



**FCC 47 CFR PART 15 SUBPART E  
ISED CANADA RSS-247 ISSUE 1**

**CERTIFICATION TEST REPORT**

**FOR**

**WIRELESS CAPABLE SECURITY CAMERA**

**HVIN: R12**

**PMN: AXIS M1065-LW**

**FCC ID: PNB-AXISM1065-LW**

**IC: 3919A-M1065LW**

**REPORT NUMBER: 11191821-E2**

**ISSUE DATE: 2016-08-11**

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NVLAP Lab code: 200246-0

Revision History

| Ver. | Issue Date | Revisions                                                                       | Revised By   |
|------|------------|---------------------------------------------------------------------------------|--------------|
| 1    | 2016-07-15 | Initial Issue                                                                   | Brian Kiewra |
| 2    | 2016-07-21 | Added model numbers and more EUT descriptive detail.                            | Brian Kiewra |
| 3    | 2016-07-26 | Added Line Conducted diagram.                                                   | Brian Kiewra |
| 4    | 2016-08-11 | Removed model variants, added HVIN and PMN and editorial changes to references. | Brian Kiewra |

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** Axis Communications AB  
Emdalavagen 14  
Lund, Sweden, SE-223 69

**EUT DESCRIPTION:** Wireless Capable Security Camera

**HVIN:** R12  
**PMN:** AXIS M1065-LW

**SERIAL NUMBER:** Radiated: ACCC8E23D3A6  
Conducted: ACCC8E23D4CF/ACCC8E23D3B2

**DATE TESTED:** 2016-04-25 to 2016-06-07

| APPLICABLE STANDARDS                          |              |
|-----------------------------------------------|--------------|
| STANDARD                                      | TEST RESULTS |
| CFR 47 Part 15 Subpart E                      | Pass         |
| INDUSTRY CANADA (ISED CANADA) RSS-247 Issue 1 | Pass         |
| INDUSTRY CANADA (ISED CANADA) RSS-GEN Issue 4 | Pass         |

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

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL 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, any agency of the Federal Government, or any agency of any government.

Approved & Released  
For UL LLC By:



Jeffrey Moser  
EMC Program Manager  
UL – Consumer Technology Division

Prepared By:



Brian Kiewra  
WISE Engineer  
UL – Consumer Technology Division

## 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, RSS-GEN Issue 4, RSS-247 Issue 1.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 12 Laboratory Dr., Research Triangle Park, NC 27709, USA and 2800 Suite B, Perimeter Park Drive, Morrisville, NC 27560.

|                                     |           |
|-------------------------------------|-----------|
| 12 Laboratory Dr., RTP, NC 27709    |           |
| <input type="checkbox"/>            | Chamber A |
| <input checked="" type="checkbox"/> | Chamber C |

|                                                           |               |
|-----------------------------------------------------------|---------------|
| 2800 Suite B Perimeter Park Dr.,<br>Morrisville, NC 27560 |               |
| <input type="checkbox"/>                                  | Chamber NORTH |
| <input type="checkbox"/>                                  | Chamber SOUTH |

The onsite chambers are covered under ISED Canada company address code 2180C with site numbers 2180C -1 through 2180C-4, respectively.

UL LLC (RTP) is accredited by NVLAP, Laboratory Code 200246-0. The full scope of accreditation can be viewed at <http://www.nist.gov/nvlap/>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

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

### 4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

### 4.3. MEASUREMENT UNCERTAINTY

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

| PARAMETER                            | UNCERTAINTY                |
|--------------------------------------|----------------------------|
| Total RF power, conducted            | $\pm 0.45$ dB              |
| RF power density, conducted          | $\pm 1.5$ dB               |
| Spurious emissions, conducted        | $\pm 2.94$ dB              |
| All emissions, radiated up to 40 GHz | $\pm 5.36$ dB              |
| Temperature                          | $\pm 0.07^{\circ}\text{C}$ |
| Humidity                             | $\pm 2.26\%$ RH            |
| DC and low frequency voltages        | $\pm 1.27\%$               |
| Conducted Emissions (0.150-30MHz)    | $\pm 2.37$ dB              |

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



## 5. EQUIPMENT UNDER TEST

### 5.1. DESCRIPTION OF EUT

The EUT is a network surveillance camera that contains an 802.11 a/b/g/n and Bluetooth transceivers, manufactured by AXIS Communications AB, Lund, SWEDEN. For 5GHz operation, the EUT only operates in the 5.2 GHz band.

The EUT is provided with an Axis PS-U05 rev. 1 power supply.

### 5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

| Frequency Range (MHz) | Mode         | Output Power (dBm) | Output Power (mW) |
|-----------------------|--------------|--------------------|-------------------|
| 5180 - 5240           | 802.11a      | 13.45              | 22.13             |
| 5180 - 5240           | 802.11n HT20 | 12.45              | 17.58             |
| 5190-5230             | 802.11n HT40 | 12.93              | 19.63             |

### 5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an internal inverted-f type antenna. The peak antenna gain is +1.3 dBi for 2.4 GHz band and +2.6 dBi for 5 GHz band.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 6.15\_beta52. Special test firmware used for EMC was 15+snapshot\_20160511 (this firmware allows for simultaneously operation for Bluetooth and WLAN in order to reduce test set-ups).

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

Radiated emission and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

Manufacturer stated that EUT is only intended to operate installed in mounting bracket which is one fixed orientation; therefore, all final radiated testing was performed in stated position.

Based on the baseline scan, the worst-case data rates were:

802.11b mode: 5.5 Mbps  
802.11g mode: 6 Mbps  
802.11a 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 |
| Laptop                 | Lenovo       | T440  | RTP1014PC015NUR | NA     |

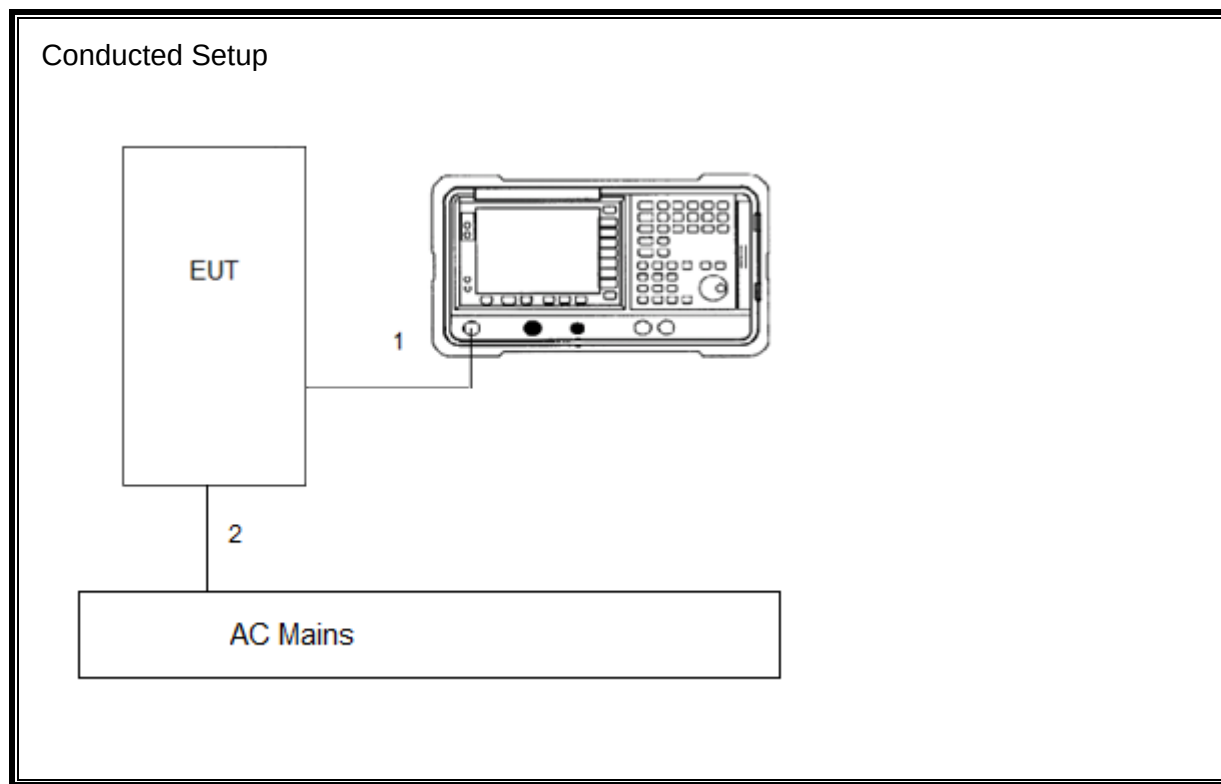
### I/O CABLES

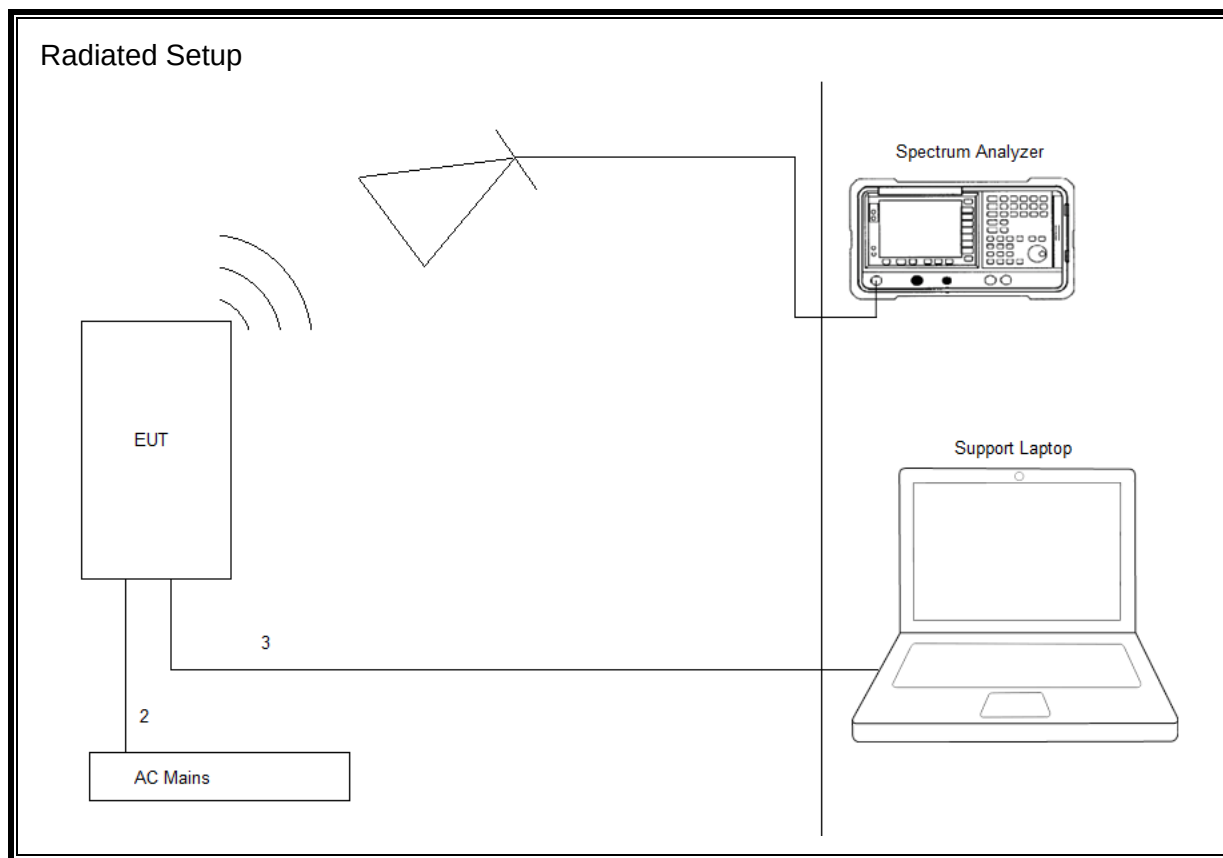
| I/O Cable List |              |                      |                |                  |         |
|----------------|--------------|----------------------|----------------|------------------|---------|
| Cable No       | Port         | # of Identical ports | Connector Type | Cable Length (m) | Remarks |
| 1              | Antenna Port | 1                    | RF             | <1m              | NA      |
| 2              | AC Mains     | 1                    | AC             | >1m              | NA      |
| 3              | Ethernet     | 1                    | RJ45           | >1m              | CAT5E   |

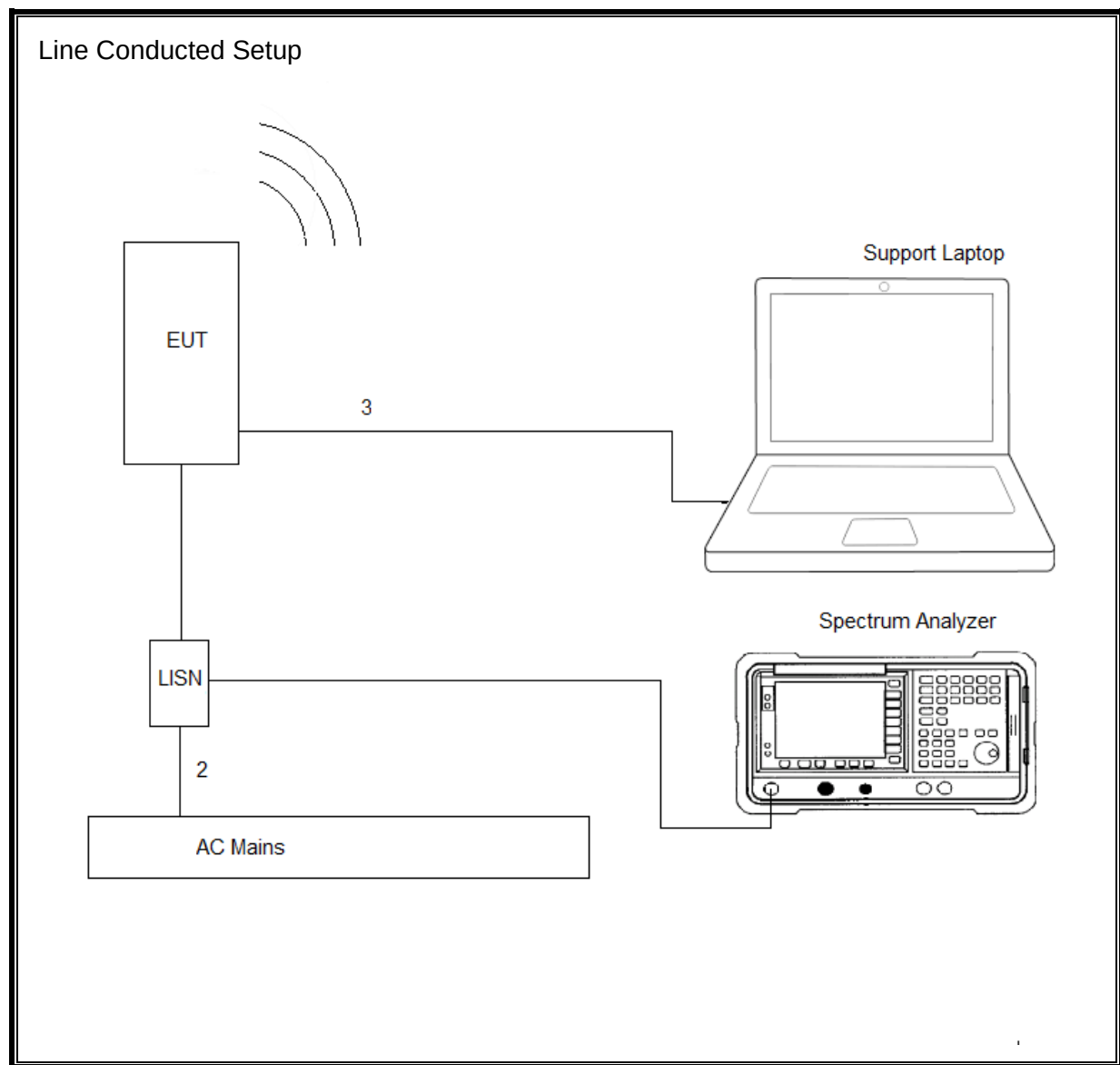
### TEST SETUP

Test software exercised the radio card.

**SETUP DIAGRAM FOR TESTS**







## 6. TEST AND MEASUREMENT EQUIPMENT

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

### Radiated Emissions – Chamber C

| Equip. ID | Description                                       | Manufacturer         | Model Number | Last Cal.  | Next Cal.  |
|-----------|---------------------------------------------------|----------------------|--------------|------------|------------|
|           | <b>30-1000 MHz Range</b>                          |                      |              |            |            |
| AT0075    | Hybrid Broadband Antenna                          | Sunol Sciences Corp. | JB3          | 2015-06-10 | 2016-06-30 |
|           | <b>1-18 GHz</b>                                   |                      |              |            |            |
| AT0062    | Double-Ridged Waveguide Horn Antenna, 1 to 18 GHz | ETS Lindgren         | 3117         | 2015-08-25 | 2016-08-31 |
|           | <b>18-40GHz</b>                                   |                      |              |            |            |
| AT0063    | Horn Antenna, 18-26.5GHz                          | ARA                  | MWH-1826/B   | 2015-08-27 | 2016-08-31 |
| AT0061    | Horn Antenna, 26-40GHz                            | ARA                  | MWH-2640/B   | 2015-08-27 | 2016-08-31 |
|           | <b>Gain-Loss Chains</b>                           |                      |              |            |            |
| C-SAC01   | Gain-loss string: 0.009-1000MHz                   | Various              | Various      | 2016-01-18 | 2017-01-31 |
| C-SAC02   | Gain-loss string: 1-18GHz                         | Various              | Various      | 2016-01-28 | 2017-01-31 |
| C-SAC03   | Gain-loss string: 18-40GHz                        | Various              | Various      | 2015-09-27 | 2016-09-30 |
|           | <b>Receiver &amp; Software</b>                    |                      |              |            |            |
| SA0016    | Spectrum Analyzer                                 | Agilent              | PXA N903A    | 2015-08-26 | 2016-08-31 |
| SOFTEMI   | EMI Software                                      | UL                   | Version 9.5  | NA         | NA         |
|           | <b>Additional Equipment used</b>                  |                      |              |            |            |
| HI0082    | Temp/Humid/Pressure Meter                         | Cole-Parmer          | 99760-00     | 2016-04-26 | 2017-04-26 |

Test Equipment Used - Wireless Conducted Measurement Equipment

| Equipment ID            | Description                              | Manufacturer          | Model Number | Last Cal.  | Next Cal.  |
|-------------------------|------------------------------------------|-----------------------|--------------|------------|------------|
| <b>Conducted Room 1</b> |                                          |                       |              |            |            |
| SA0019                  | Spectrum Analyzer                        | Agilent Technologies  | E4446A       | 2015-09-02 | 2016-09-30 |
| SA0026                  | Spectrum Analyzer                        | Agilent               | N9030A       | 2016-02-24 | 2017-02-28 |
| PWM004                  | RF Power Meter                           | Keysight Technologies | N1911A       | 2015-06-08 | 2016-06-30 |
| PWS004                  | Peak and Avg Power Sensor, 50MHz to 6GHz | Keysight Technologies | E9323A       | 2015-06-05 | 2016-06-30 |
| HI0079                  | Temp/Humid/Pressure Meter                | Springfield           | PreciseTemp  | 2015-07-01 | 2016-07-31 |
| MM0167                  | True RMS Multimeter                      | Agilent               | U1232A       | 2015-08-17 | 2016-08-31 |
| <b>Conducted Room 2</b> |                                          |                       |              |            |            |
| SA0020                  | Spectrum Analyzer                        | Agilent Technologies  | E4446A       | 2016-03-22 | 2017-03-31 |
| SA0026                  | Spectrum Analyzer                        | Agilent               | N9030A       | 2016-02-24 | 2017-02-28 |
| PWM003                  | RF Power Meter                           | Keysight Technologies | N1911A       | 2015-06-08 | 2016-06-30 |
| PWS003                  | Peak and Avg Power Sensor, 50MHz to 6GHz | Keysight Technologies | E9323A       | 2015-06-05 | 2016-06-30 |
| HI0080                  | Temp/Humid/Pressure Meter                | Springfield           | PreciseTemp  | 2015-07-01 | 2016-07-31 |
| MM0168                  | True RMS Multimeter                      | Agilent               | U1232A       | 2015-08-17 | 2016-08-31 |



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

| Equipment ID       | Description                                                   | Manufacturer          | Model Number              | Last Cal.  | Next Cal.  |
|--------------------|---------------------------------------------------------------|-----------------------|---------------------------|------------|------------|
| CBL077             | Coax cable, RG223, N-male to BNC-male, 20-ft.                 | Pasternack            | PE3476-240                | 2015-10-29 | 2016-10-31 |
| HI0079             | Temp/Humid/Pressure Meter                                     | Springfield Precision | PreciseTemp               | 2015-07-01 | 2016-07-31 |
| LISN003            | LISN, 50-ohm/50-uH, 2-conductor, 25A                          | Fischer Custom Com.   | FCC-LISN-50-25-2-01-550V  | 2015-08-24 | 2016-08-31 |
| LISN008            | LISN, 50-ohm/50-uH, 2-conductor, 25A (For support gear only.) | Solar Electronics     | 8012-50-R-24-BNC          | 2015-09-03 | 2016-09-30 |
| MM0167             | Multi-meter                                                   | Agilent               | U1232A                    | 2015-08-17 | 2016-08-31 |
| PRE0101521 (75141) | EMI Test Receiver 9kHz-7GHz                                   | Rohde & Schwarz       | ESCI 7                    | 2015-08-26 | 2016-08-31 |
| ATA222             | Transient Limiter, 0.009-30MHz                                | Electrometrics        | EM-7600                   | 2015-08-30 | 2016-08-31 |
| PS214              | AC Power Source                                               | Elgar                 | CW2501M (s/n 1523A02396)  | NA         | NA         |
| PS215              | AC Power Source                                               | Elgar                 | CW2501M (s/n 1523A02397)  | NA         | NA         |
| SOFTEMI            | EMI Software                                                  | UL                    | Version 9.5               | NA         | NA         |
|                    | <b>Miscellaneous (if needed)</b>                              |                       |                           |            |            |
| ATA220             | ISN for Unshielded Balanced Pairs                             | Teseq, Inc.           | ISN T8                    | 2015-08-24 | 2016-08-31 |
| TN0129             | ISN for Shielded Balanced Pairs                               | Teseq, Inc.           | ISN ST08                  | 2015-08-24 | 2016-08-31 |
| TN0145             | ISN for Cat-6 Unshielded Balanced Pairs                       | Teseq, Inc.           | ISN T8-Cat6               | 2015-08-25 | 2016-08-31 |
| CDECABLE001        | ANSI C63.4 1m extension cable.                                | UL                    | Per Annex B of ANSI C63.4 | 2016-06-04 | 2017-06-30 |

## 7. MEASUREMENT METHODS

Duty Cycle: KDB 789033 D02 v01r02, section B.

26 dB Emission BW: KDB 789033 D02 v01r02, Section C.

99% Occupied BW: KDB 789033 D02 v01r02, Section D.

Conducted Output Power: KDB 789033 D02 v01r02, Section E.3.a (Method PM).

Power Spectral Density: KDB 789033 D02 v01r02, Section F (Method SA-2).

Unwanted emissions in restricted bands: KDB 789033 D02 v01r02, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01r02, Sections G.3, G.4, and G.5.

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

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

## 8. ANTENNA PORT TEST RESULTS

### 8.1. ON TIME AND DUTY CYCLE

#### LIMITS

None; for reporting purposes only.

#### PROCEDURE

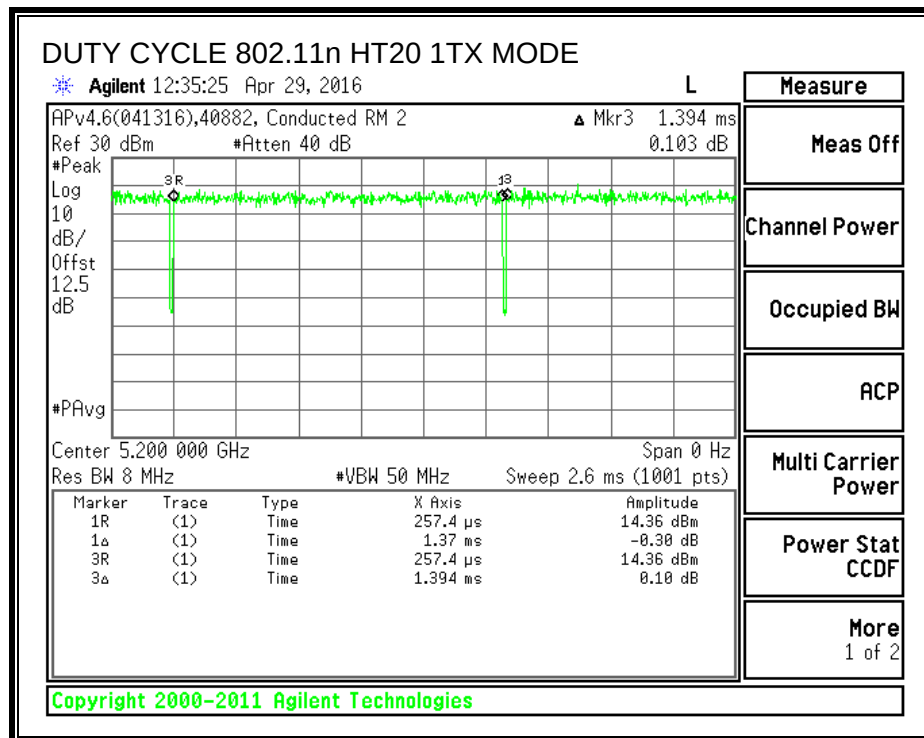
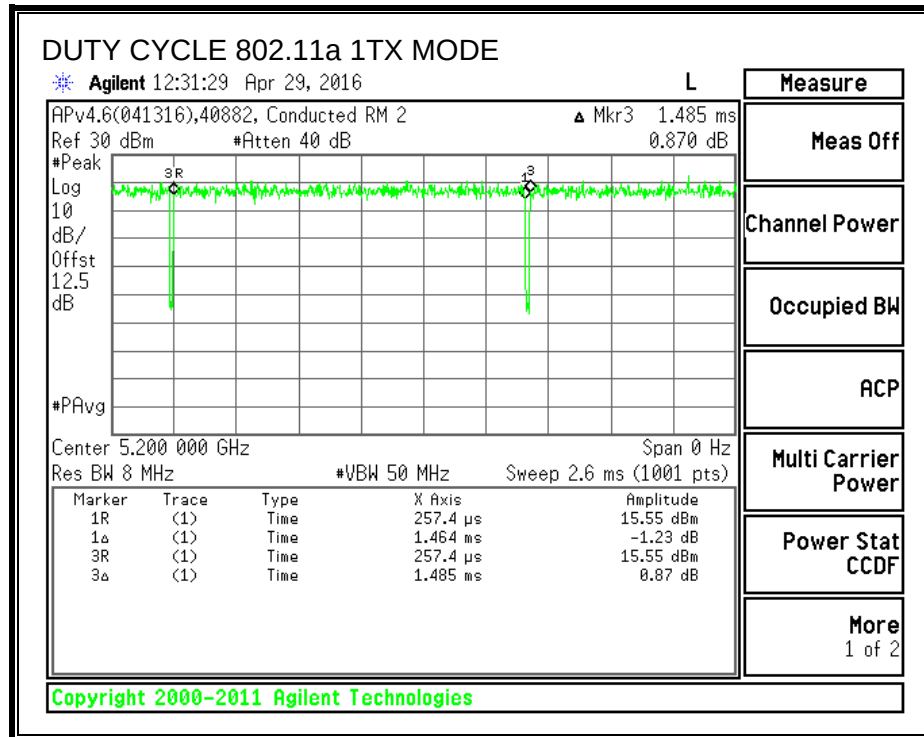
KDB 789033 Zero-Span Spectrum Analyzer Method.

