



# FCC RADIO TEST REPORT

Applicant : Benq Corporation

Address : 16 Jihu Road, Neihu, Taipei 114, Taiwan

Equipment : BenQ Wireless Dongle

Model No. : WDR02U

Trade Name : BenQ

FCC ID : JVPWDR02U

## I HEREBY CERTIFY THAT :

The sample was received on Jul. 25, 2018 and the testing was carried out on Nov. 01, 2018 at Cerpass Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of Cerpass Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Tested by:

Mark Liao / Assistant Manager

Amos Zhang/ Engineer

Laboratory Accreditation:



Cerpass Technology Corporation Test Laboratory

TAF LAB Code:

1439

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History of this test report

| Report No.  | Issue Date    | Description |
|-------------|---------------|-------------|
| TEDL1806202 | Nov. 03, 2018 | Original    |
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## 1. Summary of Test Procedure and Test Results

### 1.1. Applicable Standards

**ANSI C63.4:2014**

**ANSI C63.10:2013&RSS-247**

**FCC Rules and Regulations Part 15 Subpart E §15.407**

**First R&O 14-30**

**KDB662911**

**KDB789033**

**KDB644545**

| FCC Rule               | Description of Test                    | Result |
|------------------------|----------------------------------------|--------|
| 15.203                 | Antenna Requirement                    | Pass   |
| 15.207(a)              | AC Power Line Conducted Emission       | Pass   |
| 15.407(b)<br>15.209    | Radiated Spurious Emission             | Pass   |
| 15.407(a)              | 26 dB Occupied Bandwidth               | Pass   |
| 15.407                 | 6 dB Bandwidth                         | Pass   |
| 15.407<br>(a) & (a)(3) | Average Power                          | Pass   |
| 15.407(a)              | Output and PPSD                        | Pass   |
| 15.407(g)              | Frequency Stability                    | Pass   |
| 15.407(c)              | Automatically Discontinue Transmission | Pass   |
| 2.1091                 | Radio Frequency Exposure               | Pass   |



## 2. Test Configuration of Equipment under Test

### 2.1. Feature of Equipment under Test

|                 |                                                                                                                   |
|-----------------|-------------------------------------------------------------------------------------------------------------------|
| Equipment       | BenQ Wireless Dongle                                                                                              |
| Model No.       | WDR02U                                                                                                            |
| Frequency Range | 802.11a/n/ac: 5150MHz-5250MHz, 5725MHz -5850MHz                                                                   |
| Modulation Type | DSSS: DBPSK, DQPSK, CCK<br>OFDM: 256QAM, 64QAM, 16QAM, QPSK, BPSK                                                 |
| Data Rate       | 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps<br>802.11n: up to 400.0Mbps<br>802.11ac : up to 867Mbps |
| Antenna Type    | PCB Antenna                                                                                                       |

Note: For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

### 2.2. Carrier Frequency of Channels

Band 1: 5150MHz-5250MHz

802.11a, 802.11n HT20, 802.11ac VHT20

| Channel    | Frequency(MHz) | Channel    | Frequency(MHz) |
|------------|----------------|------------|----------------|
| <b>*36</b> | <b>5180</b>    | <b>*44</b> | <b>5220</b>    |
| 40         | 5200           | <b>*48</b> | <b>5240</b>    |

802.11n HT40, 802.11ac VHT40

| Channel    | Frequency(MHz) | Channel    | Frequency(MHz) |
|------------|----------------|------------|----------------|
| <b>*38</b> | <b>5190</b>    | <b>*46</b> | <b>5230</b>    |

802.11ac VHT80

| Channel    | Frequency(MHz) |
|------------|----------------|
| <b>*42</b> | <b>5210</b>    |

Band 4: 5725MHz -5850MHz

802.11a, 802.11n HT20, 802.11ac VHT20

| Channel     | Frequency(MHz) | Channel     | Frequency(MHz) |
|-------------|----------------|-------------|----------------|
| <b>*149</b> | <b>5745</b>    | 161         | 5805           |
| 153         | 5765           | <b>*165</b> | <b>5825</b>    |
| <b>*157</b> | <b>5785</b>    |             |                |

802.11n HT40, 802.11ac VHT40

| Channel     | Frequency(MHz) | Channel     | Frequency(MHz) |
|-------------|----------------|-------------|----------------|
| <b>*151</b> | <b>5755</b>    | <b>*159</b> | <b>5795</b>    |

802.11ac VHT80

| Channel     | Frequency(MHz) |
|-------------|----------------|
| <b>*155</b> | <b>5775</b>    |

Note: Channels remarked \* are selected to perform test.



### 2.3. Test Mode and Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
- b. The complete test system included remote workstation and EUT for RF test. The remote workstation included Notebook.

An executive program, "MT7662UQA.exe" under WIN 7 was executed to transmit and receive data via WLAN.

