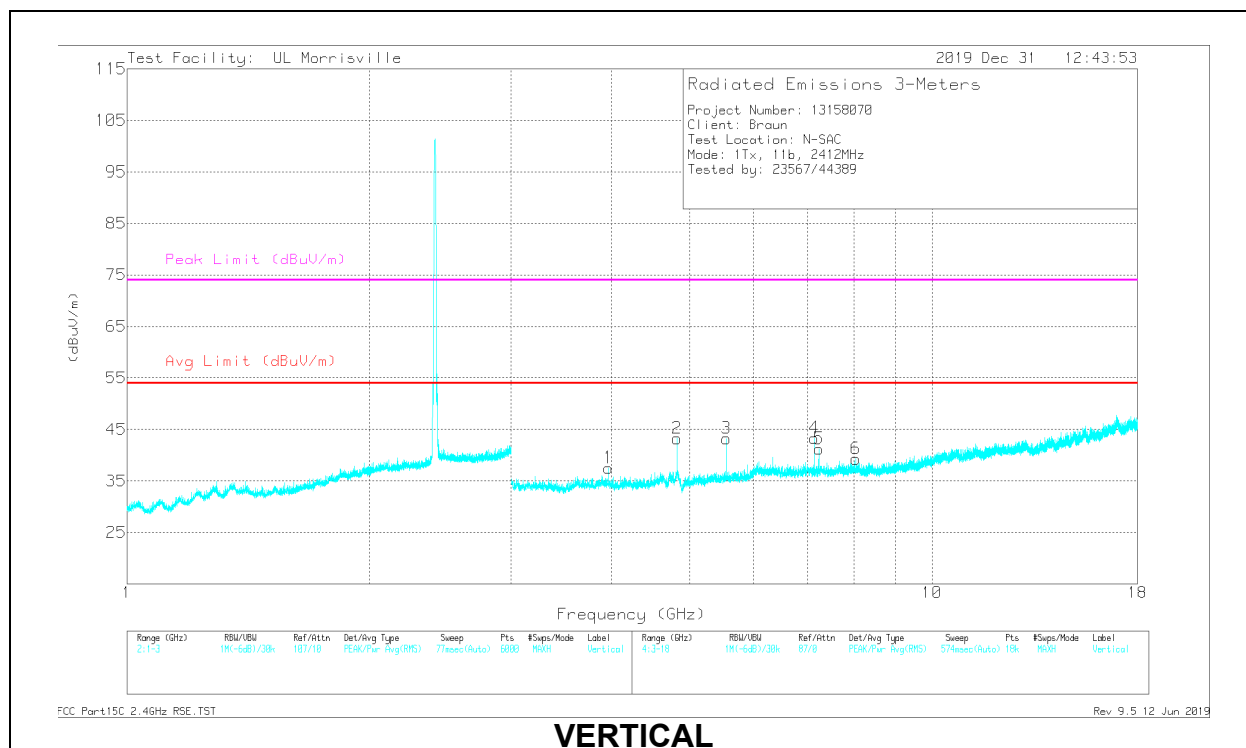
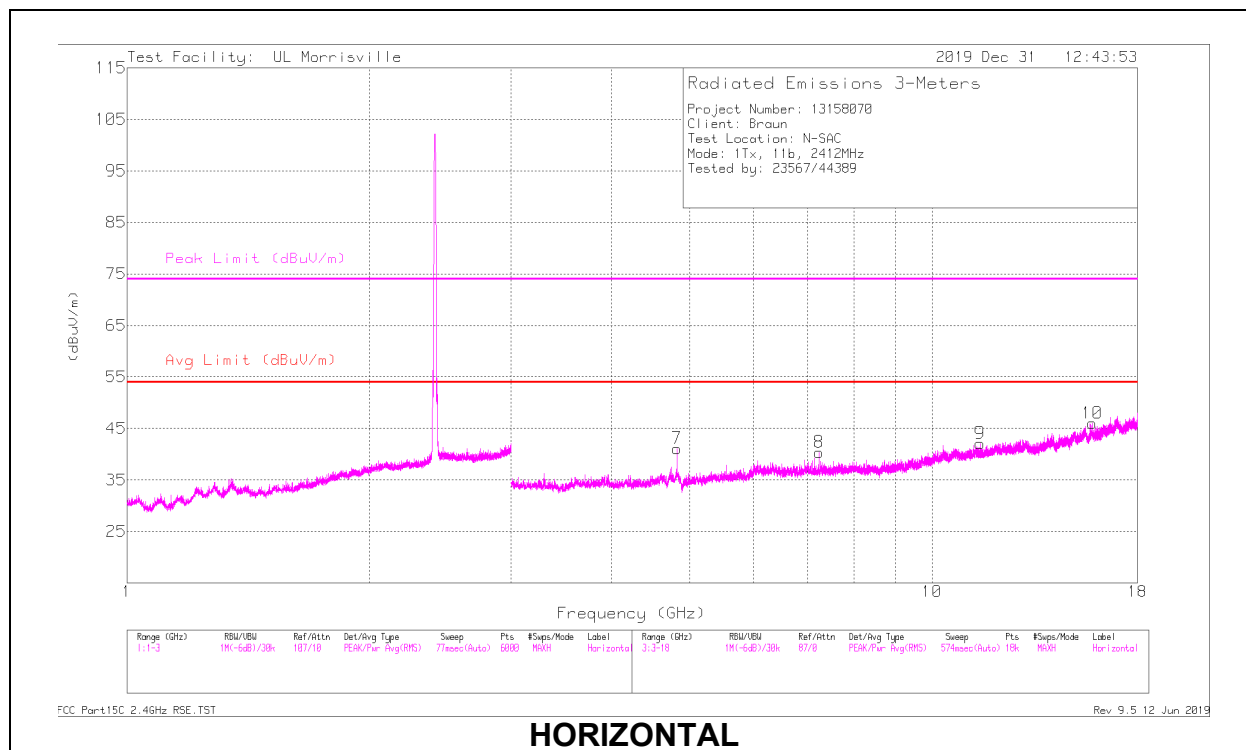
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL, CH 1 RESULTS





## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 Af (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 7      | * ** 4.8239     | 44.58                | PK2 | 34.1               | -31.4                  | 47.28                      | -                  | -           | 74                  | -26.72         | 256            | 103         | H        |
|        | * ** 4.824      | 36.56                | ADV | 34.1               | -31.4                  | 39.26                      | 54                 | -14.74      | -                   | -              | 256            | 103         | H        |
| 9      | * ** 11.47188   | 35.45                | PK2 | 38.1               | -25.5                  | 48.05                      | -                  | -           | 74                  | -25.95         | 174            | 217         | H        |
|        | * ** 11.47148   | 22.07                | ADV | 38.1               | -25.5                  | 34.67                      | 54                 | -19.33      | -                   | -              | 174            | 217         | H        |
| 10     | * ** 15.81079   | 36.31                | PK2 | 40.2               | -24.7                  | 51.81                      | -                  | -           | 74                  | -22.19         | 139            | 166         | H        |
|        | * ** 15.81067   | 22.97                | ADV | 40.2               | -24.7                  | 38.47                      | 54                 | -15.53      | -                   | -              | 139            | 166         | H        |
| 1      | * ** 3.96493    | 47.17                | PK2 | 33.4               | -31.7                  | 48.87                      | -                  | -           | 74                  | -25.13         | 175            | 150         | V        |
|        | * ** 3.96495    | 32.56                | ADV | 33.4               | -31.7                  | 34.26                      | 54                 | -19.74      | -                   | -              | 175            | 150         | V        |
| 2      | * ** 4.824      | 46.16                | PK2 | 34.1               | -31.4                  | 48.86                      | -                  | -           | 74                  | -25.14         | 330            | 104         | V        |
|        | * ** 4.82398    | 40.08                | ADV | 34.1               | -31.4                  | 42.78                      | 54                 | -11.22      | -                   | -              | 330            | 104         | V        |
| 6      | * ** 8.03883    | 37.61                | PK2 | 35.8               | -28.4                  | 45.01                      | -                  | -           | 74                  | -28.99         | 54             | 174         | V        |
|        | * ** 8.03907    | 23.94                | ADV | 35.8               | -28.4                  | 31.34                      | 54                 | -22.66      | -                   | -              | 54             | 174         | V        |
| 3      | 5.55098         | 41.05                | Pk  | 34.5               | -32.3                  | 43.25                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 4      | 7.1369          | 37.63                | Pk  | 35.7               | -30                    | 43.33                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 5      | 7.2369          | 35.24                | Pk  | 35.6               | -29.6                  | 41.24                      | -                  | -           | -                   | -              | 0-360          | 198         | V        |
| 8      | 7.23774         | 34.35                | Pk  | 35.6               | -29.6                  | 40.35                      | -                  | -           | -                   | -              | 0-360          | 198         | H        |

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

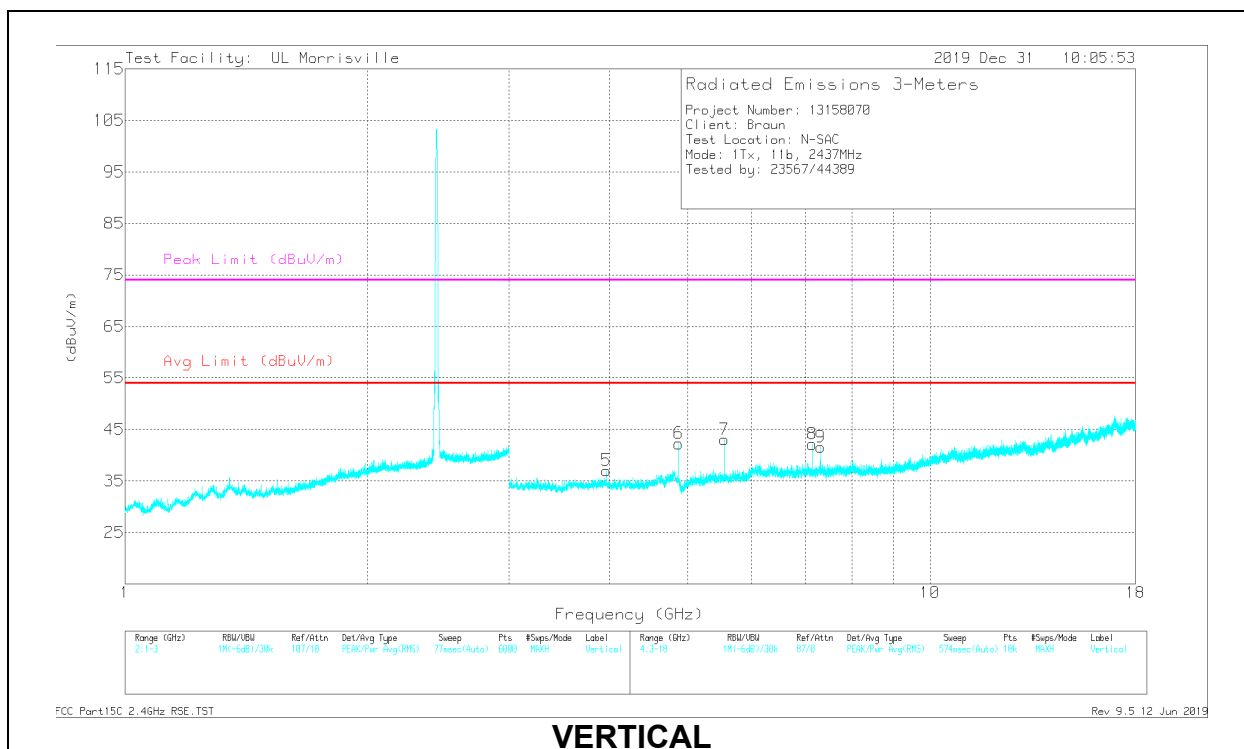
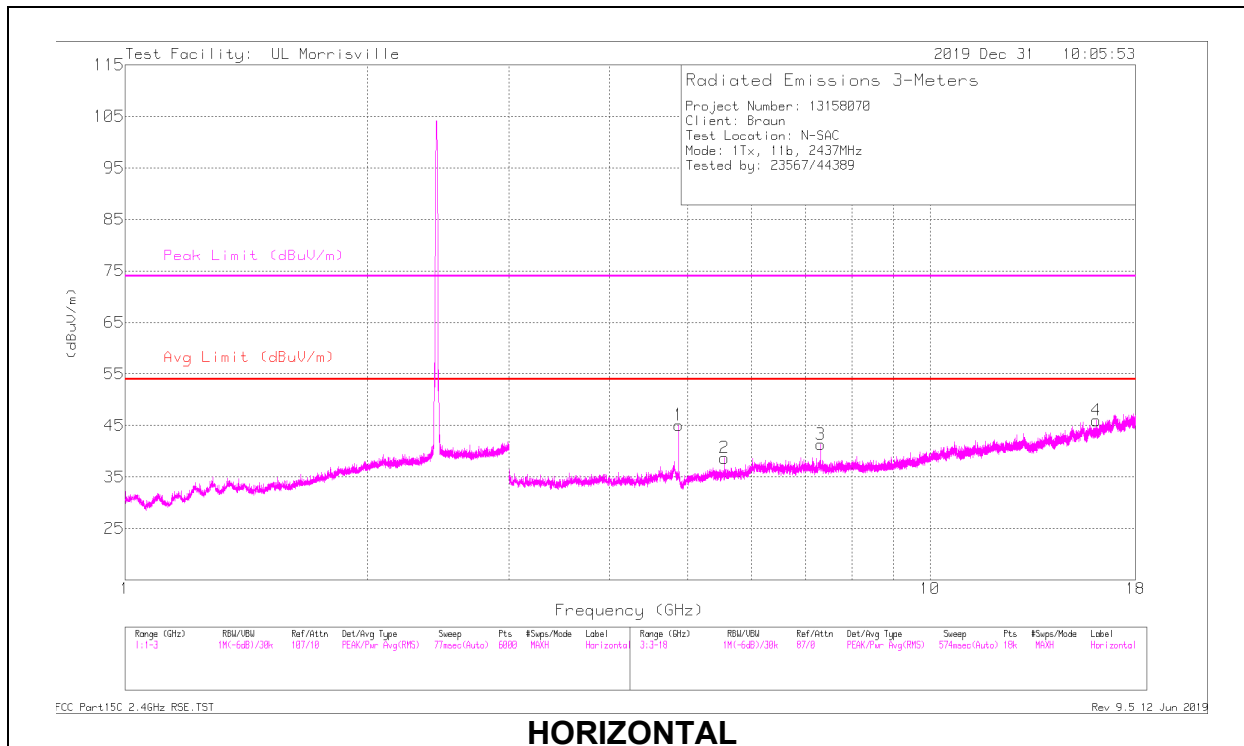
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

ADV - Linear Voltage Average

Pk - Peak detector

## MID CHANNEL, CH 6 RESULTS



## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | *** 4.87408     | 44.97                | PK2 | 34                 | -31.3                  | 47.67                      | -                  | -           | 74                  | -26.33         | 4              | 109         | H        |
|        | *** 4.87401     | 40.05                | ADV | 34                 | -31.3                  | 42.75                      | 54                 | -11.25      | -                   | -              | 4              | 109         | H        |
| 3      | *** 7.31056     | 40.9                 | PK2 | 35.6               | -29.1                  | 47.4                       | -                  | -           | 74                  | -26.6          | 121            | 231         | H        |
|        | *** 7.31029     | 31.5                 | ADV | 35.6               | -29.1                  | 38                         | 54                 | -16         | -                   | -              | 121            | 231         | H        |
| 4      | *** 16.09324    | 36.39                | PK2 | 40.5               | -24.9                  | 51.99                      | -                  | -           | 74                  | -22.01         | 216            | 111         | H        |
|        | *** 16.09143    | 22.51                | ADV | 40.5               | -24.9                  | 38.11                      | 54                 | -15.89      | -                   | -              | 216            | 111         | H        |
| 5      | *** 3.96519     | 45.51                | PK2 | 33.4               | -31.7                  | 47.21                      | -                  | -           | 74                  | -26.79         | 165            | 170         | V        |
|        | *** 3.96501     | 32.59                | ADV | 33.4               | -31.7                  | 34.29                      | 54                 | -19.71      | -                   | -              | 165            | 170         | V        |
| 6      | *** 4.87399     | 44.06                | PK2 | 34                 | -31.3                  | 46.76                      | -                  | -           | 74                  | -27.24         | 336            | 111         | V        |
|        | *** 4.87402     | 37.67                | ADV | 34                 | -31.3                  | 40.37                      | 54                 | -13.63      | -                   | -              | 336            | 111         | V        |
| 9      | *** 7.31078     | 40.72                | PK2 | 35.6               | -29.1                  | 47.22                      | -                  | -           | 74                  | -26.78         | 123            | 175         | V        |
|        | *** 7.31029     | 31.58                | ADV | 35.6               | -29.1                  | 38.08                      | 54                 | -15.92      | -                   | -              | 123            | 175         | V        |
| 2      | 5.55098         | 36.48                | Pk  | 34.5               | -32.3                  | 38.68                      | -                  | -           | -                   | -              | 0-360          | 198         | H        |
| 7      | 5.55098         | 40.85                | Pk  | 34.5               | -32.3                  | 43.05                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 8      | 7.1369          | 36.44                | Pk  | 35.7               | -30                    | 42.14                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |

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

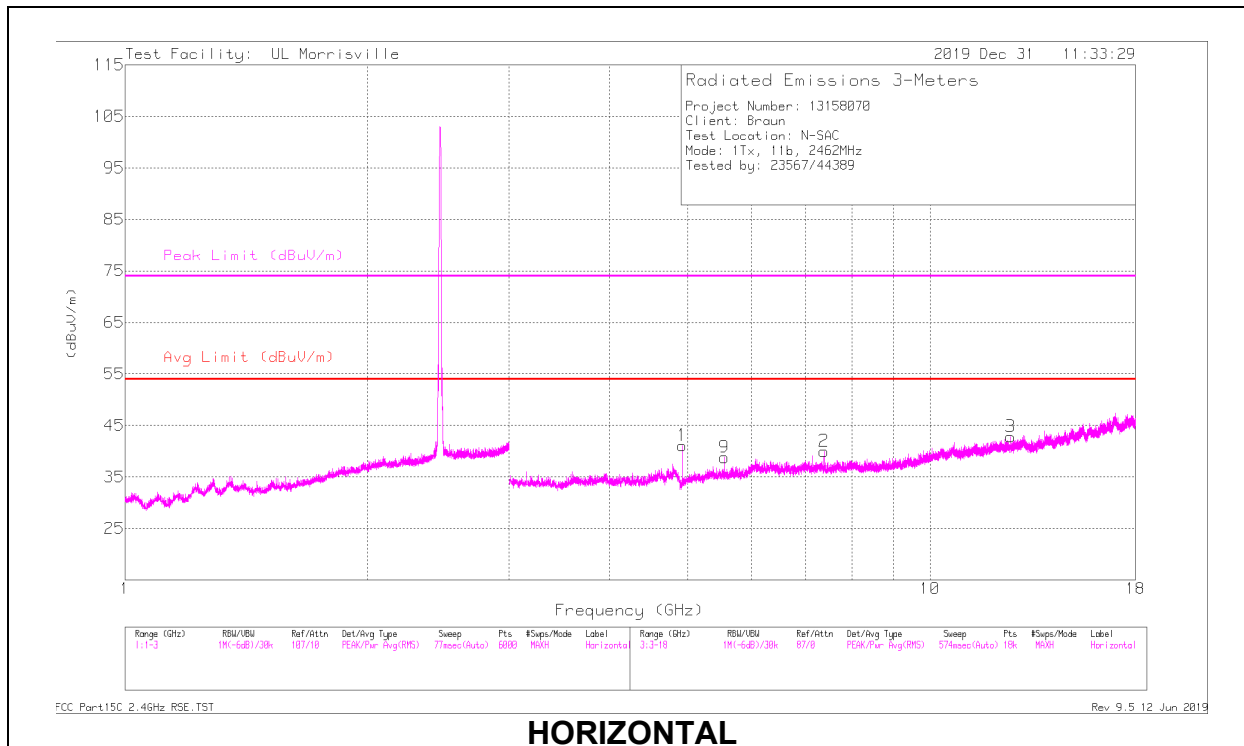
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

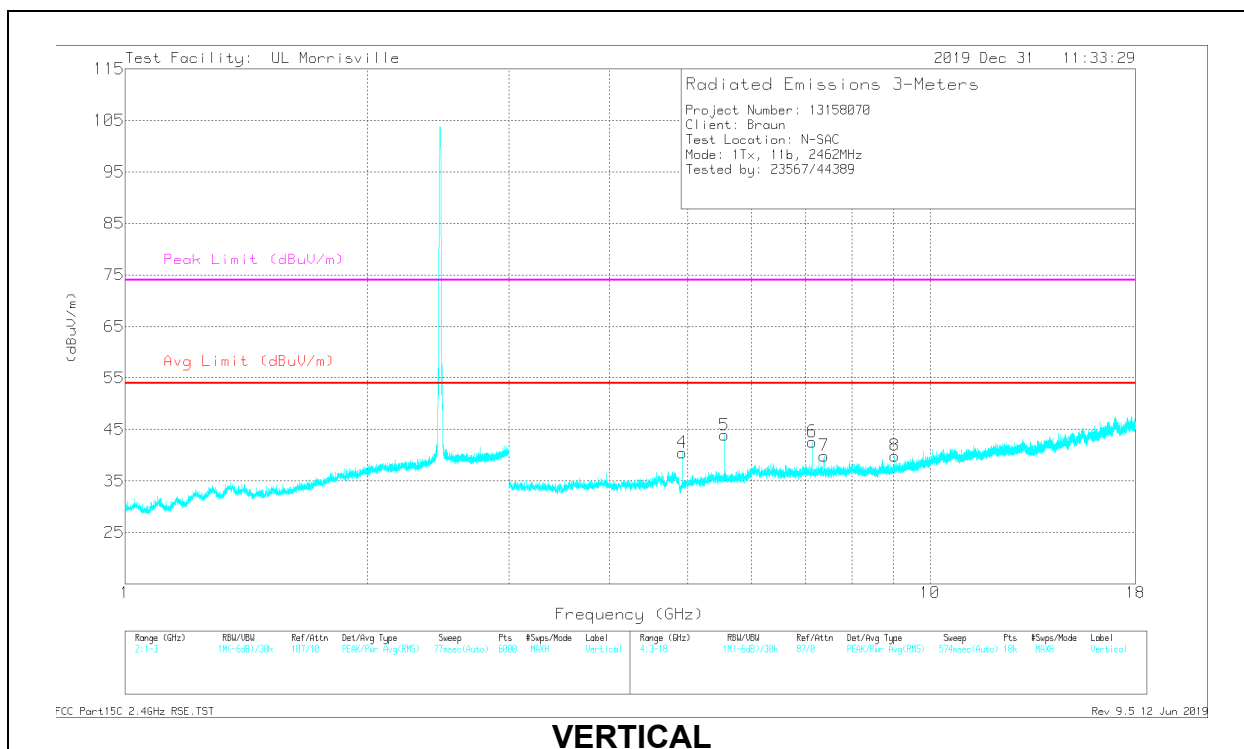
ADV - Linear Voltage Average

Pk - Peak detector

## HIGH CHANNEL, CH 11 RESULTS



### HORIZONTAL



### VERTICAL

## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | *** 4.92395     | 44.33                | PK2 | 33.9               | -31.8                  | 46.43                      | -                  | -           | 74                  | -27.57         | 24             | 103         | H        |
|        | *** 4.92404     | 38.67                | ADV | 33.9               | -31.8                  | 40.77                      | 54                 | -13.23      | -                   | -              | 24             | 103         | H        |
| 2      | *** 7.38534     | 40.02                | PK2 | 35.6               | -29.2                  | 46.42                      | -                  | -           | 74                  | -27.58         | 117            | 205         | H        |
|        | *** 7.38533     | 29.92                | ADV | 35.6               | -29.2                  | 36.32                      | 54                 | -17.68      | -                   | -              | 117            | 205         | H        |
| 3      | *** 12.58667    | 35.99                | PK2 | 38.9               | -26.5                  | 48.39                      | -                  | -           | 74                  | -25.61         | 300            | 117         | H        |
|        | *** 12.58692    | 22.72                | ADV | 38.9               | -26.5                  | 35.12                      | 54                 | -18.88      | -                   | -              | 300            | 117         | H        |
| 4      | *** 4.92406     | 42.77                | PK2 | 33.9               | -31.8                  | 44.87                      | -                  | -           | 74                  | -29.13         | 229            | 104         | V        |
|        | *** 4.92403     | 35.73                | ADV | 33.9               | -31.8                  | 37.83                      | 54                 | -16.17      | -                   | -              | 229            | 104         | V        |
| 7      | *** 7.38698     | 40.2                 | PK2 | 35.6               | -29.2                  | 46.6                       | -                  | -           | 74                  | -27.4          | 118            | 206         | V        |
|        | *** 7.38686     | 30.22                | ADV | 35.6               | -29.2                  | 36.62                      | 54                 | -17.38      | -                   | -              | 118            | 206         | V        |
| 8      | *** 9.04677     | 37.47                | PK2 | 36.1               | -28.4                  | 45.17                      | -                  | -           | 74                  | -28.83         | 6              | 230         | V        |
|        | *** 9.04553     | 24.18                | ADV | 36.1               | -28.4                  | 31.88                      | 54                 | -22.12      | -                   | -              | 6              | 230         | V        |
| 9      | 5.55098         | 36.61                | Pk  | 34.5               | -32.3                  | 38.81                      | -                  | -           | -                   | -              | 0-360          | 198         | H        |
| 5      | 5.55098         | 41.7                 | Pk  | 34.5               | -32.3                  | 43.9                       | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 6      | 7.1369          | 36.91                | Pk  | 35.7               | -30                    | 42.61                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |