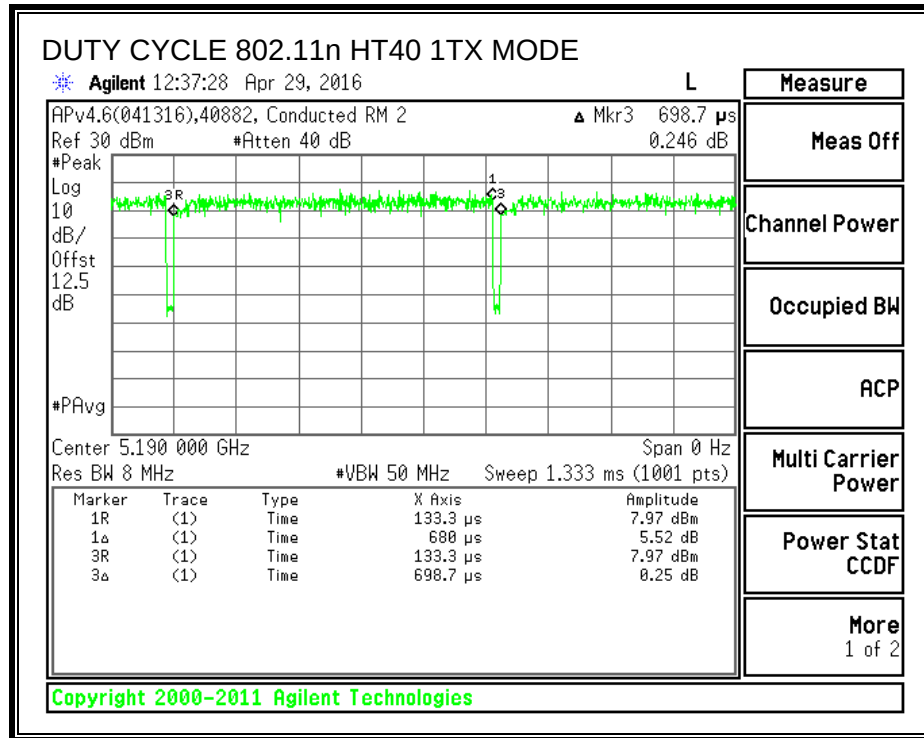
#### ON TIME AND DUTY CYCLE RESULTS

| 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) |
|------------------|------------------------|------------------|-----------------------------|----------------------|-----------------------------------------|-----------------------------|
| 802.11a 1TX      | 1.464                  | 1.485            | 0.986                       | 98.59%               | 0.00                                    | 0.010                       |
| 802.11n HT20 1TX | 1.370                  | 1.394            | 0.983                       | 98.28%               | 0.00                                    | 0.010                       |
| 802.11n HT40 1TX | 0.680                  | 0.699            | 0.973                       | 97.32%               | 0.12                                    | 1.471                       |

Test Performed: Jeff Cabrera  
Test Date: 2016-04-29

# DUTY CYCLE PLOTS





## 8.2. 802.11a MODE IN THE 5.2 GHz BAND

### 8.2.1. 26 dB BANDWIDTH

#### LIMITS

None; for reporting purposes only. Tested per FCC §15.403 (i)

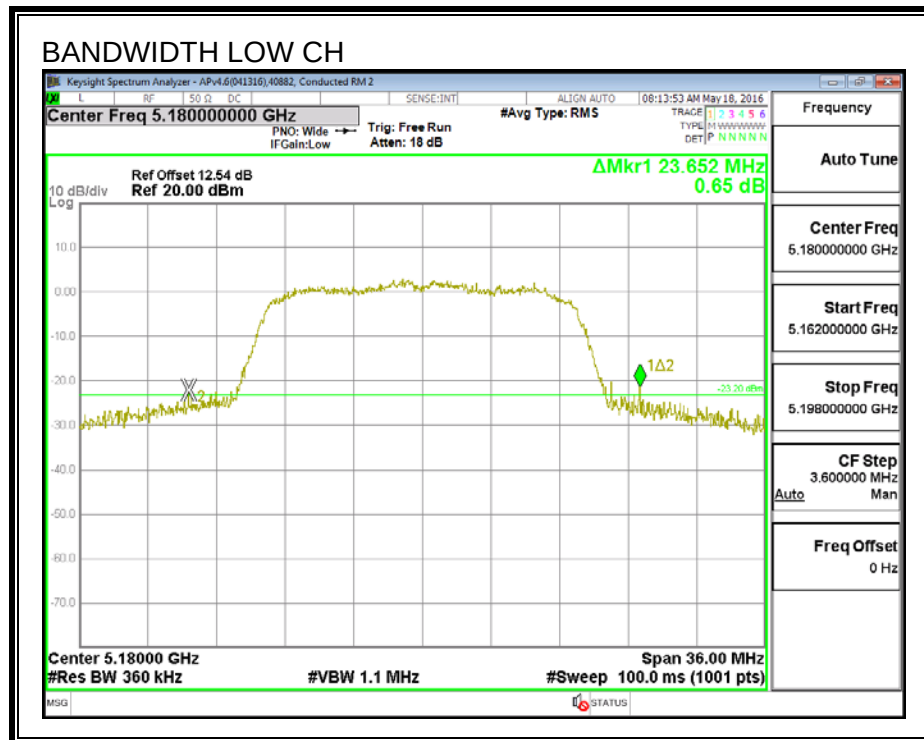
#### RESULTS

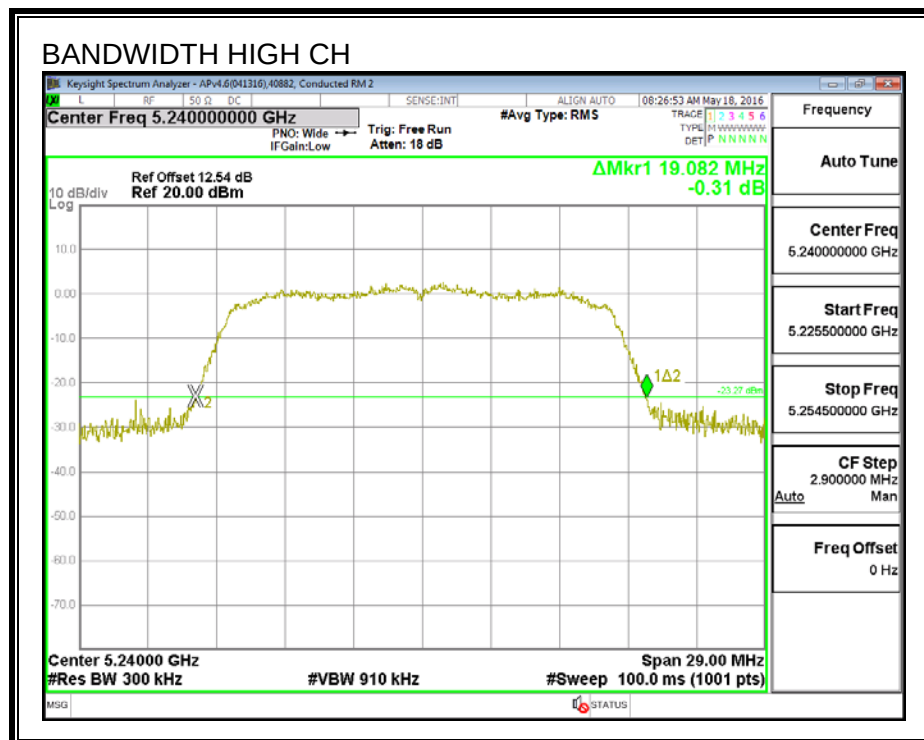
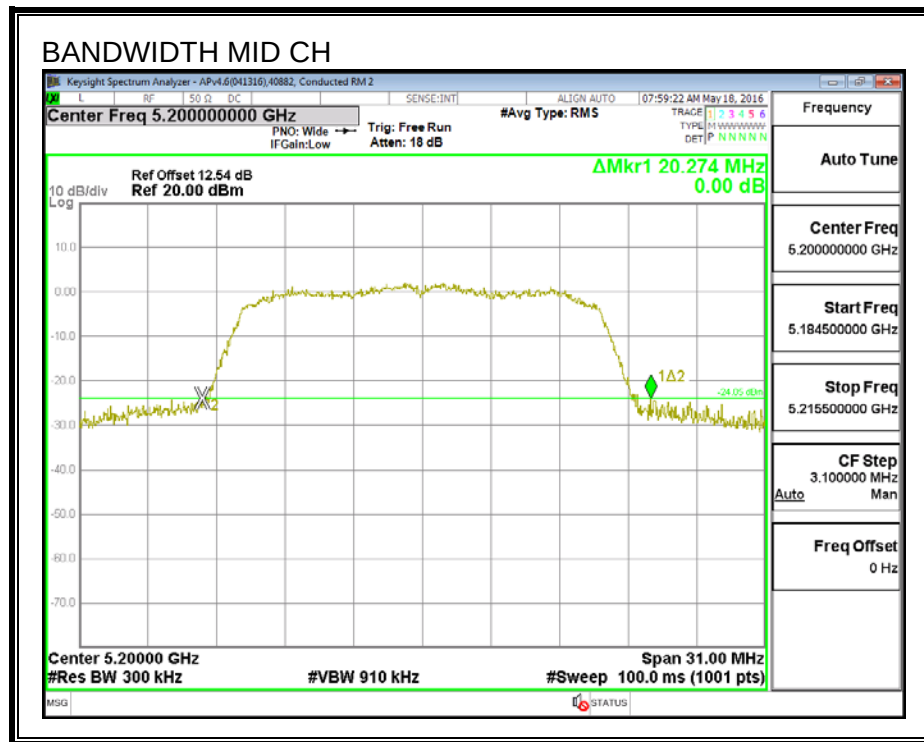
| Channel | Frequency (MHz) | 26 dB Bandwidth (MHz) |
|---------|-----------------|-----------------------|
| Low     | 5180            | 23.65                 |
| Mid     | 5200            | 20.27                 |
| High    | 5240            | 19.08                 |

Test Performed: Jeff Cabrera

Test Date: 2016-05-18

#### 26 dB BANDWIDTH





## 8.2.2. 99% BANDWIDTH

### LIMITS

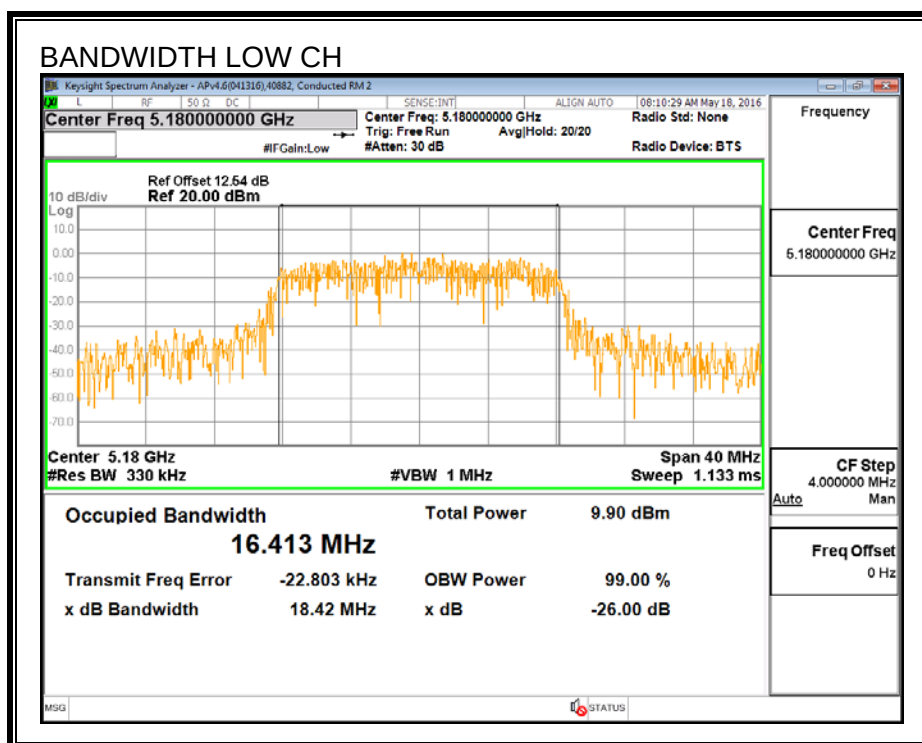
RSS-Gen Clause 6.6, RSS-247 6.2.1 (2)

### RESULTS

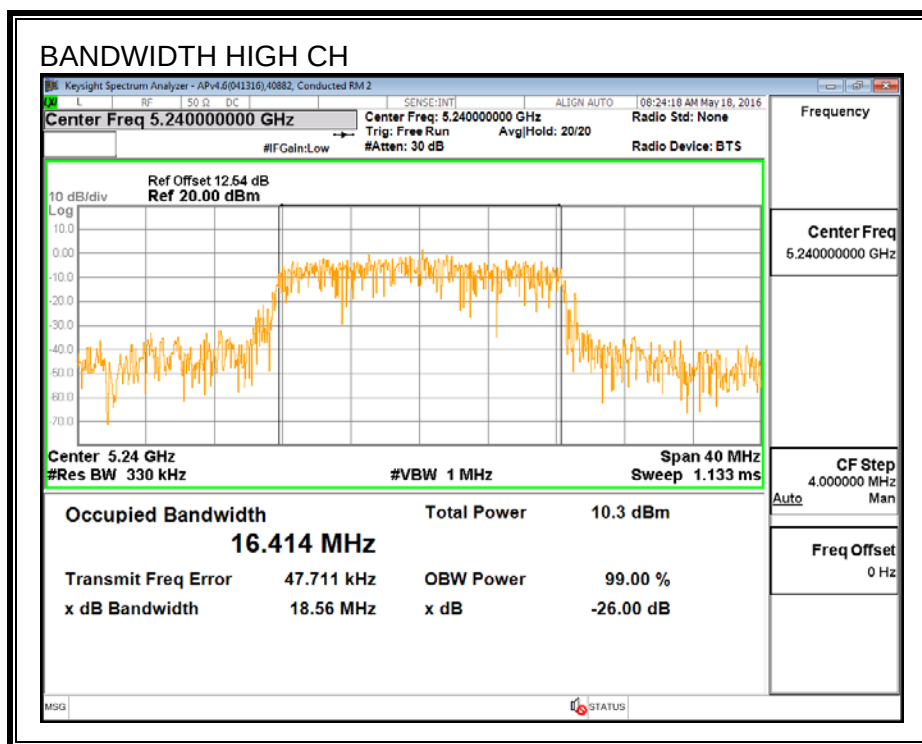
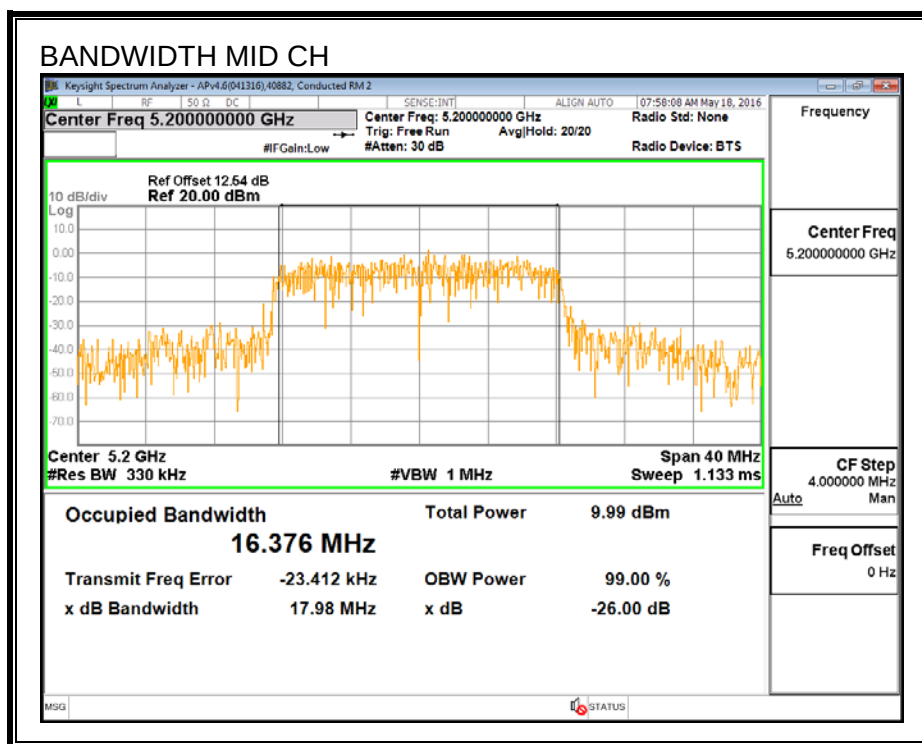
| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | Maximum Ch Freq | Does Ch. Freq. Fall in UNII 2A? Y/N |
|---------|-----------------|---------------------|-----------------|-------------------------------------|
| Low     | 5180            | 16.4130             | 5188.207        | N                                   |
| Mid     | 5200            | 16.3760             | 5208.188        | N                                   |
| High    | 5240            | 16.4140             | 5248.207        | N                                   |

Test Performed: Jeff Cabrera  
Test Date: 2016-05-18

### 99% BANDWIDTH







### **8.2.3. OUTPUT POWER AND PSD**

#### **LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **DIRECTIONAL ANTENNA GAIN**

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

## RESULTS

Test Performed: Jeff Cabrera  
Test Date: 2016-04-29, 2016-05-18

### Antenna Gain and Limits

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5180               | 2.60                                      | 2.60                                    | 24.00                   | 11.00                 |
| Mid     | 5200               | 2.60                                      | 2.60                                    | 24.00                   | 11.00                 |
| High    | 5240               | 2.60                                      | 2.60                                    | 24.00                   | 11.00                 |

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

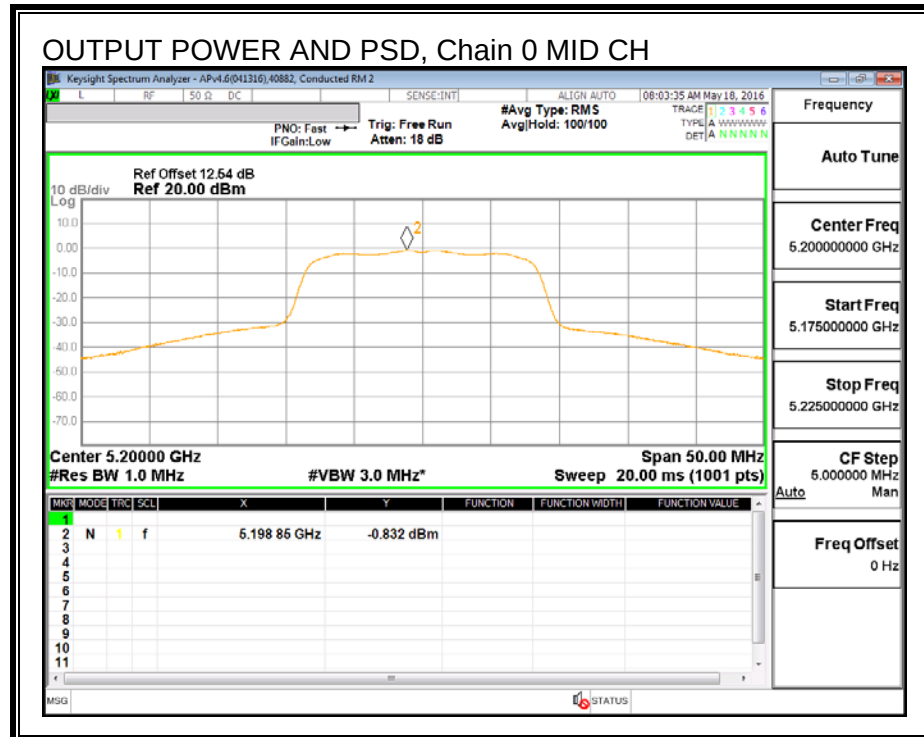
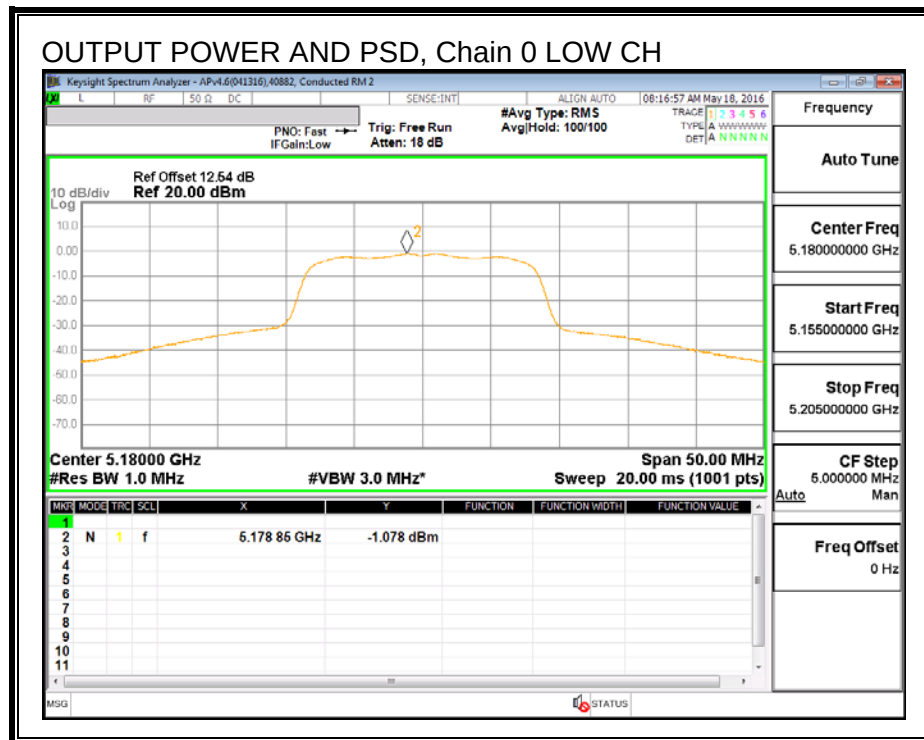
### Output Power Results

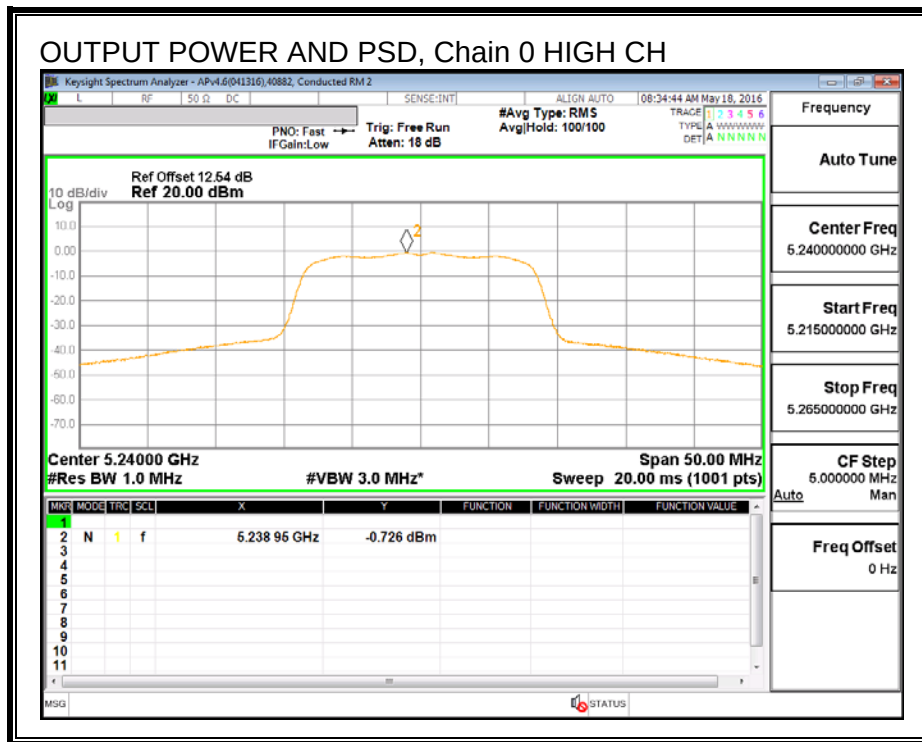
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5180               | 13.41                             | 13.41                             | 24.00                   | -10.59                  |
| Mid     | 5200               | 13.45                             | 13.45                             | 24.00                   | -10.55                  |
| High    | 5240               | 13.28                             | 13.28                             | 24.00                   | -10.72                  |

### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5180               | -1.08                           | -1.08                           | 11.00                 | -12.08                |
| Mid     | 5200               | -0.83                           | -0.83                           | 11.00                 | -11.83                |
| High    | 5240               | -0.73                           | -0.73                           | 11.00                 | -11.73                |

OUTPUT POWER AND PSD, Chain 0





### **8.2.1. OUTPUT POWER AND PPSD (IC)**

#### **LIMITS**

IC RSS-247 6.2.1 (1)

The maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10} B$ , dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

#### **DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

**RESULTS - 802.11a, 5.2 GHz band**

Test Performed: Jeff Cabrera

Test Date: 2016-04-29, 2016-05-18

**Bandwidth and Antenna Gain**

| Channel | Frequency<br>(MHz) | Min<br>99%<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) |
|---------|--------------------|---------------------------|------------------------------|
| Low     | 5180               | 16.413                    | 2.60                         |
| Mid     | 5200               | 16.376                    | 2.60                         |
| High    | 5240               | 16.414                    | 2.60                         |

**Limits**

| Channel | Frequency<br>(MHz) | IC<br>EIRP<br>Limit<br>(dBm) | IC<br>eirp<br>PSD<br>Limit<br>(dBm) |
|---------|--------------------|------------------------------|-------------------------------------|
| Low     | 5180               | 22.15                        | 10.00                               |
| Mid     | 5200               | 22.14                        | 10.00                               |
| High    | 5240               | 22.15                        | 10.00                               |

|                           |      |                                                |
|---------------------------|------|------------------------------------------------|
| <b>Duty Cycle CF (dB)</b> | 0.00 | Included in Calculations of Corr'd Power & PSD |
|---------------------------|------|------------------------------------------------|