- c. The following test modes were performed for the test:

| Conducted Emissions from the AC mains power ports                                      |                           |
|----------------------------------------------------------------------------------------|---------------------------|
| Test Mode                                                                              | Operating Description     |
| 1                                                                                      | 802.11a (6Mbps)           |
| 2                                                                                      | 802.11ac VHT20 (6.5Mbps)  |
| 3                                                                                      | 802.11ac VHT40 (13.5Mbps) |
| 4                                                                                      | 802.11ac VHT80 (29.3Mbps) |
| caused "Test Mode 1" generated the worst case, it was reported as the final data.      |                           |
| Radiation Emissions (30MHz ~ 1GHz)                                                     |                           |
| Test Mode                                                                              | Operating Description     |
| 1                                                                                      | 802.11a (6Mbps)           |
| 2                                                                                      | 802.11ac VHT20 (6.5Mbps)  |
| 3                                                                                      | 802.11ac VHT40 (13.5Mbps) |
| 4                                                                                      | 802.11ac VHT80 (29.3Mbps) |
| caused "Test Mode 1" generated the worst case, they were reported as the final data.   |                           |
| Radiation Emissions (1GHz ~ 40GHz)                                                     |                           |
| Test Mode                                                                              | Operating Description     |
| 1                                                                                      | 802.11a (6Mbps)           |
| 2                                                                                      | 802.11ac VHT20 (6.5Mbps)  |
| 3                                                                                      | 802.11ac VHT40 (13.5Mbps) |
| 4                                                                                      | 802.11ac VHT80 (29.3Mbps) |
| caused "Test Mode 1~4" generated the worst case, they were reported as the final data. |                           |

### 2.4. Description of Test System

| Device   | Manufacturer | Model No.  | Description                    |
|----------|--------------|------------|--------------------------------|
| Notebook | SONY         | PCG-71811P | Power Cable, Unshielding, 1.8m |



## 2.5. General Information of Test

|                               |                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                              |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Site                     | <b>Cerpass Technology Corporation Test Laboratory</b><br>Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.)<br>Tel:+886-3-3226-888<br>Fax:+886-3-3226-881<br>Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C.<br>Tel: +886-2-2663-8582 |                                                                                                                                                                              |
|                               | FCC                                                                                                                                                                                                                                                                                                            | TW1079, TW1061, TW1439                                                                                                                                                       |
|                               | IC                                                                                                                                                                                                                                                                                                             | 4934E-1, 4934E-2                                                                                                                                                             |
|                               | VCCI                                                                                                                                                                                                                                                                                                           | T-2205 for Telecommunication Test<br>C-4663 for Conducted emission test<br>R-4399, R-4218 for Radiated emission test<br>G-10812, G-10813 for radiated disturbance above 1GHz |
| Frequency Range Investigated: | Conducted: from 150kHz to 30 MHz<br>Radiation: from 30 MHz to 40,000MHz                                                                                                                                                                                                                                        |                                                                                                                                                                              |
| Test Distance:                | The test distance of radiated emission from antenna to EUT is 3 M.                                                                                                                                                                                                                                             |                                                                                                                                                                              |

## 2.6. Measurement Uncertainty

| Measurement Item                         | Uncertainty |
|------------------------------------------|-------------|
| Radiated Spurious Emission(9KHz~30MHz)   | ±5.007dB    |
| Radiated Spurious Emission(30MHz~1GHz)   | ±5.157dB    |
| Radiated Spurious Emission(1GHz~18GHz)   | ±6.383dB    |
| Radiated Spurious Emission(18GHz~40GHz)  | ±6.648dB    |
| Conducted Spurious Emission              | ±1.253dB    |
| 6dB Bandwidth                            | ±6.89%      |
| Power Spectral Density                   | ±0.630dB    |
| 26 dB Occupied Bandwidth                 | ±6.10%      |
| Frequency Stability                      | ±375KHz     |
| Channel Frequencies Separation           | ±6.10%      |
| 20dB Bandwidth                           | ±6.12%      |
| Dwell Time                               | ±1.34%      |
| Peak Output Power(Conducted Power Meter) | ±0.86dB     |
| Temperature                              | ±1.2oC      |
| Humidity                                 | ±2.7%       |
| Channel Move Time                        | ±4.53%      |
| Channel Closing Transmission Time        | ±6.61%      |
| Threshold                                | ±0.631dB    |
| Non occupancy period                     | ±1.17%      |