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

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

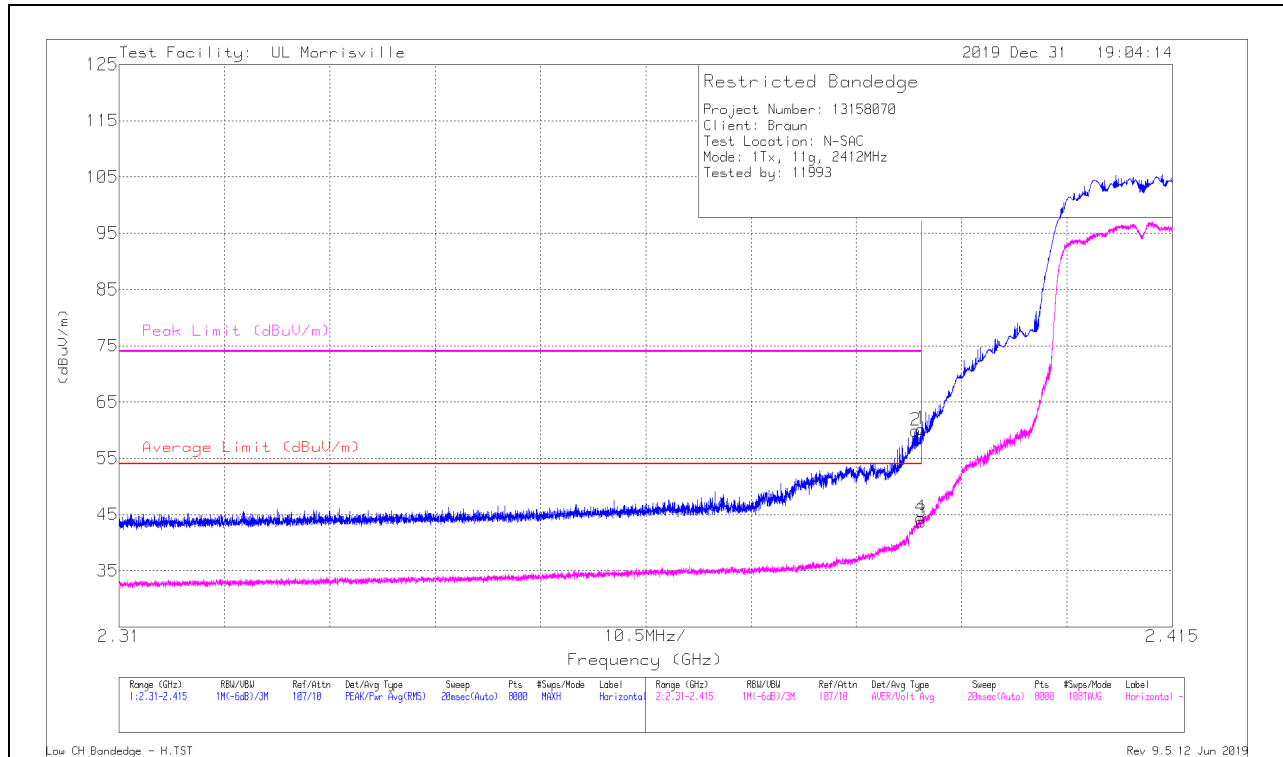
ADV - Linear Voltage Average

Pk - Peak detector

## 9.1.2. TX ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

### BANDEDGE (LOW CHANNEL, CH 1)

#### HORIZONTAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.39       | 52.63                | Pk  | 32                 | -24.4                  | 0            | 60.23                      | -                      | -           | 74                  | -13.77         | 100            | 174         | H        |
| 2      | * ** 2.38942    | 52.29                | Pk  | 32                 | -24.4                  | 0            | 59.89                      | -                      | -           | 74                  | -14.11         | 100            | 174         | H        |
| 3      | * ** 2.39       | 35.41                | ADV | 32                 | -24.4                  | .72          | 43.73                      | 54                     | -10.27      | -                   | -              | 100            | 174         | H        |
| 4      | * ** 2.38992    | 36.06                | ADV | 32                 | -24.4                  | .72          | 44.38                      | 54                     | -9.62       | -                   | -              | 100            | 174         | H        |

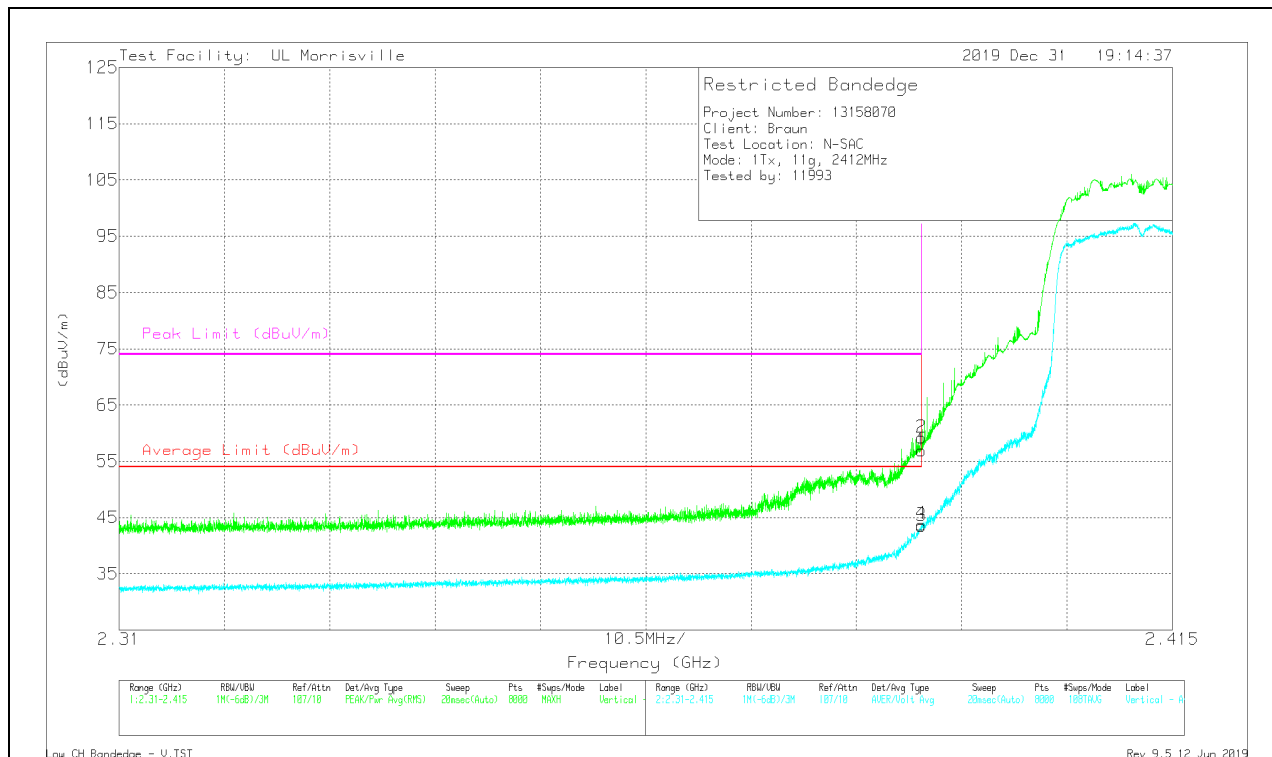
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Fitr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.39       | 49.3                 | Pk  | 32                 | -24.4                 | 0            | 56.9                       | -                      | -           | 74                  | -17.1          | 70             | 320         | V        |
| 2      | * ** 2.38997    | 51.59                | Pk  | 32                 | -24.4                 | 0            | 59.19                      | -                      | -           | 74                  | -14.81         | 70             | 320         | V        |
| 3      | * ** 2.39       | 35.18                | ADV | 32                 | -24.4                 | .72          | 43.5                       | 54                     | -10.5       | -                   | -              | 70             | 320         | V        |
| 4      | * ** 2.38997    | 35.48                | ADV | 32                 | -24.4                 | .72          | 43.8                       | 54                     | -10.2       | -                   | -              | 70             | 320         | V        |

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

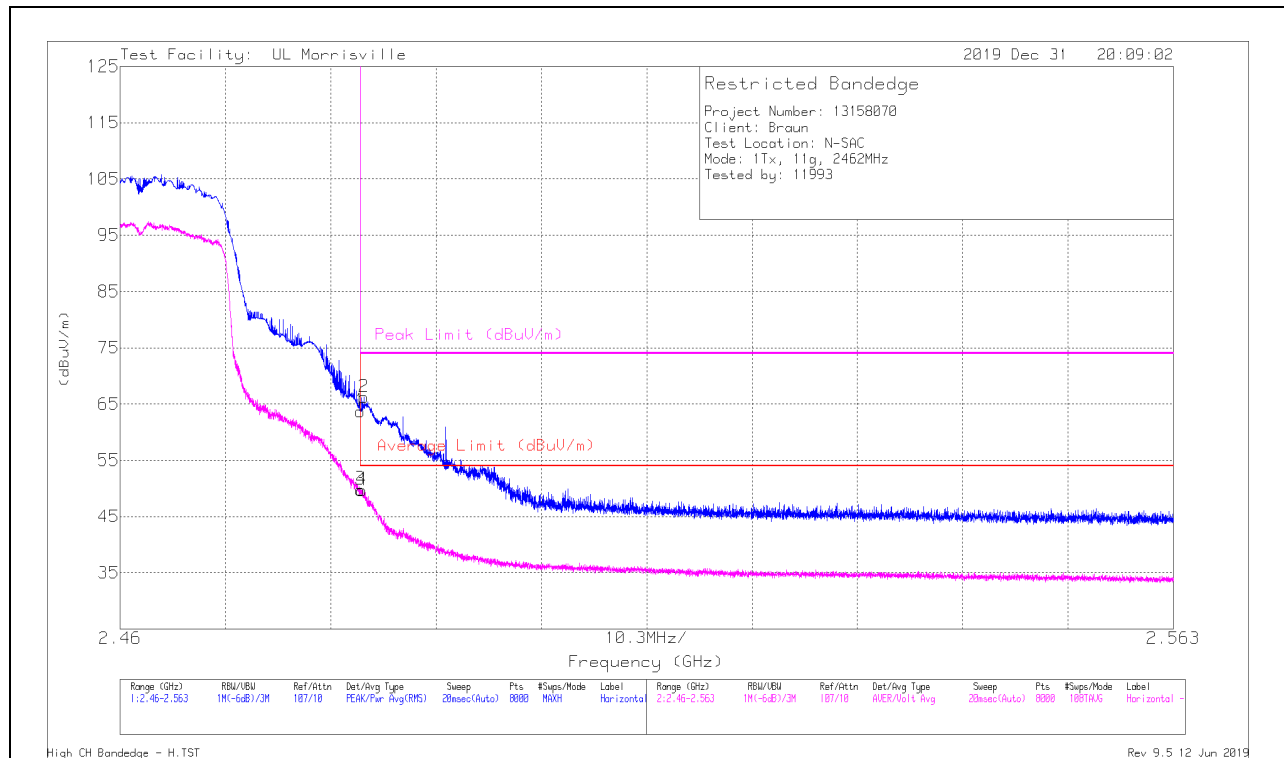
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## BANDEGE (HIGH CHANNEL, CH 11)

### HORIZONTAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.4835     | 55.63                | Pk  | 32.4               | -24.3                  | 0            | 63.73                      | -                      | -           | 74                  | -10.27         | 83             | 158         | H        |
| 2      | * ** 2.48385    | 58.1                 | Pk  | 32.4               | -24.3                  | 0            | 66.2                       | -                      | -           | 74                  | -7.8           | 83             | 158         | H        |
| 3      | * ** 2.4835     | 40.98                | ADV | 32.4               | -24.3                  | .72          | 49.8                       | 54                     | -4.2        | -                   | -              | 83             | 158         | H        |
| 4      | * ** 2.48364    | 40.89                | ADV | 32.4               | -24.3                  | .72          | 49.71                      | 54                     | -4.29       | -                   | -              | 83             | 158         | H        |

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

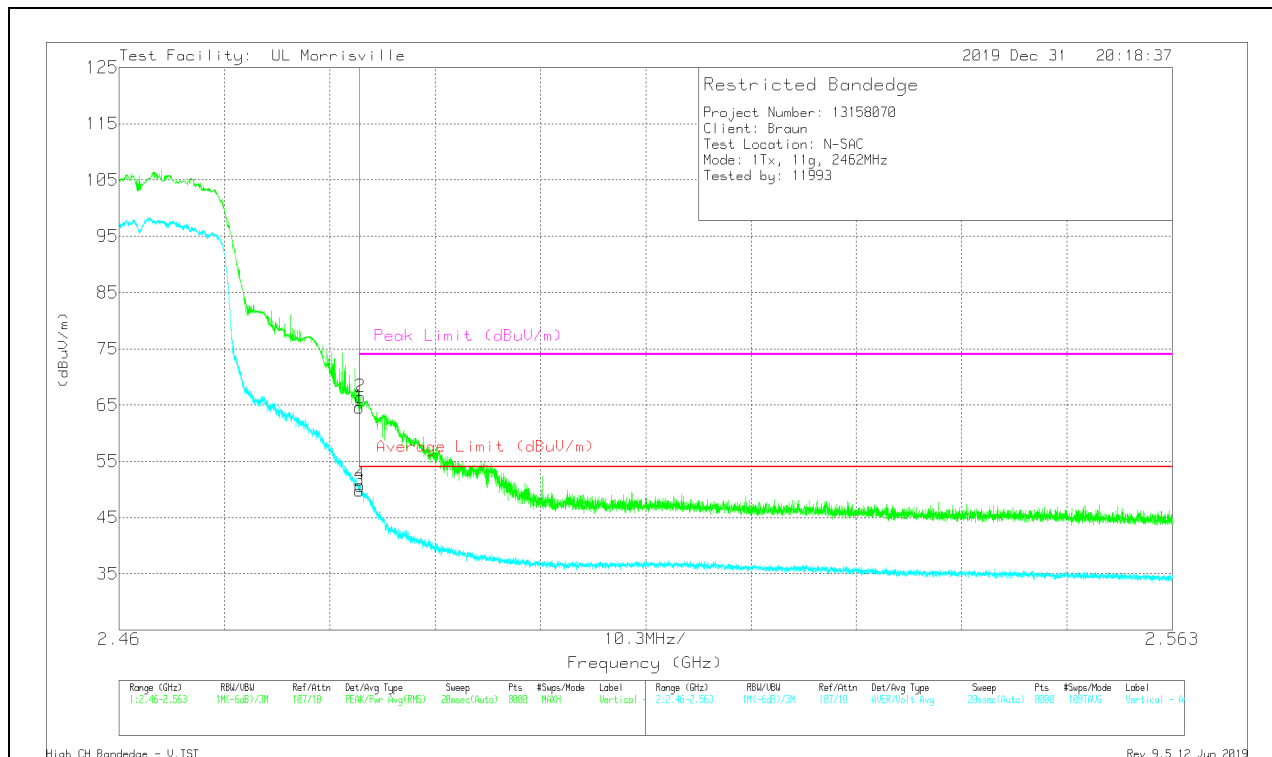
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average



## VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Fitr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.4835     | 56.5                 | Pk  | 32.4               | -24.3                 | 0            | 64.6                       | -                      | -           | 74                  | -9.4           | 99             | 143         | V        |
| 2      | * ** 2.48363    | 58.32                | Pk  | 32.4               | -24.3                 | 0            | 66.42                      | -                      | -           | 74                  | -7.58          | 99             | 143         | V        |
| 3      | * ** 2.4835     | 40.96                | ADV | 32.4               | -24.3                 | .72          | 49.78                      | 54                     | -4.22       | -                   | -              | 99             | 143         | V        |
| 4      | * ** 2.48353    | 41.89                | ADV | 32.4               | -24.3                 | .72          | 50.71                      | 54                     | -3.29       | -                   | -              | 99             | 143         | V        |

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

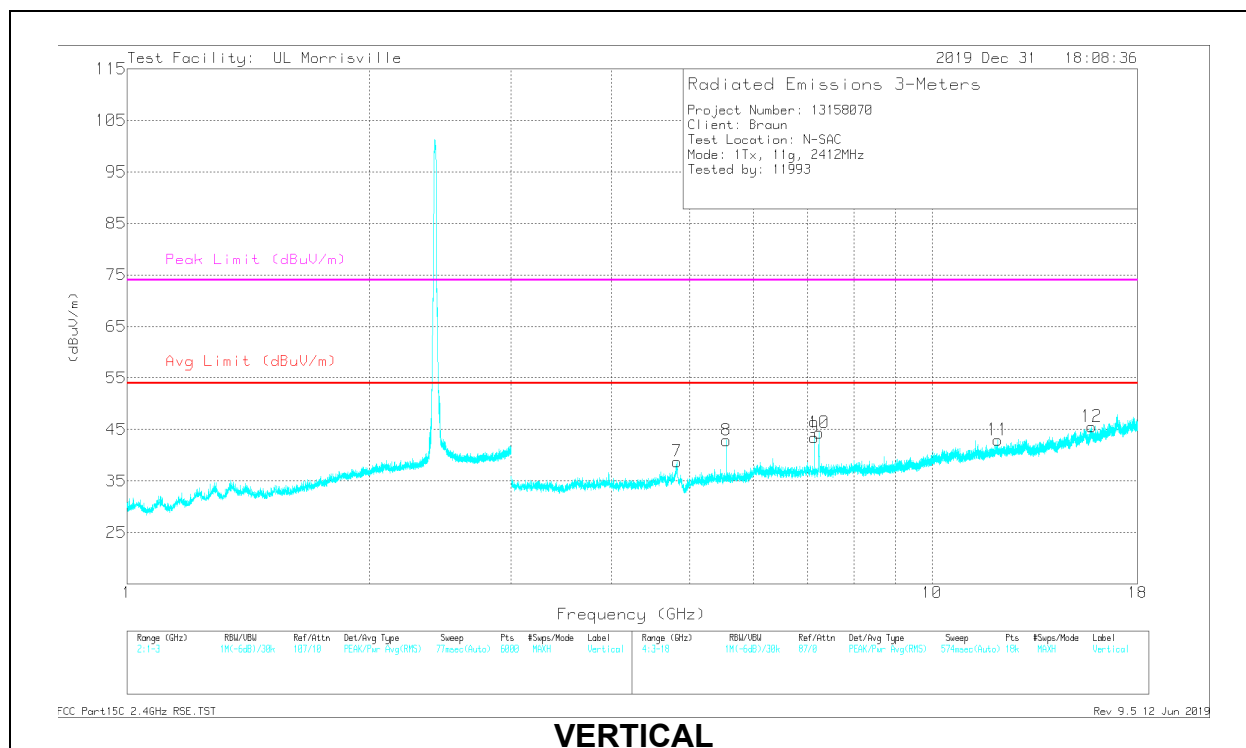
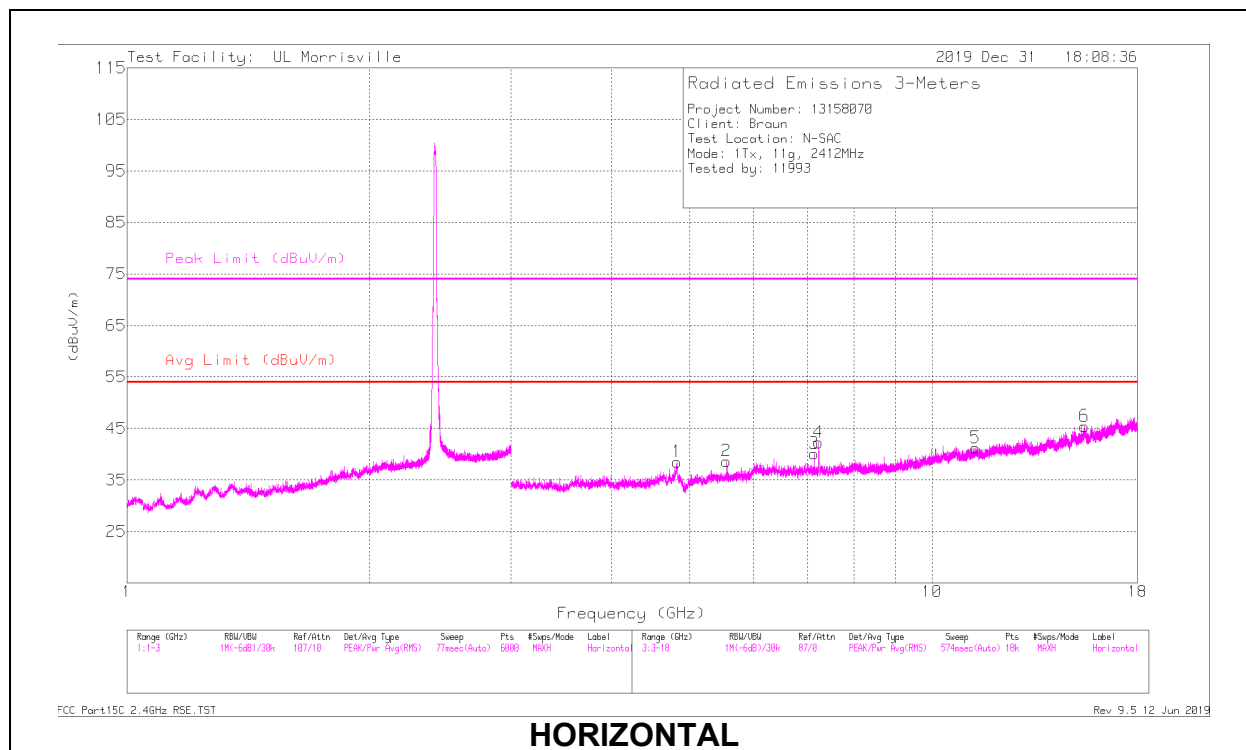
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL, CH 1 RESULTS



## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 4.82332    | 41.98                | PK2 | 34.1               | -31.4                  | 0            | 44.68                      | -                  | -           | 74                  | -29.32         | 360            | 234         | H        |
|        | * ** 4.82226    | 29.13                | ADV | 34.1               | -31.5                  | .72          | 32.45                      | 54                 | -21.55      | -                   | -              | 360            | 234         | H        |
| 5      | * ** 11.3262    | 35.01                | PK2 | 37.9               | -24.8                  | 0            | 48.11                      | -                  | -           | 74                  | -25.89         | 94             | 176         | H        |
|        | * ** 11.32636   | 21.6                 | ADV | 37.9               | -24.8                  | .72          | 35.42                      | 54                 | -18.58      | -                   | -              | 94             | 176         | H        |
| 6      | * ** 15.45928   | 34.29                | PK2 | 40.1               | -23.9                  | 0            | 50.49                      | -                  | -           | 74                  | -23.51         | 289            | 134         | H        |
|        | * ** 15.45693   | 21.94                | ADV | 40.1               | -23.9                  | .72          | 38.86                      | 54                 | -15.14      | -                   | -              | 289            | 134         | H        |
| 7      | * ** 4.8204     | 45.58                | PK2 | 34.1               | -31.5                  | 0            | 48.18                      | -                  | -           | 74                  | -25.82         | 310            | 129         | V        |
|        | * ** 4.82137    | 31.36                | ADV | 34.1               | -31.5                  | .72          | 34.68                      | 54                 | -19.32      | -                   | -              | 310            | 129         | V        |
| 11     | * ** 12.07262   | 34.31                | PK2 | 38.7               | -25.7                  | 0            | 47.31                      | -                  | -           | 74                  | -26.69         | 75             | 165         | V        |
|        | * ** 12.07154   | 22.14                | ADV | 38.7               | -25.7                  | .72          | 35.86                      | 54                 | -18.14      | -                   | -              | 75             | 165         | V        |
| 12     | * ** 15.7879    | 35.62                | PK2 | 40.2               | -24.6                  | 0            | 51.22                      | -                  | -           | 74                  | -22.78         | 341            | 164         | V        |
|        | * ** 15.78774   | 22.79                | ADV | 40.2               | -24.6                  | .72          | 39.11                      | 54                 | -14.89      | -                   | -              | 341            | 164         | V        |
| 2      | 5.55014         | 36.47                | Pk  | 34.5               | -32.3                  | 0            | 38.67                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 8      | 5.55098         | 40.69                | Pk  | 34.5               | -32.3                  | 0            | 42.89                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 3      | 7.1369          | 34.44                | Pk  | 35.7               | -30                    | 0            | 40.14                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 9      | 7.1369          | 37.76                | Pk  | 35.7               | -30                    | 0            | 43.46                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 4      | 7.23107         | 36.28                | Pk  | 35.6               | -29.6                  | 0            | 42.28                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 10     | 7.23857         | 38.37                | Pk  | 35.6               | -29.6                  | 0            | 44.37                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |

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

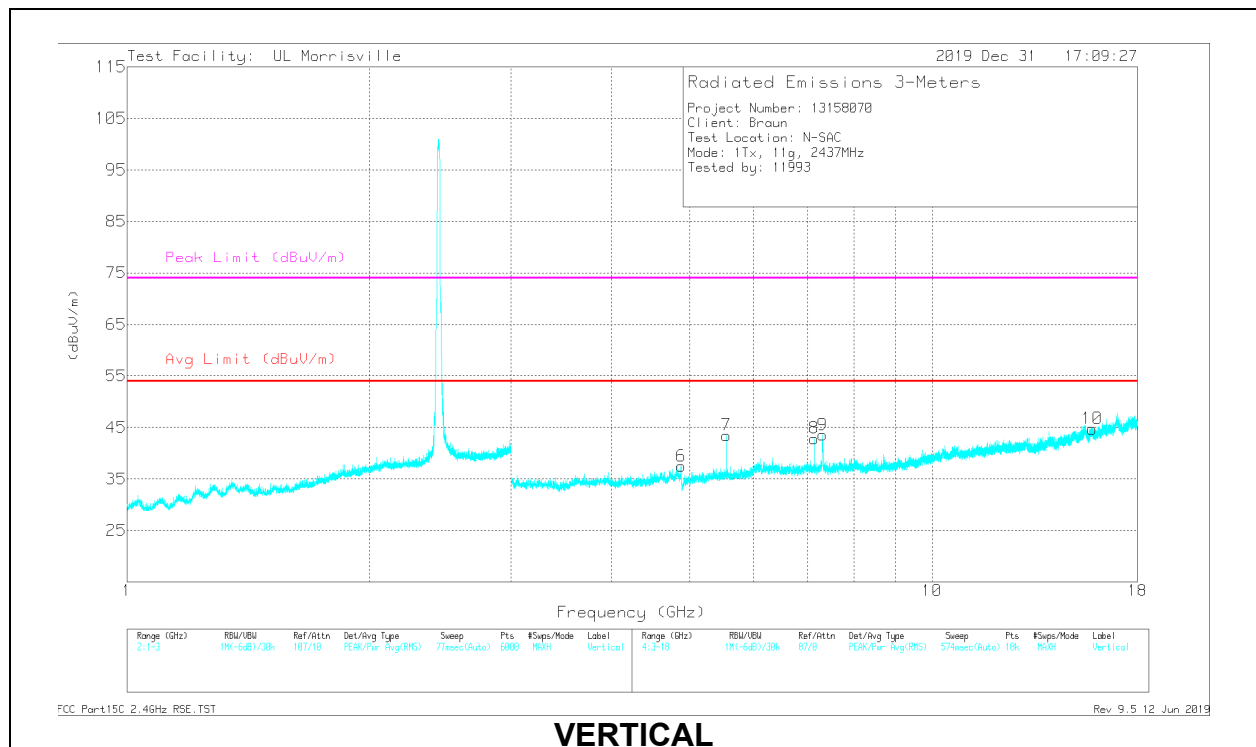
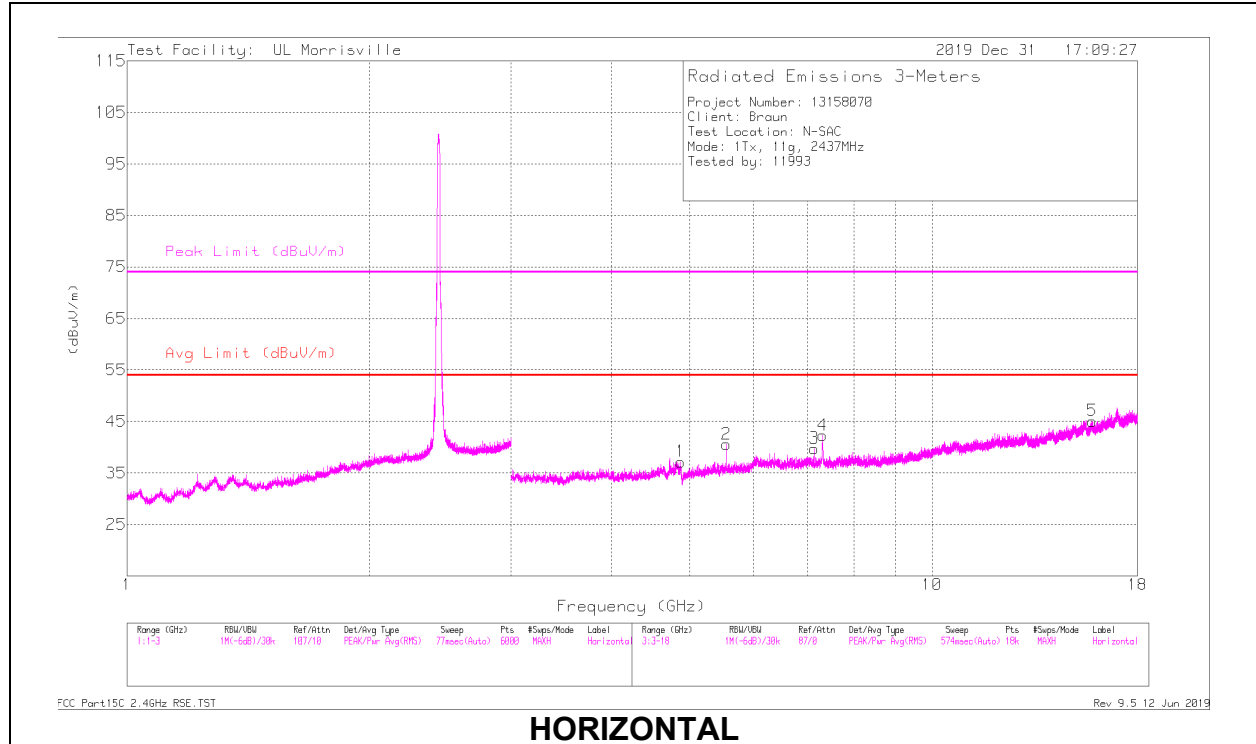
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

ADV - Linear Voltage Average

Pk - Peak detector

## MID CHANNEL, CH 6 RESULTS



## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 4.87216    | 43.1                 | PK2 | 34                 | -31.4                  | 0            | 45.7                       | -                  | -           | 74                  | -28.3          | 258            | 107         | H        |
|        | * ** 4.87221    | 29.44                | ADV | 34                 | -31.4                  | .72          | 32.76                      | 54                 | -21.24      | -                   | -              | 258            | 107         | H        |
| 4      | * ** 7.31268    | 45.44                | PK2 | 35.6               | -29.1                  | 0            | 51.94                      | -                  | -           | 74                  | -22.06         | 79             | 153         | H        |
|        | * ** 7.31147    | 29.58                | ADV | 35.6               | -29.1                  | .72          | 36.8                       | 54                 | -17.2       | -                   | -              | 79             | 153         | H        |
| 5      | * ** 15.80878   | 35.95                | PK2 | 40.2               | -24.7                  | 0            | 51.45                      | -                  | -           | 74                  | -22.55         | 93             | 139         | H        |
|        | * ** 15.80686   | 23.02                | ADV | 40.2               | -24.7                  | .72          | 39.24                      | 54                 | -14.76      | -                   | -              | 93             | 139         | H        |
| 6      | * ** 4.88113    | 42.31                | PK2 | 33.9               | -31.3                  | 0            | 44.91                      | -                  | -           | 74                  | -29.09         | 340            | 135         | V        |
|        | * ** 4.87827    | 29.18                | ADV | 33.9               | -31.3                  | .72          | 32.5                       | 54                 | -21.5       | -                   | -              | 340            | 135         | V        |
| 9      | * ** 7.31287    | 47.16                | PK2 | 35.6               | -29.1                  | 0            | 53.66                      | -                  | -           | 74                  | -20.34         | 53             | 105         | V        |
|        | * ** 7.31327    | 30.77                | ADV | 35.6               | -29.1                  | .72          | 37.99                      | 54                 | -16.01      | -                   | -              | 53             | 105         | V        |
| 10     | * ** 15.80923   | 35.93                | PK2 | 40.2               | -24.7                  | 0            | 51.43                      | -                  | -           | 74                  | -22.57         | 120            | 214         | V        |
|        | * ** 15.80855   | 23.02                | ADV | 40.2               | -24.7                  | .72          | 39.24                      | 54                 | -14.76      | -                   | -              | 120            | 214         | V        |
| 2      | 5.55098         | 38.38                | Pk  | 34.5               | -32.3                  | 0            | 40.58                      | -                  | -           | -                   | -              | 0-360          | 102         | H        |
| 7      | 5.55098         | 41.28                | Pk  | 34.5               | -32.3                  | 0            | 43.48                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 3      | 7.1369          | 34.07                | Pk  | 35.7               | -30                    | 0            | 39.77                      | -                  | -           | -                   | -              | 0-360          | 198         | H        |
| 8      | 7.1369          | 37.17                | Pk  | 35.7               | -30                    | 0            | 42.87                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |

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

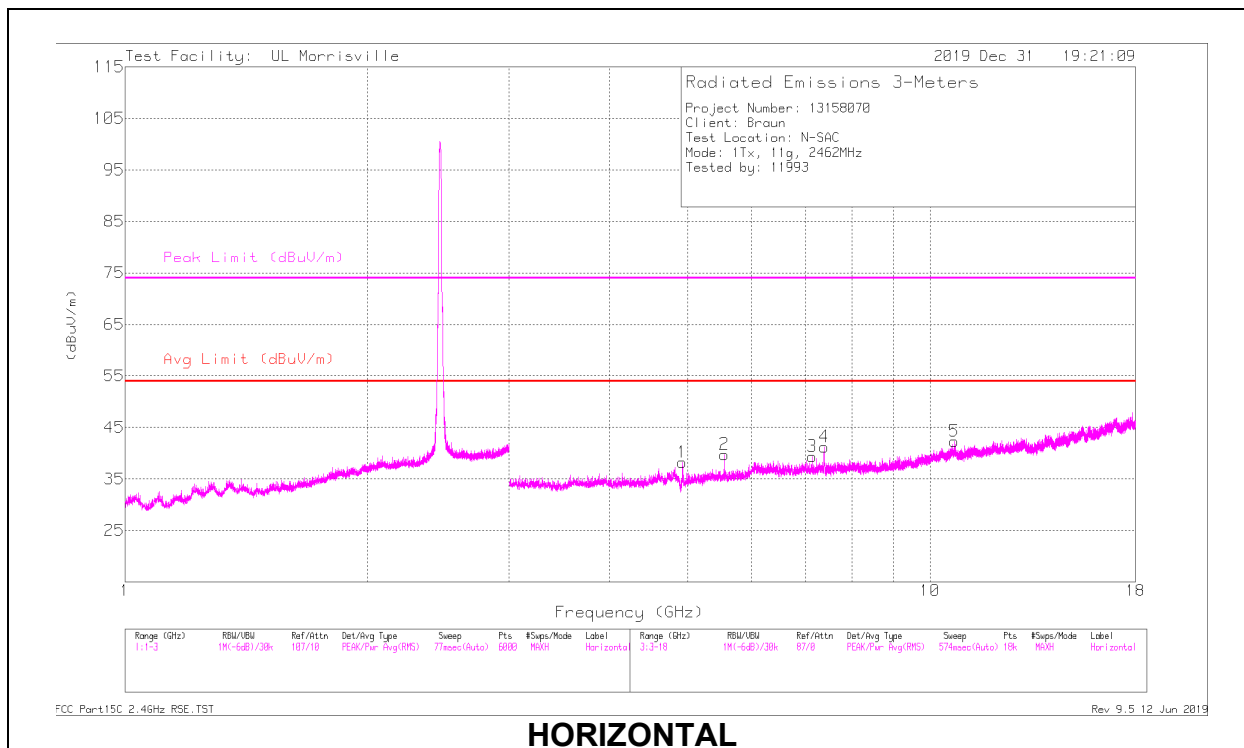
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

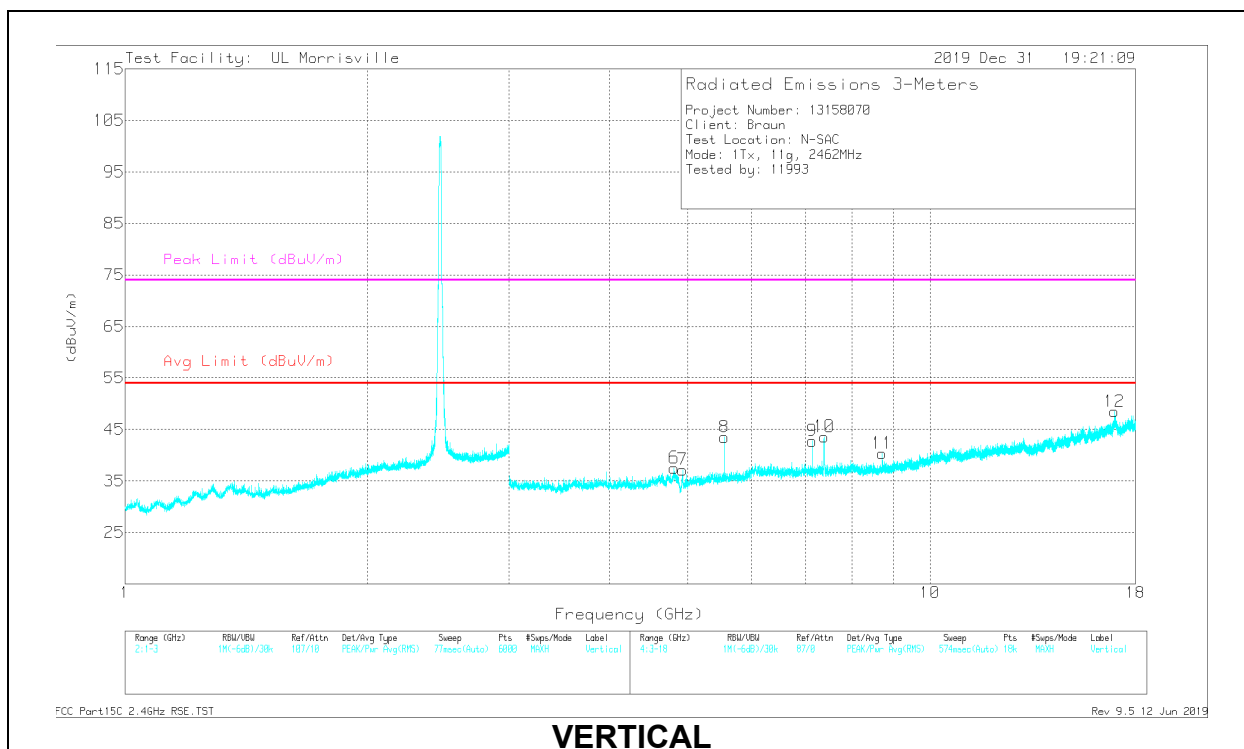
ADV - Linear Voltage Average

Pk - Peak detector

## HIGH CHANNEL, CH 11 RESULTS



### HORIZONTAL



### VERTICAL

## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | *** 4.92363     | 44                   | PK2 | 33.9               | -31.8                  | 0            | 46.1                       | -                  | -           | 74                  | -27.9          | 348            | 104         | H        |
|        | *** 4.9237      | 30.22                | ADV | 33.9               | -31.8                  | .72          | 33.04                      | 54                 | -20.96      | -                   | -              | 348            | 104         | H        |
| 4      | *** 7.38787     | 42.53                | PK2 | 35.6               | -29.2                  | 0            | 48.93                      | -                  | -           | 74                  | -25.07         | 68             | 303         | H        |
|        | *** 7.38823     | 27.97                | ADV | 35.6               | -29.2                  | .72          | 35.09                      | 54                 | -18.91      | -                   | -              | 68             | 303         | H        |
| 5      | *** 10.71792    | 34.61                | PK2 | 37.7               | -25                    | 0            | 47.31                      | -                  | -           | 74                  | -26.69         | 22             | 276         | H        |
|        | *** 10.71614    | 22.23                | ADV | 37.7               | -25                    | .72          | 35.65                      | 54                 | -18.35      | -                   | -              | 22             | 276         | H        |
| 6      | *** 4.80753     | 41.48                | PK2 | 34.1               | -31.6                  | 0            | 43.98                      | -                  | -           | 74                  | -30.02         | 357            | 383         | V        |
|        | *** 4.80751     | 28.7                 | ADV | 34.1               | -31.6                  | .72          | 31.92                      | 54                 | -22.08      | -                   | -              | 357            | 383         | V        |
| 7      | *** 4.92784     | 42.56                | PK2 | 33.9               | -31.8                  | 0            | 44.66                      | -                  | -           | 74                  | -29.34         | 321            | 222         | V        |
|        | *** 4.92647     | 29.15                | ADV | 33.9               | -31.8                  | .72          | 31.97                      | 54                 | -22.03      | -                   | -              | 321            | 222         | V        |
| 10     | *** 7.38998     | 43.99                | PK2 | 35.6               | -29.3                  | 0            | 50.29                      | -                  | -           | 74                  | -23.71         | 42             | 116         | V        |
|        | *** 7.38938     | 29.16                | ADV | 35.6               | -29.3                  | .72          | 36.18                      | 54                 | -17.82      | -                   | -              | 42             | 116         | V        |
| 2      | 5.55098         | 37.56                | Pk  | 34.5               | -32.3                  | 0            | 39.76                      | -                  | -           | -                   | -              | 0-360          | 102         | H        |
| 8      | 5.55098         | 41.31                | Pk  | 34.5               | -32.3                  | 0            | 43.51                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 3      | 7.1369          | 33.66                | Pk  | 35.7               | -30                    | 0            | 39.36                      | -                  | -           | -                   | -              | 0-360          | 102         | H        |
| 9      | 7.1369          | 37.06                | Pk  | 35.7               | -30                    | 0            | 42.76                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 11     | 8.72282         | 32.75                | Pk  | 35.9               | -28.3                  | 0            | 40.35                      | -                  | -           | -                   | -              | 0-360          | 198         | V        |
| 12     | 16.94911        | 30.47                | Pk  | 41.4               | -23.4                  | 0            | 48.47                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |

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

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

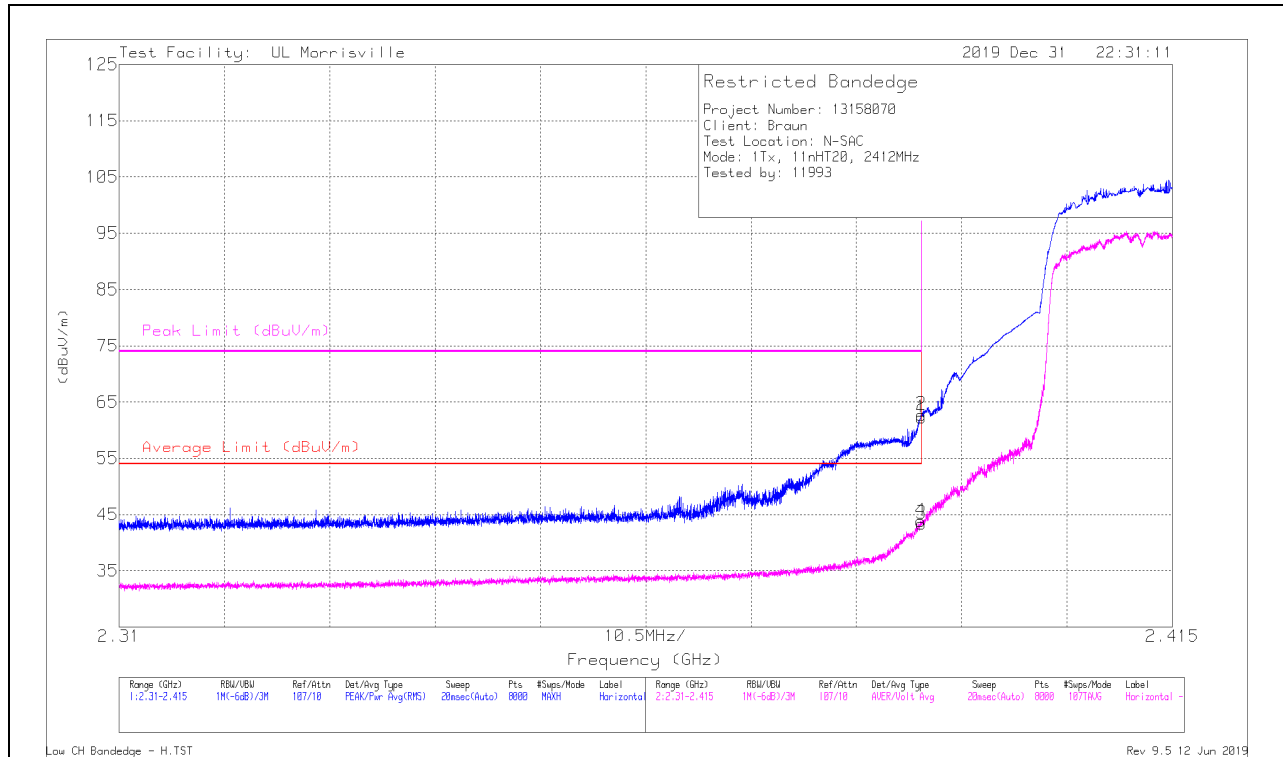
ADV - Linear Voltage Average

Pk - Peak detector

### 9.1.3. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 2.4 GHz BAND

#### BANDEDGE (LOW CHANNEL, CH 1)

#### HORIZONTAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.39       | 54.64                | Pk  | 32                 | -24.4                  | 0            | 62.24                      | -                      | -           | 74                  | -11.76         | 141            | 145         | H        |
| 2      | * ** 2.38997    | 55.14                | Pk  | 32                 | -24.4                  | 0            | 62.74                      | -                      | -           | 74                  | -11.26         | 141            | 145         | H        |
| 3      | * ** 2.39       | 35.17                | ADV | 32                 | -24.4                  | .61          | 43.38                      | 54                     | -10.62      | -                   | -              | 141            | 145         | H        |
| 4      | * ** 2.38992    | 35.61                | ADV | 32                 | -24.4                  | .61          | 43.82                      | 54                     | -10.18      | -                   | -              | 141            | 145         | H        |

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

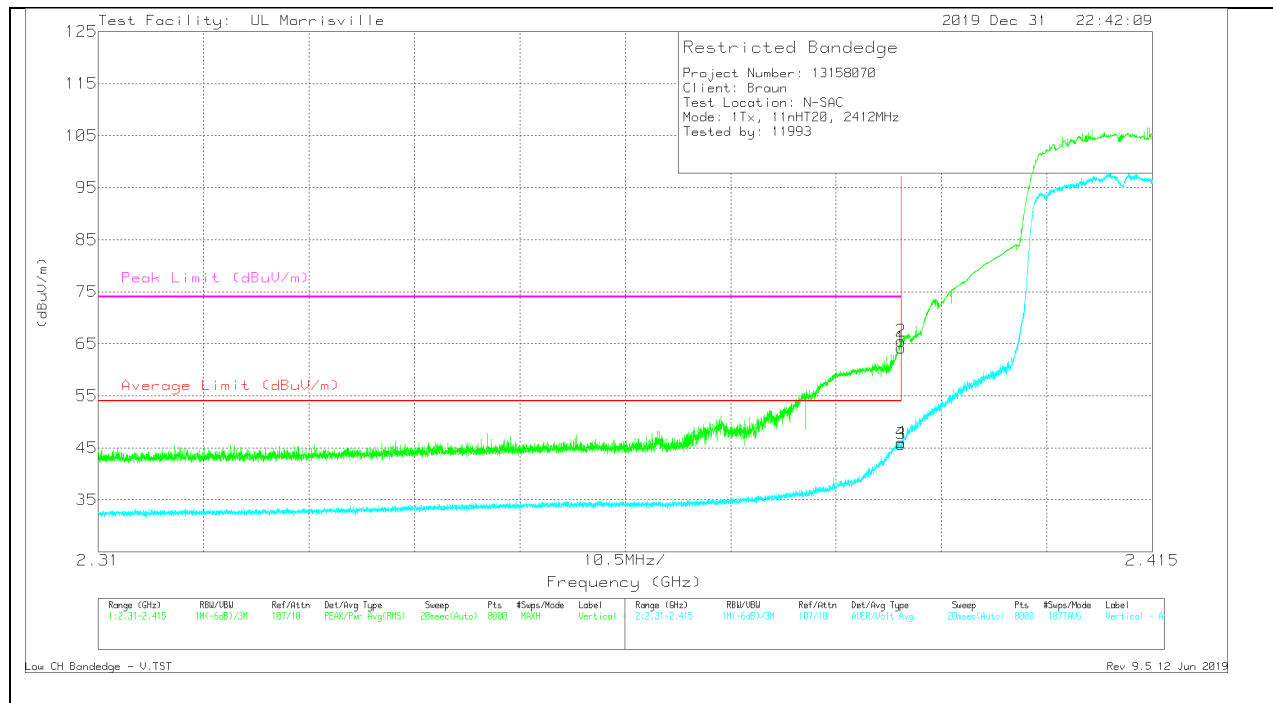
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average



## VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.39       | 56.66                | Pk  | 32                 | -24.4                  | 0            | 64.26                      | -                      | -           | 74                  | -9.74          | 75             | 251         | V        |
| 2      | * ** 2.38996    | 57.91                | Pk  | 32                 | -24.4                  | 0            | 65.51                      | -                      | -           | 74                  | -8.49          | 75             | 251         | V        |
| 3      | * ** 2.39       | 37.54                | ADV | 32                 | -24.4                  | .62          | 45.76                      | 54                     | -8.24       | -                   | -              | 75             | 251         | V        |
| 4      | * ** 2.38996    | 37.81                | ADV | 32                 | -24.4                  | .62          | 46.03                      | 54                     | -7.97       | -                   | -              | 75             | 251         | V        |

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

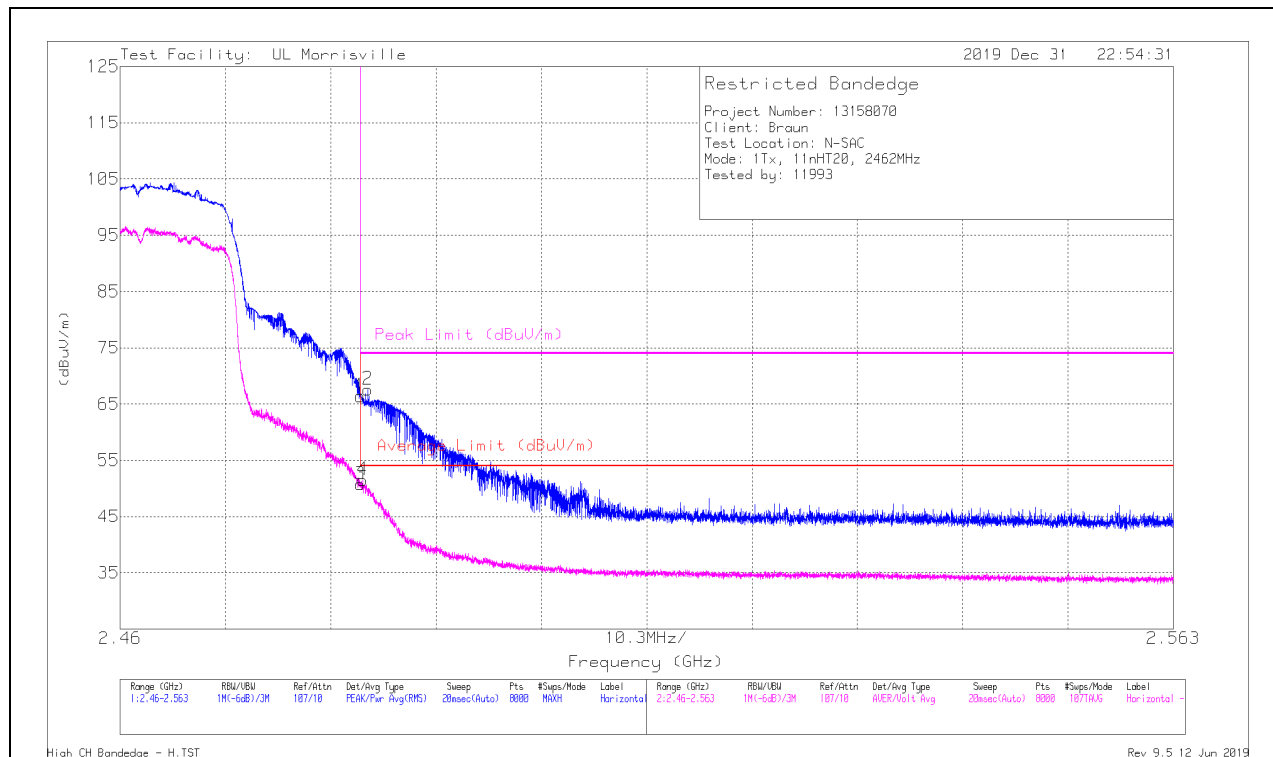
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

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

# BANDEDGE (HIGH CHANNEL, CH 11)

## HORIZONTAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.4835     | 58.33                | Pk  | 32.4               | -24.3                  | 0            | 66.43                      | -                      | -           | 74                  | -7.57          | 86             | 236         | H        |
| 2      | * ** 2.48421    | 59.48                | Pk  | 32.4               | -24.3                  | 0            | 67.58                      | -                      | -           | 74                  | -6.42          | 86             | 236         | H        |
| 3      | * ** 2.4835     | 42.02                | ADV | 32.4               | -24.3                  | .61          | 50.73                      | 54                     | -3.27       | -                   | -              | 86             | 236         | H        |
| 4      | * ** 2.48372    | 42.77                | ADV | 32.4               | -24.3                  | .61          | 51.48                      | 54                     | -2.52       | -                   | -              | 86             | 236         | H        |

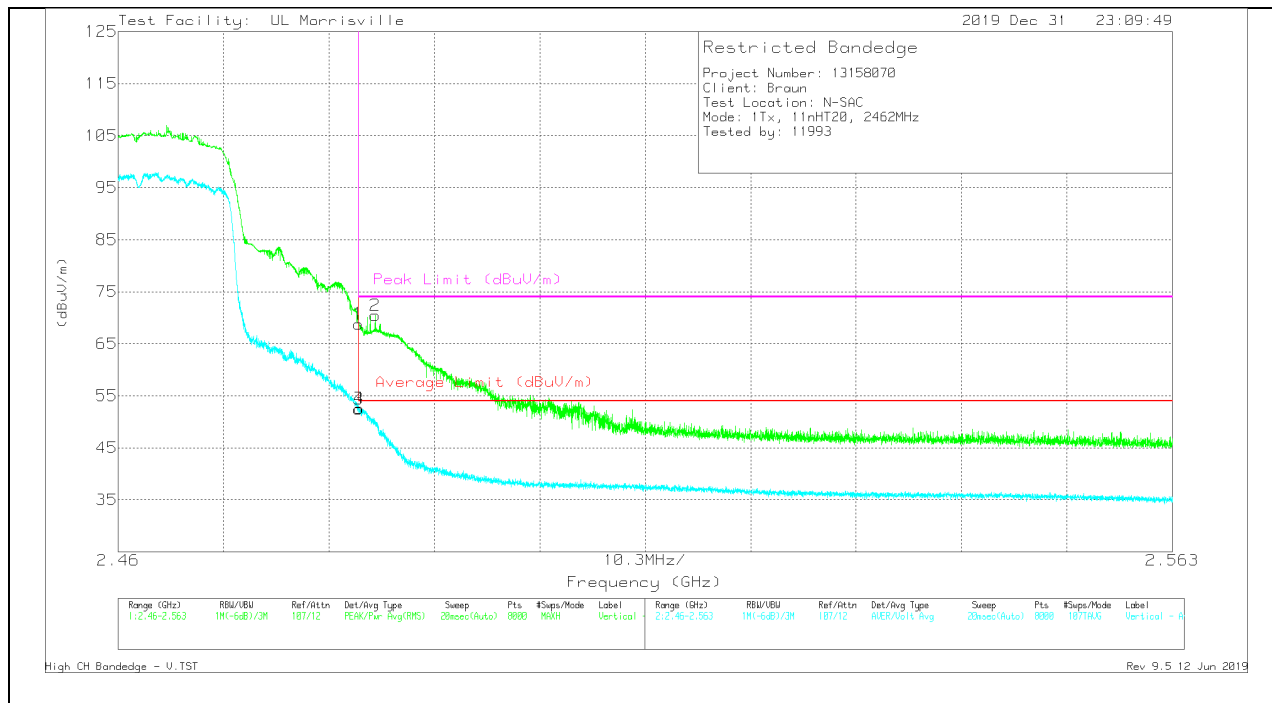
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.4835     | 60.69                | Pk  | 32.4               | -24.3                  | 0            | 68.79                      | -                      | -           | 74                  | -5.21          | 49             | 217         | V        |
| 2      | * ** 2.48511    | 62.33                | Pk  | 32.4               | -24.3                  | 0            | 70.43                      | -                      | -           | 74                  | -3.57          | 49             | 217         | V        |
| 3      | * ** 2.4835     | 43.74                | ADV | 32.4               | -24.3                  | .61          | 52.45                      | 54                     | -1.55       | -                   | -              | 49             | 217         | V        |
| 4      | * ** 2.48355    | 43.84                | ADV | 32.4               | -24.3                  | .61          | 52.55                      | 54                     | -1.45       | -                   | -              | 49             | 217         | V        |

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

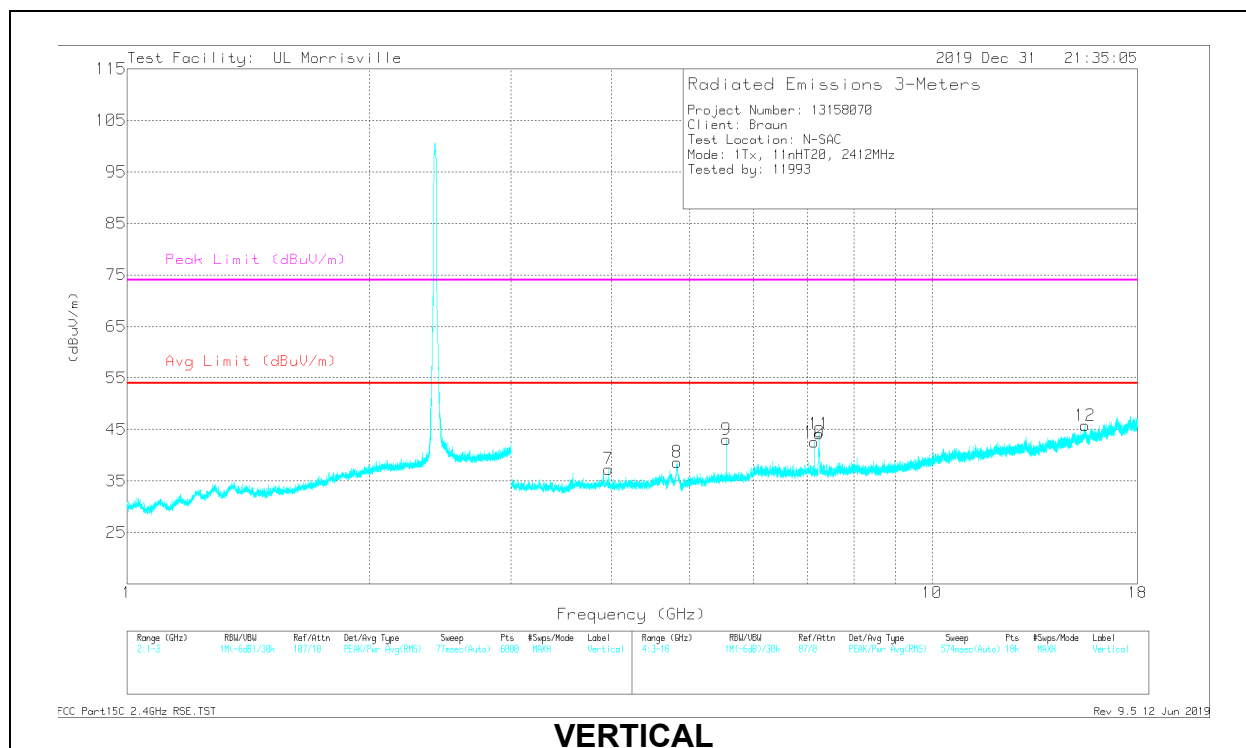
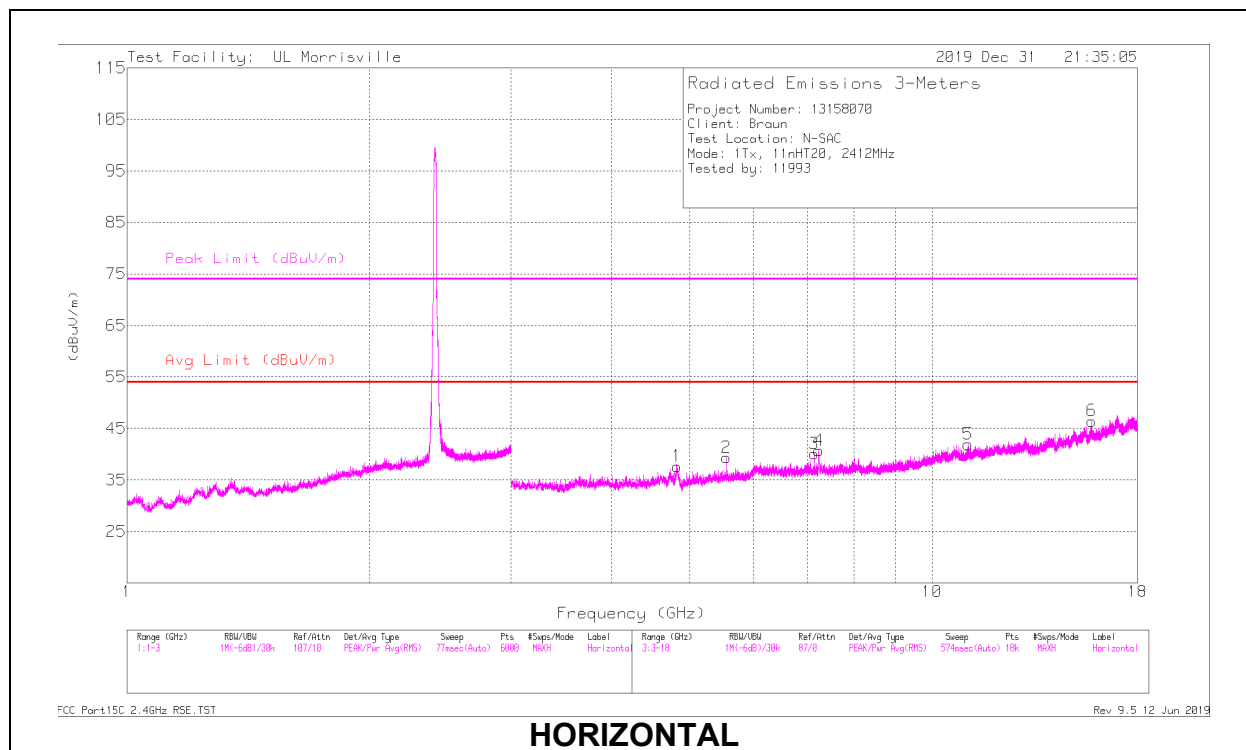
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

# HARMONICS AND SPURIOUS EMISSIONS

## LOW CHANNEL, CH 1 RESULTS



## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | *** 4.82152     | 43.84                | PK2 | 34.1               | -31.5                  | 0            | 46.44                      | -                  | -           | 74                  | -27.56         | 341            | 106         | H        |
|        | *** 4.82142     | 30.1                 | ADV | 34.1               | -31.5                  | .61          | 33.31                      | 54                 | -20.69      | -                   | -              | 341            | 106         | H        |
| 5      | *** 11.08651    | 34.22                | PK2 | 37.7               | -25.3                  | 0            | 46.62                      | -                  | -           | 74                  | -27.38         | 3              | 182         | H        |
|        | *** 11.08611    | 21.86                | ADV | 37.7               | -25.3                  | .61          | 34.87                      | 54                 | -19.13      | -                   | -              | 3              | 182         | H        |
| 6      | *** 15.78044    | 36.44                | PK2 | 40.2               | -24.5                  | 0            | 52.14                      | -                  | -           | 74                  | -21.86         | 143            | 159         | H        |
|        | *** 15.77836    | 23.02                | ADV | 40.1               | -24.5                  | .61          | 39.23                      | 54                 | -14.77      | -                   | -              | 143            | 159         | H        |
| 7      | *** 3.96489     | 43.94                | PK2 | 33.4               | -31.7                  | 0            | 45.64                      | -                  | -           | 74                  | -28.36         | 137            | 345         | V        |
|        | *** 3.96497     | 30.86                | ADV | 33.4               | -31.7                  | .61          | 33.17                      | 54                 | -20.83      | -                   | -              | 137            | 345         | V        |
| 8      | *** 4.82446     | 44.24                | PK2 | 34.1               | -31.4                  | 0            | 46.94                      | -                  | -           | 74                  | -27.06         | 307            | 129         | V        |
|        | *** 4.82279     | 30.87                | ADV | 34.1               | -31.5                  | .61          | 34.08                      | 54                 | -19.92      | -                   | -              | 307            | 129         | V        |
| 12     | *** 15.48838    | 35.69                | PK2 | 40.2               | -23.6                  | 0            | 52.29                      | -                  | -           | 74                  | -21.71         | 268            | 268         | V        |
|        | *** 15.48707    | 22.2                 | ADV | 40.1               | -23.6                  | .61          | 39.31                      | 54                 | -14.69      | -                   | -              | 268            | 268         | V        |
| 2      | 5.55098         | 37.14                | Pk  | 34.5               | -32.3                  | 0            | 39.34                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 9      | 5.55098         | 40.83                | Pk  | 34.5               | -32.3                  | 0            | 43.03                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |
| 3      | 7.1369          | 34.36                | Pk  | 35.7               | -30                    | 0            | 40.06                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 10     | 7.1369          | 36.86                | Pk  | 35.7               | -30                    | 0            | 42.56                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |
| 4      | 7.2319          | 34.69                | Pk  | 35.6               | -29.6                  | 0            | 40.69                      | -                  | -           | -                   | -              | 0-360          | 198         | H        |
| 11     | 7.24274         | 38.16                | Pk  | 35.6               | -29.6                  | 0            | 44.16                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |

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

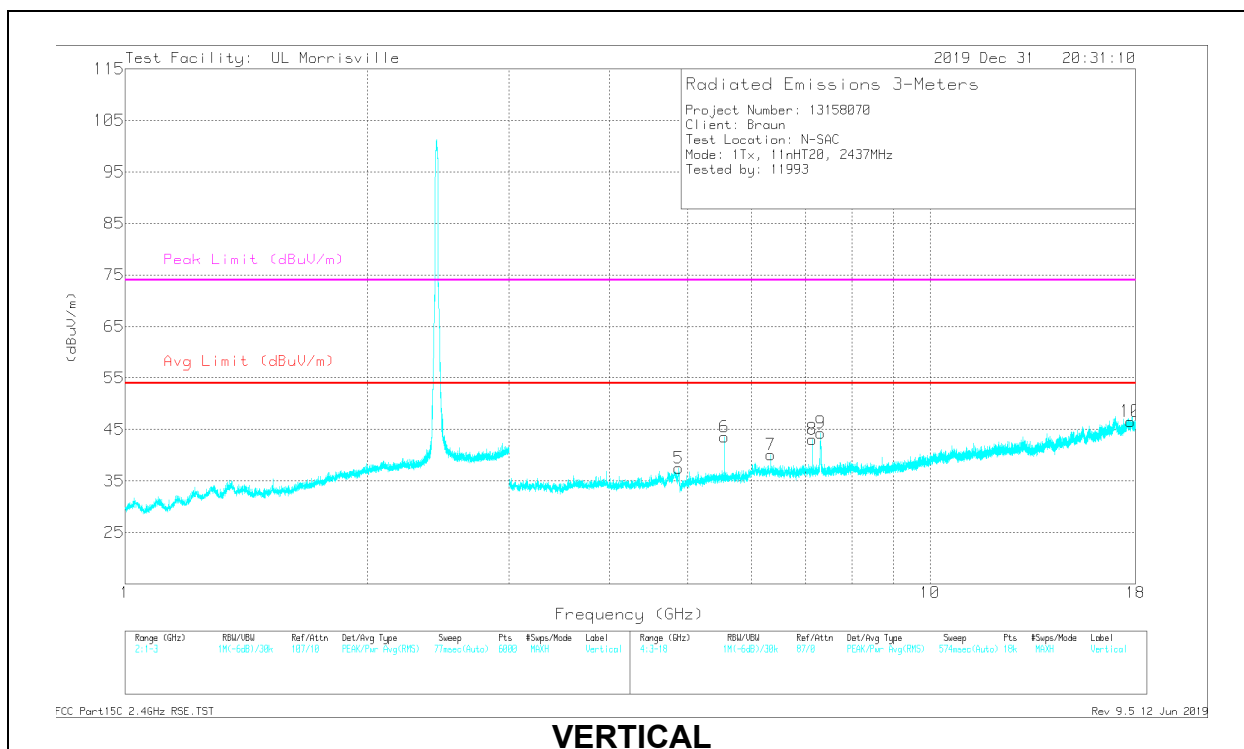
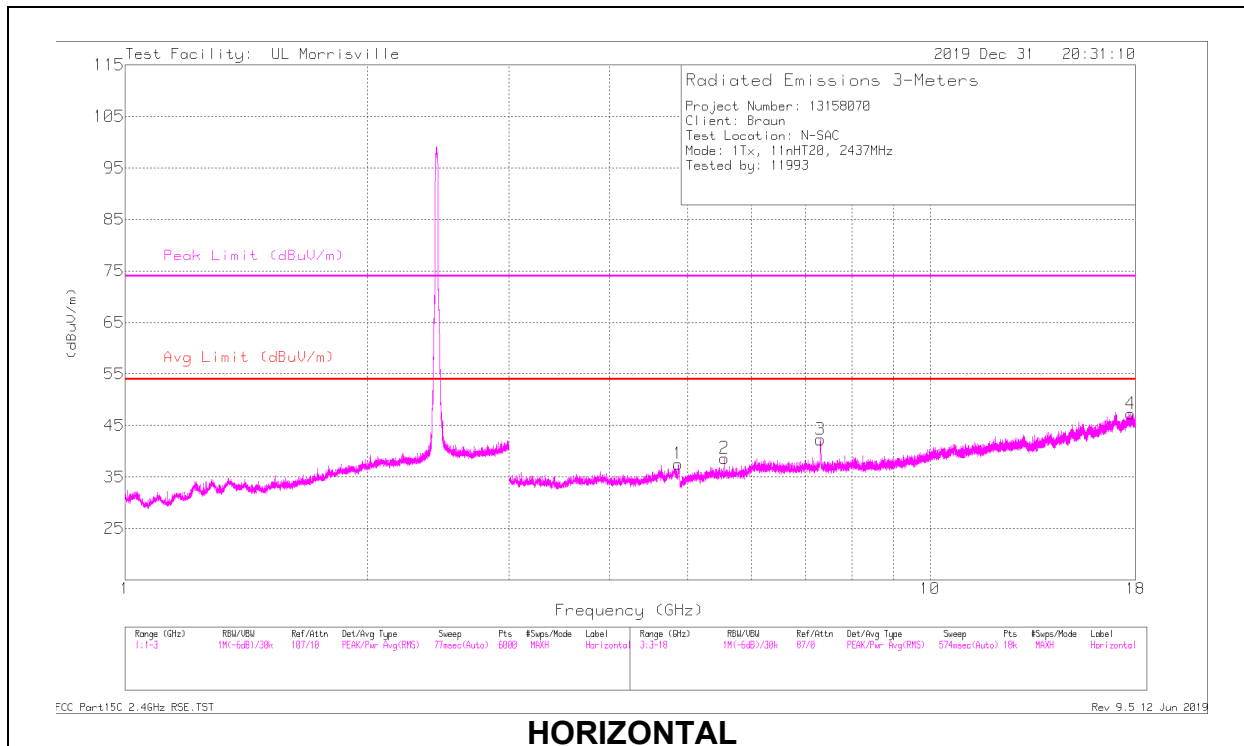
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

ADV - Linear Voltage Average

Pk - Peak detector

## MID CHANNEL, CH 6 RESULTS



## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0067 AF (dBuV/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|--------------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | *** 4.86888     | 41.69                | PK2 | 34                 | -31.4                  | 0            | 44.29                      | -                  | -           | 74                  | -29.71         | 41             | 113         | H        |
|        | *** 4.86878     | 28.32                | ADV | 34                 | -31.4                  | .61          | 31.53                      | 54                 | -22.47      | -                   | -              | 41             | 113         | H        |
| 3      | *** 7.30824     | 45.29                | PK2 | 35.6               | -29.1                  | 0            | 51.79                      | -                  | -           | 74                  | -22.21         | 86             | 128         | H        |
|        | *** 7.30728     | 29.21                | ADV | 35.6               | -29.1                  | .61          | 36.32                      | 54                 | -17.68      | -                   | -              | 86             | 128         | H        |
| 4      | *** 17.76174    | 34.39                | PK2 | 41.1               | -22.8                  | 0            | 52.69                      | -                  | -           | 74                  | -21.31         | 318            | 236         | H        |
|        | *** 17.76129    | 21.67                | ADV | 41.1               | -22.8                  | .61          | 40.58                      | 54                 | -13.42      | -                   | -              | 318            | 236         | H        |
| 5      | *** 4.87448     | 43.48                | PK2 | 34                 | -31.3                  | 0            | 46.18                      | -                  | -           | 74                  | -27.82         | 310            | 119         | V        |
|        | *** 4.87424     | 29.71                | ADV | 34                 | -31.3                  | .61          | 33.02                      | 54                 | -20.98      | -                   | -              | 310            | 119         | V        |
| 9      | *** 7.31621     | 46.45                | PK2 | 35.6               | -29.1                  | 0            | 52.95                      | -                  | -           | 74                  | -21.05         | 74             | 157         | V        |
|        | *** 7.31691     | 29.77                | ADV | 35.6               | -29.1                  | .61          | 36.88                      | 54                 | -17.12      | -                   | -              | 74             | 157         | V        |
| 10     | *** 17.74761    | 34.34                | PK2 | 41.1               | -23                    | 0            | 52.44                      | -                  | -           | 74                  | -21.56         | 212            | 175         | V        |
|        | *** 17.74564    | 21.77                | ADV | 41.1               | -23                    | .61          | 40.48                      | 54                 | -13.52      | -                   | -              | 212            | 175         | V        |
| 2      | 5.55098         | 36.43                | Pk  | 34.5               | -32.3                  | 0            | 38.63                      | -                  | -           | -                   | -              | 0-360          | 198         | H        |
| 6      | 5.55098         | 41.35                | Pk  | 34.5               | -32.3                  | 0            | 43.55                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 7      | 6.34352         | 34.39                | Pk  | 35.5               | -29.8                  | 0            | 40.09                      | -                  | -           | -                   | -              | 0-360          | 198         | V        |
| 8      | 7.1369          | 37.37                | Pk  | 35.7               | -30                    | 0            | 43.07                      | -                  | -           | -                   | -              | 0-360          | 102         | V        |
| 2      | 5.55098         | 36.43                | Pk  | 34.5               | -32.3                  | 0            | 38.63                      | -                  | -           | -                   | -              | 0-360          | 198         | H        |

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

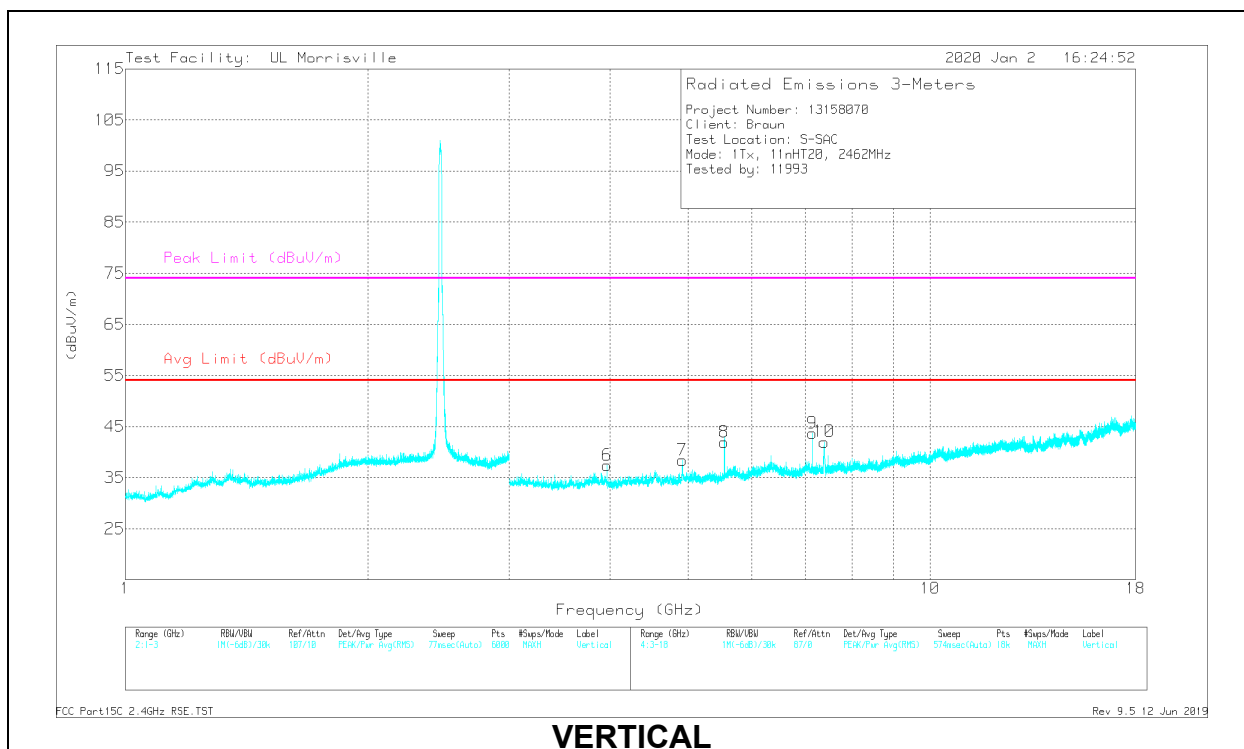
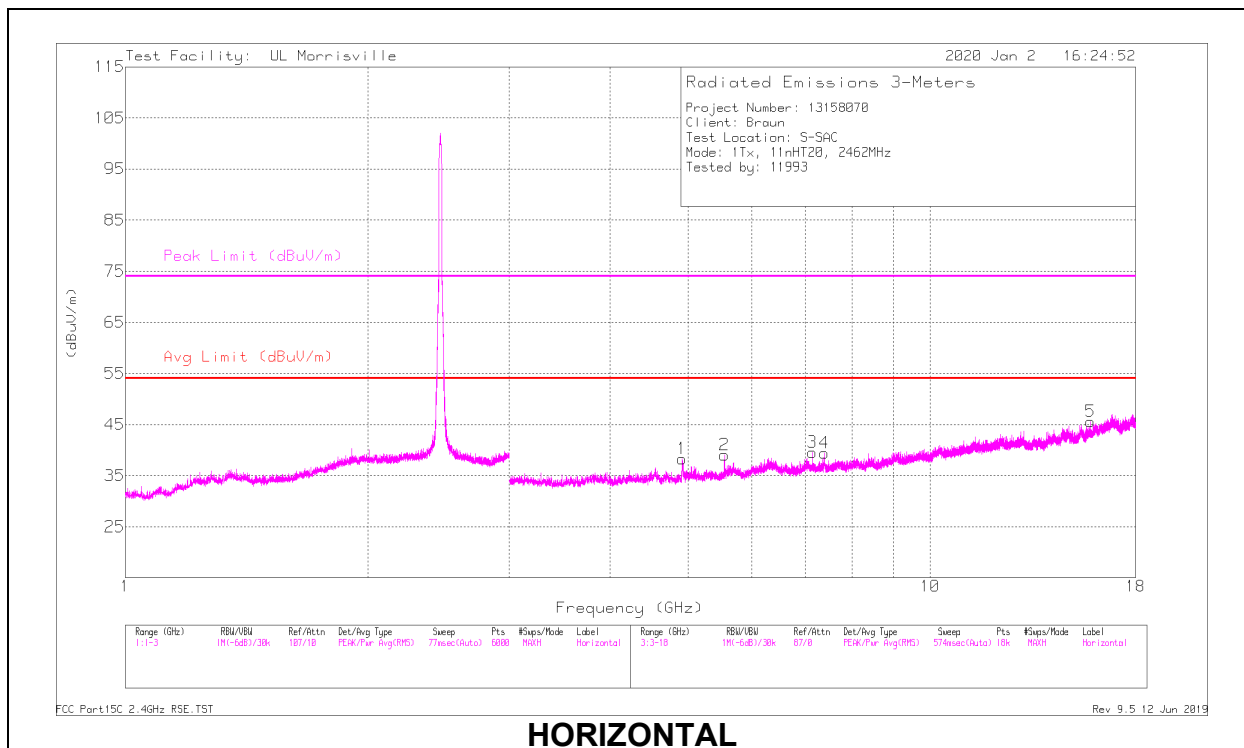
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

ADV - Linear Voltage Average

Pk - Peak detector

## HIGH CHANNEL, CH 11 RESULTS





## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | *** 4.92041     | 43.94                | PK2 | 34            | -30.8                  | 0            | 47.14                      | -                  | -           | 74                  | -26.86         | 74             | 102         | H        |
|        | *** 4.92185     | 29.04                | ADV | 34            | -30.8                  | .61          | 32.85                      | 54                 | -21.15      | -                   | -              | 74             | 102         | H        |
| 4      | *** 7.38578     | 39.13                | PK2 | 35.7          | -27.6                  | 0            | 47.23                      | -                  | -           | 74                  | -26.77         | 186            | 279         | H        |
|        | *** 7.38574     | 24.86                | ADV | 35.7          | -27.6                  | .61          | 33.57                      | 54                 | -20.43      | -                   | -              | 186            | 279         | H        |
| 5      | *** 15.82372    | 33.97                | PK2 | 40.4          | -23.2                  | 0            | 51.17                      | -                  | -           | 74                  | -22.83         | 0              | 266         | H        |
|        | *** 15.82459    | 21.28                | ADV | 40.4          | -23.2                  | .61          | 39.09                      | 54                 | -14.91      | -                   | -              | 0              | 266         | H        |
| 6      | *** 3.96493     | 44.39                | PK2 | 33.4          | -31.5                  | 0            | 46.29                      | -                  | -           | 74                  | -27.71         | 230            | 180         | V        |
|        | *** 3.965       | 31.8                 | ADV | 33.4          | -31.5                  | .61          | 34.31                      | 54                 | -19.69      | -                   | -              | 230            | 180         | V        |
| 7      | *** 4.92408     | 42.18                | PK2 | 34            | -30.8                  | 0            | 45.38                      | -                  | -           | 74                  | -28.62         | 120            | 315         | V        |
|        | *** 4.92378     | 28.77                | ADV | 34            | -30.8                  | .61          | 32.58                      | 54                 | -21.42      | -                   | -              | 120            | 315         | V        |
| 10     | *** 7.38414     | 42.75                | PK2 | 35.7          | -27.6                  | 0            | 50.85                      | -                  | -           | 74                  | -23.15         | 186            | 171         | V        |
|        | *** 7.38478     | 26.98                | ADV | 35.7          | -27.6                  | .61          | 35.69                      | 54                 | -18.31      | -                   | -              | 186            | 171         | V        |
| 8      | 5.55014         | 38.13                | Pk  | 34.5          | -30.7                  | 0            | 41.93                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |
| 2      | 5.55098         | 35.21                | Pk  | 34.5          | -30.7                  | 0            | 39.01                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 3      | 7.13607         | 32.34                | Pk  | 35.7          | -28.5                  | 0            | 39.54                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 9      | 7.1369          | 36.51                | Pk  | 35.7          | -28.5                  | 0            | 43.71                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |

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

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

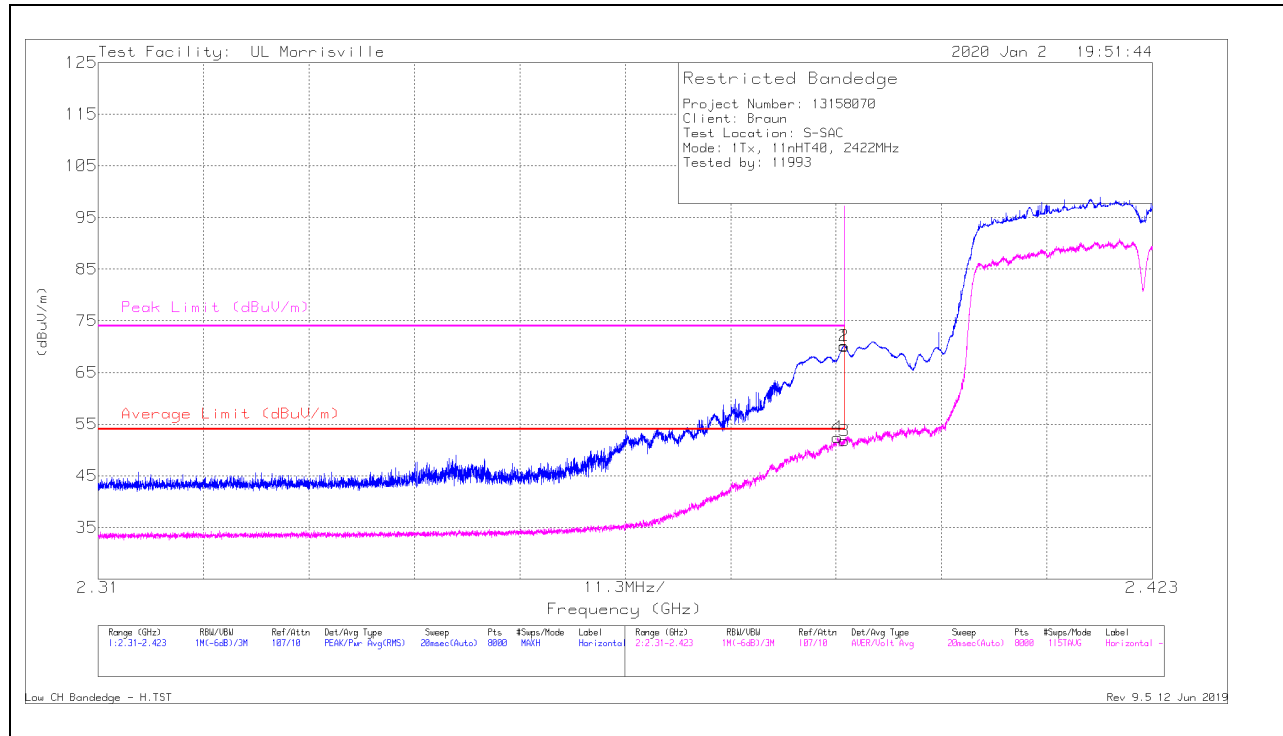
ADV - Linear Voltage Average

Pk - Peak detector

## 9.1.4. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 2.4 GHz BAND

### BANDEDGE (LOW CHANNEL, CH 1)

#### HORIZONTAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.38999    | 62.14                | Pk  | 31.9          | -24                    | 0            | 70.04                      | -                      | -           | 74                  | -3.96          | 202            | 104         | H        |
| 2      | * ** 2.38993    | 62.27                | Pk  | 31.9          | -24                    | 0            | 70.17                      | -                      | -           | 74                  | -3.83          | 202            | 104         | H        |
| 3      | * ** 2.38999    | 42.59                | ADV | 31.9          | -24                    | 1.28         | 51.77                      | 54                     | -2.23       | -                   | -              | 202            | 104         | H        |
| 4      | * ** 2.38924    | 43.26                | ADV | 31.9          | -24                    | 1.28         | 52.44                      | 54                     | -1.56       | -                   | -              | 202            | 104         | H        |