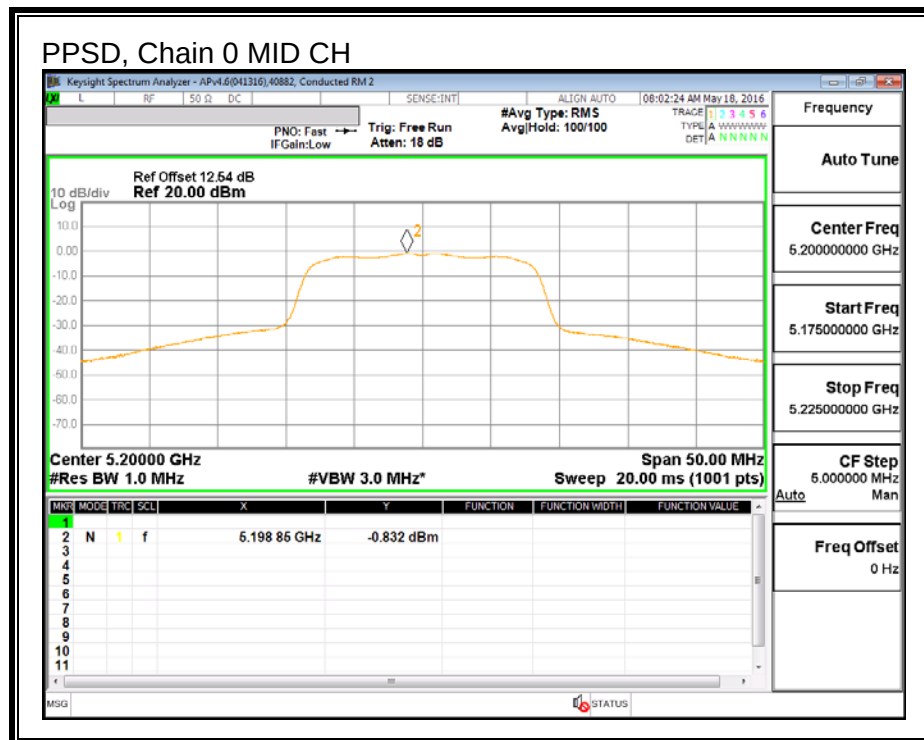
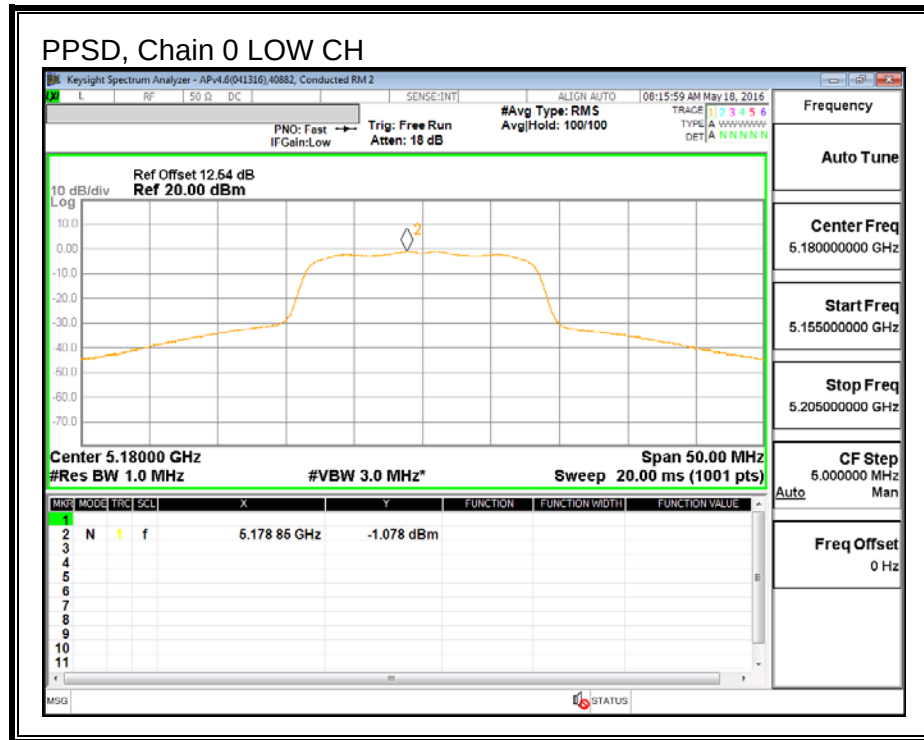
**Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>EIRP<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|----------------------------------|-------------------------|-------------------------|
| Low     | 5180               | 13.41                             | 16.01                            | 22.15                   | -6.14                   |
| Mid     | 5200               | 13.45                             | 16.05                            | 22.14                   | -6.09                   |
| High    | 5240               | 13.28                             | 15.88                            | 22.15                   | -6.27                   |

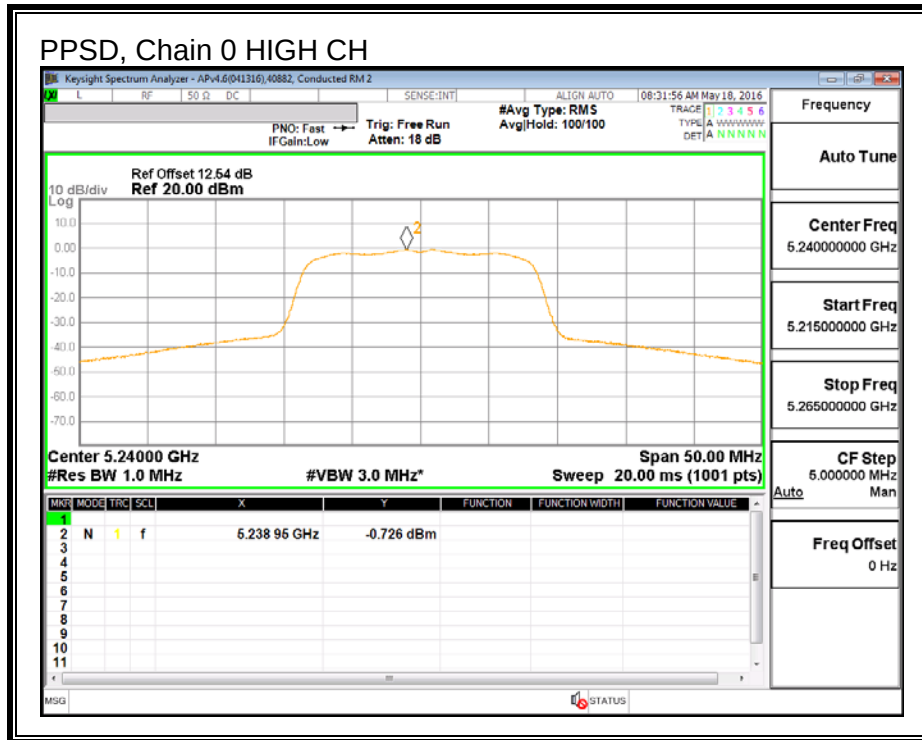
**PPSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>EIRP PSD<br>(dBm) | PPSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|--------------------------------------|------------------------|-----------------------|
| Low     | 5180               | -1.08                           | 1.52                                 | 10.00                  | -8.48                 |
| Mid     | 5200               | -0.83                           | 1.77                                 | 10.00                  | -8.23                 |
| High    | 5240               | -0.73                           | 1.87                                 | 10.00                  | -8.13                 |

**PPSD**







### 8.3. 802.11n HT20 MODE IN THE 5.2 GHz BAND

#### 8.3.1. 26 dB BANDWIDTH

##### LIMITS

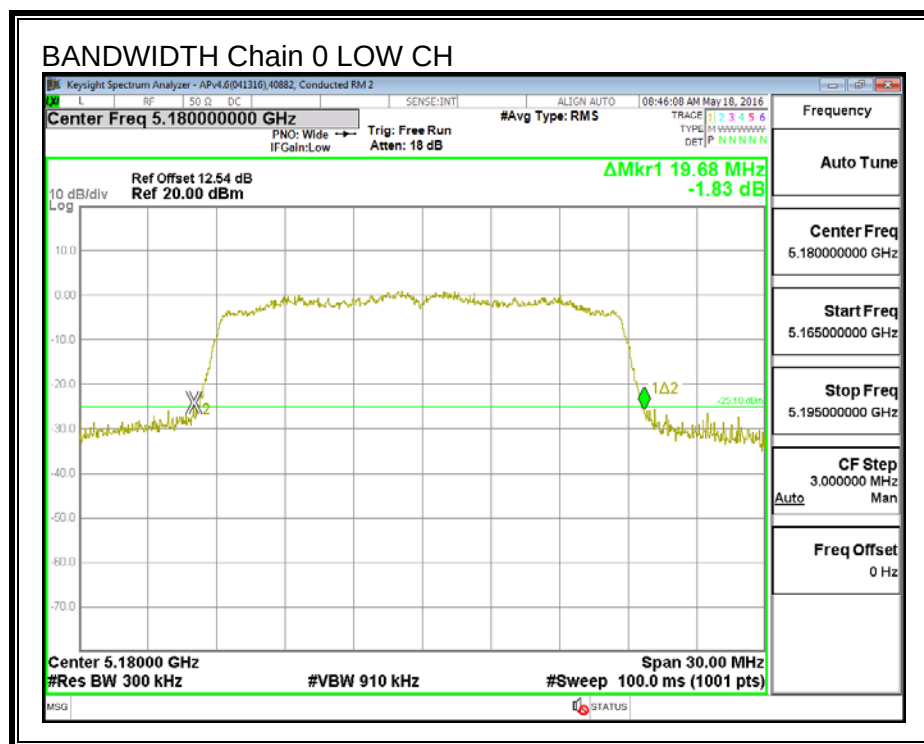
None; for reporting purposes only. Tested per FCC §15.403 (i)

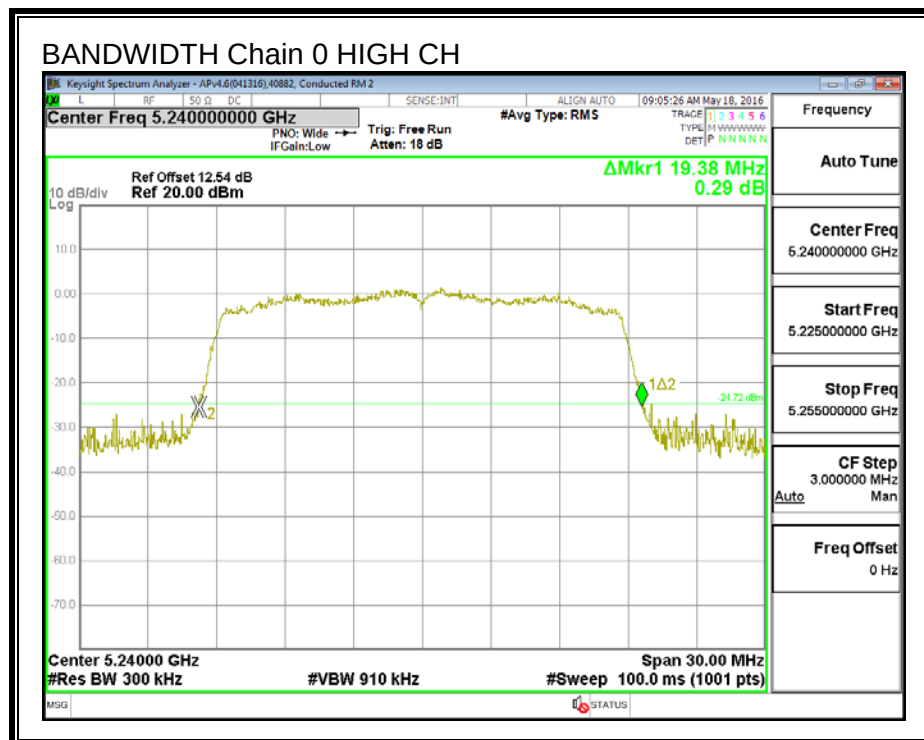
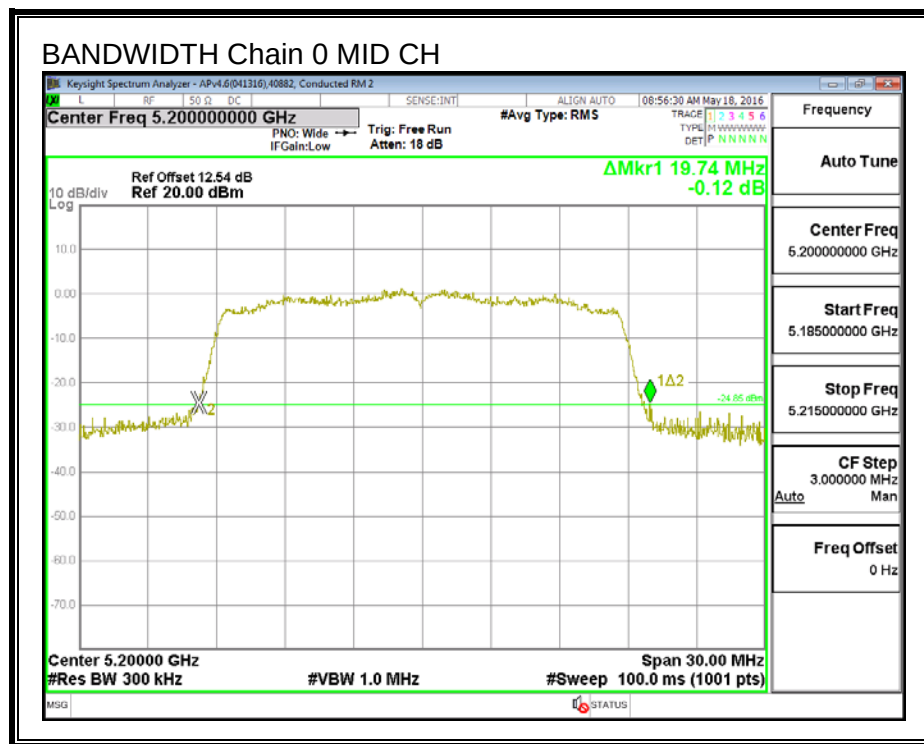
##### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB BW<br>Chain 0<br>(MHz) |
|---------|--------------------|------------------------------|
| Low     | 5180               | 19.68                        |
| Mid     | 5200               | 19.74                        |
| High    | 5240               | 19.38                        |

Test Performed: Jeff Cabrera  
Test Date: 2016-05-18

##### 26 dB BANDWIDTH, Chain 0





### 8.3.2. 99% BANDWIDTH

#### LIMITS

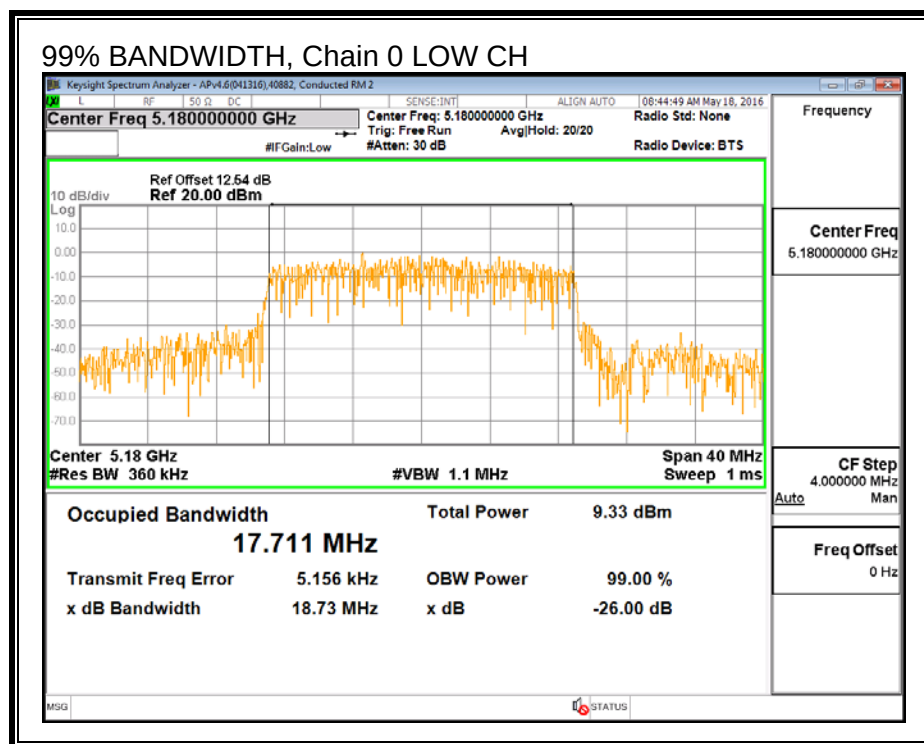
RSS-Gen Clause 6.6, RSS-247 6.2.1 (2)

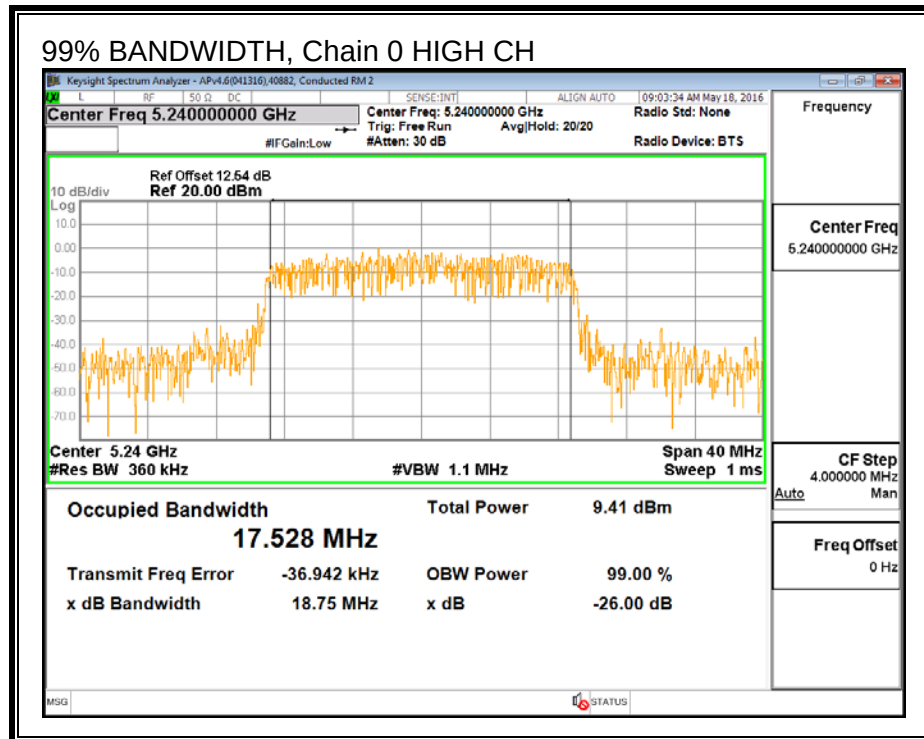
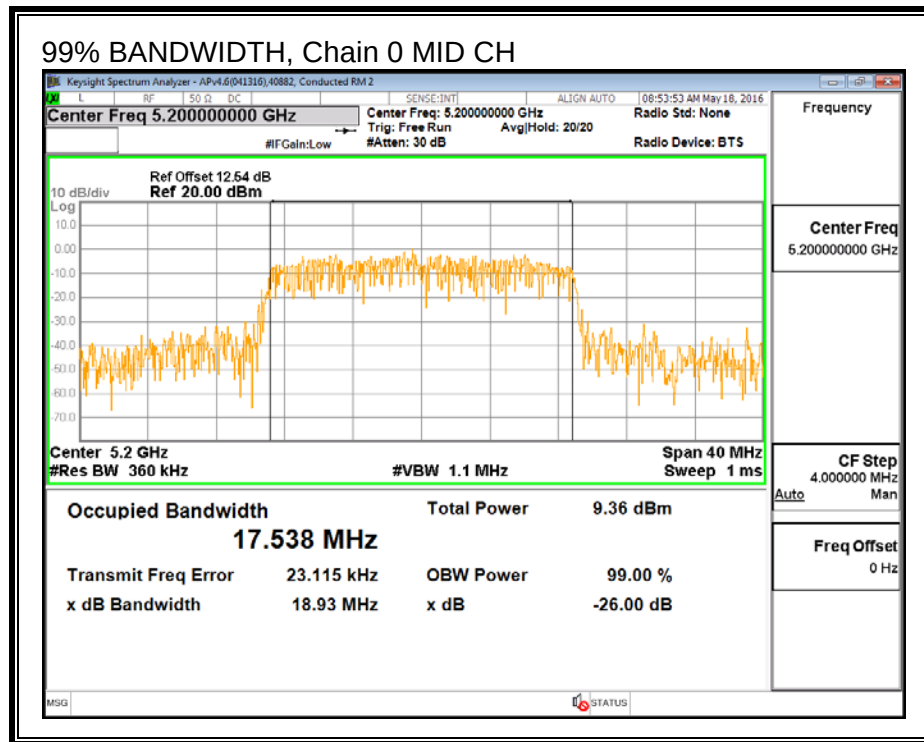
#### RESULTS

| Channel | Frequency (MHz) | 99% Bandwidth (MHz) | Maximum Ch Freq | Does Ch. Freq. Fall in UNII 2A? Y/N |
|---------|-----------------|---------------------|-----------------|-------------------------------------|
| Low     | 5180            | 17.7110             | 5188.856        | N                                   |
| Mid     | 5200            | 17.5380             | 5208.769        | N                                   |
| High    | 5240            | 17.5280             | 5248.764        | N                                   |

Test Performed: Jeff Cabrera  
Test Date: 2016-05-18

#### 99% BANDWIDTH, Chain 0





### 8.3.3. OUTPUT POWER AND PSD

#### LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### DIRECTIONAL ANTENNA GAIN

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

## RESULTS

Test Performed: Jeff Cabrera  
Test Date: 2016-04-29, 2016-05-18

### Antenna Gain and Limits

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5180               | 2.60                                      | 2.60                                    | 24.00                   | 11.00                 |
| Mid     | 5200               | 2.60                                      | 2.60                                    | 24.00                   | 11.00                 |
| High    | 5240               | 2.60                                      | 2.60                                    | 24.00                   | 11.00                 |

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

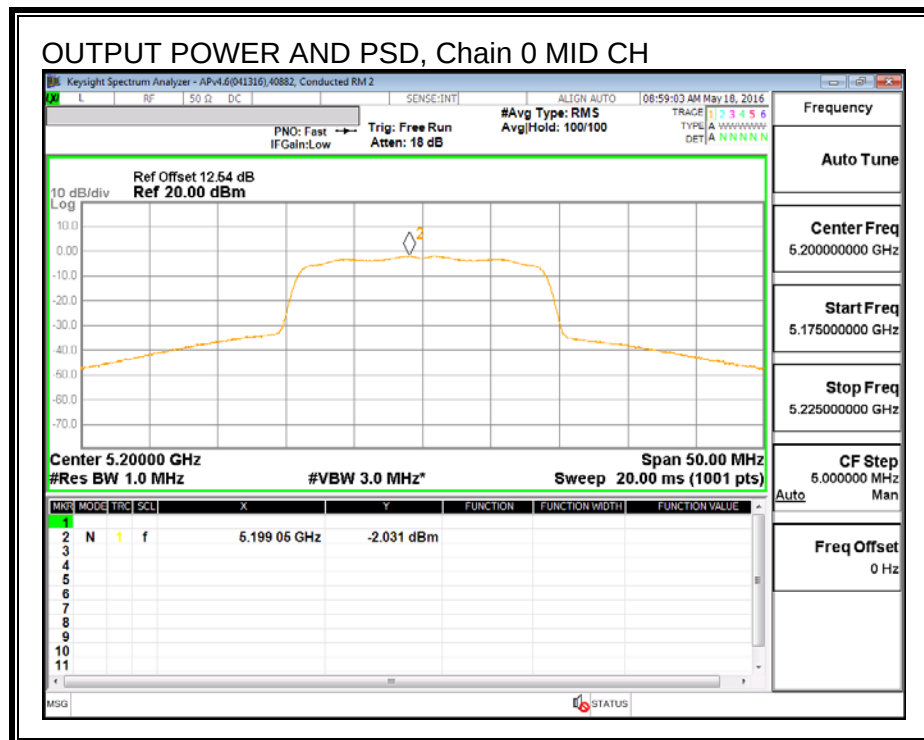
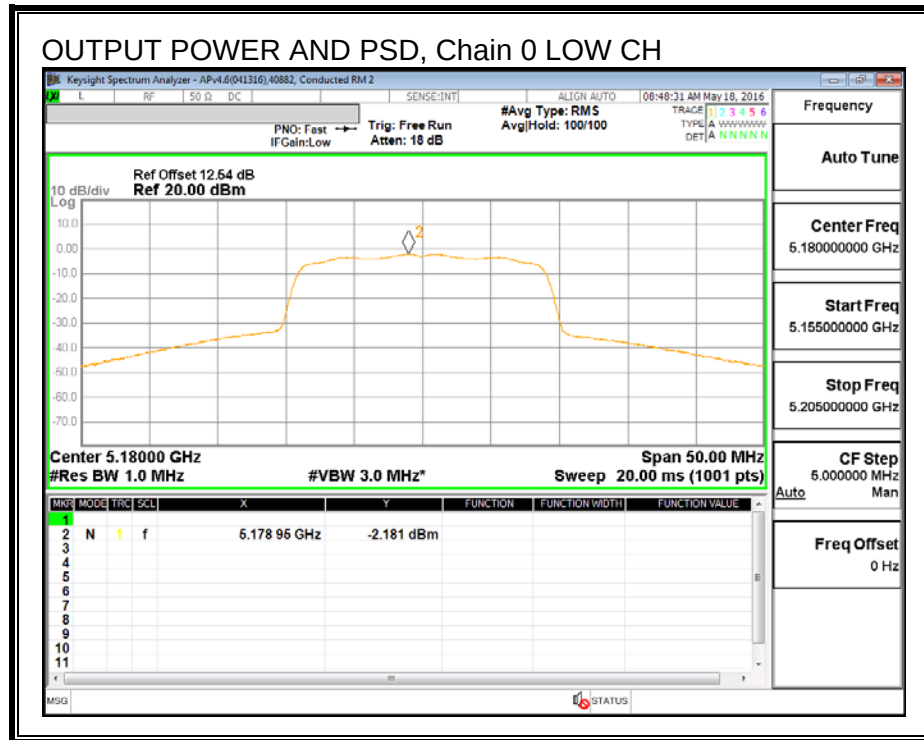
### Output Power Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5180               | 12.43                             | 12.43                             | 24.00                   | -11.57                  |
| Mid     | 5200               | 12.45                             | 12.45                             | 24.00                   | -11.55                  |
| High    | 5240               | 12.37                             | 12.37                             | 24.00                   | -11.63                  |