### 3. Test Equipment and Ancillaries Used for Tests

| Instrument                     | Manufacturer    | Model No                 | Serial No   | Calibration Date | Valid Date |
|--------------------------------|-----------------|--------------------------|-------------|------------------|------------|
| EMI Receiver                   | R&S             | ESCI3                    | 100821      | 2017/09/08       | 2018/09/07 |
| LISN                           | Schwarzbeck     | NSLK 8127                | 8127-568    | 2018/02/26       | 2019/02/25 |
| Pulse Limiter                  | R&S             | ESH3-Z2                  | 101934      | 2018/02/22       | 2019/02/21 |
| Bilog Antenna                  | Schwarzbeck     | VULB9168                 | 275         | 2017/08/31       | 2018/08/30 |
| Active Loop Antenna            | EMCO            | 6507                     | 40855       | 2018/05/22       | 2019/05/21 |
| Horn Antenna                   | EMCO            | 3115                     | 31601       | 2017/09/11       | 2018/09/10 |
| Horn Antenna                   | EMCO            | 3116                     | 31970       | 2018/03/23       | 2019/03/22 |
| Preamplifier                   | EM              | EM330                    | 60658       | 2017/09/08       | 2018/09/07 |
| Preamplifier                   | EMC INSTRUMENTS | EMC051845SE              | 980333      | 2017/09/20       | 2018/09/19 |
| Preamplifier                   | EMC INSTRUMENTS | EMC184045                | 980065      | 2017/11/10       | 2018/11/09 |
| MXG MW Analog Signal Generator | KEYSIGHT        | N5183A                   | MY50142931  | 2018/03/23       | 2019/03/22 |
| Spectrum Analyzer              | R&S             | FSP40                    | 100219      | 2018/07/03       | 2019/07/02 |
| BLUETOOTH TESTER               | R&S             | CBT                      | 101133      | 2018/04/02       | 2019/04/01 |
| Attenuator                     | KEYSIGHT        | 8491B                    | MY39250705  | 2017/09/04       | 2018/09/03 |
| Rotary Attenuator              | Agilent         | 8495B                    | MY42146680  | 2018/03/29       | 2019/03/28 |
| Temp & Humi chamber            | T-MACHINE       | TMJ-9712                 | T-12-040111 | 2017/09/04       | 2018/09/03 |
| Series Power Meter             | Anritsu         | ML2495A                  | 1224005     | 2018/03/23       | 2019/03/22 |
| Power Sensor                   | Anritsu         | MA2411B                  | 1207295     | 2018/03/23       | 2019/03/22 |
| Software                       | Farad           | Ez-EMC                   | ver.ct3a1   | N/A              | N/A        |
| Software                       | AUDIX           | E3                       | V8.2014-8-6 | N/A              | N/A        |
| Software                       | Keysight        | N7607B Signal Studio     | V3.0.0.0    | N/A              | N/A        |
| Software                       | Keysight        | Inservice MonitorUtility | N/A         | N/A              | N/A        |



## 4. Antenna Requirements

### 4.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 4.2. Antenna Construction and Directional Gain

|              |                                                                                                                                                                       |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Antenna Type | PCB Antenna                                                                                                                                                           |
| Antenna Gain | Bluetooth: 2.0 dBi<br>2.4GHz: ANT A: 2.0 dBi ; ANT B: 2.0 dBi<br>5150MHz-5250MHz: ANT A: 2.0 dBi ; ANT B: 2.0 dBi<br>5725MHz-5850MHz: ANT A: 2.0 dBi ; ANT B: 2.0 dBi |

|                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2412-2462MHz                                                                                                                                           |
| For Power directional gain= $G_{ant} = 2.0 \text{ dBi}$<br>For PSD directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$<br>= 5.01 (dBi) |
| 5150MHz -5250MHz                                                                                                                                       |
| For Power directional gain= $G_{ant} = 2.0 \text{ dBi}$<br>For PSD directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$<br>= 5.01 (dBi) |
| 5725MHz -5850MHz                                                                                                                                       |
| For Power directional gain= $G_{ant} = 2.0 \text{ dBi}$<br>For PSD directional gain = $10 \log[(10^{G1/20} + 10^{G2/20})^2 / N_{ANT}]$<br>= 5.01 (dBi) |



## 5. Test of AC Power Line Conducted Emission

### 5.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz, according to the methods defined in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

| Frequency<br>(MHz) | Quasi Peak<br>(dB $\mu$ V) | Average<br>(dB $\mu$ V) |
|--------------------|----------------------------|-------------------------|
| 0.15 – 0.5         | 66-56*                     | 56-46*                  |
| 0.5 – 5.0          | 56                         | 46                      |
| 5.0 – 30.0         | 60                         | 50                      |

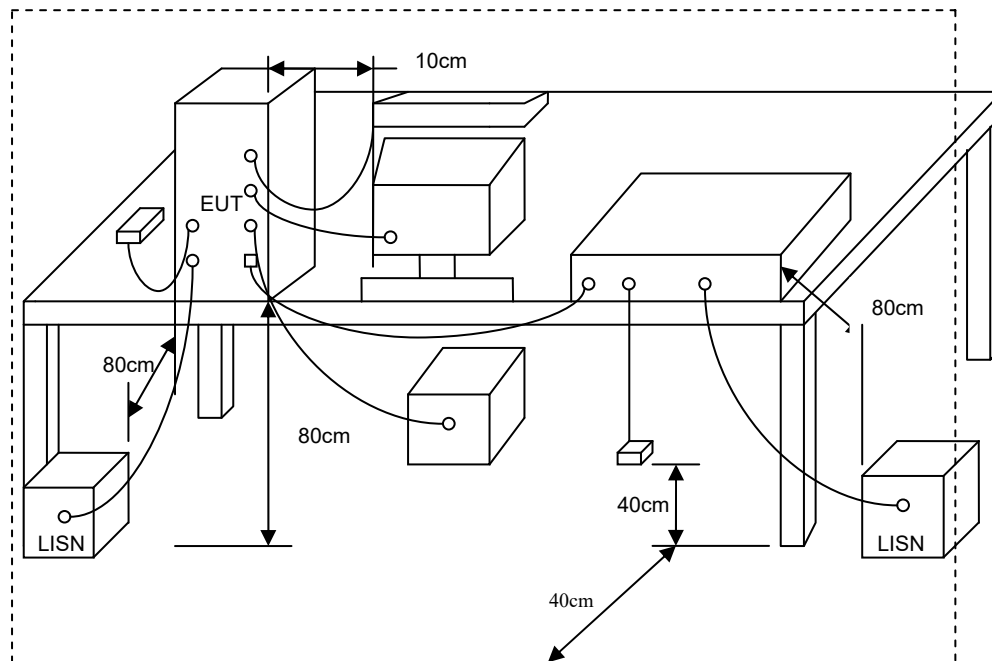
\*Decreases with the logarithm of the frequency.