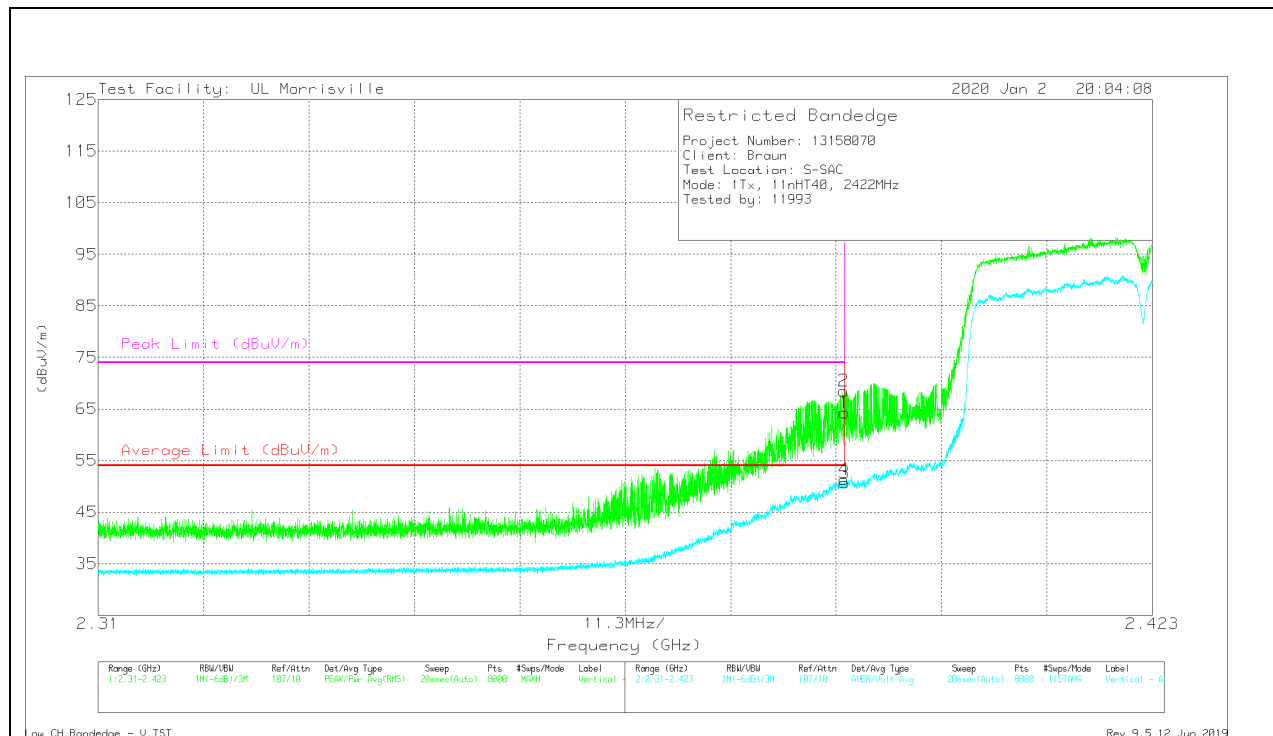
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/Fitr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|-----------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.38999    | 56.38                | Pk  | 31.9          | -24                   | 0            | 64.28                      | -                      | -           | 74                  | -9.72          | 205            | 133         | V        |
| 2      | * ** 2.38992    | 60.61                | Pk  | 31.9          | -24                   | 0            | 68.51                      | -                      | -           | 74                  | -5.49          | 205            | 133         | V        |
| 3      | * ** 2.38999    | 41.52                | ADV | 31.9          | -24                   | 1.28         | 50.7                       | 54                     | -3.3        | -                   | -              | 205            | 133         | V        |
| 4      | * ** 2.38993    | 42.14                | ADV | 31.9          | -24                   | 1.28         | 51.32                      | 54                     | -2.68       | -                   | -              | 205            | 133         | V        |

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

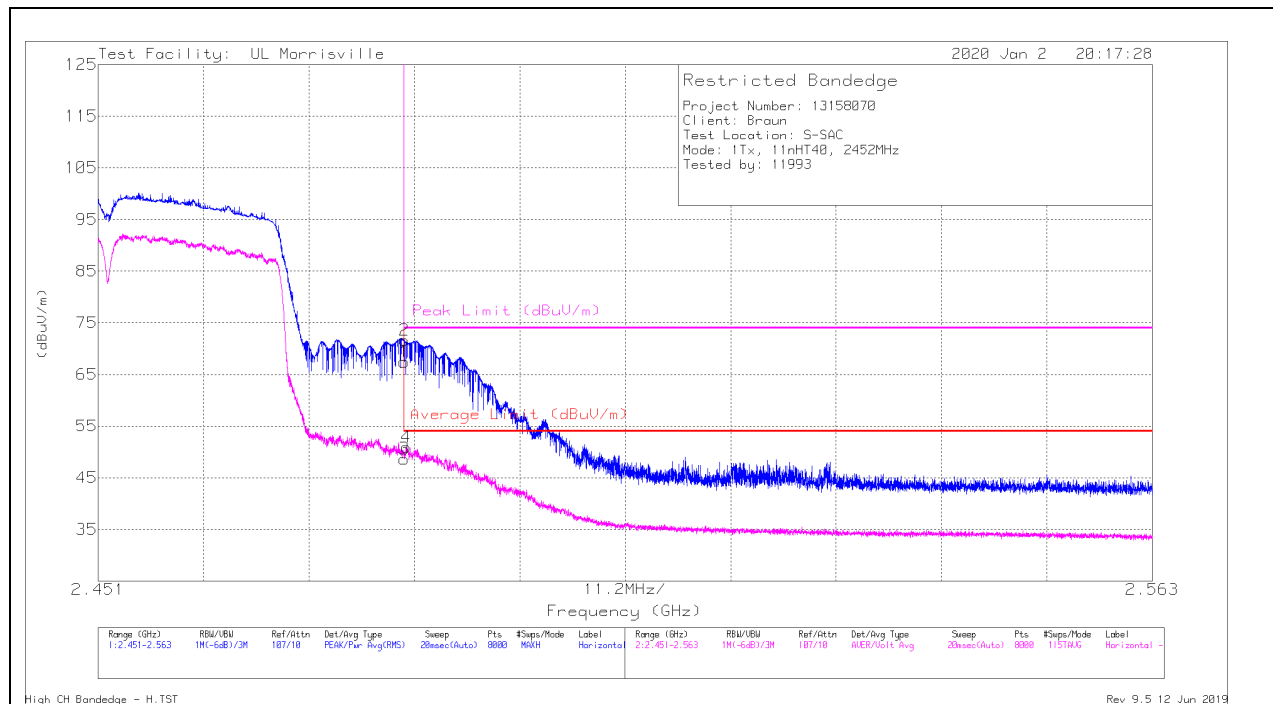
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## BANDEDGE (HIGH CHANNEL, CH 11)

### HORIZONTAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.48351    | 59.65                | Pk  | 32.3          | -24.5                  | 0            | 67.45                      | -                      | -           | 74                  | -6.55          | 216            | 136         | H        |
| 2      | * ** 2.48354    | 63.83                | Pk  | 32.3          | -24.5                  | 0            | 71.63                      | -                      | -           | 74                  | -2.37          | 216            | 136         | H        |
| 3      | * ** 2.48351    | 39.55                | ADV | 32.3          | -24.5                  | 1.28         | 48.63                      | 54                     | -5.37       | -                   | -              | 216            | 136         | H        |
| 4      | * ** 2.48375    | 41.84                | ADV | 32.3          | -24.5                  | 1.28         | 50.92                      | 54                     | -3.08       | -                   | -              | 216            | 136         | H        |

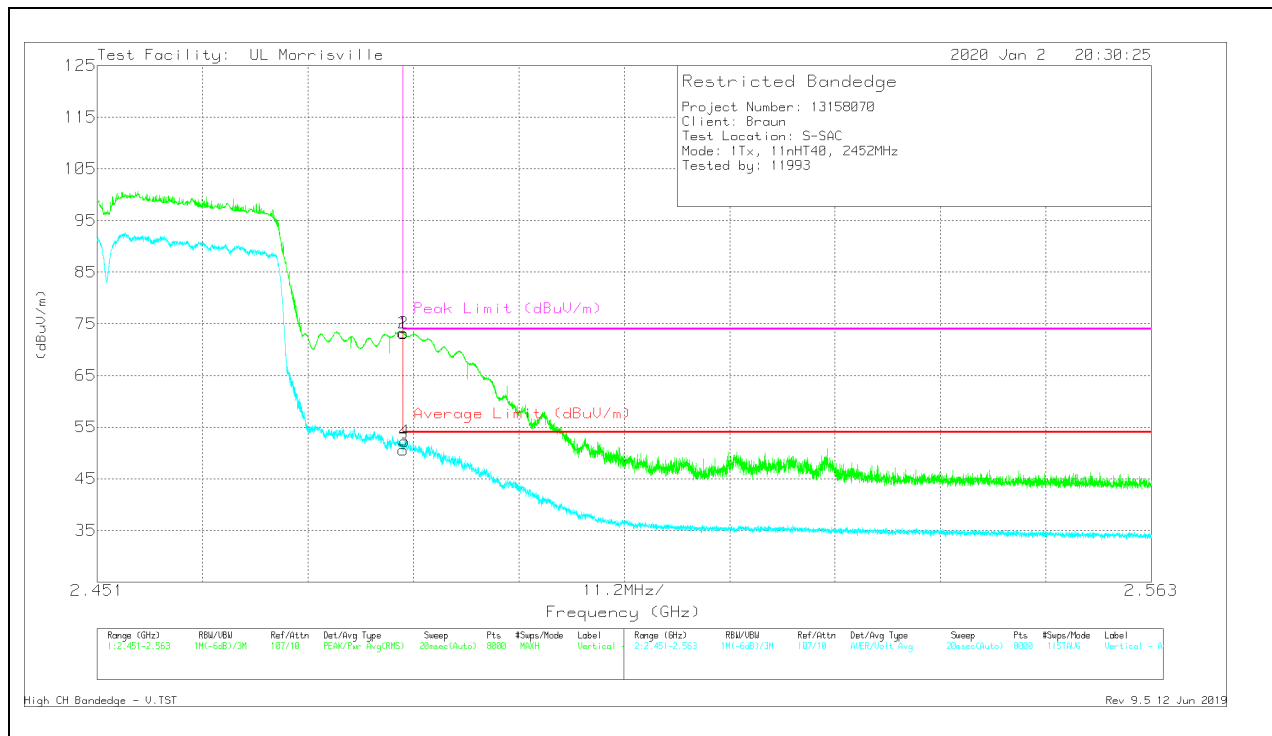
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## VERTICAL RESULT



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 2.48351    | 65.39                | Pk  | 32.3          | -24.5                  | 0            | 73.19                      | -                      | -           | 74                  | -.81           | 199            | 140         | V        |
| 2      | * ** 2.48354    | 65.35                | Pk  | 32.3          | -24.5                  | 0            | 73.15                      | -                      | -           | 74                  | -.85           | 199            | 140         | V        |
| 3      | * ** 2.48351    | 41.53                | ADV | 32.3          | -24.5                  | 1.28         | 50.61                      | 54                     | -3.39       | -                   | -              | 199            | 140         | V        |
| 4      | * ** 2.4837     | 43.18                | ADV | 32.3          | -24.5                  | 1.28         | 52.26                      | 54                     | -1.74       | -                   | -              | 199            | 140         | V        |

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

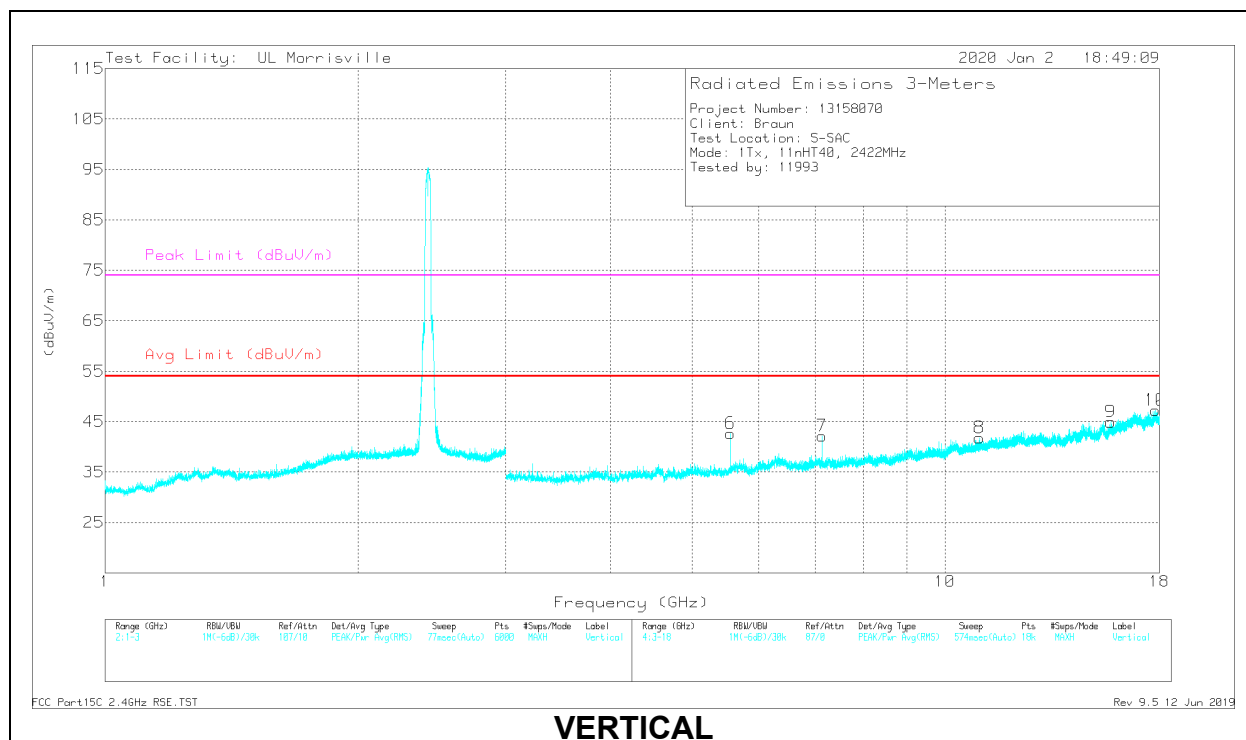
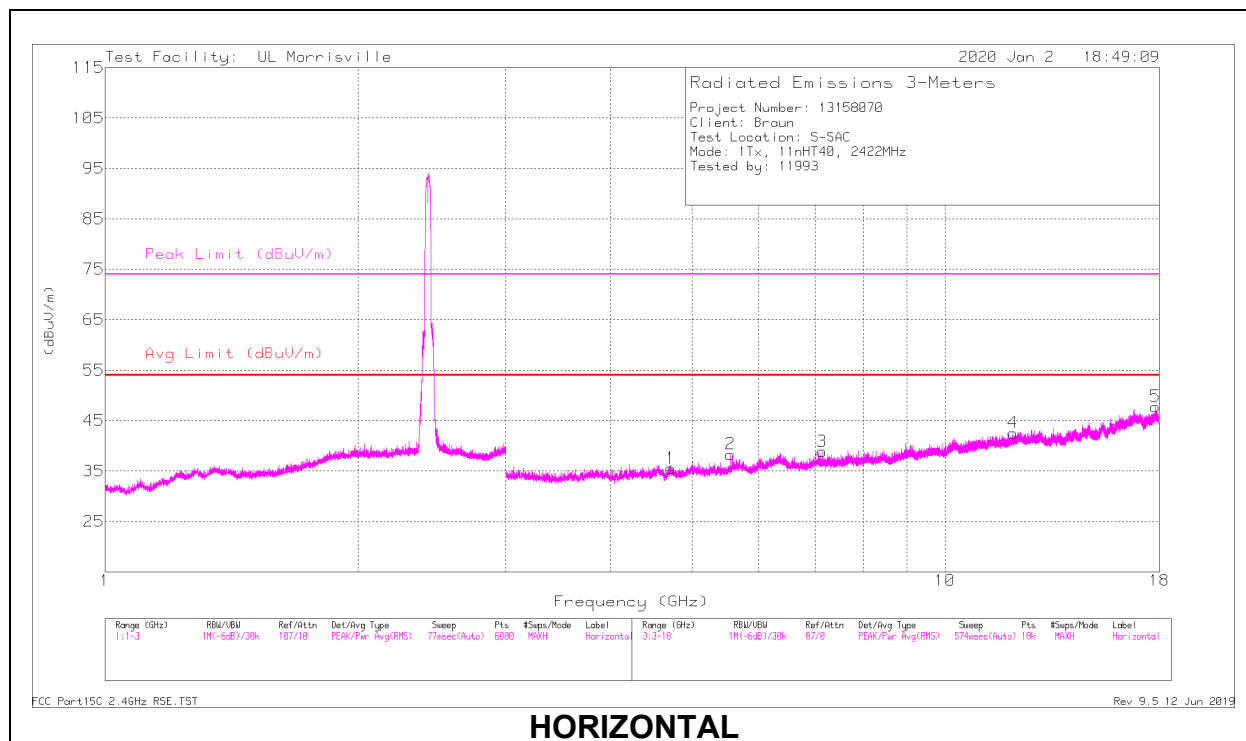
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

ADV - Linear Voltage Average

## HARMONICS AND SPURIOUS EMISSIONS

### LOW CHANNEL, CH 1 RESULTS



## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * ** 4.72106    | 39.08                | PK2 | 34            | -31.5                  | 0            | 41.58                      | -                  | -           | 74                  | -32.42         | 234            | 298         | H        |
|        | * ** 4.71784    | 26.22                | ADV | 34            | -31.5                  | 1.28         | 30                         | 54                 | -24         | -                   | -              | 234            | 298         | H        |
| 4      | * ** 12.05404   | 33.19                | PK2 | 38.7          | -23.7                  | 0            | 48.19                      | -                  | -           | 74                  | -25.81         | 285            | 276         | H        |
|        | * ** 12.05343   | 20.74                | ADV | 38.7          | -23.7                  | 1.28         | 37.02                      | 54                 | -16.98      | -                   | -              | 285            | 276         | H        |
| 5      | * ** 17.80374   | 33.84                | PK2 | 41.2          | -20.9                  | 0            | 54.14                      | -                  | -           | 74                  | -19.86         | 238            | 200         | H        |
|        | * ** 17.80387   | 20.04                | ADV | 41.2          | -20.9                  | 1.28         | 41.62                      | 54                 | -12.38      | -                   | -              | 238            | 200         | H        |
| 8      | * ** 10.99058   | 33.79                | PK2 | 37.9          | -24.1                  | 0            | 47.59                      | -                  | -           | 74                  | -26.41         | 198            | 139         | V        |
|        | * ** 10.98827   | 21.22                | ADV | 37.9          | -24.1                  | 1.28         | 36.3                       | 54                 | -17.7       | -                   | -              | 198            | 139         | V        |
| 9      | * ** 15.74836   | 33.82                | PK2 | 40.3          | -22.2                  | 0            | 51.92                      | -                  | -           | 74                  | -22.08         | 158            | 236         | V        |
|        | * ** 15.74812   | 20.64                | ADV | 40.3          | -22.2                  | 1.28         | 40.02                      | 54                 | -13.98      | -                   | -              | 158            | 236         | V        |
| 10     | * ** 17.81047   | 32.68                | PK2 | 41.2          | -20.8                  | 0            | 53.08                      | -                  | -           | 74                  | -20.92         | 4              | 117         | V        |
|        | * ** 17.81292   | 20.25                | ADV | 41.2          | -20.8                  | 1.28         | 41.93                      | 54                 | -12.07      | -                   | -              | 4              | 117         | V        |
| 2      | 5.55098         | 34.54                | Pk  | 34.5          | -30.7                  | 0            | 38.34                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 6      | 5.55098         | 38.88                | Pk  | 34.5          | -30.7                  | 0            | 42.68                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |
| 3      | 7.1369          | 31.67                | Pk  | 35.7          | -28.5                  | 0            | 38.87                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 7      | 7.1369          | 34.98                | Pk  | 35.7          | -28.5                  | 0            | 42.18                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |

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

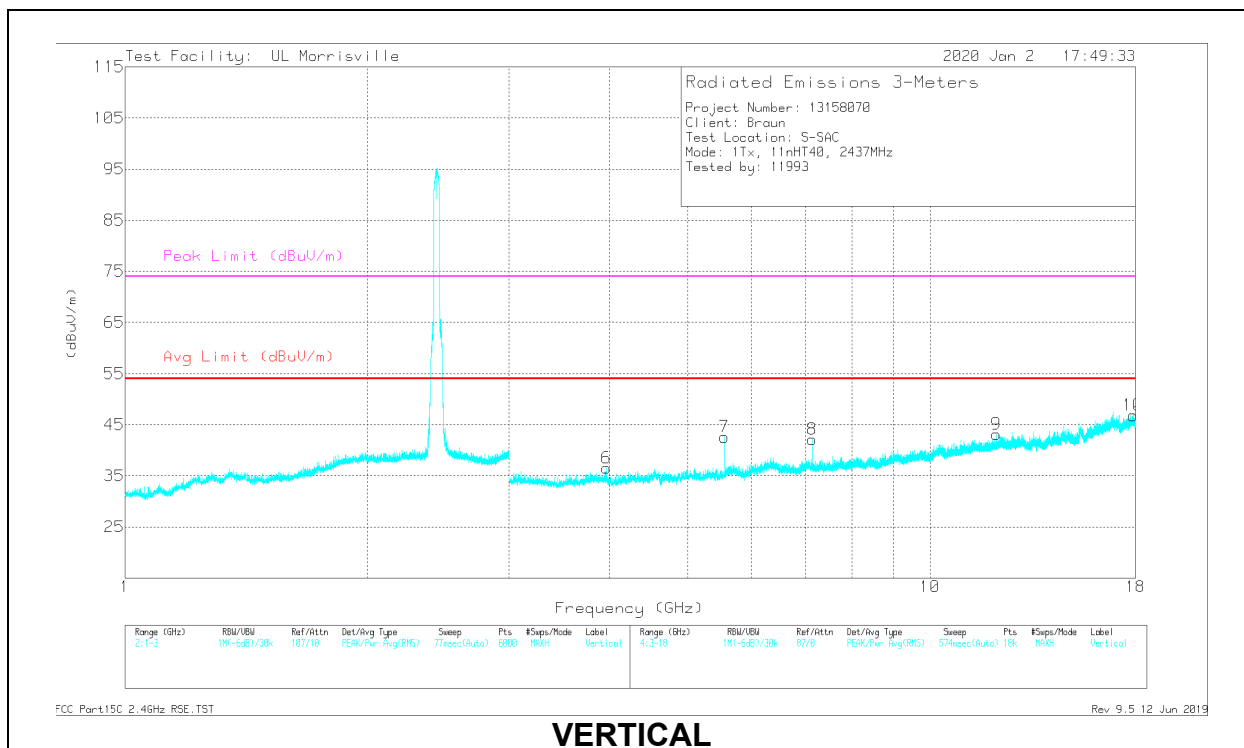
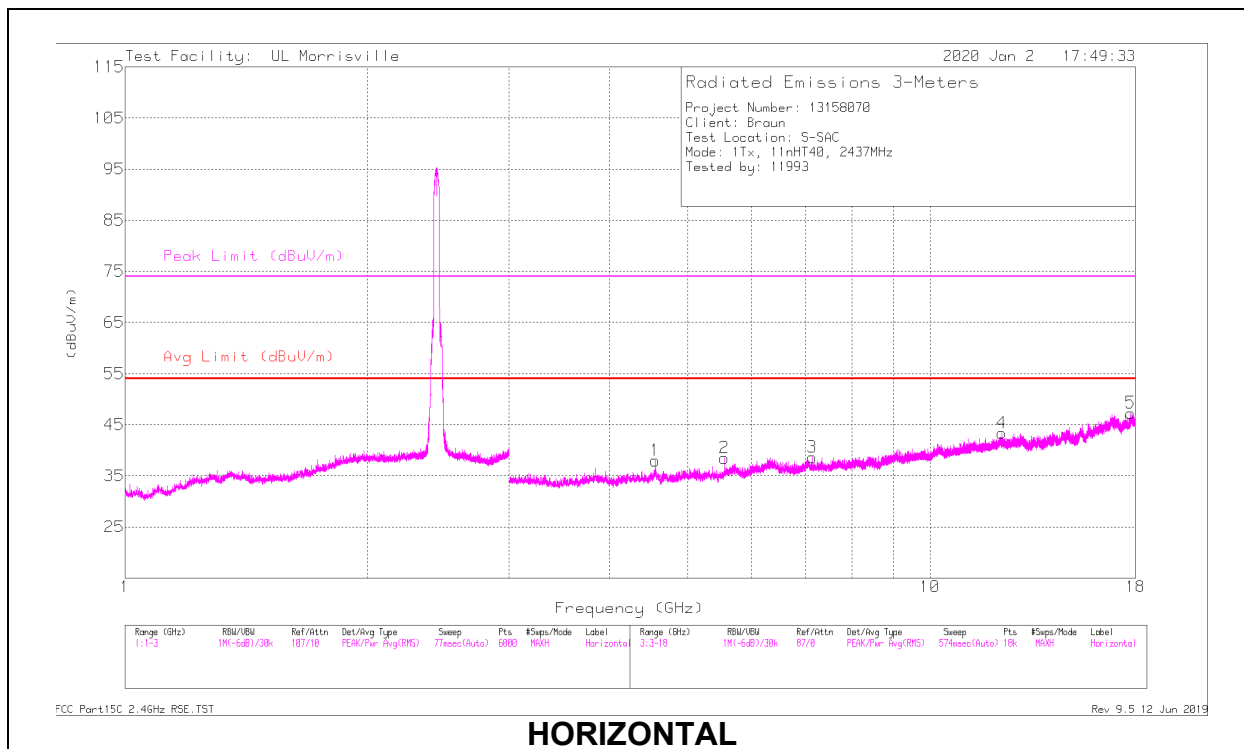
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