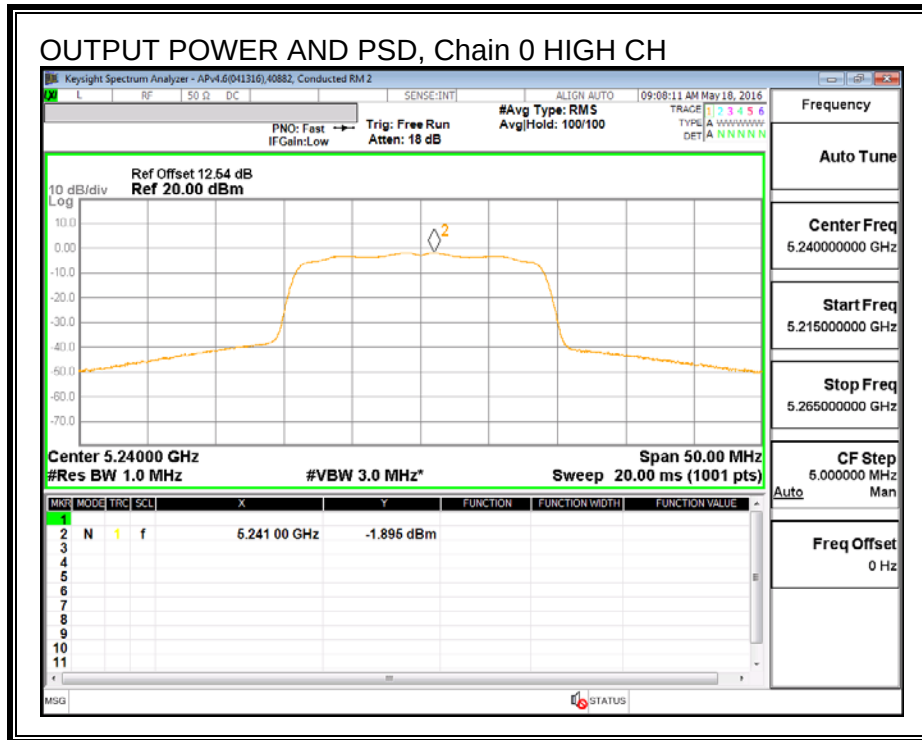
### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5180               | -2.18                           | -2.18                           | 11.00                 | -13.18                |
| Mid     | 5200               | -2.03                           | -2.03                           | 11.00                 | -13.03                |
| High    | 5240               | -1.90                           | -1.90                           | 11.00                 | -12.90                |

**OUTPUT POWER AND PSD, Chain 0**







### **8.3.4. OUTPUT POWER AND PPSD (IC)**

#### **LIMITS**

IC RSS-247 6.2.1 (1)

The maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10} B$ , dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

#### **DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

**RESULTS - 802.11n, 5.2 GHz band**

Test Performed: Jeff Cabrera

Test Date: 2016-04-29, 2016-05-18

**Bandwidth and Antenna Gain**

| Channel | Frequency<br>(MHz) | Min<br>99%<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) |
|---------|--------------------|---------------------------|------------------------------|
| Low     | 5180               | 17.711                    | 2.60                         |
| Mid     | 5200               | 17.538                    | 2.60                         |
| High    | 5240               | 17.528                    | 2.60                         |

**Limits**

| Channel | Frequency<br>(MHz) | IC<br>EIRP<br>Limit<br>(dBm) | IC<br>eirp<br>PSD<br>Limit<br>(dBm) |
|---------|--------------------|------------------------------|-------------------------------------|
| Low     | 5180               | 22.48                        | 10.00                               |
| Mid     | 5200               | 22.44                        | 10.00                               |
| High    | 5240               | 22.44                        | 10.00                               |

|                           |      |                                                |
|---------------------------|------|------------------------------------------------|
| <b>Duty Cycle CF (dB)</b> | 0.00 | Included in Calculations of Corr'd Power & PSD |
|---------------------------|------|------------------------------------------------|

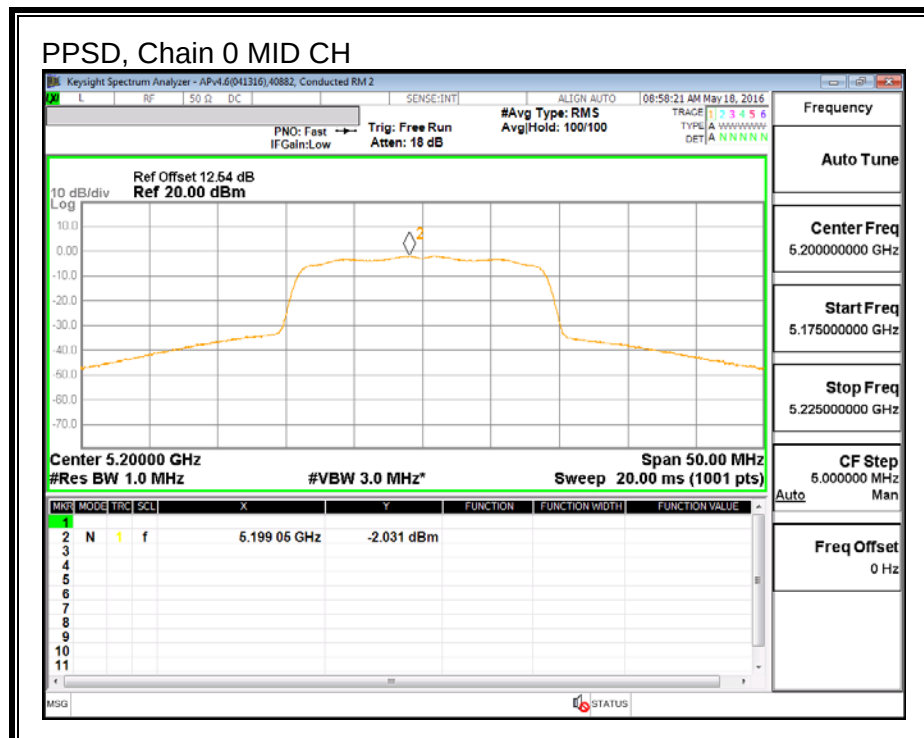
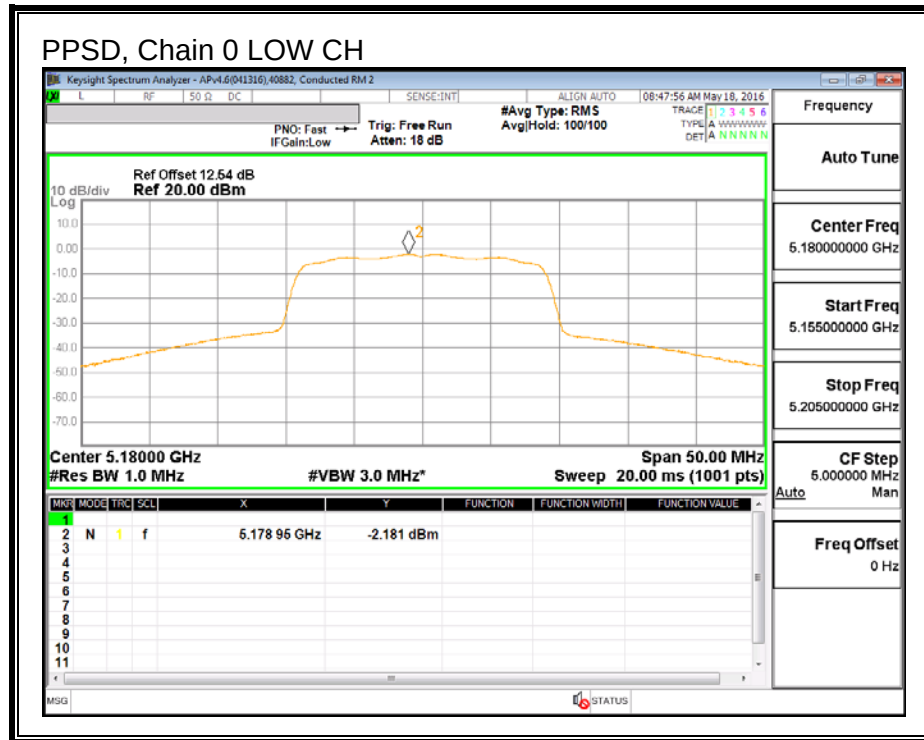
**Output Power Results**

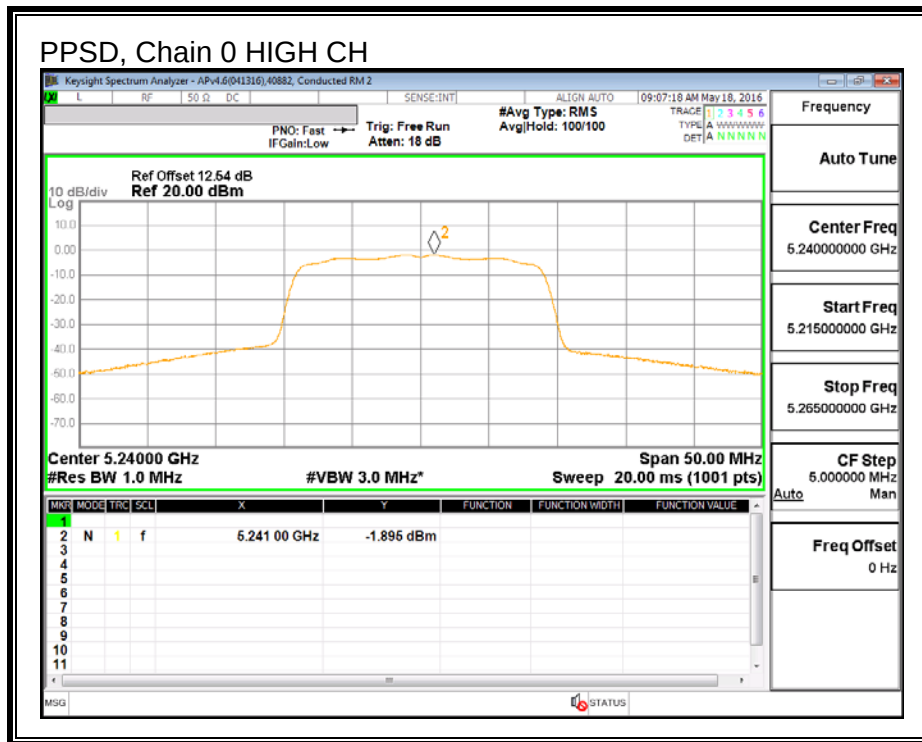
| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>EIRP<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|----------------------------------|-------------------------|-------------------------|
| Low     | 5180               | 12.43                             | 15.03                            | 22.48                   | -7.45                   |
| Mid     | 5200               | 12.45                             | 15.05                            | 22.44                   | -7.39                   |
| High    | 5240               | 12.37                             | 14.97                            | 22.44                   | -7.47                   |

**PPSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>EIRP PSD<br>(dBm) | PPSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|--------------------------------------|------------------------|-----------------------|
| Low     | 5180               | -2.18                           | 0.42                                 | 10.00                  | -9.58                 |
| Mid     | 5200               | -2.03                           | 0.57                                 | 10.00                  | -9.43                 |
| High    | 5240               | -1.90                           | 0.70                                 | 10.00                  | -9.30                 |

**PPSD**





## 8.4. 802.11n HT40 MODE IN THE 5.2 GHz BAND

### 8.4.1. 26 dB BANDWIDTH

#### LIMITS

None; for reporting purposes only. Tested per FCC §15.403 (i)

#### RESULTS

| Channel | Frequency<br>(MHz) | 26 dB Bandwidth<br>(MHz) |
|---------|--------------------|--------------------------|
| Low     | 5190               | 40.02                    |
| High    | 5230               | 40.08                    |

Test Performed: Jeff Cabrera  
Test Date: 2016-05-18



#### **8.4.2. 99% BANDWIDTH**

##### **LIMITS**

RSS-Gen Clause 6.6, RSS-247 6.2.1 (2)

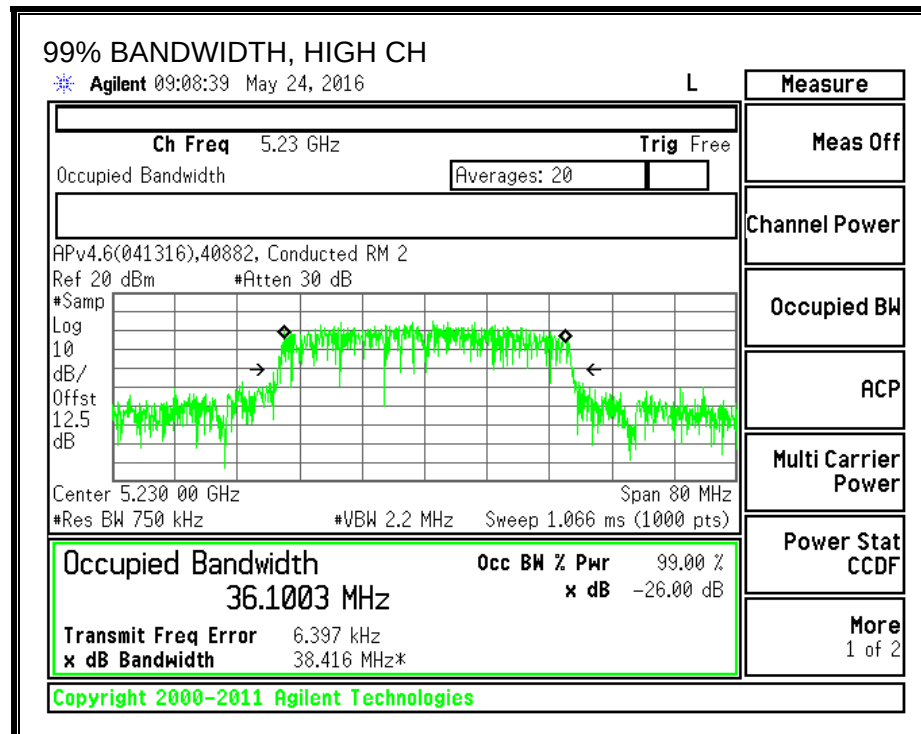
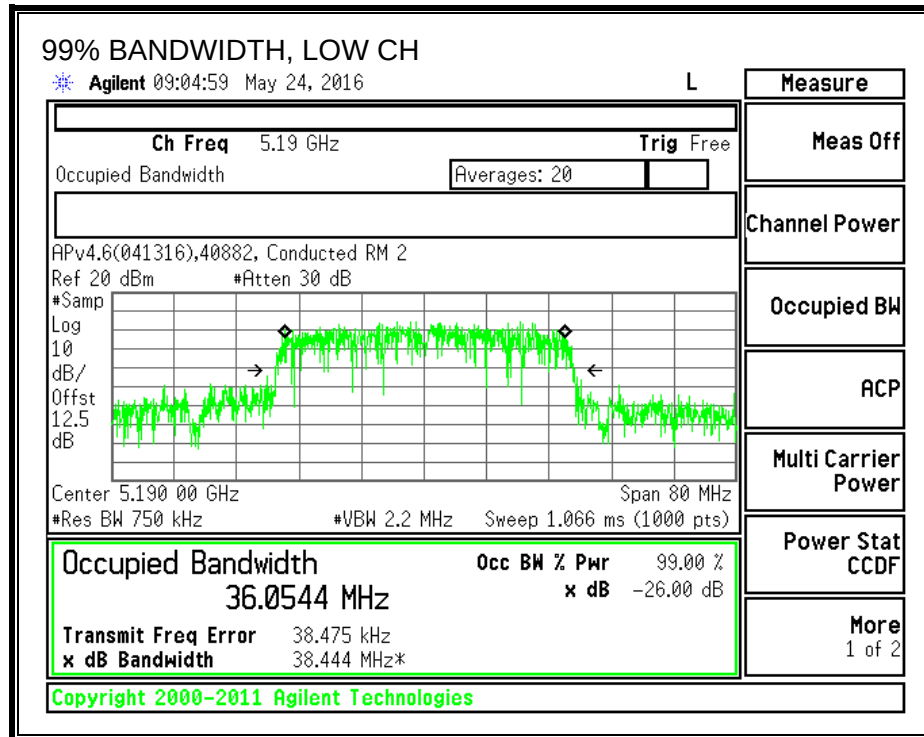
##### **RESULTS**

| Channel | Frequency<br>(MHz) | 99%<br>Bandwidth<br>(MHz) | Maximum<br>Ch Freq | Does Ch.<br>Freq. Fall in<br>UNII 2A?<br>Y/N |
|---------|--------------------|---------------------------|--------------------|----------------------------------------------|
| Low     | 5190               | 36.0544                   | 5208.027           | N                                            |
| High    | 5230               | 36.1003                   | 5248.050           | N                                            |

Test Performed: Jeff Cabrera  
Test Date: 2016-05-24



**99% BANDWIDTH**



### **8.4.3. OUTPUT POWER AND PSD**

#### **LIMITS**

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### **DIRECTIONAL ANTENNA GAIN**

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

## RESULTS

Test Performed: Jeff Cabrera

Test Date: 2016-04-29, 2016-05-18

### Antenna Gain and Limits

| Channel | Frequency<br>(MHz) | Directional<br>Gain<br>for Power<br>(dBi) | Directional<br>Gain<br>for PSD<br>(dBi) | Power<br>Limit<br>(dBm) | PSD<br>Limit<br>(dBm) |
|---------|--------------------|-------------------------------------------|-----------------------------------------|-------------------------|-----------------------|
| Low     | 5190               | 2.60                                      | 2.60                                    | 24.00                   | 11.00                 |
| High    | 5230               | 2.60                                      | 2.60                                    | 24.00                   | 11.00                 |

|                    |      |                                                |
|--------------------|------|------------------------------------------------|
| Duty Cycle CF (dB) | 0.12 | Included in Calculations of Corr'd Power & PSD |
|--------------------|------|------------------------------------------------|

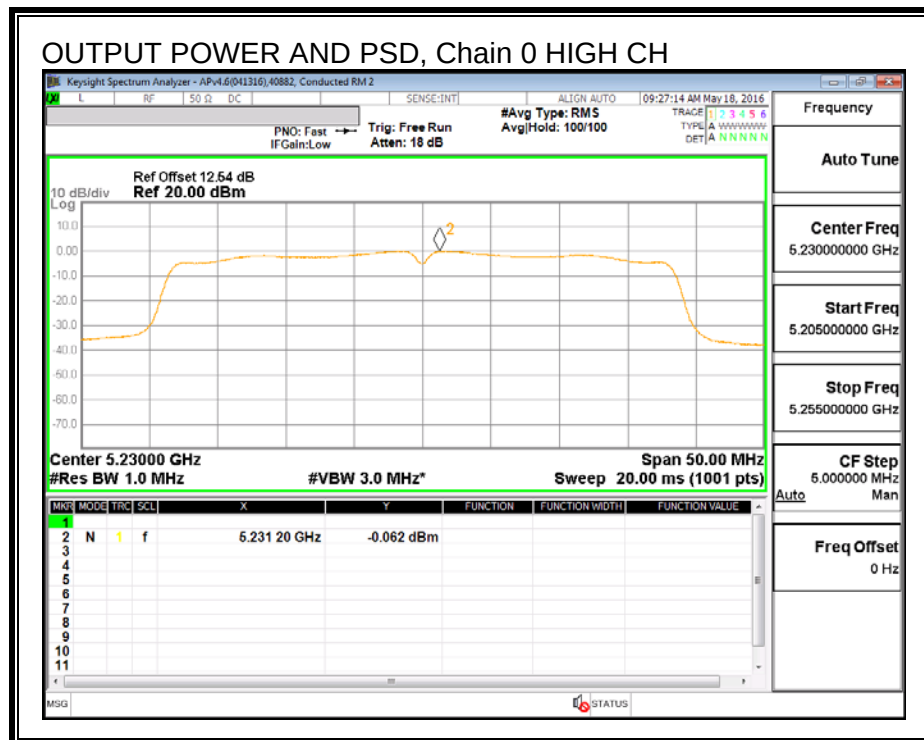
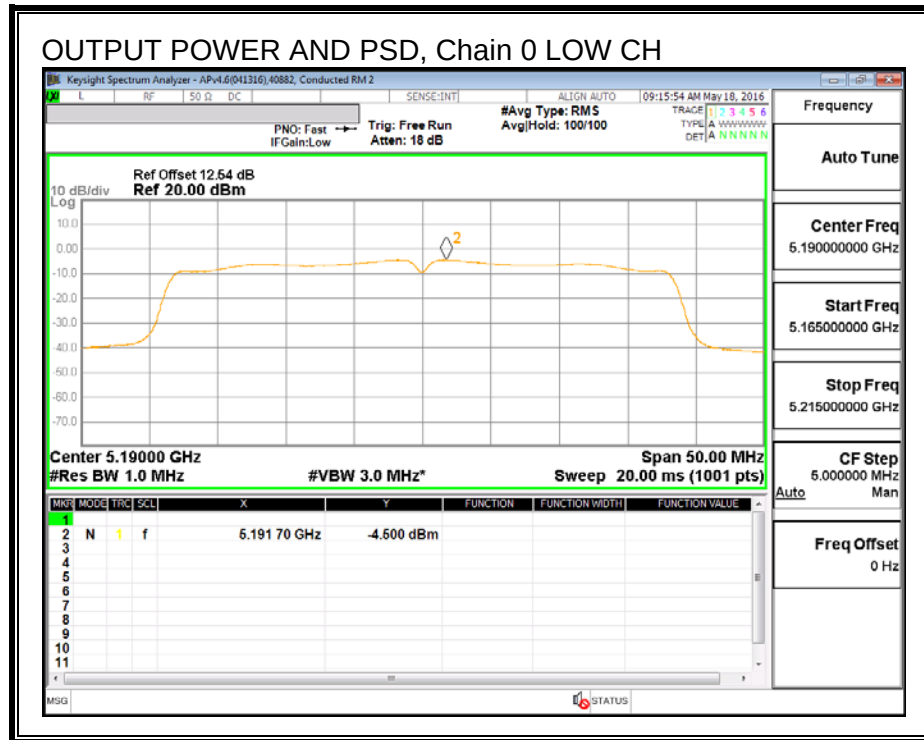
### Output Power Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|-----------------------------------|-------------------------|-------------------------|
| Low     | 5190               | 12.81                             | 12.93                             | 24.00                   | -11.07                  |
| High    | 5230               | 12.63                             | 12.75                             | 24.00                   | -11.25                  |

### PSD Results

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>PSD<br>(dBm) | PSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|---------------------------------|-----------------------|-----------------------|
| Low     | 5190               | -4.50                           | -4.38                           | 11.00                 | -15.38                |
| High    | 5230               | -0.06                           | 0.06                            | 11.00                 | -10.94                |

**OUTPUT POWER AND PSD, Chain 0**



#### **8.4.4. OUTPUT POWER AND PPSD (IC)**

##### **LIMITS**

IC RSS-247 6.2.1 (1)

The maximum e.i.r.p. shall not exceed 200 mW or  $10 + 10 \log_{10} B$ , dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

##### **DIRECTIONAL ANTENNA GAIN**

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain.

**RESULTS - 802.11n, 5.2 GHz band**

Test Performed: Jeff Cabrera

Test Date: 2016-04-29, 2016-05-18

**Bandwidth and Antenna Gain**

| Channel | Frequency<br>(MHz) | Min<br>99%<br>BW<br>(MHz) | Directional<br>Gain<br>(dBi) |
|---------|--------------------|---------------------------|------------------------------|
| Low     | 5190               | 36.054                    | 2.60                         |
| High    | 5230               | 36.100                    | 2.60                         |

**Limits**

| Channel | Frequency<br>(MHz) | IC<br>EIRP<br>Limit<br>(dBm) | IC<br>eirp<br>PSD<br>Limit<br>(dBm) |
|---------|--------------------|------------------------------|-------------------------------------|
| Low     | 5190               | 23.00                        | 10.00                               |
| High    | 5230               | 23.00                        | 10.00                               |

|                    |      |                                                |
|--------------------|------|------------------------------------------------|
| Duty Cycle CF (dB) | 0.12 | Included in Calculations of Corr'd Power & PSD |
|--------------------|------|------------------------------------------------|

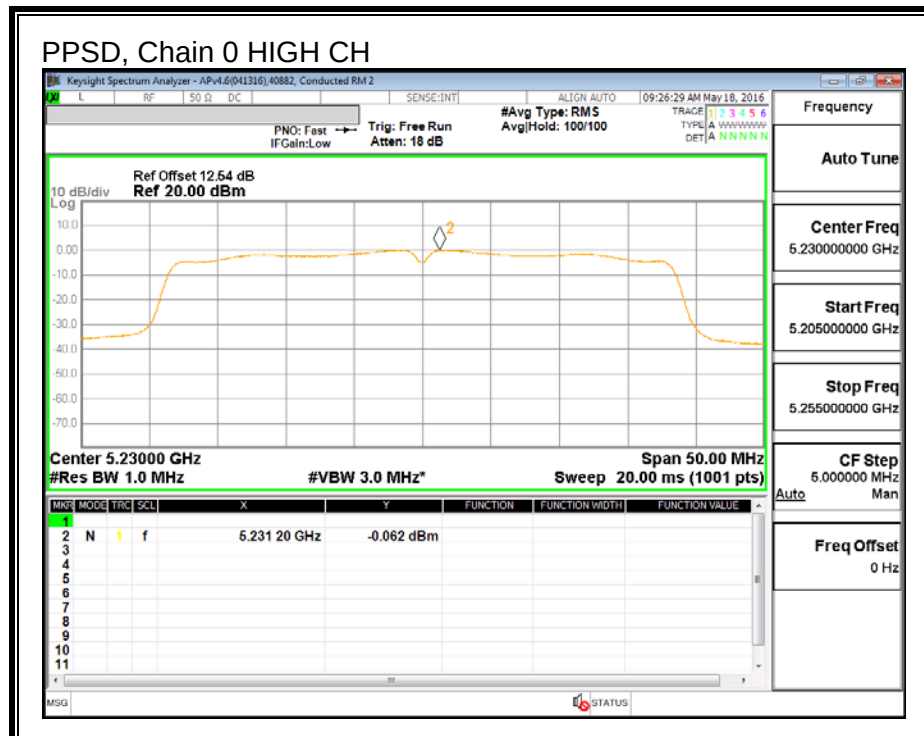
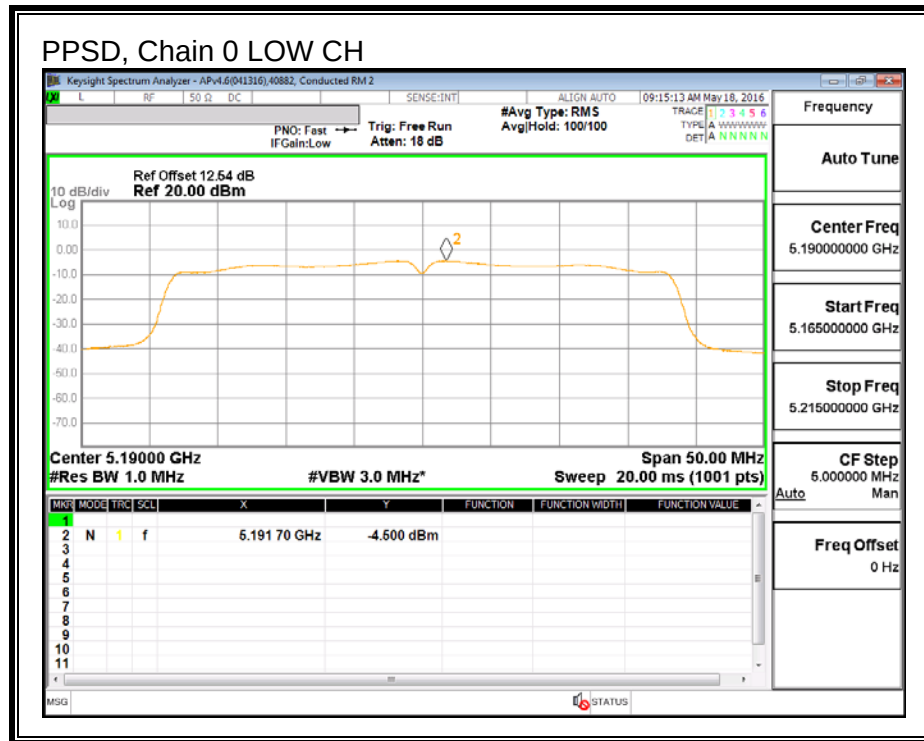
**Output Power Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>Power<br>(dBm) | Total<br>Corr'd<br>EIRP<br>(dBm) | Power<br>Limit<br>(dBm) | Power<br>Margin<br>(dB) |
|---------|--------------------|-----------------------------------|----------------------------------|-------------------------|-------------------------|
| Low     | 5190               | 12.81                             | 15.53                            | 23.00                   | -7.47                   |
| High    | 5230               | 12.63                             | 15.35                            | 23.00                   | -7.65                   |

**PPSD Results**

| Channel | Frequency<br>(MHz) | Chain 0<br>Meas<br>PSD<br>(dBm) | Total<br>Corr'd<br>EIRP PSD<br>(dBm) | PPSD<br>Limit<br>(dBm) | PSD<br>Margin<br>(dB) |
|---------|--------------------|---------------------------------|--------------------------------------|------------------------|-----------------------|
| Low     | 5190               | -4.50                           | -1.78                                | 10.00                  | -11.78                |
| High    | 5230               | -0.06                           | 2.66                                 | 10.00                  | -7.34                 |

**PPSD**



## 9. RADIATED TEST RESULTS

### 9.1. LIMITS AND PROCEDURE

#### LIMITS

FCC §15.205, §15.209, §15.407 (b) (1)

IC RSS-GEN Clause 8.9 (Transmitter), RSS-247 6.2.1 (2)

| Frequency Range<br>(MHz) | Field Strength Limit<br>(uV/m) at 3 m | Field Strength Limit<br>(dBuV/m) at 3 m |
|--------------------------|---------------------------------------|-----------------------------------------|
| 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 below 1GHz measurements and 1.5 m above the ground plane for above 1GHz measurements. The antenna to EUT distance is 3 meters.