### 5.2. Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



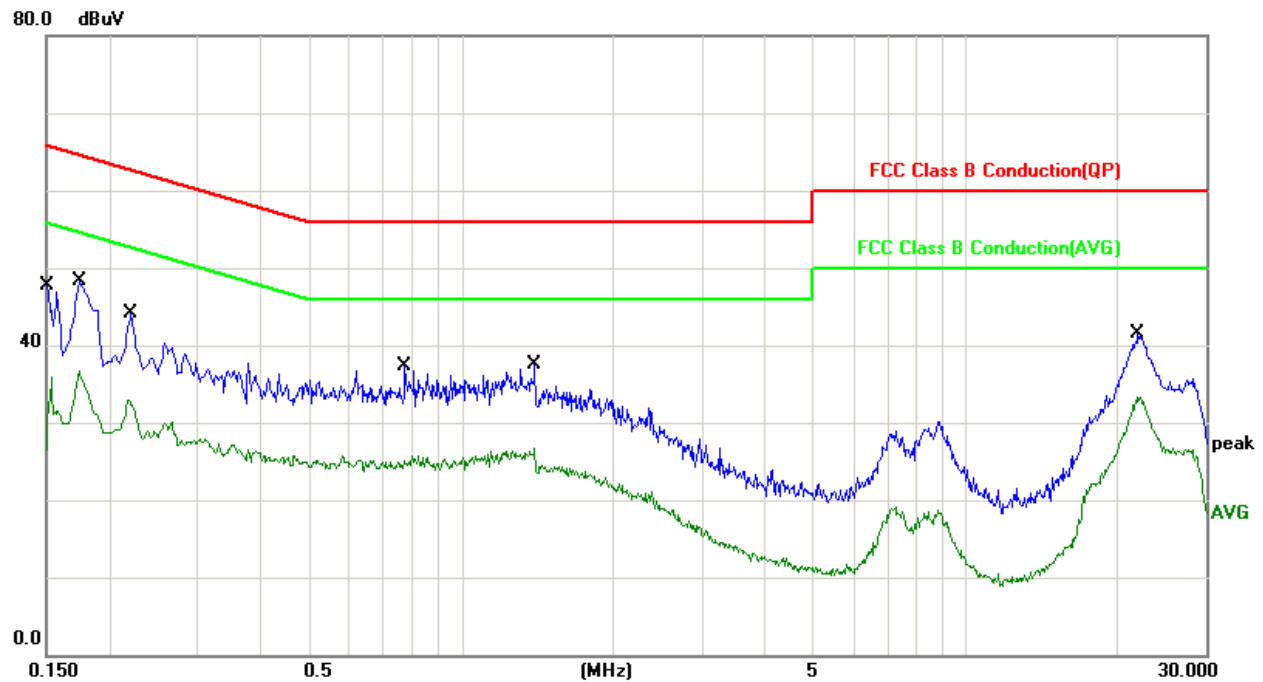
### 5.3. Typical Test Setup





#### 5.4. Test Result and Data

|           |                  |             |         |
|-----------|------------------|-------------|---------|
| Power     | : AC 120V        | Pol/Phase   | : LINE  |
| Test Mode | : Mode 1, Band 1 | Temperature | : 26 °C |
| Test date | : Aug. 12, 2018  | Humidity    | : 48 %  |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 0.1508          | 10.06       | 34.64          | 44.70        | 65.95        | -21.25      | QP       |
| 2   | 0.1508          | 10.06       | 21.18          | 31.24        | 55.95        | -24.71      | AVG      |
| 3   | 0.1740          | 10.06       | 34.29          | 44.35        | 64.76        | -20.41      | QP       |
| 4   | 0.1740          | 10.06       | 23.89          | 33.95        | 54.76        | -20.81      | AVG      |
| 5   | 0.2220          | 10.05       | 28.51          | 38.56        | 62.74        | -24.18      | QP       |
| 6   | 0.2220          | 10.05       | 21.82          | 31.87        | 52.74        | -20.87      | AVG      |
| 7   | 0.7740          | 10.08       | 19.72          | 29.80        | 56.00        | -26.20      | QP       |
| 8   | 0.7740          | 10.08       | 14.48          | 24.56        | 46.00        | -21.44      | AVG      |
| 9   | 1.3980          | 10.50       | 19.24          | 29.74        | 56.00        | -26.26      | QP       |
| 10  | 1.3980          | 10.50       | 14.26          | 24.76        | 46.00        | -21.24      | AVG      |
| 11  | 22.0020         | 10.58       | 26.35          | 36.93        | 60.00        | -23.07      | QP       |
| 12  | 22.0020         | 10.58       | 21.40          | 31.98        | 50.00        | -18.02      | AVG      |