ADV - Linear Voltage Average

Pk - Peak detector

## MID CHANNEL, CH 6 RESULTS





## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | *** 4.55786     | 40.28                | PK2 | 34.1          | -31.3                  | 0            | 43.08                      | -                  | -           | 74                  | -30.92         | 329            | 186         | H        |
|        | *** 4.55801     | 27.07                | ADV | 34.1          | -31.3                  | 1.28         | 31.15                      | 54                 | -22.85      | -                   | -              | 329            | 186         | H        |
| 4      | *** 12.27873    | 34.22                | PK2 | 38.9          | -23.7                  | 0            | 49.42                      | -                  | -           | 74                  | -24.58         | 62             | 236         | H        |
|        | *** 12.27888    | 21.25                | ADV | 38.9          | -23.7                  | 1.28         | 37.73                      | 54                 | -16.27      | -                   | -              | 62             | 236         | H        |
| 5      | *** 17.75261    | 34.06                | PK2 | 41.3          | -21.5                  | 0            | 53.86                      | -                  | -           | 74                  | -20.14         | 180            | 261         | H        |
|        | *** 17.75242    | 20.99                | ADV | 41.3          | -21.5                  | 1.28         | 42.07                      | 54                 | -11.93      | -                   | -              | 180            | 261         | H        |
| 6      | *** 3.96508     | 40.91                | PK2 | 33.4          | -31.5                  | 0            | 42.81                      | -                  | -           | 74                  | -31.19         | 232            | 254         | V        |
|        | *** 3.9651      | 30.68                | ADV | 33.4          | -31.5                  | 1.28         | 33.86                      | 54                 | -20.14      | -                   | -              | 232            | 254         | V        |
| 9      | *** 12.08585    | 34.18                | PK2 | 38.8          | -23.7                  | 0            | 49.28                      | -                  | -           | 74                  | -24.72         | 167            | 242         | V        |
|        | *** 12.08683    | 20.75                | ADV | 38.8          | -23.7                  | 1.28         | 37.13                      | 54                 | -16.87      | -                   | -              | 167            | 242         | V        |
| 10     | *** 17.87087    | 32.57                | PK2 | 41.2          | -20.6                  | 0            | 53.17                      | -                  | -           | 74                  | -20.83         | 2              | 246         | V        |
|        | *** 17.87038    | 20.3                 | ADV | 41.2          | -20.6                  | 1.28         | 42.18                      | 54                 | -11.82      | -                   | -              | 2              | 246         | V        |
| 2      | 5.55098         | 34.68                | Pk  | 34.5          | -30.7                  | 0            | 38.48                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 7      | 5.55098         | 38.8                 | Pk  | 34.5          | -30.7                  | 0            | 42.6                       | -                  | -           | -                   | -              | 0-360          | 101         | V        |
| 3      | 7.1369          | 31.41                | Pk  | 35.7          | -28.5                  | 0            | 38.61                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 8      | 7.1369          | 34.92                | Pk  | 35.7          | -28.5                  | 0            | 42.12                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |

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

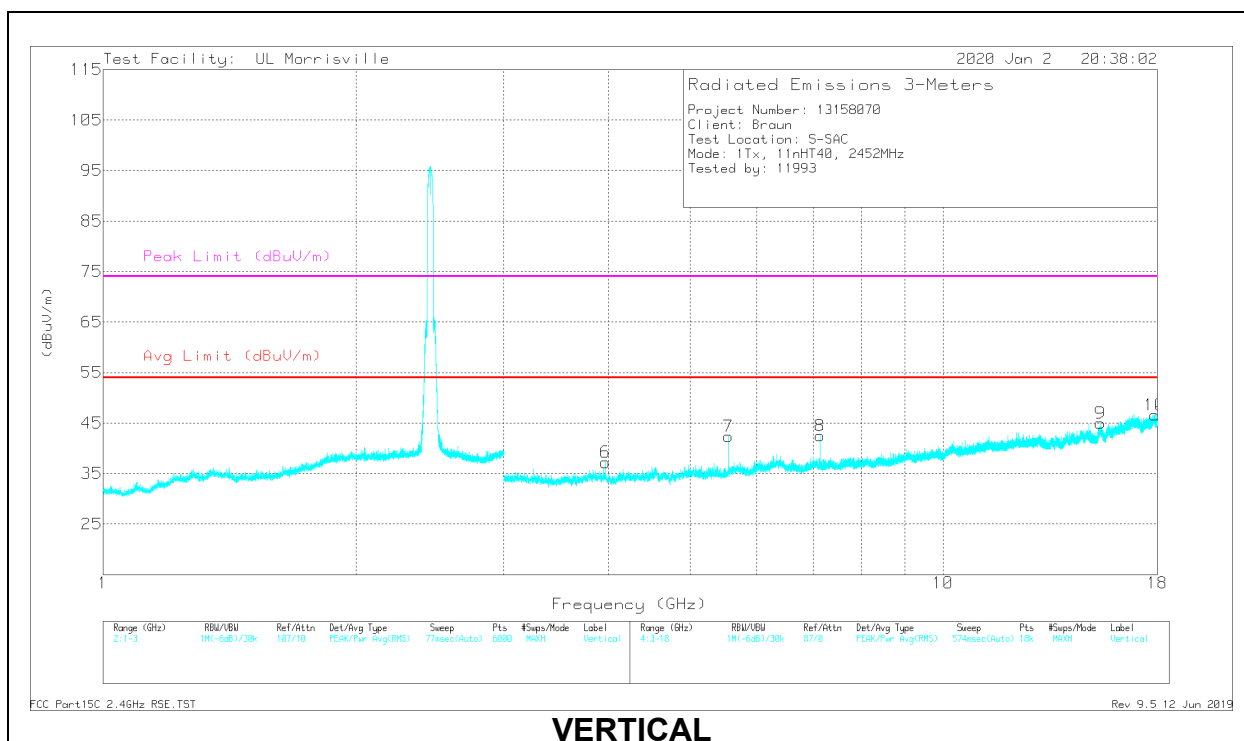
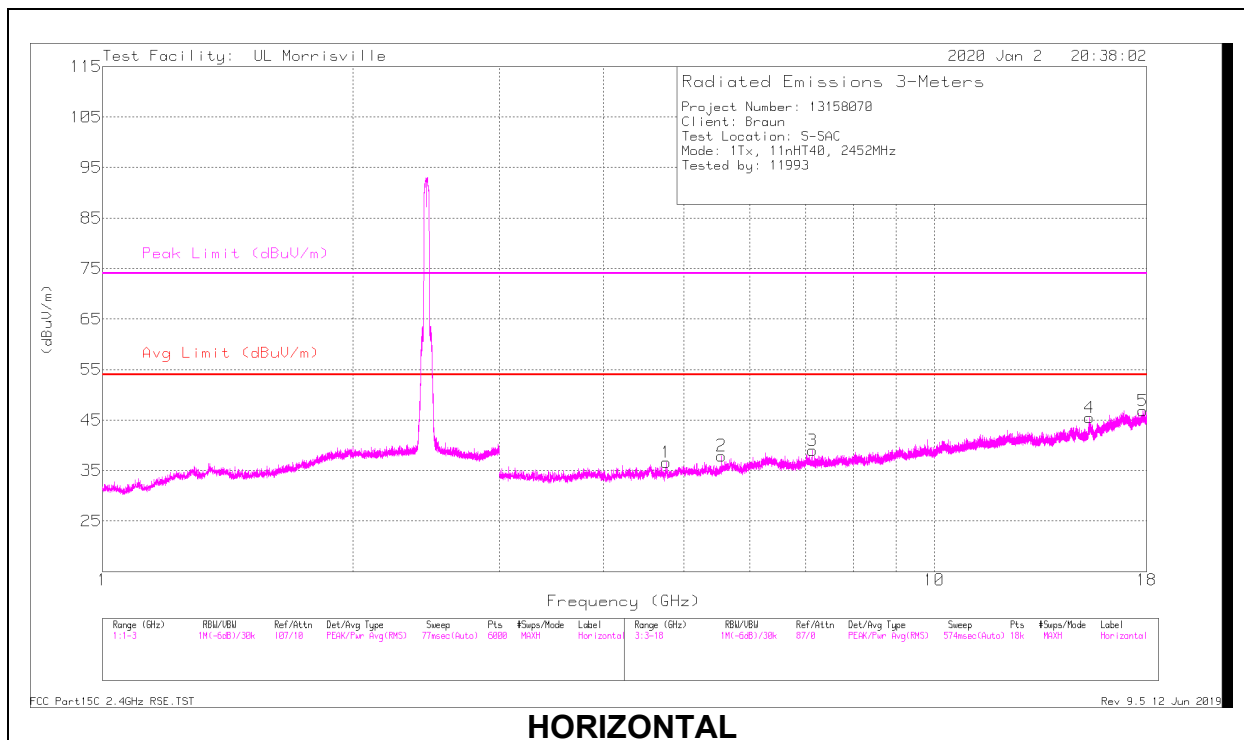
\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

ADV - Linear Voltage Average

Pk - Peak detector

## HIGH CHANNEL, CH 11 RESULTS



## RADIATED EMISSIONS

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0072 (dB/m) | Amp/Cbl/Filtr/Pad (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|---------------|------------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | *** 4.75788     | 39.41                | PK2 | 34.1          | -31.4                  | 0            | 42.11                      | -                  | -           | 74                  | -31.89         | 28             | 104         | H        |
|        | *** 4.75813     | 27.3                 | ADV | 34.1          | -31.4                  | 1.28         | 31.28                      | 54                 | -22.72      | -                   | -              | 28             | 104         | H        |
| 4      | *** 15.35722    | 33.45                | PK2 | 39.9          | -22.2                  | 0            | 51.15                      | -                  | -           | 74                  | -22.85         | 42             | 251         | H        |
|        | *** 15.36056    | 20.88                | ADV | 39.9          | -22.1                  | 1.28         | 39.96                      | 54                 | -14.04      | -                   | -              | 42             | 251         | H        |
| 5      | *** 17.8078     | 33.17                | PK2 | 41.2          | -20.8                  | 0            | 53.57                      | -                  | -           | 74                  | -20.43         | 17             | 188         | H        |
|        | *** 17.80781    | 20.24                | ADV | 41.2          | -20.8                  | 1.28         | 41.92                      | 54                 | -12.08      | -                   | -              | 17             | 188         | H        |
| 6      | *** 3.96535     | 43.21                | PK2 | 33.4          | -31.5                  | 0            | 45.11                      | -                  | -           | 74                  | -28.89         | 31             | 107         | V        |
|        | *** 3.96492     | 30.5                 | ADV | 33.4          | -31.5                  | 1.28         | 33.68                      | 54                 | -20.32      | -                   | -              | 31             | 107         | V        |
| 9      | *** 15.39857    | 32.3                 | PK2 | 39.9          | -21.3                  | 0            | 50.9                       | -                  | -           | 74                  | -23.1          | 351            | 243         | V        |
|        | *** 15.39702    | 20.25                | ADV | 39.9          | -21.3                  | 1.28         | 40.13                      | 54                 | -13.87      | -                   | -              | 351            | 243         | V        |
| 10     | *** 17.88774    | 32.2                 | PK2 | 41.2          | -20.7                  | 0            | 52.7                       | -                  | -           | 74                  | -21.3          | 329            | 267         | V        |
|        | *** 17.88552    | 20.01                | ADV | 41.2          | -20.7                  | 1.28         | 41.79                      | 54                 | -12.21      | -                   | -              | 329            | 267         | V        |
| 2      | 5.55098         | 34.09                | Pk  | 34.5          | -30.7                  | 0            | 37.89                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 7      | 5.55098         | 38.52                | Pk  | 34.5          | -30.7                  | 0            | 42.32                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |
| 3      | 7.13607         | 31.78                | Pk  | 35.7          | -28.5                  | 0            | 38.98                      | -                  | -           | -                   | -              | 0-360          | 101         | H        |
| 8      | 7.1369          | 35.25                | Pk  | 35.7          | -28.5                  | 0            | 42.45                      | -                  | -           | -                   | -              | 0-360          | 101         | V        |

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

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

PK2 - Maximum Peak

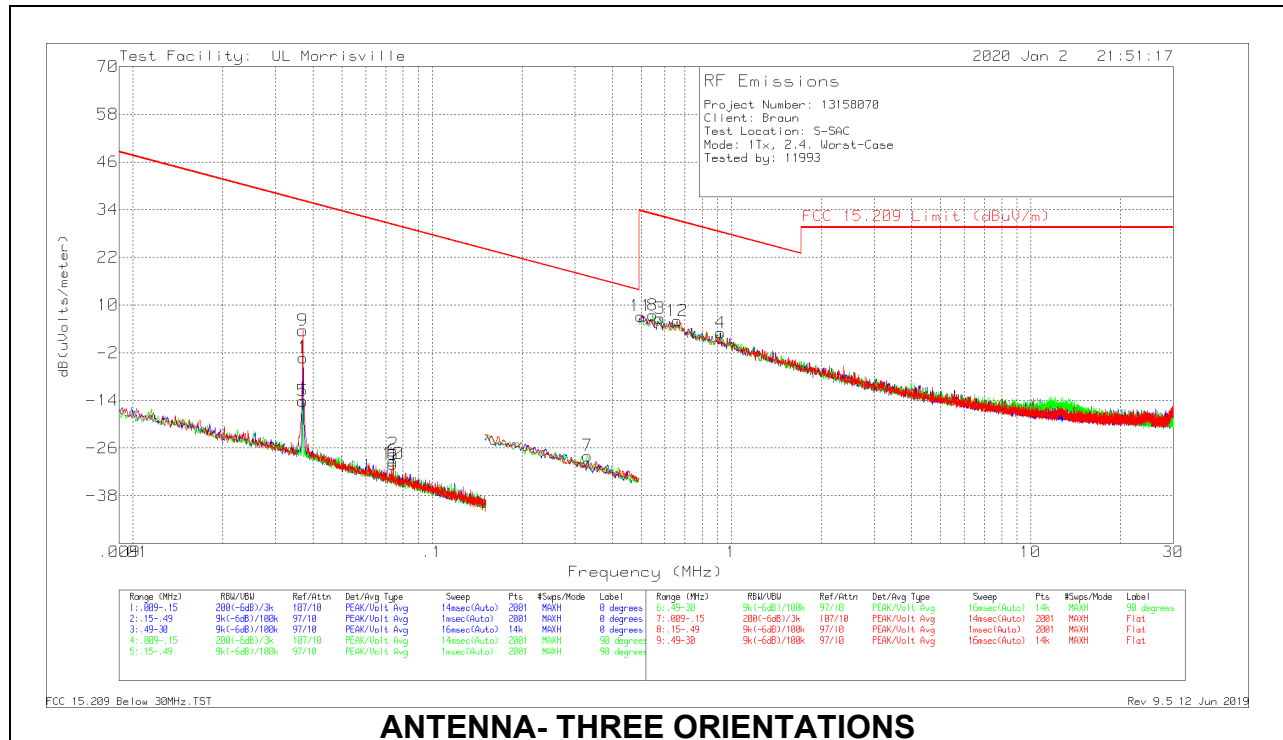
ADV - Linear Voltage Average

Pk - Peak detector

## 9.2. WORST CASE BELOW 30MHZ

**Note:** All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz – 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were  $40 \cdot \log(\text{test distance} / \text{specification distance})$ .

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



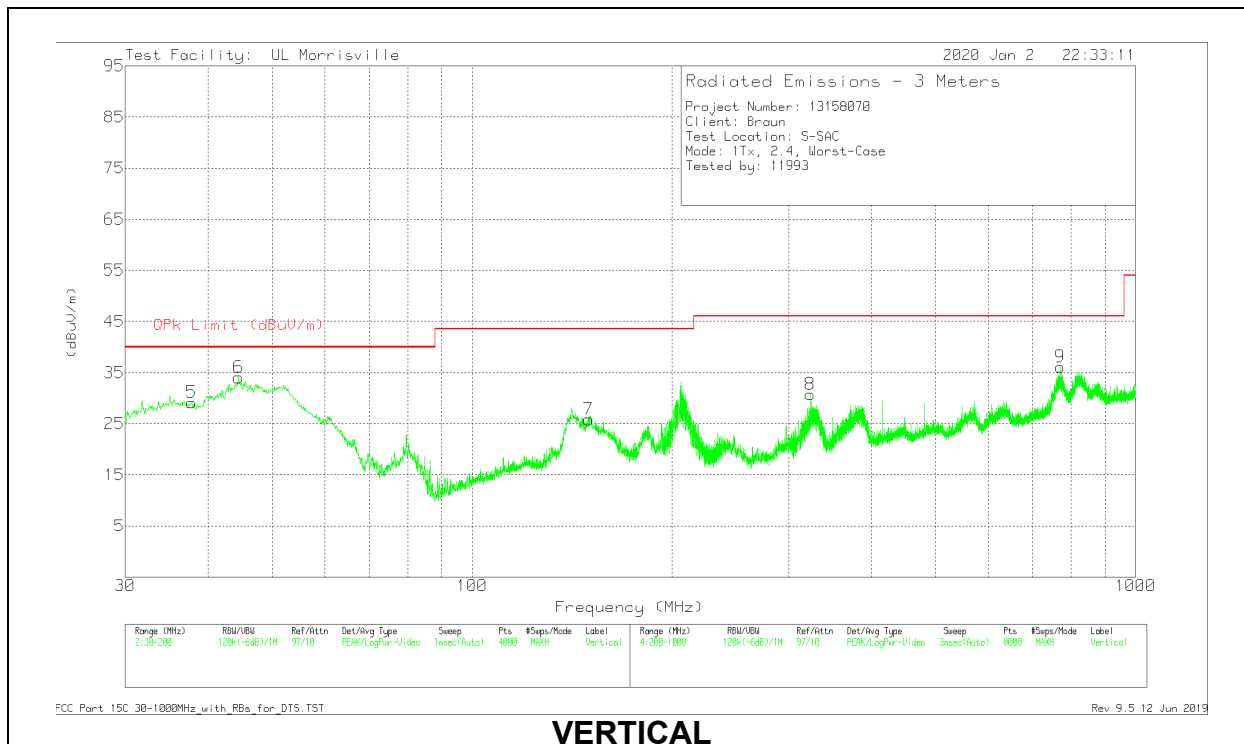
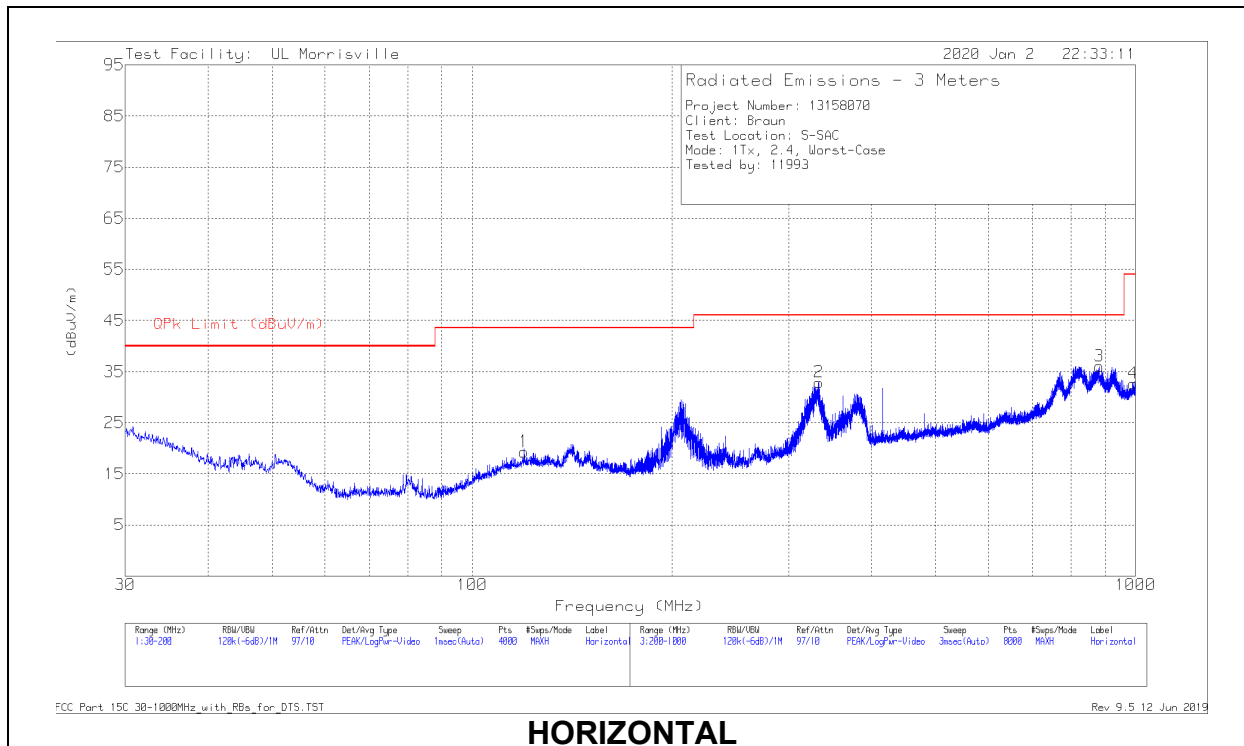
### ANTENNA- THREE ORIENTATIONS