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

For 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 this evaluation, RMS Power Averaging was used and the resolution/video bandwidth settings were 1MHz/3MHz.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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

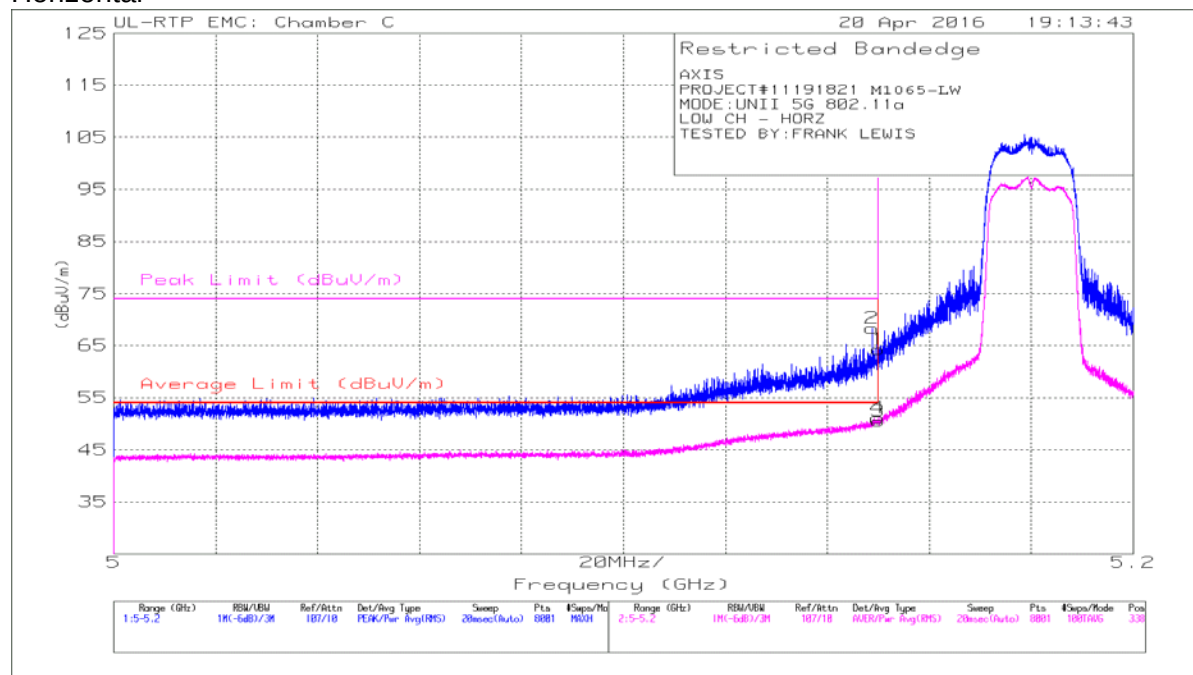


## 9.2. TRANSMITTER 1-18 GHz

### 9.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL)

Horizontal



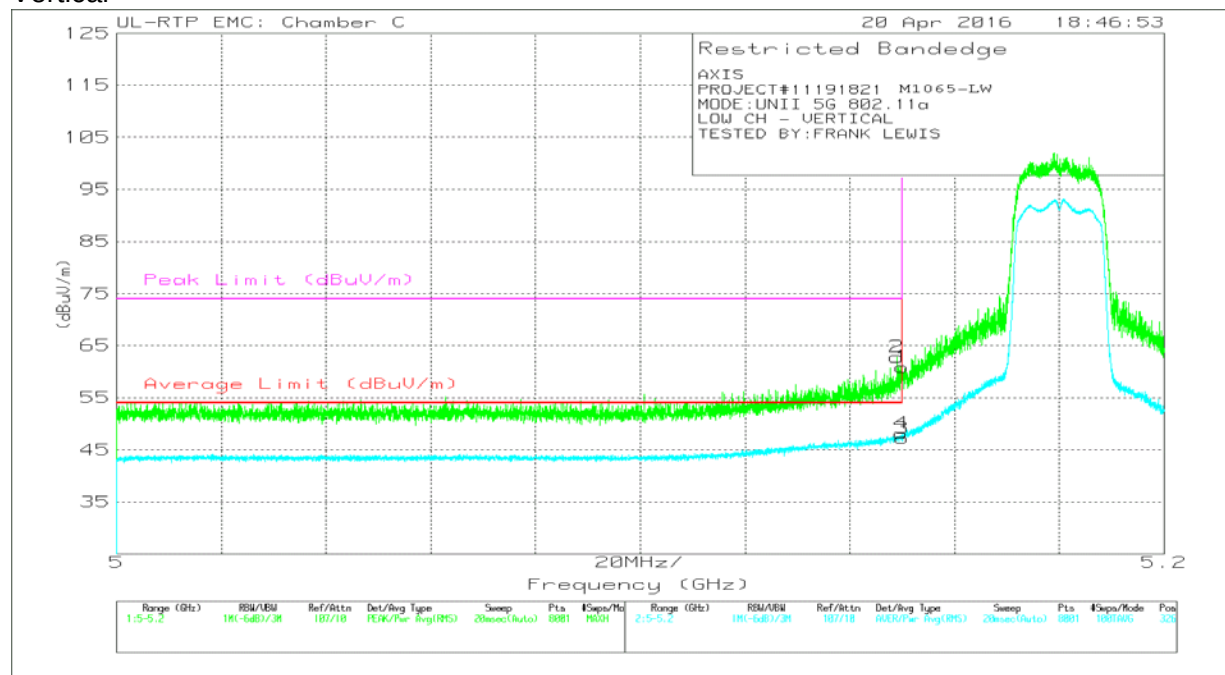
| Marker | Frequency (GHz) | Meter Reading (dBUV) | Det | AF (dB/m) | Amp/Cbl/ Filt/Pad | DC Corr (dB) | Corrected Reading (dBUV/m) | Average Limit (dBUV/m) | Margin (dB) | Peak Limit (dBUV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-----------|-------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 2      | * 5.149         | 57.34                | Pk  | 34.3      | -23.3             | 0            | 68.34                      | -                      | -           | 74                  | -5.66          | 338            | 107         | H        |
| 4      | * 5.15          | 40                   | RMS | 34.3      | -23.3             | 0            | 51.0                       | 54                     | -3.0        | -                   | -              | 338            | 107         | H        |
| 1      | 5.15            | 53.33                | Pk  | 34.3      | -23.3             | 0            | 64.33                      | -                      | -           | 74                  | -9.67          | 338            | 107         | H        |
| 3      | 5.15            | 39.39                | RMS | 34.3      | -23.3             | 0            | 50.39                      | 54                     | -3.61       | -                   | -              | 338            | 107         | H        |

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

Pk - Peak detector

RMS - RMS detection

Vertical



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF (dB/m) | Amp/Cbl/Filtr/Pad | 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 |
|--------|-----------------|----------------------|-----|-----------|-------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 2      | * 5.149         | 51.82                | Pk  | 34.3      | -23.3             | 0            | 62.82                      | -                      | -           | 74                  | -11.18         | 326            | 198         | V        |
| 4      | * 5.15          | 37.05                | RMS | 34.3      | -23.3             | 0            | 48.05                      | 54                     | -5.95       | -                   | -              | 326            | 198         | V        |
| 1      | 5.15            | 49.87                | Pk  | 34.3      | -23.3             | 0            | 60.87                      | -                      | -           | 74                  | -13.13         | 326            | 198         | V        |
| 3      | 5.15            | 36.15                | RMS | 34.3      | -23.3             | 0            | 47.15                      | 54                     | -6.85       | -                   | -              | 326            | 198         | V        |

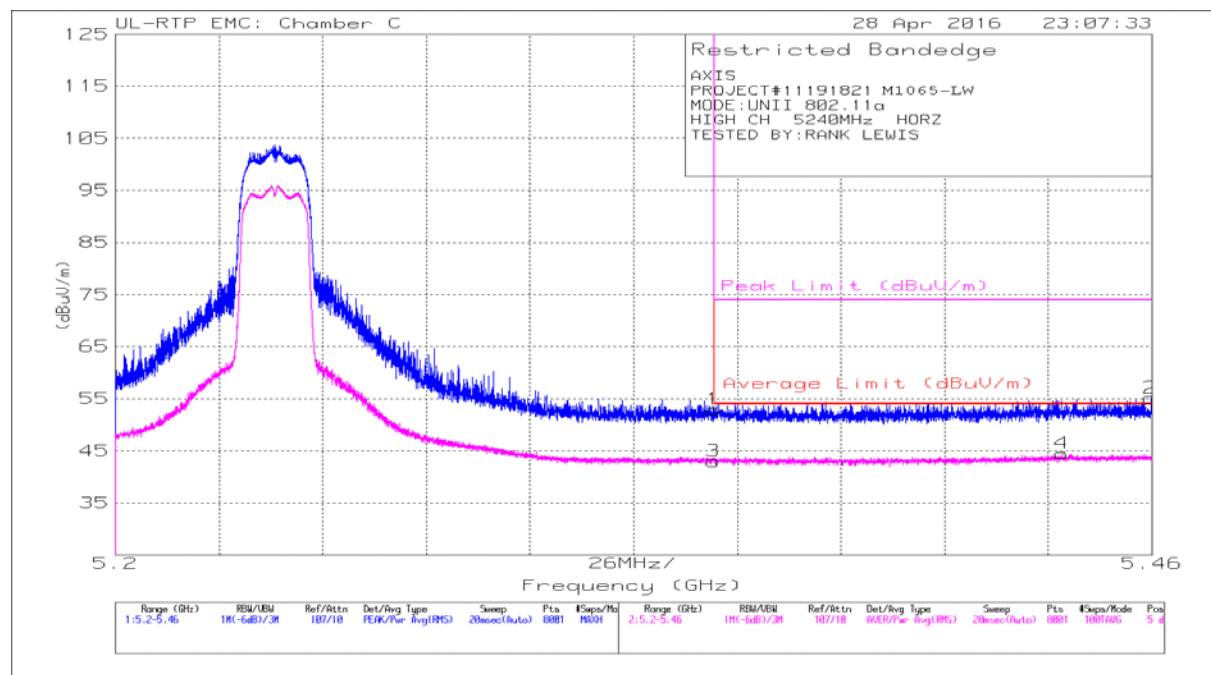
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

**AUTHORIZED BANDEDGE (HIGH CHANNEL)**

Horizontal



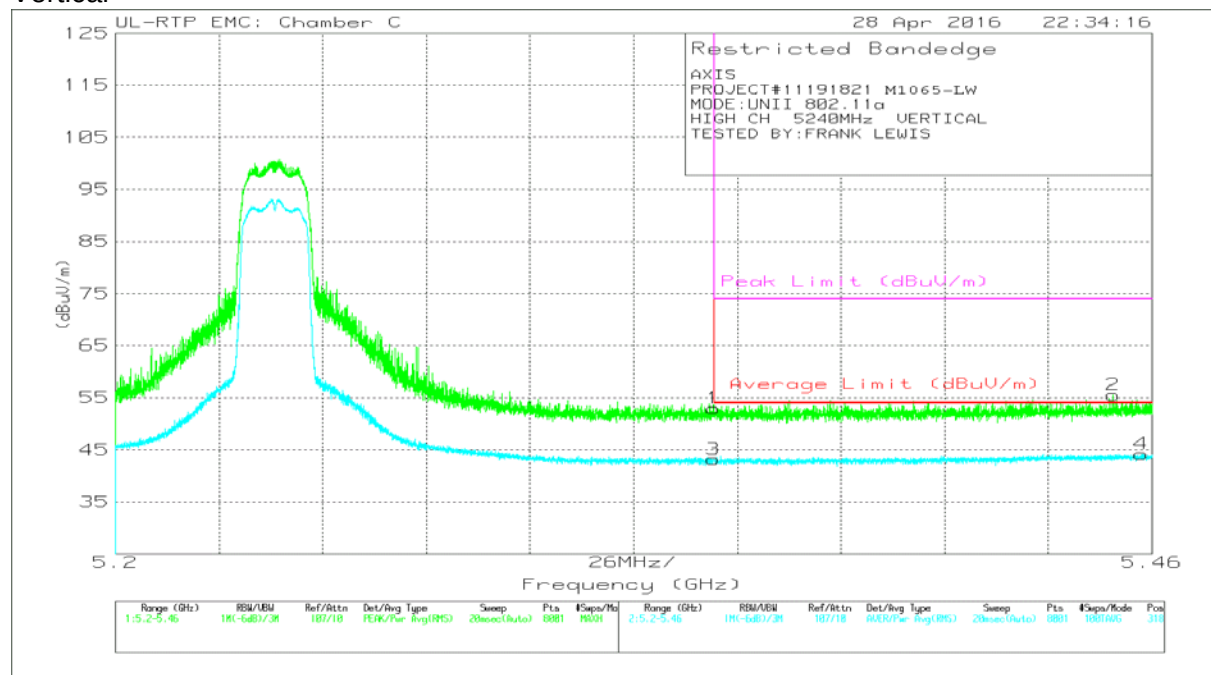
| Marker | Frequency (GHz) | Meter Reading (dBUV) | Det | AF (dB/m) | Amp/Cbl/ Ftr/Pad | DC Corr (dB) | Corrected Reading (dBUV/m) | Average Limit (dBUV/m) | Margin (dB) | Peak Limit (dBUV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-----------|------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 5.35          | 41.05                | Pk  | 34.7      | -22.8            | 0            | 52.95                      | -                      | -           | 74                  | -21.05         | 5              | 191         | H        |
| 2      | * 5.46          | 42.41                | Pk  | 34.7      | -22              | 0            | 55.11                      | -                      | -           | 74                  | -18.89         | 5              | 191         | H        |
| 3      | * 5.35          | 31.03                | RMS | 34.7      | -22.8            | 0            | 42.93                      | 54                     | -11.07      | -                   | -              | 5              | 191         | H        |
| 4      | * 5.437         | 31.89                | RMS | 34.7      | -22.2            | 0            | 44.39                      | 54                     | -9.61       | -                   | -              | 5              | 191         | H        |

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

Pk - Peak detector

RMS - RMS detection

Vertical



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF (dB/m) | Amp/Cbl /Ftr/Pad | 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      | * 5.35          | 41.06                | Pk  | 34.7      | -22.8            | 0            | 52.96                      | -                      | -           | 74                  | -21.04         | 318            | 188         | V        |
| 2      | * 5.45          | 42.92                | Pk  | 34.7      | -22.1            | 0            | 55.52                      | -                      | -           | 74                  | -18.48         | 318            | 188         | V        |
| 3      | * 5.35          | 31.19                | RMS | 34.7      | -22.8            | 0            | 43.09                      | 54                     | -10.91      | -                   | -              | 318            | 188         | V        |
| 4      | * 5.457         | 31.51                | RMS | 34.7      | -22.1            | 0            | 44.11                      | 54                     | -9.89       | -                   | -              | 318            | 188         | V        |

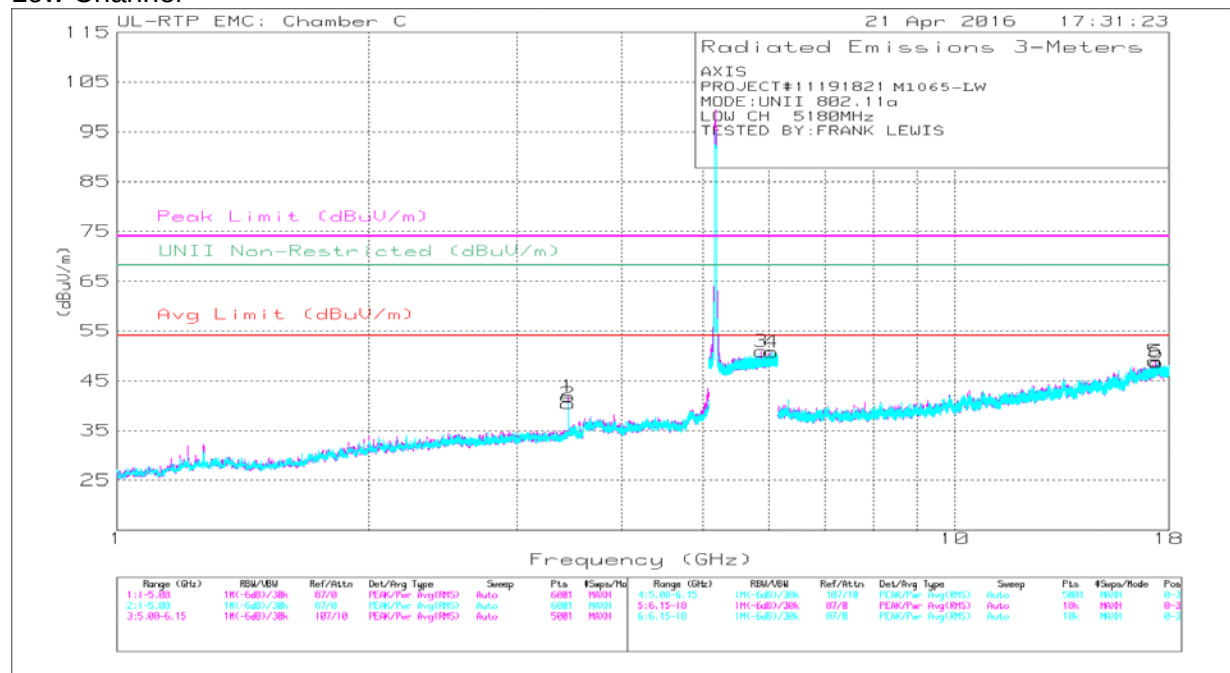
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

# HARMONICS AND SPURIOUS EMISSIONS

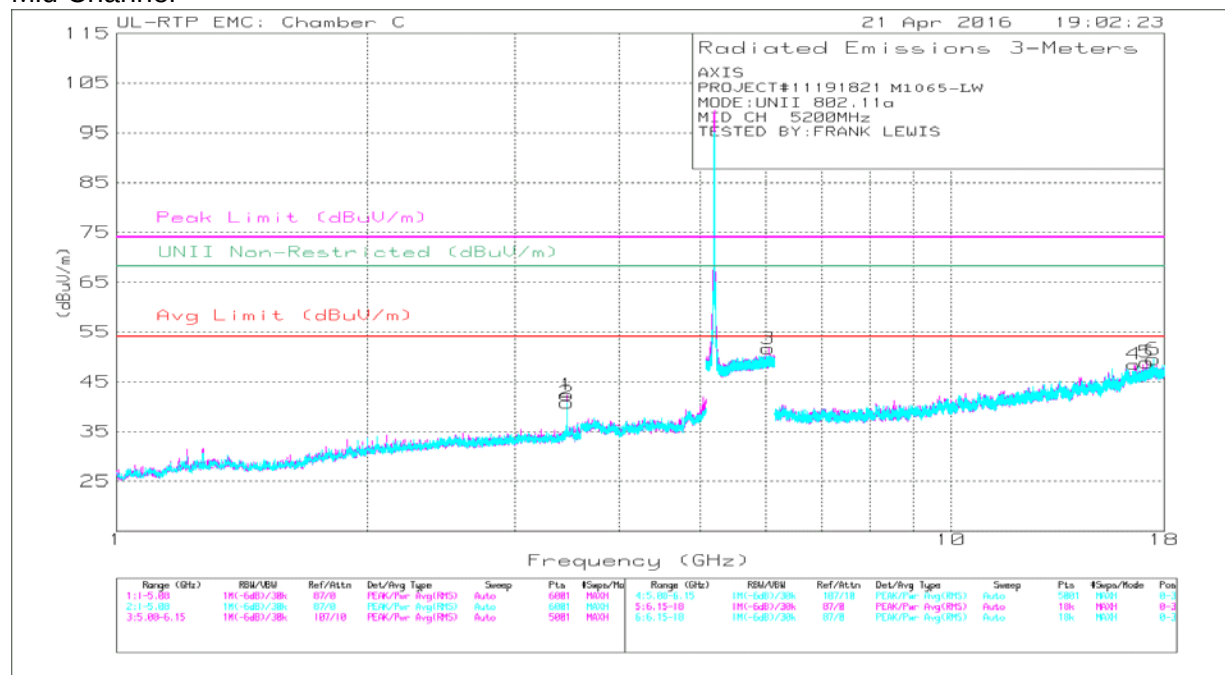
## Low Channel



| Marker | Freq. (GHz) | Meter Reading (dBuV) | Det  | AF (dB/m) | Amp/Cbl/Filtr/Pad | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarit y |
|--------|-------------|----------------------|------|-----------|-------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|------------------------------|----------------|----------------|-------------|-----------|
| 1      | 3.453       | 47.99                | PK-U | 33        | -33.7             | 0            | 47.29                      | -                  | -           | -                   | -              | 68.2                         | -20.91         | 43             | 101         | H         |
| 3      | 5.861       | 42.61                | PK-U | 34.8      | -21.2             | 0            | 56.21                      | -                  | -           | -                   | -              | 68.2                         | -11.99         | 72             | 285         | H         |
| 5      | 17.357      | 32.33                | PK-U | 41.6      | -20.4             | 0            | 53.53                      | -                  | -           | -                   | -              | 68.2                         | -14.67         | 240            | 174         | H         |
| 2      | 3.453       | 46.43                | PK-U | 33        | -33.7             | 0            | 45.73                      | -                  | -           | -                   | -              | 68.2                         | -22.47         | 87             | 101         | V         |
| 4      | 6.021       | 41.69                | PK-U | 35.2      | -20.6             | 0            | 56.29                      | -                  | -           | -                   | -              | 68.2                         | -11.91         | 195            | 364         | V         |
| 6      | 17.425      | 32.44                | PK-U | 41.7      | -19.9             | 0            | 54.24                      | -                  | -           | -                   | -              | 68.2                         | -13.96         | 40             | 287         | V         |

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

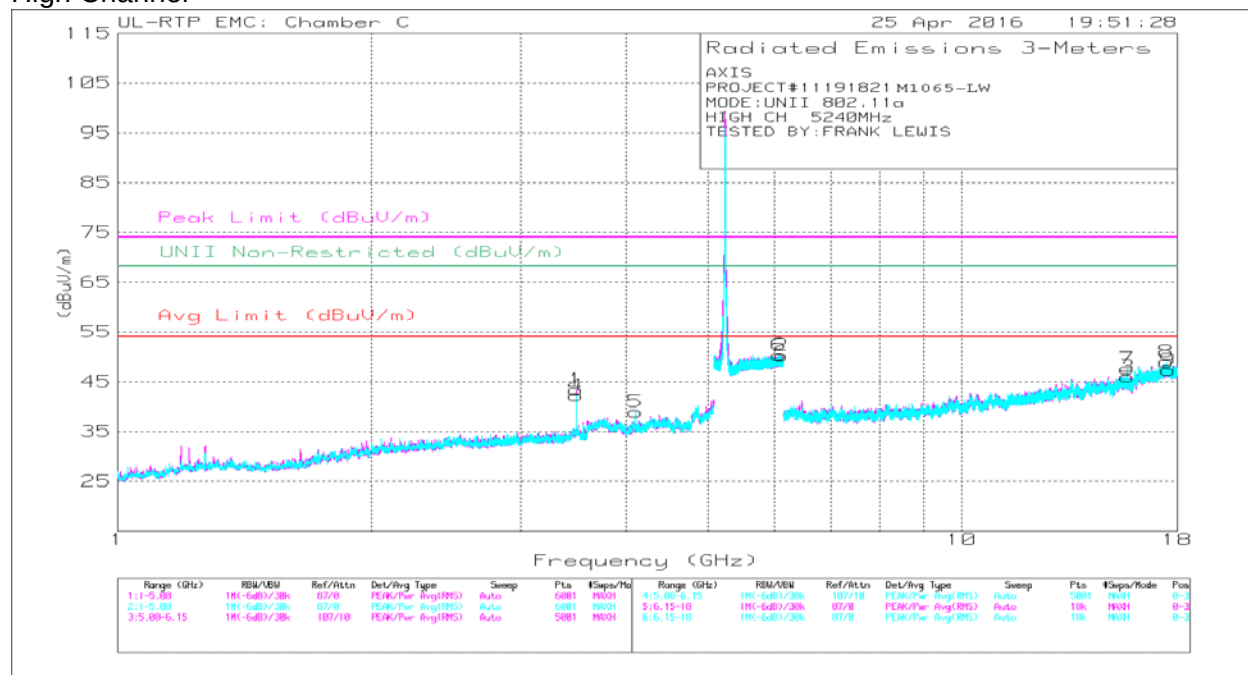
# Mid Channel



| Marker | Freq. (GHz) | Meter Reading (dBuV) | Det  | AF (dB/m) | Amp/Cbl/ Fltr/Pad | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-------------|----------------------|------|-----------|-------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|------------------------------|----------------|----------------|-------------|----------|
| 1      | 3.467       | 48.34                | PK-U | 33.4      | -33.9             | 0            | 47.84                      | -                  | -           | -                   | -              | 68.2                         | -20.36         | 54             | 125         | H        |
| 3      | 6.037       | 41.44                | PK-U | 35.3      | -20.6             | 0            | 56.14                      | -                  | -           | -                   | -              | 68.2                         | -12.06         | 318            | 136         | H        |
| 4      | 16.555      | 33.29                | PK-U | 41.6      | -21.5             | 0            | 53.39                      | -                  | -           | -                   | -              | 68.2                         | -14.81         | 5              | 143         | H        |
| 5      | 17.162      | 33.44                | PK-U | 41.5      | -20.8             | 0            | 54.14                      | -                  | -           | -                   | -              | 68.2                         | -14.06         | 301            | 385         | H        |
| 2      | 3.467       | 46.96                | PK-U | 33.4      | -33.9             | 0            | 46.46                      | -                  | -           | -                   | -              | 68.2                         | -21.74         | 86             | 106         | V        |
| 6      | 17.471      | 32.11                | PK-U | 41.6      | -20.1             | 0            | 53.61                      | -                  | -           | -                   | -              | 68.2                         | -14.59         | 46             | 143         | V        |