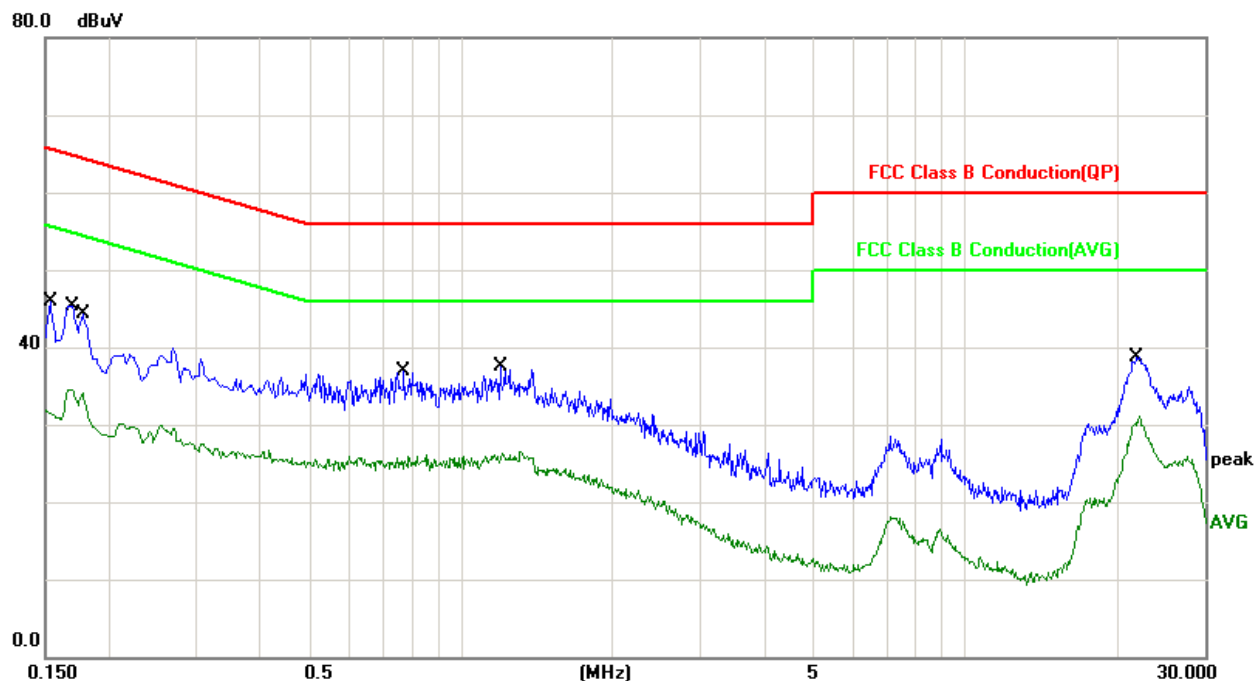
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC, or Current Probe) Factor + Cable Loss + Attenuator



|           |                  |             |           |
|-----------|------------------|-------------|-----------|
| Power     | : AC 120V        | Pol/Phase   | : NEUTRAL |
| Test Mode | : Mode 1, Band 1 | Temperature | : 26 °C   |
| Test date | : Aug. 12, 2018  | Humidity    | : 48 %    |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 0.1539          | 10.06       | 26.45          | 36.51        | 65.78        | -29.27      | QP       |
| 2   | 0.1539          | 10.06       | 20.19          | 30.25        | 55.78        | -25.53      | AVG      |
| 3   | 0.1700          | 10.06       | 32.32          | 42.38        | 64.96        | -22.58      | QP       |
| 4   | 0.1700          | 10.06       | 25.21          | 35.27        | 54.96        | -19.69      | AVG      |
| 5   | 0.1780          | 10.06       | 28.98          | 39.04        | 64.57        | -25.53      | QP       |
| 6   | 0.1780          | 10.06       | 21.86          | 31.92        | 54.57        | -22.65      | AVG      |
| 7   | 0.7740          | 10.08       | 19.99          | 30.07        | 56.00        | -25.93      | QP       |
| 8   | 0.7740          | 10.08       | 14.81          | 24.89        | 46.00        | -21.11      | AVG      |
| 9   | 1.2020          | 10.14       | 20.50          | 30.64        | 56.00        | -25.36      | QP       |
| 10  | 1.2020          | 10.14       | 15.35          | 25.49        | 46.00        | -20.51      | AVG      |
| 11  | 21.9540         | 10.58       | 23.92          | 34.50        | 60.00        | -25.50      | QP       |
| 12  | 21.9540         | 10.58       | 19.04          | 29.62        | 50.00        | -20.38      | AVG      |