#### Below 30MHz Data

| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AT0079 AF (dB/m) | Cbl (dB) | Dist. Corr. Factor (dB) | Corrected Reading dB(uV/m) | FCC 15.209 QP/AV Limit (dBuV/m) | FCC 15.209 PK Limit (dBuV/m) | Worst-Case Margin (dB) | Antenna Face |
|--------|-----------------|----------------------|-----|------------------|----------|-------------------------|----------------------------|---------------------------------|------------------------------|------------------------|--------------|
| 5      | .03697          | 53.17                | Pk  | 12.6             | .1       | -80                     | -14.13                     | 36.25                           | 56.25                        | -50.38                 | Off          |
| 9      | .03697          | 70.91                | Pk  | 12.6             | .1       | -80                     | 3.61                       | 36.25                           | 56.25                        | -32.64                 | Flat         |
| 1      | .03701          | 64.04                | Pk  | 12.6             | .1       | -80                     | -3.26                      | 36.24                           | 56.24                        | -39.5                  | On           |
| 6      | .07404          | 39.47                | Pk  | 11.2             | .1       | -80                     | -29.23                     | 30.22                           | 50.22                        | -59.45                 | Off          |
| 10     | .07404          | 38.72                | Pk  | 11.2             | .1       | -80                     | -29.98                     | 30.22                           | 50.24                        | -60.2                  | Flat         |
| 2      | .07411          | 41.21                | Pk  | 11.2             | .1       | -80                     | -27.49                     | 30.21                           | 50.21                        | -57.7                  | On           |
| 7      | .33046          | 40.98                | Pk  | 11               | .1       | -80                     | -27.92                     | 17.22                           | 47.22                        | -45.14                 | Off          |
| 11     | .49843          | 36.11                | Pk  | 11               | .1       | -40                     | 7.21                       | 33.65                           | -                            | -26.44                 | Flat         |
| 8      | .54586          | 36.33                | Pk  | 11               | .1       | -40                     | 7.43                       | 32.86                           | -                            | -25.43                 | Off          |
| 3      | .57748          | 35.56                | Pk  | 11               | .1       | -40                     | 6.66                       | 32.37                           | -                            | -25.71                 | On           |
| 12     | .65864          | 34.9                 | Pk  | 11               | .1       | -40                     | 6                          | 31.23                           | -                            | -25.23                 | Flat         |
| 4      | .92003          | 31.9                 | Pk  | 11               | .1       | -40                     | 3                          | 28.33                           | -                            | -25.33                 | On           |

Pk - Peak detector

### 9.3. WORST CASE BELOW 1 GHZ



**Below 1GHz DATA**

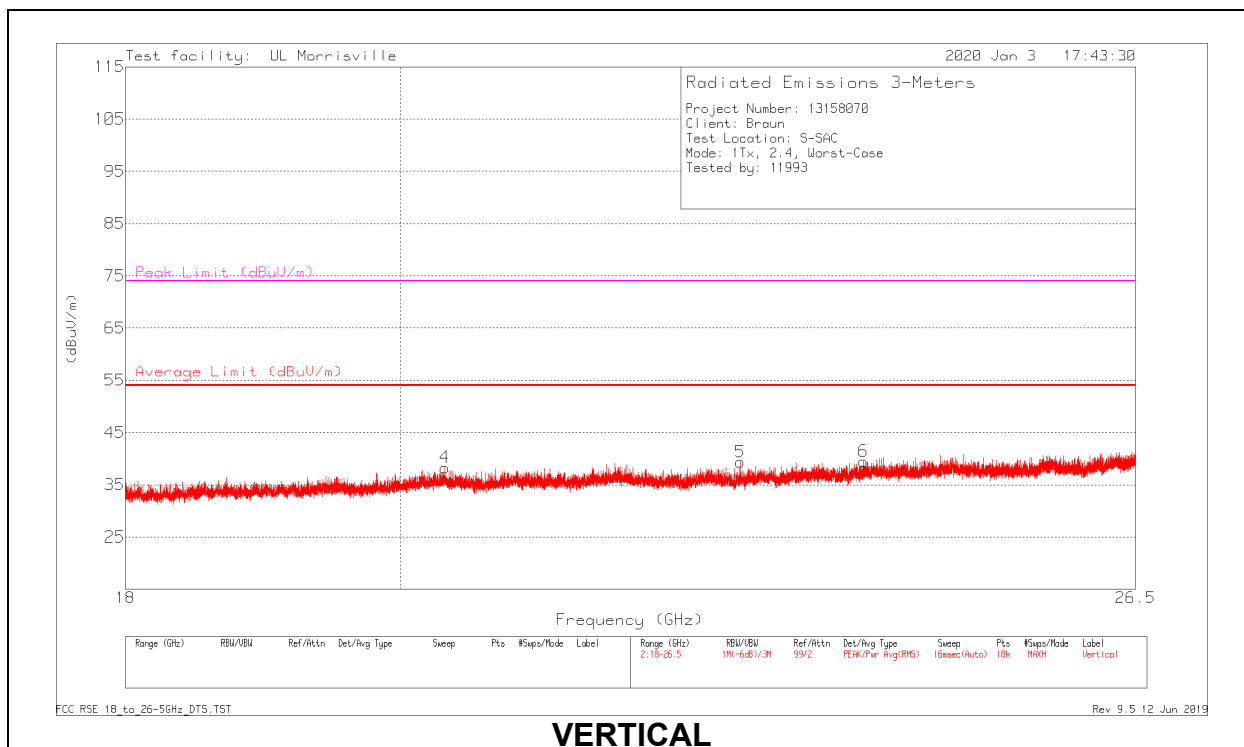
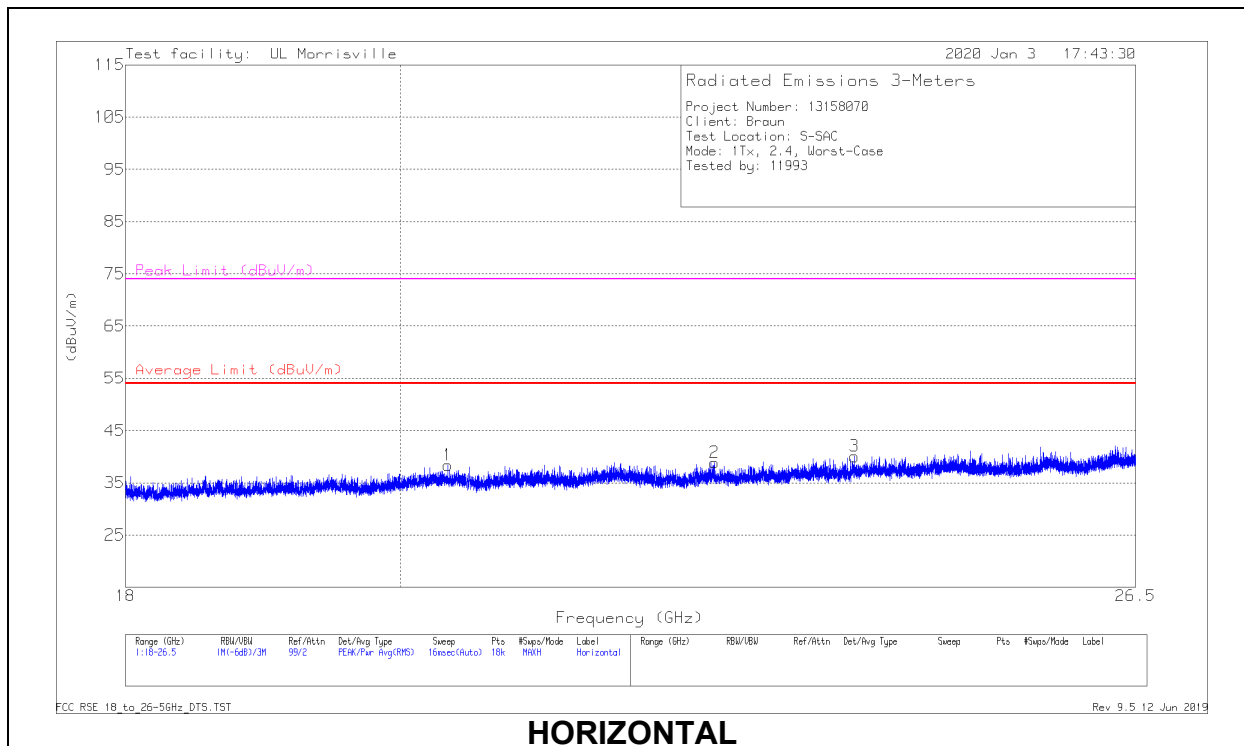
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AT0074 AF (dB/m) | Cbl/Amp | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|------------------|---------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 1      | * ** 119.7407   | 30.29                | Pk  | 19.9             | -30.9   | 19.29                      | 43.52              | -24.23      | 0-360          | 399         | H        |
| 5      | * ** 37.7795    | 39.26                | Pk  | 21.6             | -31.7   | 29.16                      | 40                 | -10.84      | 0-360          | 102         | V        |
| 7      | * ** 149.9023   | 37.82                | Pk  | 18.6             | -30.6   | 25.82                      | 43.52              | -17.7       | 0-360          | 102         | V        |
| 2      | * ** 333.3173   | 42.4                 | Pk  | 20               | -29.5   | 32.9                       | 46.02              | -13.12      | 0-360          | 102         | H        |
| 3      | ** 881.9886     | 35.03                | Pk  | 28.2             | -27.2   | 36.03                      | 46.02              | -9.99       | 0-360          | 102         | H        |
| 4      | * ** 991.4029   | 29.26                | Pk  | 29.3             | -25.9   | 32.66                      | 53.97              | -21.31      | 0-360          | 102         | H        |
| 8      | * ** 323.416    | 40.14                | Pk  | 20               | -29.4   | 30.74                      | 46.02              | -15.28      | 0-360          | 199         | V        |
| 9      | ** 770.4742     | 37.21                | Pk  | 27.1             | -28.2   | 36.11                      | 46.02              | -9.91       | 0-360          | 102         | V        |
| 6      | 44.4537         | 48.94                | Pk  | 16.7             | -31.6   | 34.04                      | 40                 | -5.96       | 0-360          | 102         | V        |

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

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector

## 9.4. WORST CASE 18-26 GHZ



## 18 – 26GHz DATA

| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AT0076 AF (dB/m) | Amp/Cbl (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|------------------|--------------|----------------------------|------------------------|-------------|---------------------|-------------|----------------|-------------|----------|
| 1      | * ** 20.36502   | 39.77                | Pk  | 33.1             | -34.5        | 38.37                      | 54                     | -15.63      | 74                  | -35.63      | 0-360          | 298         | H        |
| 2      | * ** 22.55342   | 39.76                | Pk  | 33.5             | -34.4        | 38.86                      | 54                     | -15.14      | 74                  | -35.14      | 0-360          | 198         | H        |
| 3      | * ** 23.79684   | 39.65                | Pk  | 34               | -33.6        | 40.05                      | 54                     | -13.95      | 74                  | -33.95      | 0-360          | 198         | H        |
| 4      | * ** 20.34235   | 39.71                | Pk  | 33.1             | -34.5        | 38.31                      | 54                     | -15.69      | 74                  | -35.69      | 0-360          | 252         | V        |
| 5      | * ** 22.77679   | 39.83                | Pk  | 33.6             | -34.1        | 39.33                      | 54                     | -14.67      | 74                  | -34.67      | 0-360          | 152         | V        |
| 6      | * ** 23.88043   | 38.99                | Pk  | 34.1             | -33.6        | 39.49                      | 54                     | -14.51      | 74                  | -34.51      | 0-360          | 298         | V        |

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

\*\* - indicates frequency in Taiwan NCC LP0002 Restricted Band

Pk - Peak detector



## 10. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

| 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.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.10.

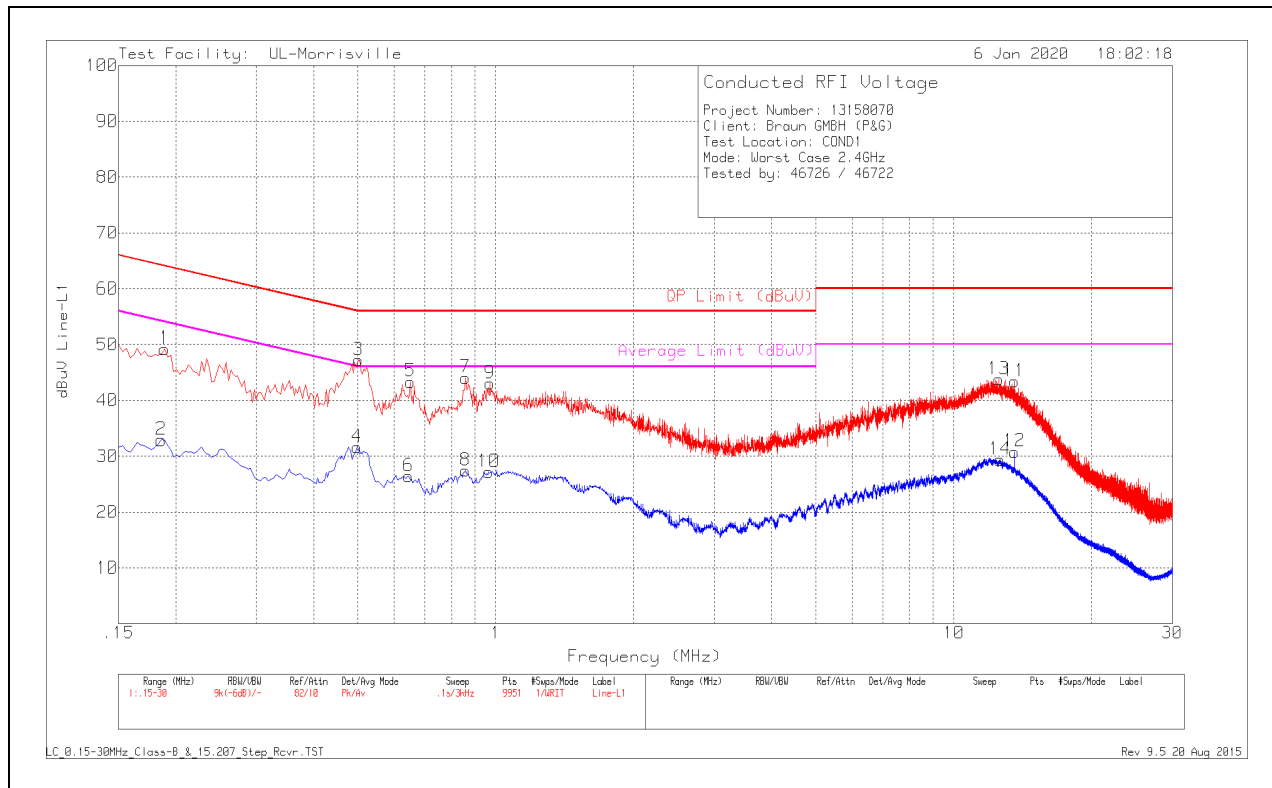
The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

# 10.1.1. AC Power Line Norm

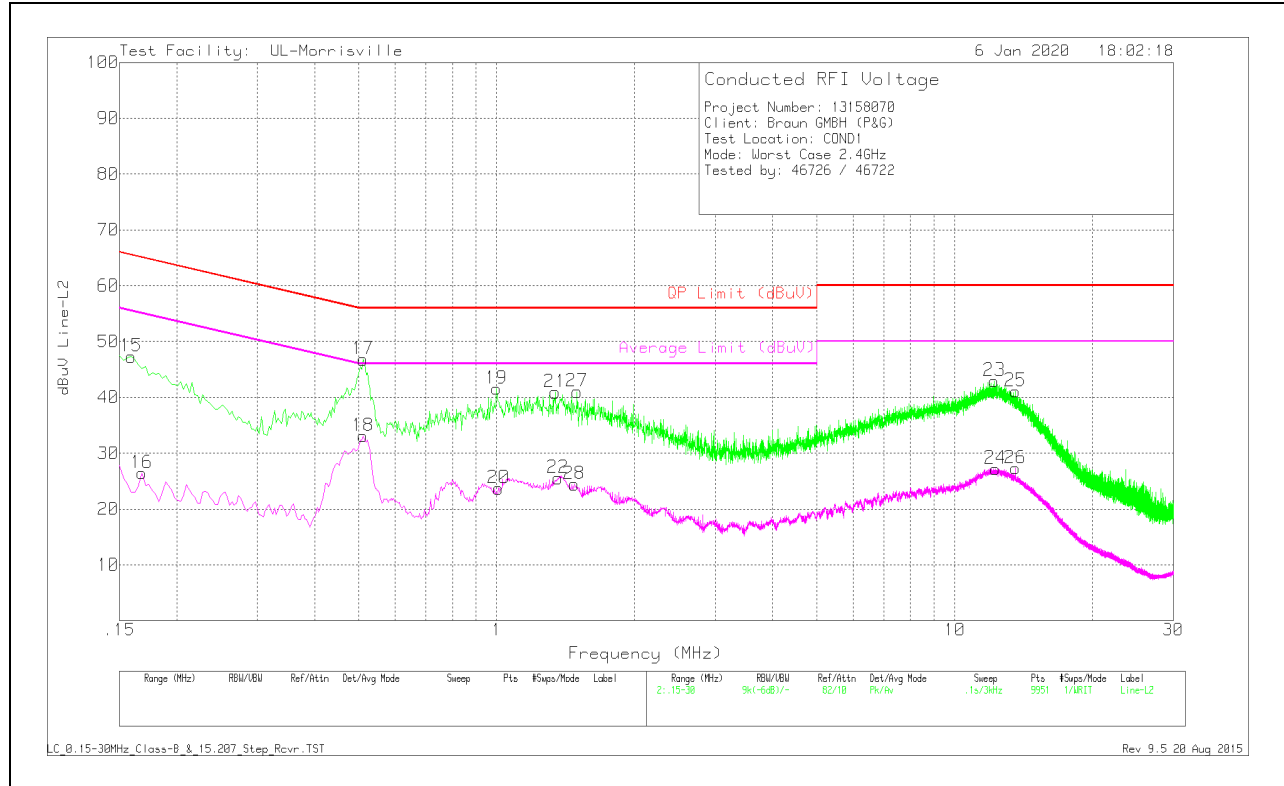
## LINE 1 RESULTS



| 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                            | .189            | 39.04                | Pk  | .2            | 10               | 49.24                  | 64.08           | -14.84      | -                    | -           |
| 2                            | .186            | 22.71                | Av  | .2            | 10               | 32.91                  | -               | -           | 54.21                | -21.3       |
| 3                            | .501            | 37.13                | Pk  | .1            | 10               | 47.23                  | 56              | -8.77       | -                    | -           |
| 4                            | .498            | 21.5                 | Av  | .1            | 10               | 31.6                   | -               | -           | 46.03                | -14.43      |
| 5                            | .651            | 33.25                | Pk  | .1            | 10               | 43.35                  | 56              | -12.65      | -                    | -           |
| 6                            | .645            | 16.32                | Av  | .1            | 10               | 26.42                  | -               | -           | 46                   | -19.58      |
| 7                            | .858            | 34.09                | Pk  | 0             | 10               | 44.09                  | 56              | -11.91      | -                    | -           |
| 8                            | .858            | 17.43                | Av  | 0             | 10               | 27.43                  | -               | -           | 46                   | -18.57      |
| 9                            | .972            | 33.02                | Pk  | 0             | 10               | 43.02                  | 56              | -12.98      | -                    | -           |
| 10                           | .966            | 17.19                | Av  | 0             | 10               | 27.19                  | -               | -           | 46                   | -18.81      |
| 11                           | 13.56           | 32.91                | Pk  | .1            | 10.4             | 43.41                  | 60              | -16.59      | -                    | -           |
| 12                           | 13.56           | 20.31                | Av  | .1            | 10.4             | 30.81                  | -               | -           | 50                   | -19.19      |
| 13                           | 12.543          | 33.27                | Pk  | .1            | 10.4             | 43.77                  | 60              | -16.23      | -                    | -           |
| 14                           | 12.618          | 18.85                | Av  | .1            | 10.4             | 29.35                  | -               | -           | 50                   | -20.65      |

Pk - Peak Detector  
Av - Average Detector

## 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) |
| 15                           | .159            | 37.09                | Pk  | .2            | 10               | 47.29                  | 65.52           | -18.23      | -                    | -           |
| 16                           | .168            | 16.21                | Av  | .2            | 10               | 26.41                  | -               | -           | 55.06                | -28.65      |
| 17                           | .51             | 36.81                | Pk  | 0             | 10               | 46.81                  | 56              | -9.19       | -                    | -           |
| 18                           | .51             | 23.06                | Av  | 0             | 10               | 33.06                  | -               | -           | 46                   | -12.94      |
| 19                           | .999            | 31.55                | Pk  | 0             | 10               | 41.55                  | 56              | -14.45      | -                    | -           |
| 20                           | 1.0095          | 13.7                 | Av  | 0             | 10               | 23.7                   | -               | -           | 46                   | -22.3       |
| 21                           | 1.341           | 30.81                | Pk  | 0             | 10.1             | 40.91                  | 56              | -15.09      | -                    | -           |
| 22                           | 1.359           | 15.44                | Av  | 0             | 10.1             | 25.54                  | -               | -           | 46                   | -20.46      |
| 23                           | 12.201          | 32.45                | Pk  | .1            | 10.4             | 42.95                  | 60              | -17.05      | -                    | -           |
| 24                           | 12.258          | 16.73                | Av  | .1            | 10.4             | 27.23                  | -               | -           | 50                   | -22.77      |
| 25                           | 13.56           | 30.61                | Pk  | .1            | 10.4             | 41.11                  | 60              | -18.89      | -                    | -           |
| 26                           | 13.56           | 16.83                | Av  | .1            | 10.4             | 27.33                  | -               | -           | 50                   | -22.67      |
| 27                           | 1.497           | 30.92                | Pk  | 0             | 10.1             | 41.02                  | 56              | -14.98      | -                    | -           |
| 28                           | 1.476           | 14.33                | Av  | 0             | 10.1             | 24.43                  | -               | -           | 46                   | -21.57      |

Pk - Peak Detector  
Av - Average Detector

## **11. SETUP PHOTOS**

Please refer to R13158070-EP2 for setup diagrams

## **END OF TEST REPORT**