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

# High Channel



| Marker | Freq. (GHz) | Meter Reading (dBuV) | Det  | AF (dB/m) | Amp/Cbl/Fltr/Pad | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-------------|----------------------|------|-----------|------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|------------------------------|----------------|----------------|-------------|----------|
| 5      | * 4.115     | 43.61                | PK-U | 33.6      | -33.6            | 0            | 43.61                      | -                  | -           | 74                  | -30.39         | -                            | -              | 355            | 392         | V        |
|        | * 4.116     | 31.42                | ADR  | 33.6      | -33.7            | 0            | 31.32                      | 54                 | -22.68      | -                   | -              | -                            | -              | 355            | 392         | V        |
| 3      | * 15.721    | 37.35                | PK-U | 40.5      | -24.3            | 0            | 53.55                      | -                  | -           | 74                  | -20.45         | -                            | -              | 41             | 219         | H        |
|        | * 15.721    | 25.68                | ADR  | 40.5      | -24.3            | 0            | 41.88                      | 54                 | -12.12      | -                   | -              | -                            | -              | 41             | 219         | H        |
| 7      | * 15.719    | 39.68                | PK-U | 40.5      | -24.3            | 0            | 55.88                      | -                  | -           | 74                  | -18.12         | -                            | -              | 46             | 190         | V        |
|        | * 15.72     | 27.7                 | ADR  | 40.5      | -24.3            | 0            | 43.90                      | 54                 | -10.10      | -                   | -              | -                            | -              | 46             | 190         | V        |
| 1      | 3.493       | 48                   | PK-U | 34.1      | -34.3            | 0            | 47.8                       | -                  | -           | -                   | -              | 68.2                         | -20.4          | 44             | 109         | H        |
| 2      | 6.12        | 41.72                | PK-U | 35.3      | -20.5            | 0            | 56.52                      | -                  | -           | -                   | -              | 68.2                         | -11.68         | 138            | 400         | H        |
| 9      | 17.581      | 32.86                | PK-U | 41.5      | -20.1            | 0            | 54.26                      | -                  | -           | -                   | -              | 68.2                         | -13.94         | 104            | 248         | H        |
| 4      | 3.493       | 47.16                | PK-U | 34.1      | -34.3            | 0            | 46.96                      | -                  | -           | -                   | -              | 68.2                         | -21.24         | 69             | 102         | V        |
| 6      | 6.076       | 41.65                | PK-U | 35.3      | -20.4            | 0            | 56.55                      | -                  | -           | -                   | -              | 68.2                         | -11.65         | 339            | 116         | V        |
| 8      | 17.478      | 33.05                | PK-U | 41.6      | -20.2            | 0            | 54.45                      | -                  | -           | -                   | -              | 68.2                         | -13.75         | 283            | 314         | V        |

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

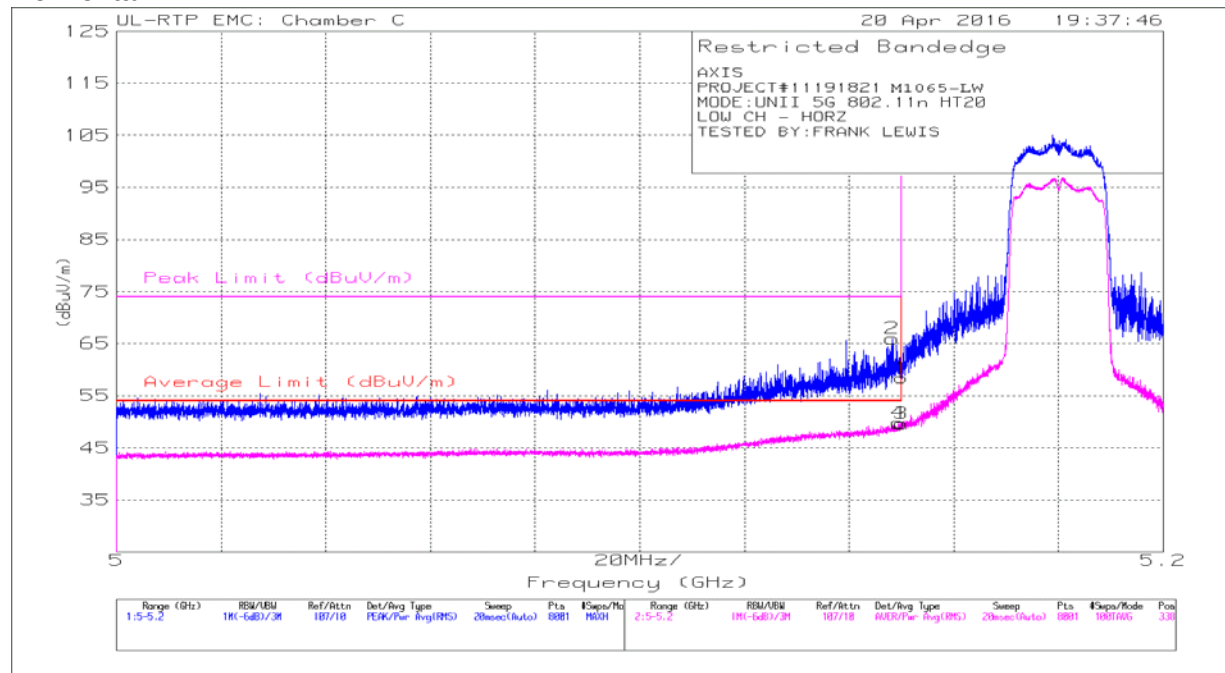
PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

## 9.2.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

### RESTRICTED BANDEGE (LOW CHANNEL)

Horizontal



| Marker | Freq. (GHz) | Meter Reading (dBuV) | Det | AF (dB/m) | Amp/Cbl/ Fltr/Pad | 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 |
|--------|-------------|----------------------|-----|-----------|-------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 2      | * 5.148     | 54.94                | Pk  | 34.3      | -23.3             | 0            | 65.94                      | -                      | -           | 74                  | -8.06          | 338            | 102         | H        |
| 4      | * 5.149     | 38.72                | RMS | 34.3      | -23.3             | 0            | 49.72                      | 54                     | -4.28       | -                   | -              | 338            | 102         | H        |
| 1      | 5.15        | 47.45                | Pk  | 34.3      | -23.3             | 0            | 58.45                      | -                      | -           | 74                  | -15.55         | 338            | 102         | H        |
| 3      | 5.15        | 38.59                | RMS | 34.3      | -23.3             | 0            | 49.59                      | 54                     | -4.41       | -                   | -              | 338            | 102         | H        |

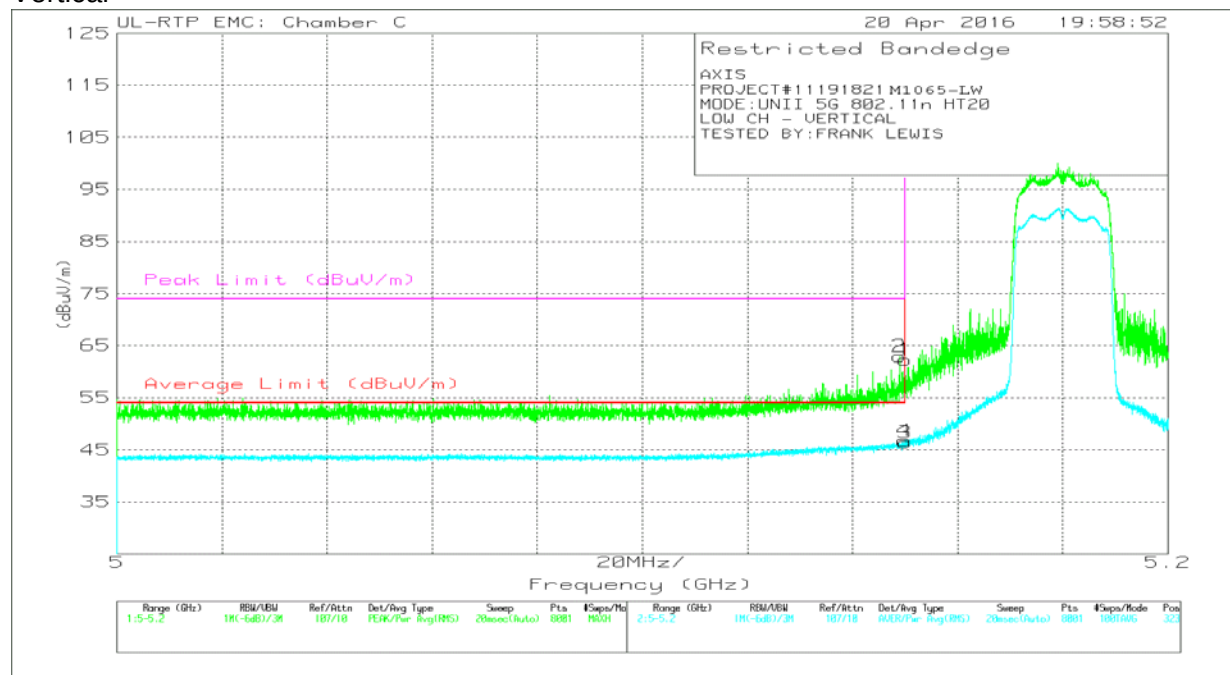
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection



# Vertical



| Marker | Freq (GHz) | Meter Reading (dBuV) | Det | AF (dB/m) | Amp/Cbl/Fltr/Pad | 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 |
|--------|------------|----------------------|-----|-----------|------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 2      | * 5.149    | 51.93                | Pk  | 34.3      | -23.3            | 0            | 62.93                      | -                      | -           | 74                  | -11.07         | 323            | 199         | V        |
| 4      | * 5.15     | 35.65                | RMS | 34.3      | -23.3            | 0            | 46.65                      | 54                     | -7.35       | -                   | -              | 323            | 199         | V        |
| 1      | 5.15       | 51.29                | Pk  | 34.3      | -23.3            | 0            | 62.29                      | -                      | -           | 74                  | -11.71         | 323            | 199         | V        |
| 3      | 5.15       | 35.28                | RMS | 34.3      | -23.3            | 0            | 46.28                      | 54                     | -7.72       | -                   | -              | 323            | 199         | V        |

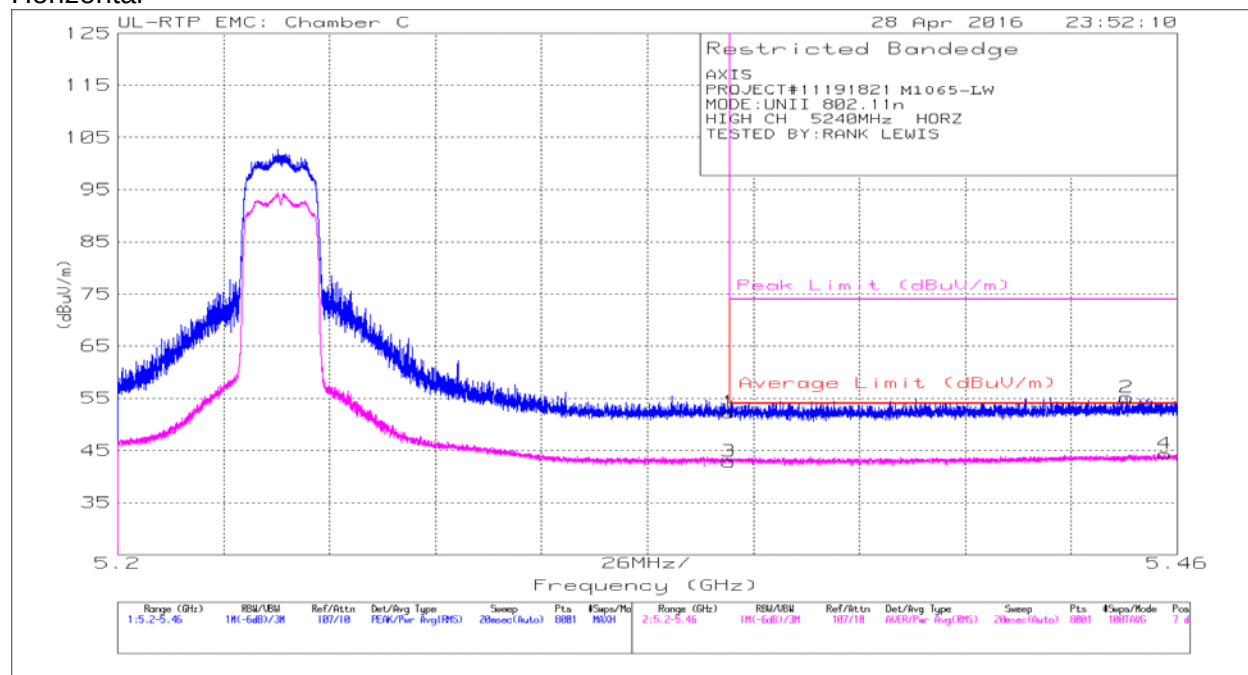
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

# AUTHORIZED BANDEDGE (HIGH CHANNEL)

Horizontal



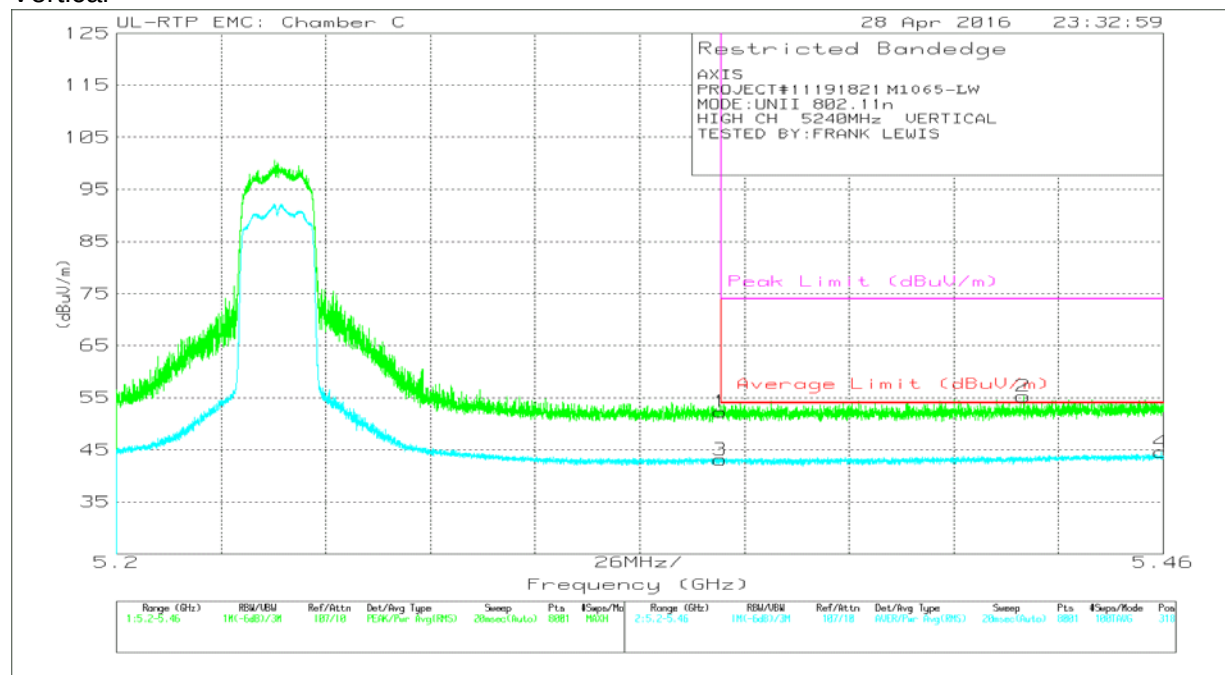
| Marker | Freq. (GHz) | Meter Reading (dBUV) | Det | AF (dB/m) | Amp/Cbl/Filtr/Pad | DC Corr (dB) | Corrected Reading (dBUV/m) | Average Limit (dBUV/m) | Margin (dB) | Peak Limit (dBUV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-------------|----------------------|-----|-----------|-------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 5.35      | 40.37                | Pk  | 34.7      | -22.8             | 0            | 52.27                      | -                      | -           | 74                  | -21.73         | 7              | 205         | H        |
| 2      | * 5.448     | 42.58                | Pk  | 34.7      | -22.1             | 0            | 55.18                      | -                      | -           | 74                  | -18.82         | 7              | 205         | H        |
| 3      | * 5.35      | 30.9                 | RMS | 34.7      | -22.8             | 0            | 42.80                      | 54                     | -11.20      | -                   | -              | 7              | 205         | H        |
| 4      | * 5.457     | 31.68                | RMS | 34.7      | -22.1             | 0            | 44.28                      | 54                     | -9.72       | -                   | -              | 7              | 205         | H        |

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

Pk - Peak detector

RMS - RMS detection

Vertical



| Marker | Freq. (GHz) | Meter Reading (dBuV) | Det | AF (dB/m) | Amp/Cbl/Filtr/Pad | 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      | * 5.35      | 40.4                 | Pk  | 34.7      | -22.8             | 0            | 52.3                       | -                      | -           | 74                  | -21.7          | 318            | 204         | V        |
| 2      | * 5.425     | 42.99                | Pk  | 34.7      | -22.4             | 0            | 55.29                      | -                      | -           | 74                  | -18.71         | 318            | 204         | V        |
| 3      | * 5.35      | 31.12                | RMS | 34.7      | -22.8             | 0            | 43.02                      | 54                     | -10.98      | -                   | -              | 318            | 204         | V        |
| 4      | * 5.459     | 31.74                | RMS | 34.7      | -22               | 0            | 44.44                      | 54                     | -9.56       | -                   | -              | 318            | 204         | V        |

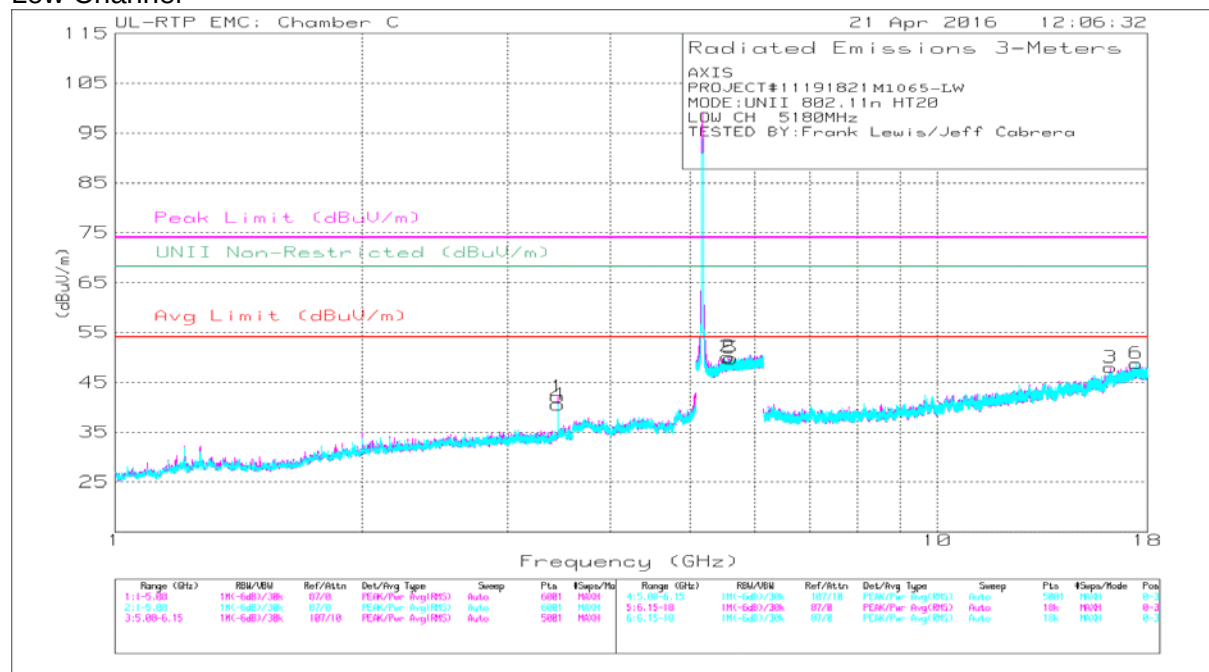
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

# HARMONICS AND SPURIOUS EMISSIONS

## Low Channel

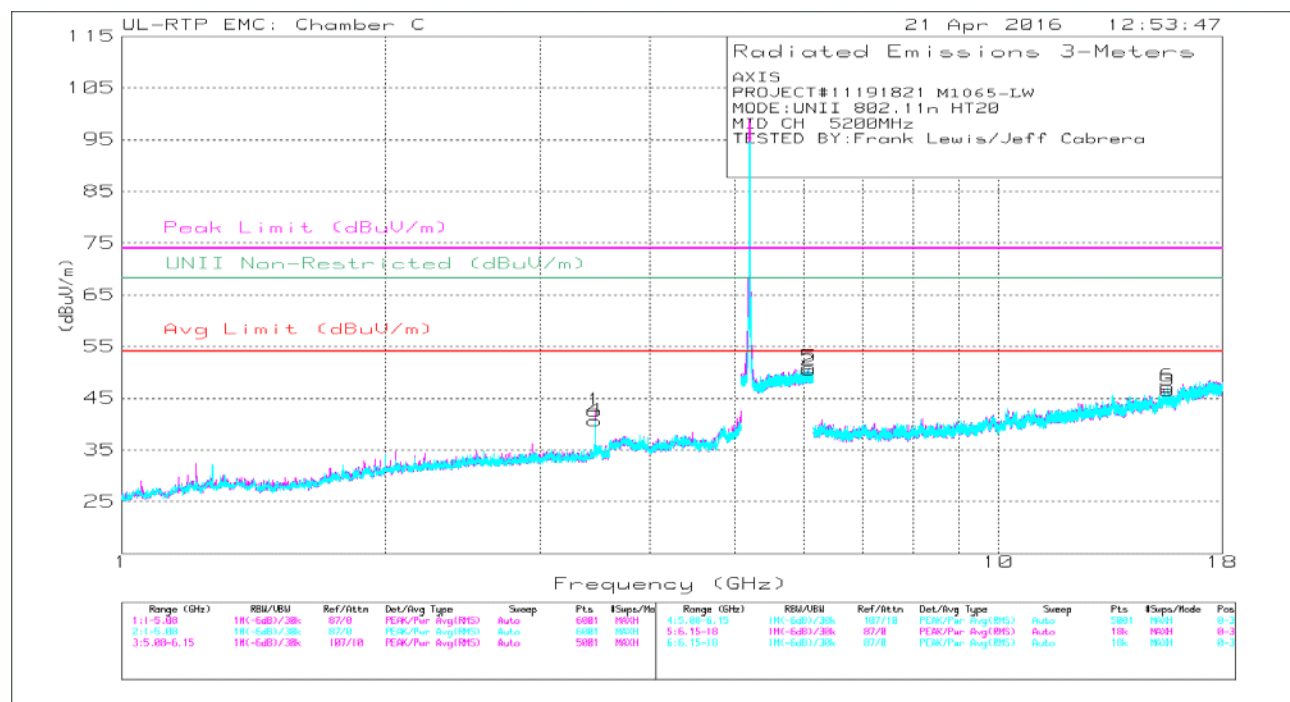


| Marker | Freq. (GHz) | Meter Reading (dBuV) | Det  | AF (dB/m) | Amp/Cbl/ Fltr/Pad | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-------------|----------------------|------|-----------|-------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|------------------------------|----------------|----------------|-------------|----------|
| 1      | 3.453       | 47.13                | PK-U | 33        | -33.7             | 0            | 46.43                      | -                  | -           | -                   | -              | 68.2                         | -21.77         | 51             | 118         | H        |
| 2      | 5.589       | 43.47                | PK-U | 34.5      | -22               | 0            | 55.97                      | -                  | -           | -                   | -              | 68.2                         | -12.23         | 335            | 252         | H        |
| 3      | 16.241      | 34.66                | PK-U | 41.1      | -21.8             | 0            | 53.96                      | -                  | -           | -                   | -              | 68.2                         | -14.24         | 37             | 323         | H        |
| 4      | 3.453       | 46.69                | PK-U | 33        | -33.7             | 0            | 45.99                      | -                  | -           | -                   | -              | 68.2                         | -22.21         | 88             | 110         | V        |
| 5      | 5.611       | 43.4                 | PK-U | 34.5      | -22               | 0            | 55.9                       | -                  | -           | -                   | -              | 68.2                         | -12.3          | 36             | 127         | V        |
| 6      | 17.452      | 33.07                | PK-U | 41.6      | -19.8             | 0            | 54.87                      | -                  | -           | -                   | -              | 68.2                         | -13.33         | 145            | 179         | V        |