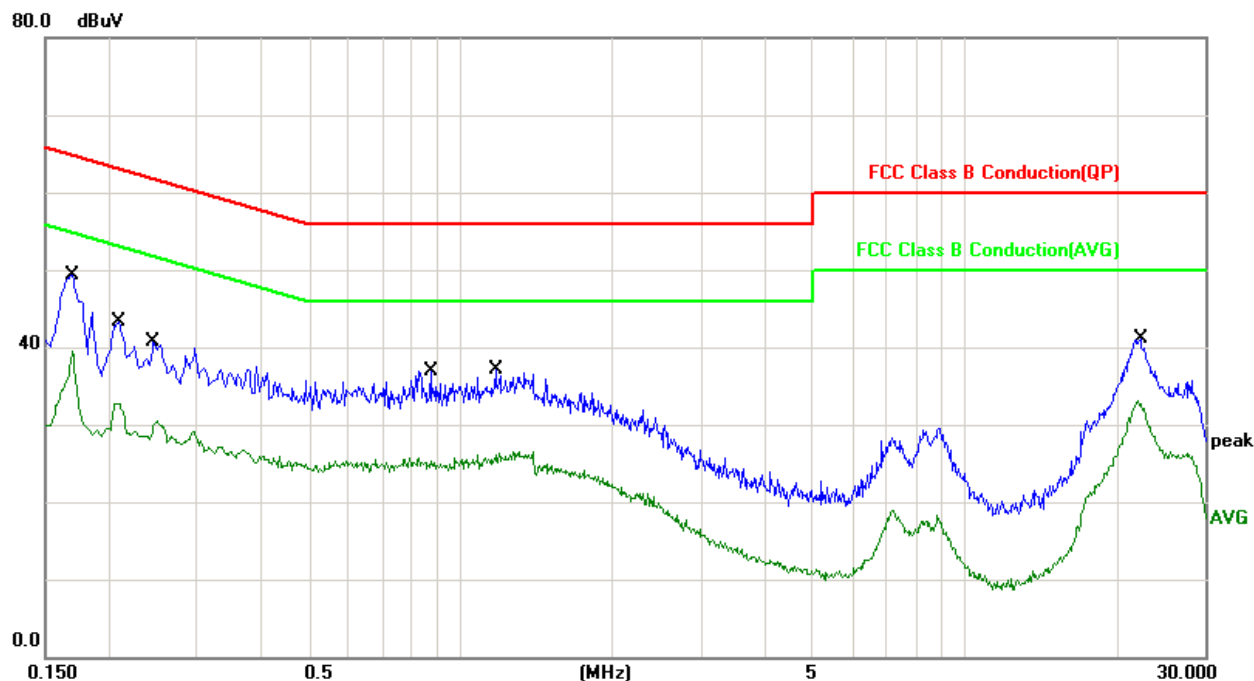
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC, or Current Probe) Factor + Cable Loss + Attenuator



|           |                  |             |         |
|-----------|------------------|-------------|---------|
| Power     | : AC 120V        | Pol/Phase   | : LINE  |
| Test Mode | : Mode 1, Band 4 | Temperature | : 26 °C |
| Test date | : Aug. 12, 2018  | Humidity    | : 48 %  |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 0.1700          | 10.06       | 36.51          | 46.57        | 64.96        | -18.39      | QP       |
| 2   | 0.1700          | 10.06       | 25.88          | 35.94        | 54.96        | -19.02      | AVG      |
| 3   | 0.2100          | 10.05       | 28.35          | 38.40        | 63.20        | -24.80      | QP       |
| 4   | 0.2100          | 10.05       | 21.44          | 31.49        | 53.20        | -21.71      | AVG      |
| 5   | 0.2460          | 10.03       | 24.39          | 34.42        | 61.89        | -27.47      | QP       |
| 6   | 0.2460          | 10.03       | 18.68          | 28.71        | 51.89        | -23.18      | AVG      |
| 7   | 0.8740          | 10.10       | 19.55          | 29.65        | 56.00        | -26.35      | QP       |
| 8   | 0.8740          | 10.10       | 14.50          | 24.60        | 46.00        | -21.40      | AVG      |
| 9   | 1.1740          | 10.30       | 20.16          | 30.46        | 56.00        | -25.54      | QP       |
| 10  | 1.1740          | 10.30       | 15.00          | 25.30        | 46.00        | -20.70      | AVG      |
| 11  | 22.3900         | 10.58       | 25.82          | 36.40        | 60.00        | -23.60      | QP       |
| 12  | 22.3900         | 10.58       | 20.93          | 31.51        | 50.00        | -18.49      | AVG      |