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

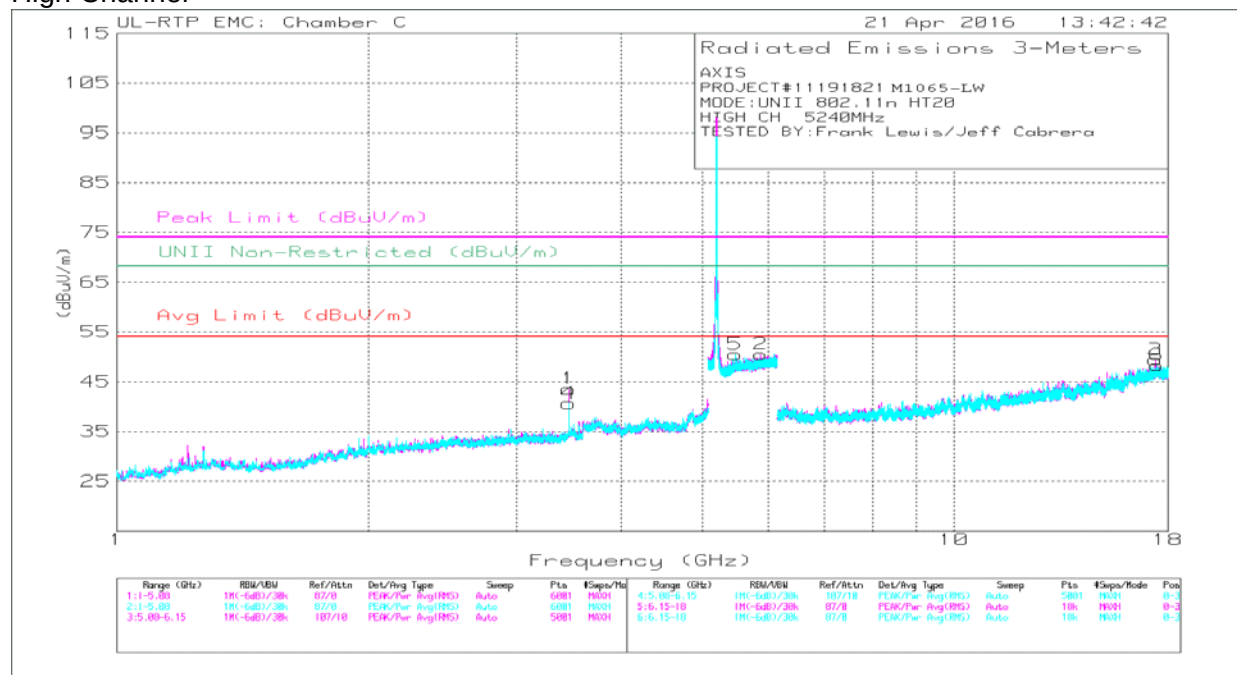
Mid Channel



| Marker | Freq. (GHz) | Meter Reading (dBuV) | Det  | AF (dB/m) | Amp/Cbl/ Filt/Pad | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-------------|----------------------|------|-----------|-------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|------------------------------|----------------|----------------|-------------|----------|
| 3      | * 15.602    | 35.77                | PK-U | 40.5      | -23.5             | 0            | 52.77                      | -                  | -           | 74                  | -21.23         | -                            | -              | 312            | 156         | H        |
|        | * 15.602    | 23.79                | ADR  | 40.5      | -23.6             | 0            | 40.69                      | 54                 | -13.31      | -                   | -              | -                            | -              | 312            | 156         | H        |
| 6      | * 15.597    | 37.89                | PK-U | 40.5      | -23.7             | 0            | 54.69                      | -                  | -           | 74                  | -19.31         | -                            | -              | 45             | 183         | V        |
|        | * 15.597    | 25.14                | ADR  | 40.5      | -23.6             | 0            | 42.04                      | 54                 | -11.96      | -                   | -              | -                            | -              | 45             | 183         | V        |
| 1      | 3.467       | 48.24                | PK-U | 33.4      | -33.9             | 0            | 47.74                      | -                  | -           | -                   | -              | 68.2                         | -20.46         | 53             | 111         | H        |
| 2      | 6.086       | 41.34                | PK-U | 35.3      | -20.4             | 0            | 56.24                      | -                  | -           | -                   | -              | 68.2                         | -11.96         | 96             | 121         | H        |
| 4      | 3.467       | 46.88                | PK-U | 33.4      | -33.9             | 0            | 46.38                      | -                  | -           | -                   | -              | 68.2                         | -21.82         | 13             | 106         | V        |
| 5      | 6.074       | 42.65                | PK-U | 35.3      | -20.5             | 0            | 57.45                      | -                  | -           | -                   | -              | 68.2                         | -10.75         | 360            | 206         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)  
 ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

# High Channel



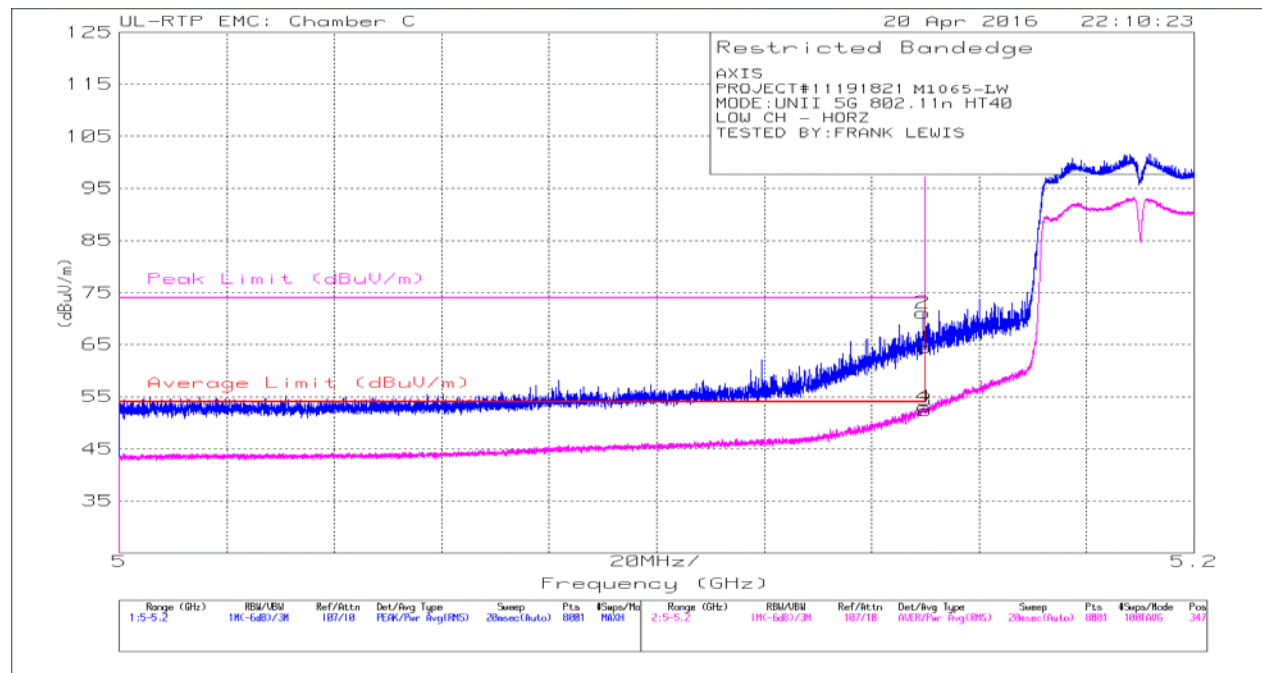
| Marker | Freq. (GHz) | Meter Reading (dBuV) | Det  | AF (dB/m) | Amp/Cbl/Fitr/Pad | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-------------|----------------------|------|-----------|------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|------------------------------|----------------|----------------|-------------|----------|
| 1      | 3.493       | 47.94                | PK-U | 34.2      | -34.3            | 0            | 47.84                      | -                  | -           | -                   | -              | 68.2                         | -20.36         | 39             | 101         | H        |
| 2      | 5.876       | 43.37                | PK-U | 34.9      | -21.1            | 0            | 57.17                      | -                  | -           | -                   | -              | 68.2                         | -11.03         | 11             | 224         | H        |
| 3      | 17.393      | 33.95                | PK-U | 41.8      | -20.6            | 0            | 55.15                      | -                  | -           | -                   | -              | 68.2                         | -13.05         | 191            | 240         | H        |
| 4      | 3.493       | 46.84                | PK-U | 34.2      | -34.3            | 0            | 46.74                      | -                  | -           | -                   | -              | 68.2                         | -21.46         | 69             | 102         | V        |
| 5      | 5.477       | 43.32                | PK-U | 34.6      | -22              | 0            | 55.92                      | -                  | -           | -                   | -              | 68.2                         | -12.28         | 139            | 185         | V        |
| 6      | 17.47       | 32.98                | PK-U | 41.6      | -20              | 0            | 54.58                      | -                  | -           | -                   | -              | 68.2                         | -13.62         | 211            | 354         | V        |

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

### 9.2.3. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL)

Horizontal



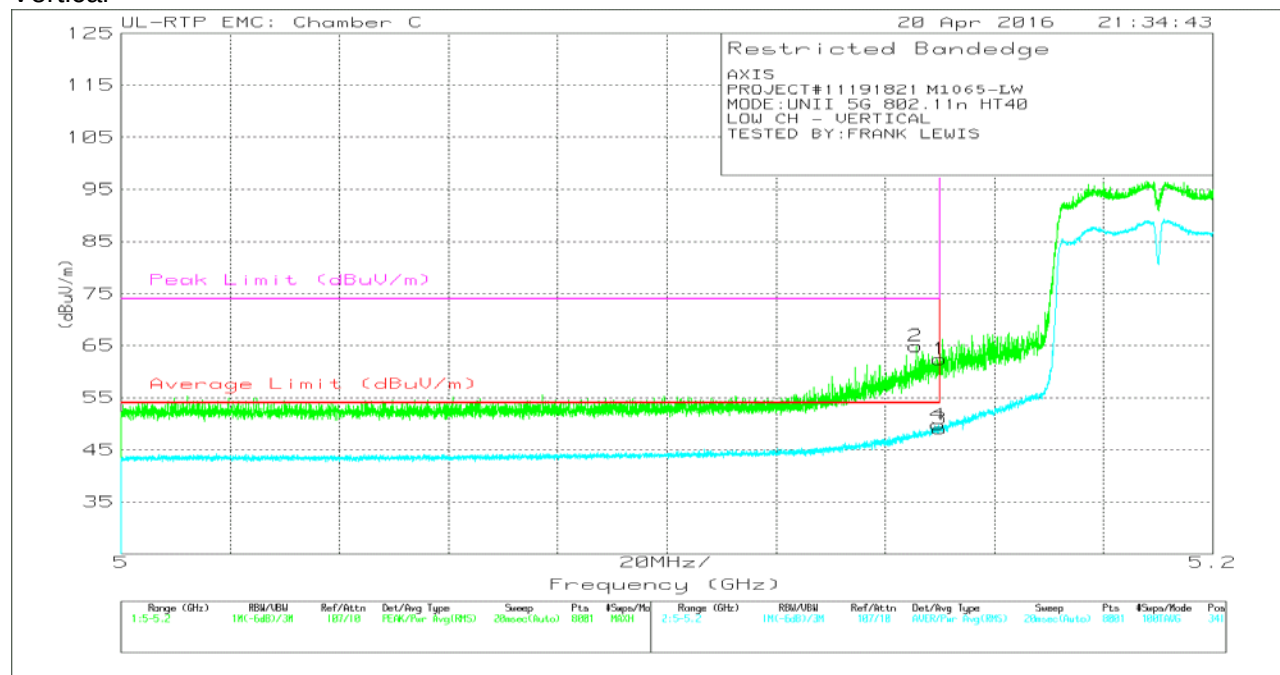
| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF (dB/m) | Amp/Cbl/ Ftr/Pad | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-----------|------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 2      | * 5.15          | 60.13                | Pk  | 34.3      | -23.3            | 0            | 71.13                      | -                      | -           | 74                  | -2.87          | 347            | 105         | H        |
| 4      | * 5.15          | 42                   | RMS | 34.3      | -23.3            | .12          | 53.12                      | 54                     | -0.88       | -                   | -              | 347            | 105         | H        |
| 1      | 5.15            | 53.47                | Pk  | 34.3      | -23.3            | 0            | 64.47                      | -                      | -           | 74                  | -9.53          | 347            | 105         | H        |
| 3      | 5.15            | 41.29                | RMS | 34.3      | -23.3            | .12          | 52.41                      | 54                     | -1.59       | -                   | -              | 347            | 105         | H        |

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

Pk - Peak detector

RMS - RMS detection

Vertical



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF (dB/m) | Amp/Cbl/ Fltr/Pad | 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 |
|--------|-----------------|----------------------|-----|-----------|-------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 2      | * 5.146         | 53.91                | Pk  | 34.3      | -23.3             | 0            | 64.91                      | -                      | -           | 74                  | -9.09          | 341            | 200         | V        |
| 4      | * 5.15          | 38.74                | RMS | 34.3      | -23.3             | .12          | 49.86                      | 54                     | -4.14       | -                   | -              | 341            | 200         | V        |
| 1      | 5.15            | 51.45                | Pk  | 34.3      | -23.3             | 0            | 62.45                      | -                      | -           | 74                  | -11.55         | 341            | 200         | V        |
| 3      | 5.15            | 37.95                | RMS | 34.3      | -23.3             | .12          | 49.07                      | 54                     | -4.93       | -                   | -              | 341            | 200         | V        |

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

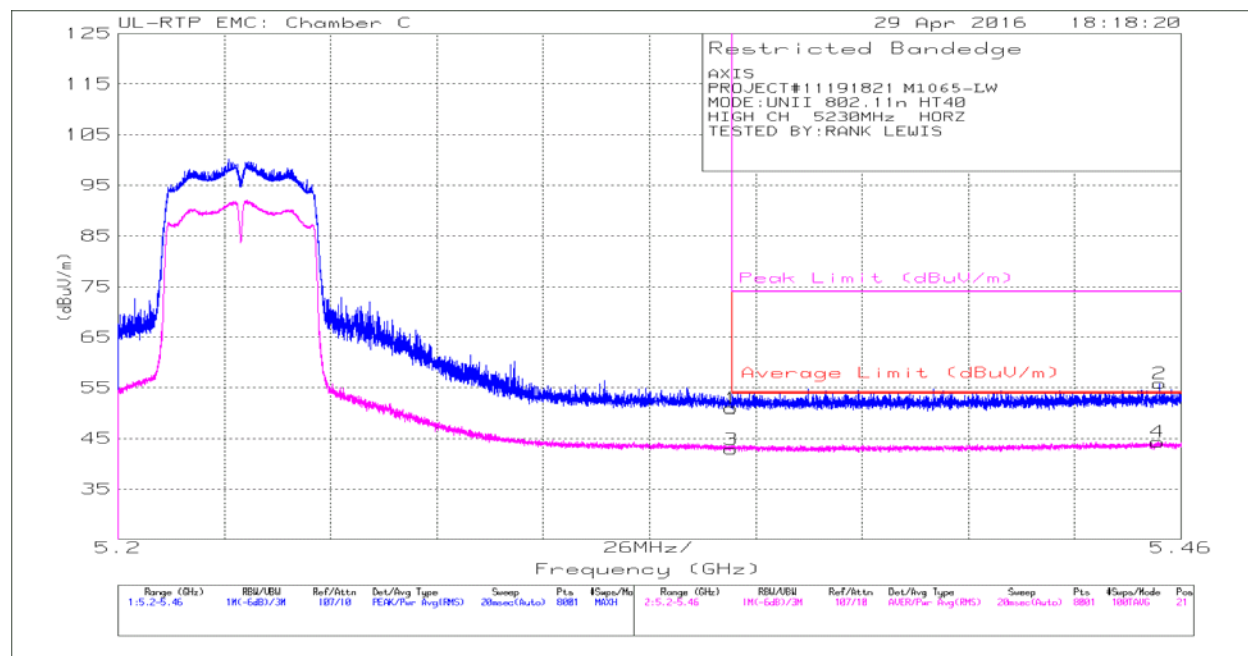
Pk - Peak detector

RMS - RMS detection



# **AUTHORIZED BANDEDGE (HIGH CHANNEL)**

Horizontal



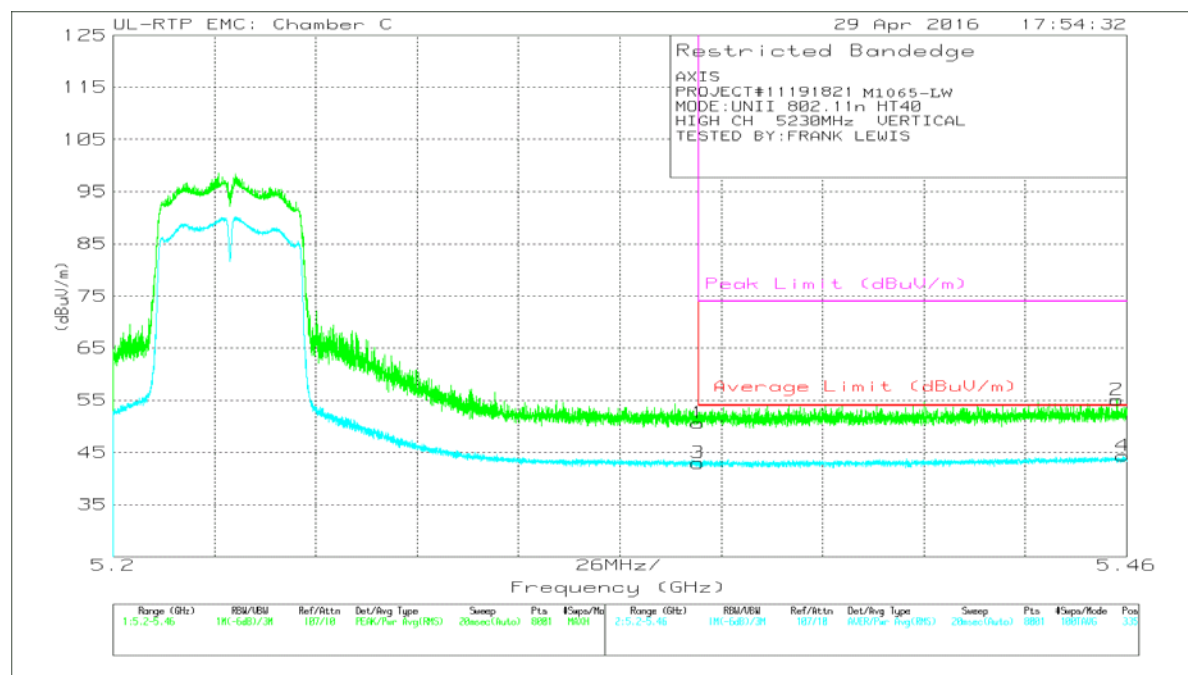
| Marker | Frequency (GHz) | Meter Reading (dBUV) | Det | AF (dB/m) | Amp/Cbl/ Fitr/Pad | DC Corr (dB) | Corrected Reading (dBUV/m) | Average Limit (dBUV/m) | Margin (dB) | Peak Limit (dBUV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-----------|-------------------|--------------|----------------------------|------------------------|-------------|---------------------|----------------|----------------|-------------|----------|
| 1      | * 5.35          | 39.05                | Pk  | 34.7      | -22.8             | 0            | 50.95                      | -                      | -           | 74                  | -23.05         | 21             | 146         | H        |
| 2      | * 5.455         | 43.26                | Pk  | 34.7      | -22.1             | 0            | 55.86                      | -                      | -           | 74                  | -18.14         | 21             | 146         | H        |
| 3      | * 5.35          | 30.84                | RMS | 34.7      | -22.8             | .12          | 42.86                      | 54                     | -11.14      | -                   | -              | 21             | 146         | H        |
| 4      | * 5.454         | 31.62                | RMS | 34.7      | -22.1             | .12          | 44.34                      | 54                     | -9.66       | -                   | -              | 21             | 146         | H        |

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

Pk - Peak detector

RMS - RMS detection

Vertical



| Marker | Frequency (GHz) | Meter Reading (dBuV) | Det | AF (dB/m) | Amp/Cbl/ Fitr/Pad | 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      | * 5.35          | 38.75                | Pk  | 34.7      | -22.8             | 0            | 50.65                      | -                      | -           | 74                  | -23.35         | 335            | 196         | V        |
| 2      | * 5.457         | 42.49                | Pk  | 34.7      | -22.1             | 0            | 55.09                      | -                      | -           | 74                  | -18.91         | 335            | 196         | V        |
| 3      | * 5.35          | 31.03                | RMS | 34.7      | -22.8             | .12          | 43.05                      | 54                     | -10.95      | -                   | -              | 335            | 196         | V        |
| 4      | * 5.459         | 31.69                | RMS | 34.7      | -22.1             | .12          | 44.41                      | 54                     | -9.59       | -                   | -              | 335            | 196         | V        |

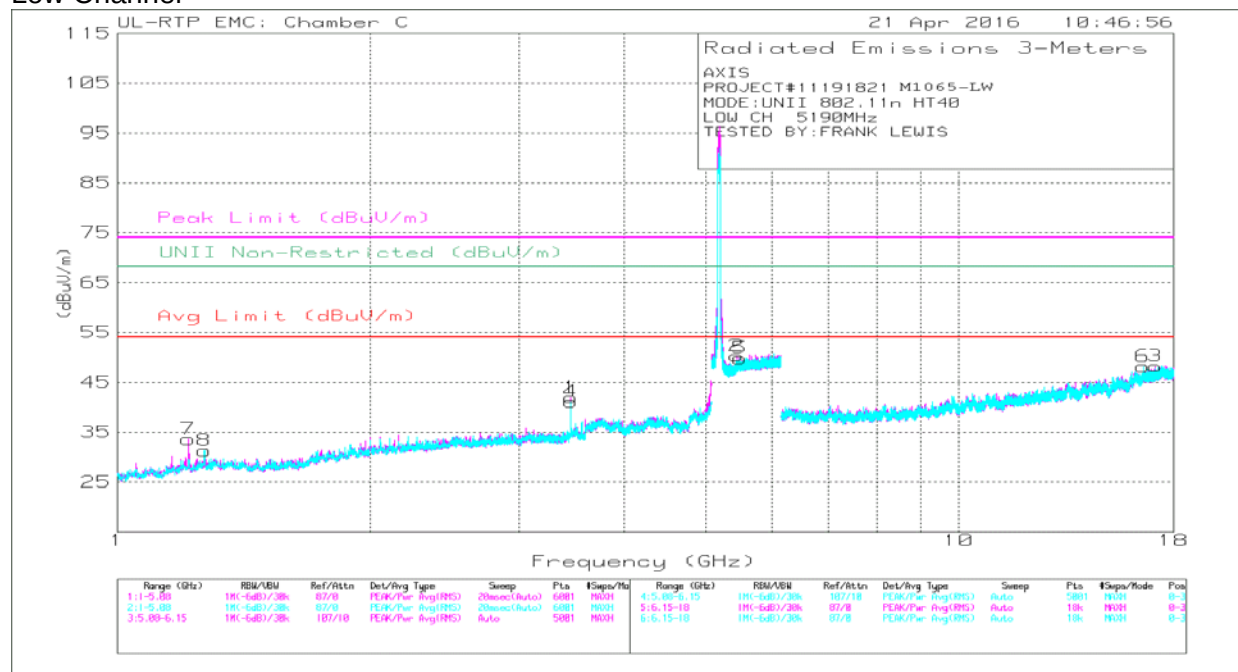
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

## HARMONICS AND SPURIOUS EMISSIONS

### Low Channel



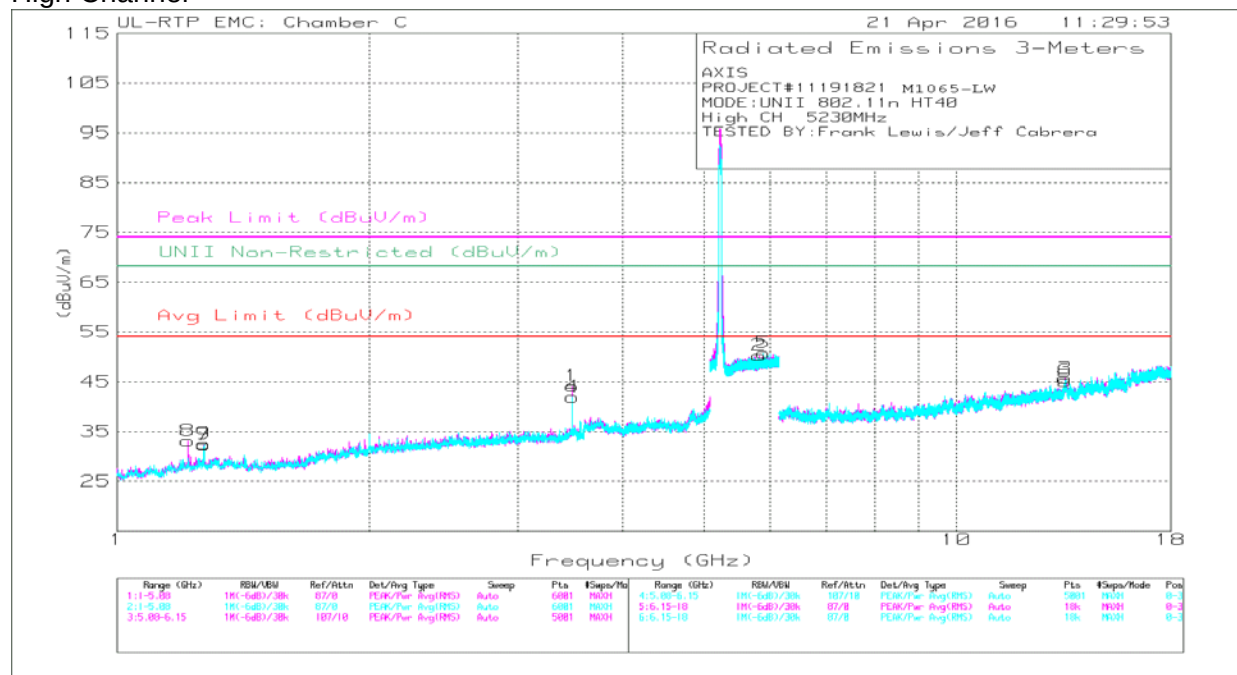
| Marker | Freq (GHz) | Meter Reading (dBuV) | Det  | AF (dB/m) | Amp/Cbl/Fltr/Pad | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|------------|----------------------|------|-----------|------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|------------------------------|----------------|----------------|-------------|----------|
| 7      | * 1.215    | 48.64                | PK-U | 28.3      | -39.6            | 0            | 37.34                      | -                  | -           | 74                  | -36.66         | -                            | -              | 219            | 187         | H        |
|        | * 1.215    | 39.12                | ADR  | 28.3      | -39.6            | .12          | 27.94                      | 54                 | -26.06      | -                   | -              | -                            | -              | 219            | 187         | H        |
| 8      | * 1.269    | 49.96                | PK-U | 28.4      | -39.4            | 0            | 38.96                      | -                  | -           | 74                  | -35.04         | -                            | -              | 264            | 147         | H        |
|        | * 1.269    | 40.79                | ADR  | 28.4      | -39.4            | .12          | 29.91                      | 54                 | -24.09      | -                   | -              | -                            | -              | 264            | 147         | H        |
| 2      | * 5.449    | 42.76                | PK-U | 34.7      | -22.1            | 0            | 55.36                      | -                  | -           | 74                  | -18.64         | -                            | -              | 291            | 384         | H        |
|        | * 5.451    | 31.04                | ADR  | 34.7      | -22.1            | .12          | 43.76                      | 54                 | -10.24      | -                   | -              | -                            | -              | 291            | 384         | H        |
| 1      | 3.46       | 47.58                | PK-U | 33.2      | -33.8            | 0            | 46.98                      | -                  | -           | -                   | -              | 68.2                         | -21.22         | 48             | 113         | H        |
| 3      | 17.127     | 33.78                | PK-U | 41.6      | -20.6            | 0            | 54.78                      | -                  | -           | -                   | -              | 68.2                         | -13.42         | 321            | 144         | H        |
| 4      | 3.46       | 46.69                | PK-U | 33.2      | -33.8            | 0            | 46.09                      | -                  | -           | -                   | -              | 68.2                         | -22.11         | 90             | 112         | V        |
| 5      | 5.506      | 43.96                | PK-U | 34.6      | -22              | 0            | 56.56                      | -                  | -           | -                   | -              | 68.2                         | -11.64         | 210            | 303         | V        |
| 6      | 16.559     | 33.98                | PK-U | 41.6      | -21.5            | 0            | 54.08                      | -                  | -           | -                   | -              | 68.2                         | -14.12         | 79             | 280         | V        |

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

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

# High Channel



| Marker | Freq (GHz) | Meter Reading (dBuV) | Det  | AF (dB/m) | Amp/Cbl/Filtr/Pad | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|------------|----------------------|------|-----------|-------------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|------------------------------|----------------|----------------|-------------|----------|
| 7      | * 1.269    | 49.42                | PK-U | 28.4      | -39.4             | 0            | 38.42                      | -                  | -           | 74                  | -35.58         | -                            | -              | 264            | 197         | H        |
|        | * 1.269    | 40.5                 | ADR  | 28.4      | -39.4             | .12          | 29.62                      | 54                 | -24.38      | -                   | -              | -                            | -              | 264            | 197         | H        |
| 8      | * 1.215    | 49.19                | PK-U | 28.3      | -39.6             | 0            | 37.89                      | -                  | -           | 74                  | -36.11         | -                            | -              | 212            | 199         | H        |
|        | * 1.215    | 39.65                | ADR  | 28.3      | -39.6             | .12          | 28.47                      | 54                 | -25.53      | -                   | -              | -                            | -              | 212            | 199         | H        |
| 9      | * 1.269    | 48.94                | PK-U | 28.4      | -39.4             | 0            | 37.94                      | -                  | -           | 74                  | -36.06         | -                            | -              | 108            | 130         | V        |
|        | * 1.269    | 38.78                | ADR  | 28.4      | -39.4             | .12          | 27.90                      | 54                 | -26.10      | -                   | -              | -                            | -              | 108            | 130         | V        |
| 1      | 3.487      | 48.1                 | PK-U | 34        | -34.1             | 0            | 48                         | -                  | -           | -                   | -              | 68.2                         | -20.2          | 56             | 101         | H        |
| 4      | 3.487      | 47.25                | PK-U | 34        | -34.1             | 0            | 47.15                      | -                  | -           | -                   | -              | 68.2                         | -21.05         | 70             | 101         | V        |
| 2      | 5.819      | 42.74                | PK-U | 34.7      | -21.3             | 0            | 56.14                      | -                  | -           | -                   | -              | 68.2                         | -12.06         | 165            | 139         | H        |
| 5      | 5.88       | 43.14                | PK-U | 34.9      | -21.1             | 0            | 56.94                      | -                  | -           | -                   | -              | 68.2                         | -11.26         | 226            | 388         | V        |
| 3      | 13.449     | 35.56                | PK-U | 39.1      | -23.7             | 0            | 50.96                      | -                  | -           | -                   | -              | 68.2                         | -17.24         | 123            | 398         | H        |
| 6      | 13.464     | 35.81                | PK-U | 39        | -23.2             | 0            | 51.61                      | -                  | -           | -                   | -              | 68.2                         | -16.59         | 169            | 208         | V        |

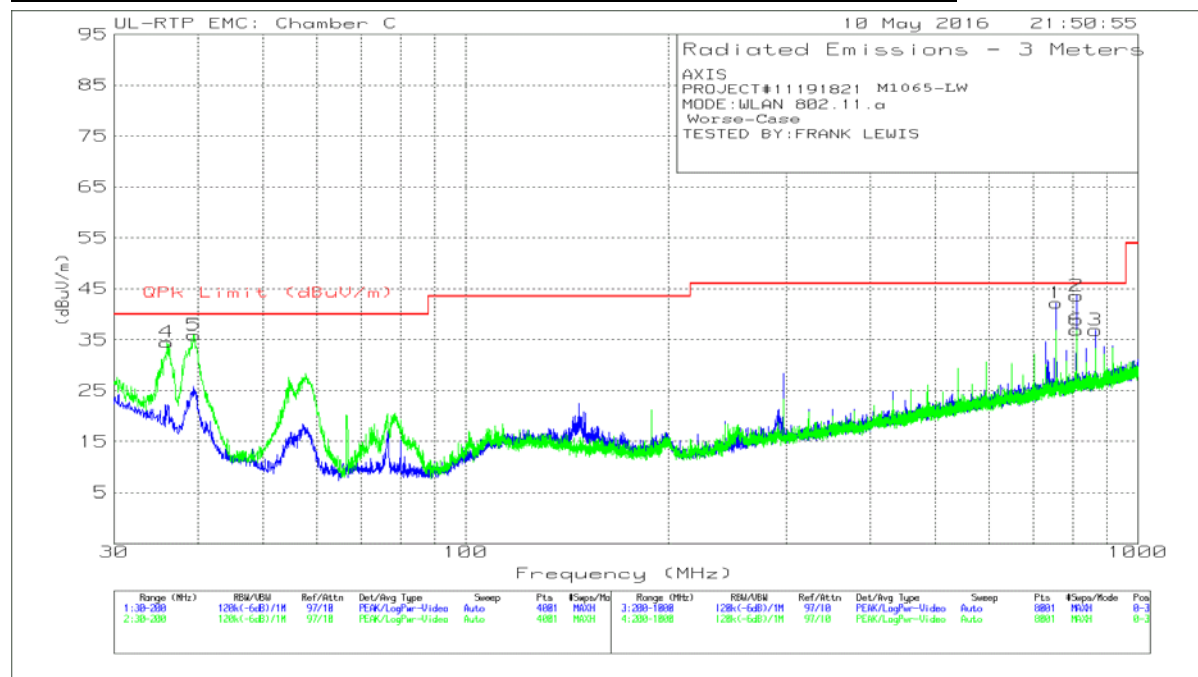
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

### 9.3. WORST-CASE BELOW 1 GHz

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



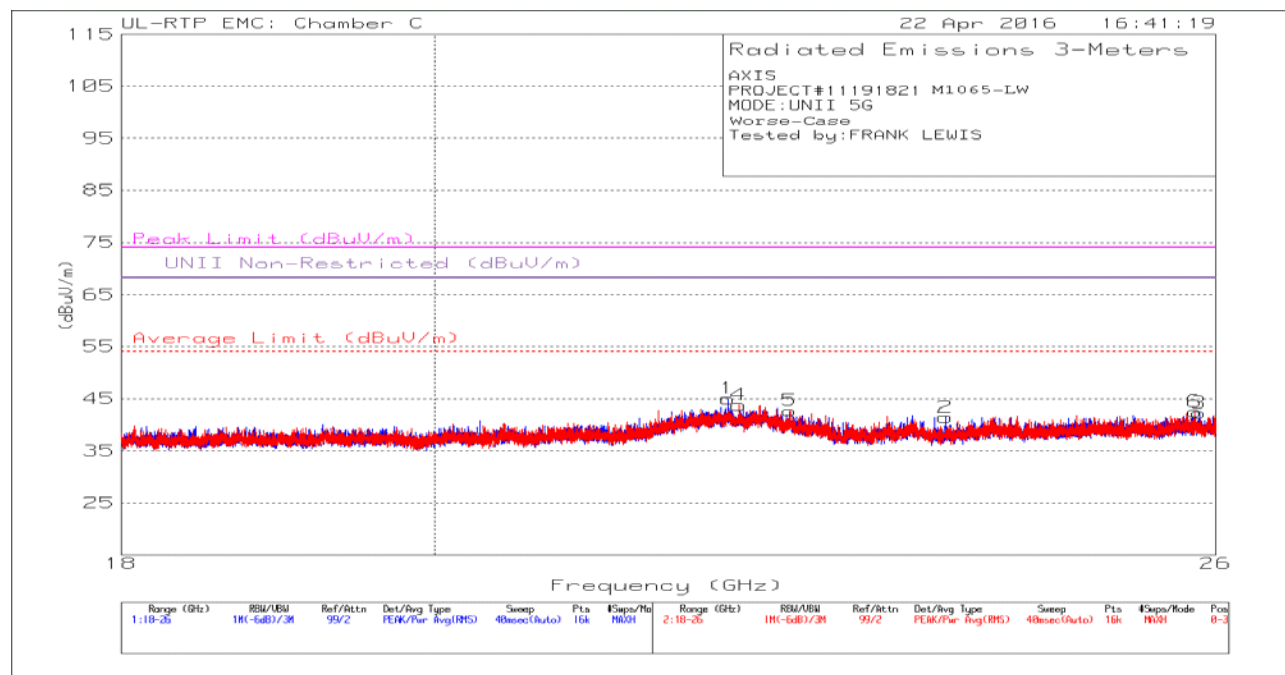
| Marker | Frequency (MHz) | Meter Reading (dBuV) | Det | AF (dB/m) | Amp/Cbl (dB) | Corrected Reading (dBuV/m) | QPk Limit (dBuV/m) | Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-----------------|----------------------|-----|-----------|--------------|----------------------------|--------------------|-------------|----------------|-------------|----------|
| 1      | 756.0132        | 46.19                | Qp  | 25.8      | -28.3        | 43.69                      | 46.02              | -2.33       | 280            | 117         | H        |
| 2      | 810.0127        | 46.31                | Qp  | 26.3      | -28          | 44.61                      | 46.02              | -1.41       | 227            | 101         | H        |
| 3      | 864.0204        | 38.93                | Qp  | 26.5      | -27.6        | 37.83                      | 46.02              | -8.19       | 50             | 101         | H        |
| 4      | 35.925          | 40.84                | Qp  | 21.6      | -31.5        | 30.94                      | 40                 | -9.06       | 42             | 115         | V        |
| 5      | 39.4835         | 44.87                | Qp  | 18.8      | -31.5        | 32.17                      | 40                 | -7.83       | 51             | 105         | V        |
| 6      | 810.016         | 43.02                | Qp  | 26.3      | -28          | 41.32                      | 46.02              | -4.7        | 323            | 131         | V        |

Pk - Peak detector

Qp - Quasi-Peak detector

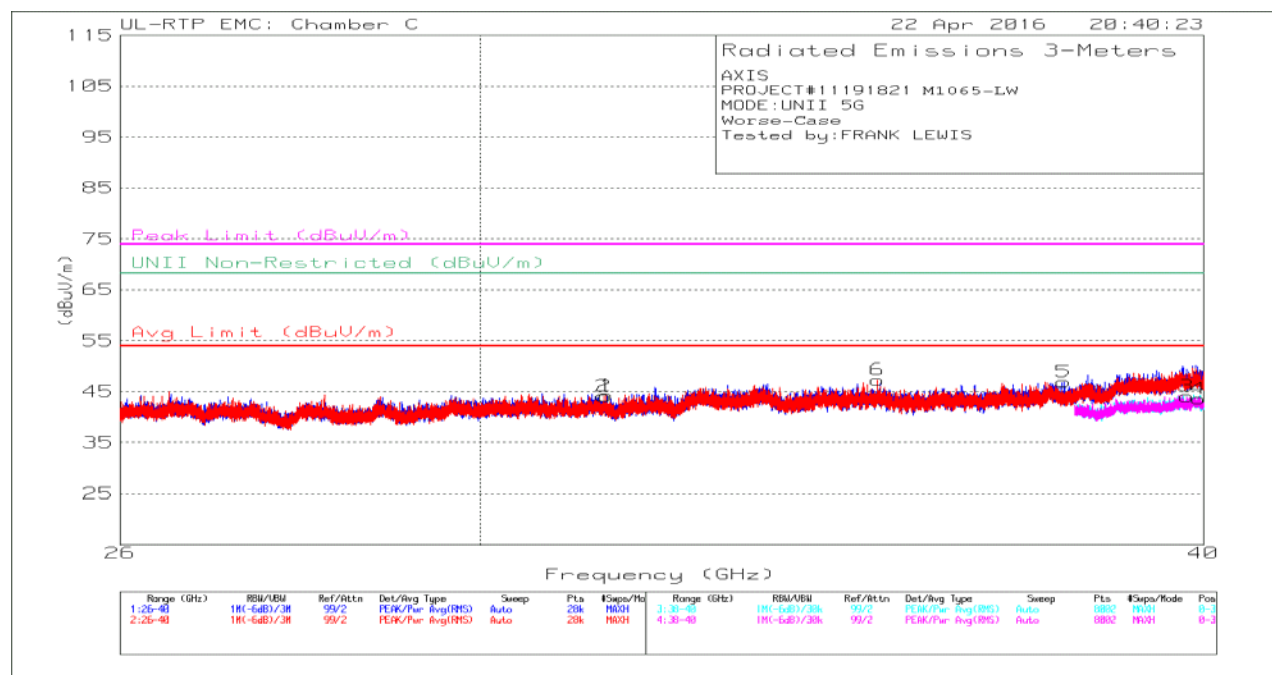
## 9.4. WORST-CASE 18-40GHz

### SPURIOUS EMISSIONS 18 to 40GHz (WORST-CASE CONFIGURATION)



| Marker | Freq. (GHz) | Meter Reading (dBuV) | Det  | AF (dB/m) | Amp/C bl (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Average Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-------------|----------------------|------|-----------|---------------|--------------|----------------------------|------------------------|-------------|---------------------|-------------|------------------------------|----------------|----------------|-------------|----------|
| 1      | * 22.076    | 48.02                | PK-U | 36.6      | -40.7         | 0            | 43.92                      | 54                     | -10.08      | 74                  | -30.08      | -                            | -              | 185            | 116         | H        |
| 2      | * 23.753    | 48.01                | PK-U | 33.6      | -39.5         | 0            | 42.11                      | 54                     | -11.89      | 74                  | -31.89      | -                            | -              | 127            | 190         | H        |
| 4      | * 22.154    | 47.61                | PK-U | 36.3      | -40.5         | 0            | 43.41                      | 54                     | -10.59      | 74                  | -30.59      | -                            | -              | 311            | 242         | V        |
| 5      | * 22.537    | 48.68                | PK-U | 34.6      | -40.3         | 0            | 42.98                      | 54                     | -11.02      | 74                  | -31.02      | -                            | -              | 75             | 201         | V        |
| 3      | 25.854      | 47.79                | PK-U | 33.8      | -37.8         | 0            | 43.79                      | -                      | -           | -                   | -           | 68.2                         | -24.41         | 254            | 341         | H        |
| 6      | 25.819      | 47.32                | PK-U | 33.9      | -37.7         | 0            | 43.52                      | -                      | -           | -                   | -           | 68.2                         | -24.68         | 24             | 329         | V        |

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)  
ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)



| Marker | Freq. (GHz) | Meter Reading (dBuV) | Det  | AF (dB/m) | Amp/ Cbl (dB) | DC Corr (dB) | Corrected Reading (dBuV/m) | Avg Limit (dBuV/m) | Margin (dB) | Peak Limit (dBuV/m) | PK Margin (dB) | UNII Non-Restricted (dBuV/m) | PK Margin (dB) | Azimuth (Degs) | Height (cm) | Polarity |
|--------|-------------|----------------------|------|-----------|---------------|--------------|----------------------------|--------------------|-------------|---------------------|----------------|------------------------------|----------------|----------------|-------------|----------|
| 1      | * 31.543    | 43.32                | PK-U | 36.6      | -35.1         | 0            | 44.82                      | 54                 | -9.18       | 74                  | -29.18         | -                            | -              | 328            | 310         | H        |
| 3      | * 39.74     | 43.11                | PK-U | 38.3      | -31.8         | 0            | 49.61                      | -                  | -           | 74                  | -24.39         | -                            | -              | 263            | 100         | H        |
|        | * 39.731    | 31.89                | ADR  | 38.3      | -31.9         | .12          | 38.41                      | 54                 | -15.59      | -                   | -              | -                            | -              | 263            | 100         | H        |
| 2      | * 31.52     | 42.99                | PK-U | 36.5      | -34.8         | 0            | 44.69                      | 54                 | -9.31       | 74                  | -29.31         | -                            | -              | 172            | 387         | V        |
| 4      | * 39.925    | 43.25                | PK-U | 38.4      | -31.6         | 0            | 50.05                      | -                  | -           | 74                  | -23.95         | -                            | -              | 2              | 295         | V        |
|        | * 39.926    | 31.73                | ADR  | 38.4      | -31.6         | .12          | 38.65                      | 54                 | -15.35      | -                   | -              | -                            | -              | 2              | 295         | V        |
| 5      | 37.837      | 44.59                | PK-U | 38        | -34.6         | 0            | 47.99                      | -                  | -           | -                   | -              | 68.2                         | -20.21         | 183            | 269         | H        |
| 6      | 35.141      | 46.05                | PK-U | 37.3      | -35.8         | 0            | 47.55                      | -                  | -           | -                   | -              | 68.2                         | -20.65         | 73             | 136         | V        |

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

PK-U - U-NII: Maximum Peak (KDB 789033 II.G.5)

ADR - U-NII AD primary method, RMS average (KDB 789033 II.G.6c)

## 10. AC POWER LINE CONDUCTED EMISSIONS

### LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

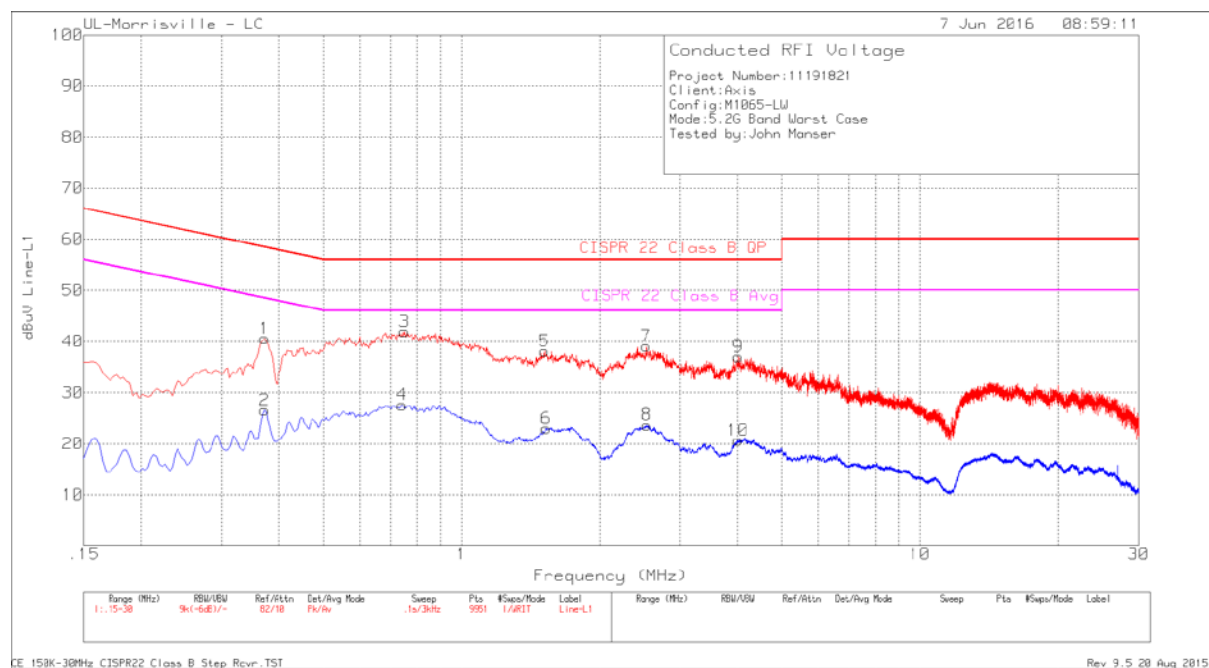
| Frequency of Emission (MHz) | Conducted Limit (dBuV) |                       |
|-----------------------------|------------------------|-----------------------|
|                             | Quasi-peak             | Average               |
| 0.15-0.5                    | 66 to 56 <sup>*</sup>  | 56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

<sup>\*</sup> Decreases with the logarithm of the frequency.



## RESULTS

### LINE 1 RESULTS

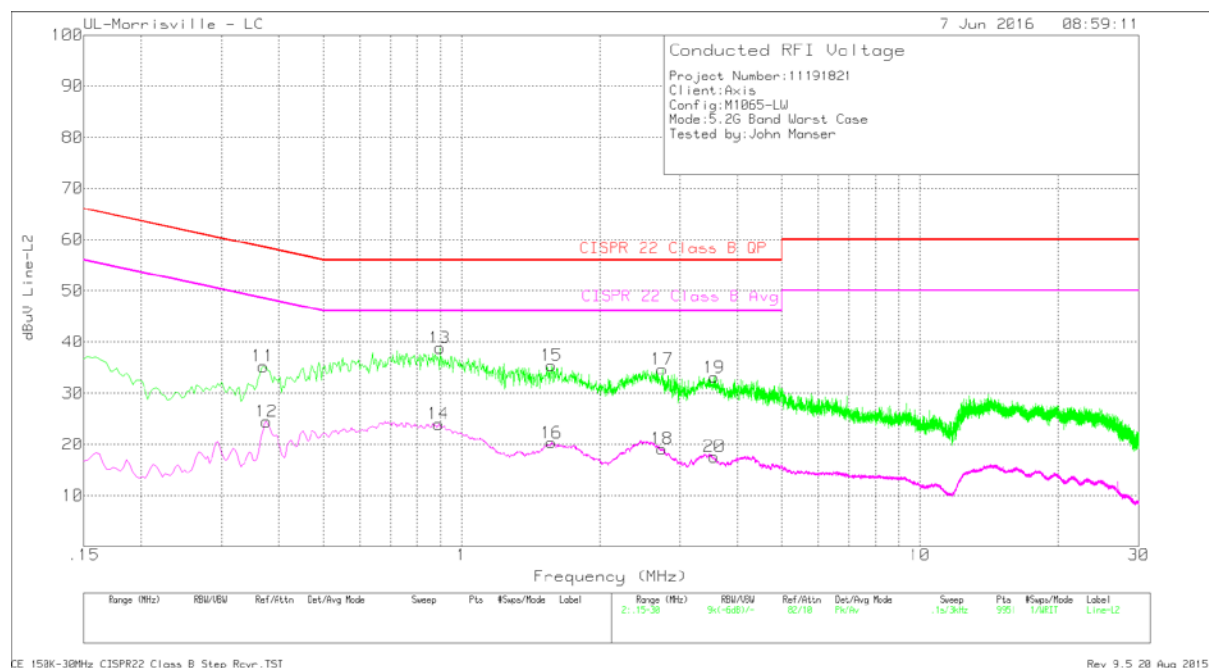


| Range 1: Line-L1 .15 - 30MHz |                 |                      |     |               |                  |                        |          |             |           |             |
|------------------------------|-----------------|----------------------|-----|---------------|------------------|------------------------|----------|-------------|-----------|-------------|
| Marker                       | Frequency (MHz) | Meter Reading (dBuV) | Det | LISN VCF [dB] | Cbl/Limiter (dB) | Corrected Reading dBuV | QP Limit | Margin (dB) | AVE Limit | Margin (dB) |
| 1                            | .372            | 30.79                | Pk  | .1            | 9.7              | 40.59                  | 58.46    | -17.87      | -         | -           |
| 2                            | .372            | 16.76                | Av  | .1            | 9.7              | 26.56                  | -        | -           | 48.46     | -21.9       |
| 3                            | .75             | 32.14                | Pk  | 0             | 9.8              | 41.94                  | 56       | -14.06      | -         | -           |
| 4                            | .741            | 17.82                | Av  | 0             | 9.8              | 27.62                  | -        | -           | 46        | -18.38      |
| 5                            | 1.518           | 28.3                 | Pk  | 0             | 9.8              | 38.1                   | 56       | -17.9       | -         | -           |
| 6                            | 1.53            | 13.22                | Av  | 0             | 9.8              | 23.02                  | -        | -           | 46        | -22.98      |
| 7                            | 2.532           | 29.18                | Pk  | .1            | 9.8              | 39.08                  | 56       | -16.92      | -         | -           |
| 8                            | 2.538           | 13.77                | Av  | .1            | 9.8              | 23.67                  | -        | -           | 46        | -22.33      |
| 9                            | 4.008           | 27.16                | Pk  | .1            | 9.8              | 37.06                  | 56       | -18.94      | -         | -           |
| 10                           | 4.008           | 10.78                | Av  | .1            | 9.8              | 20.68                  | -        | -           | 46        | -25.32      |

Pk - Peak detector

Av - Average detection

## 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 | CISPR 22 Class B QP | Margin (dB) | CISPR 22 Class B Avg | Margin (dB) |
| 11                           | .369            | 25.45                | Pk  | .1            | 9.7              | 35.25                  | 58.52               | -23.27      | -                    | -           |
| 12                           | .375            | 14.63                | Av  | .1            | 9.7              | 24.43                  | -                   | -           | 48.39                | -23.96      |
| 13                           | .897            | 29.02                | Pk  | 0             | 9.8              | 38.82                  | 56                  | -17.18      | -                    | -           |
| 14                           | .891            | 14.14                | Av  | 0             | 9.8              | 23.94                  | -                   | -           | 46                   | -22.06      |
| 15                           | 1.572           | 25.59                | Pk  | 0             | 9.8              | 35.39                  | 56                  | -20.61      | -                    | -           |
| 16                           | 1.572           | 10.49                | Av  | 0             | 9.8              | 20.29                  | -                   | -           | 46                   | -25.71      |
| 17                           | 2.742           | 24.91                | Pk  | 0             | 9.8              | 34.71                  | 56                  | -21.29      | -                    | -           |
| 18                           | 2.739           | 9.32                 | Av  | 0             | 9.8              | 19.12                  | -                   | -           | 46                   | -26.88      |
| 19                           | 3.558           | 23.18                | Pk  | .1            | 9.8              | 33.08                  | 56                  | -22.92      | -                    | -           |
| 20                           | 3.561           | 7.65                 | Av  | .1            | 9.8              | 17.55                  | -                   | -           | 46                   | -28.45      |

Pk - Peak detector

Av - Average detection