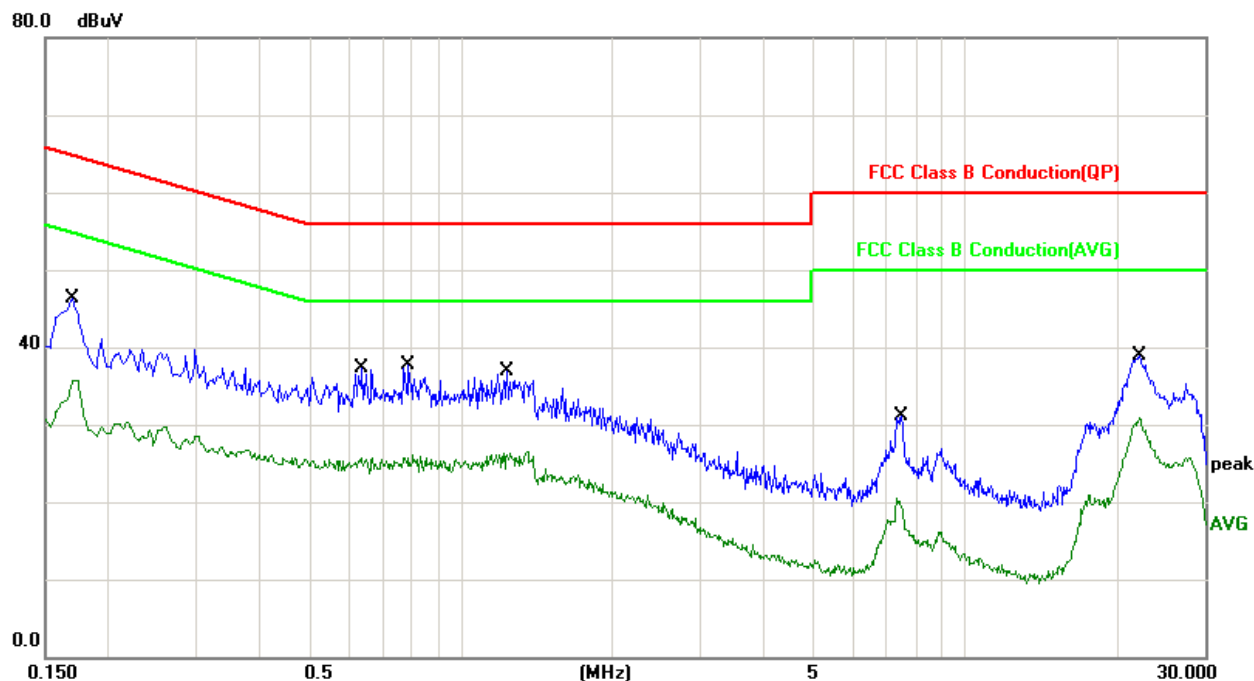
Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC, or Current Probe) Factor + Cable Loss + Attenuator



|           |                  |             |           |
|-----------|------------------|-------------|-----------|
| Power     | : AC 120V        | Pol/Phase   | : NEUTRAL |
| Test Mode | : Mode 1, Band 4 | Temperature | : 26 °C   |
| Test date | : Aug. 12, 2018  | Humidity    | : 48 %    |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 0.1700          | 10.06       | 32.41          | 42.47        | 64.96        | -22.49      | QP       |
| 2   | 0.1700          | 10.06       | 25.32          | 35.38        | 54.96        | -19.58      | AVG      |
| 3   | 0.6380          | 10.01       | 20.63          | 30.64        | 56.00        | -25.36      | QP       |
| 4   | 0.6380          | 10.01       | 14.92          | 24.93        | 46.00        | -21.07      | AVG      |
| 5   | 0.7900          | 10.09       | 20.39          | 30.48        | 56.00        | -25.52      | QP       |
| 6   | 0.7900          | 10.09       | 14.79          | 24.88        | 46.00        | -21.12      | AVG      |
| 7   | 1.2380          | 10.14       | 20.55          | 30.69        | 56.00        | -25.31      | QP       |
| 8   | 1.2380          | 10.14       | 15.29          | 25.43        | 46.00        | -20.57      | AVG      |
| 9   | 7.5060          | 10.24       | 11.26          | 21.50        | 60.00        | -38.50      | QP       |
| 10  | 7.5060          | 10.24       | 5.33           | 15.57        | 50.00        | -34.43      | AVG      |
| 11  | 22.2340         | 10.58       | 24.03          | 34.61        | 60.00        | -25.39      | QP       |
| 12  | 22.2340         | 10.58       | 19.28          | 29.86        | 50.00        | -20.14      | AVG      |

Note: Level = Reading + Factor

Margin = Level – Limit

Factor = (LISN, ISN, PLC, or Current Probe) Factor + Cable Loss + Attenuator



## 5.5. Test Photographs

Front View



Rear View





## 6. Test of Spurious Emission (Radiated)

### 6.1. Test Limit

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:  
All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.
- (5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.
- (7) The provisions of §15.205 apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

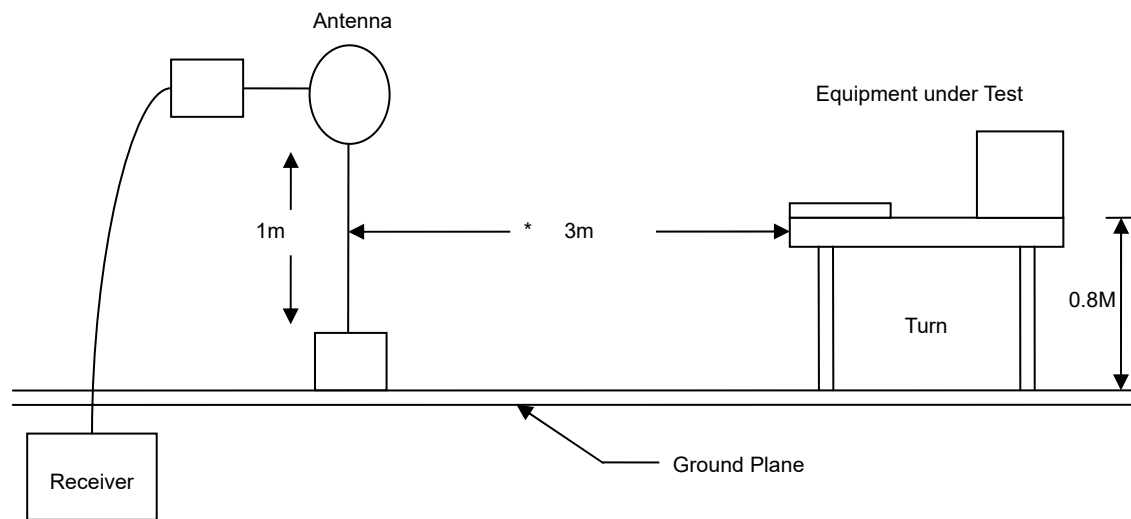
### 6.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- h. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
- i. "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

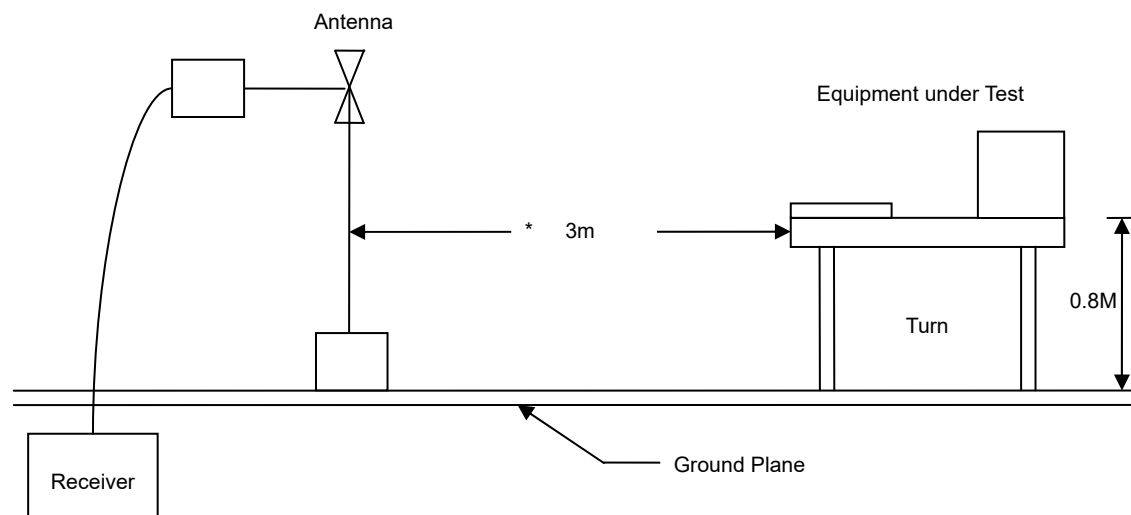


### 6.3. Typical Test Setup

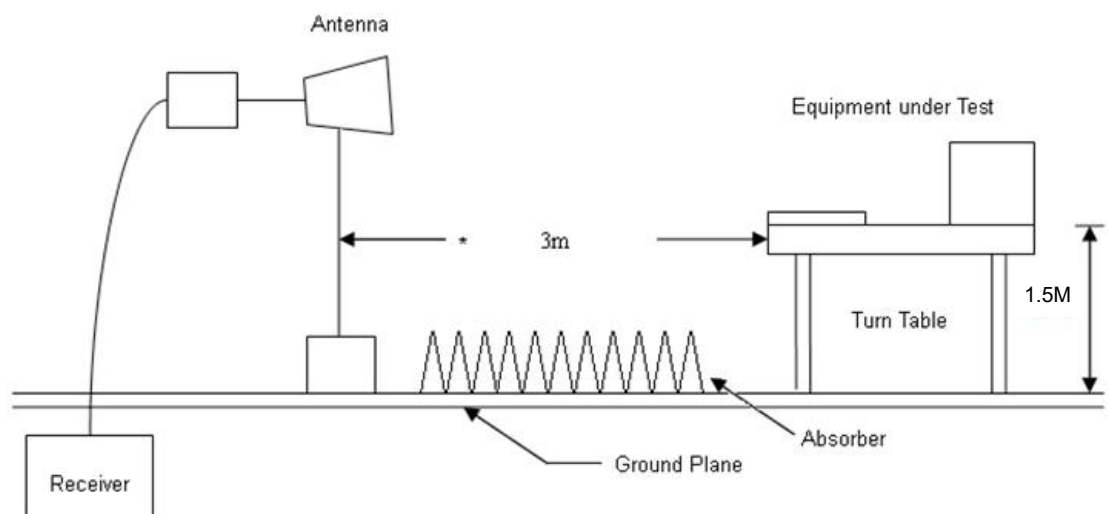
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



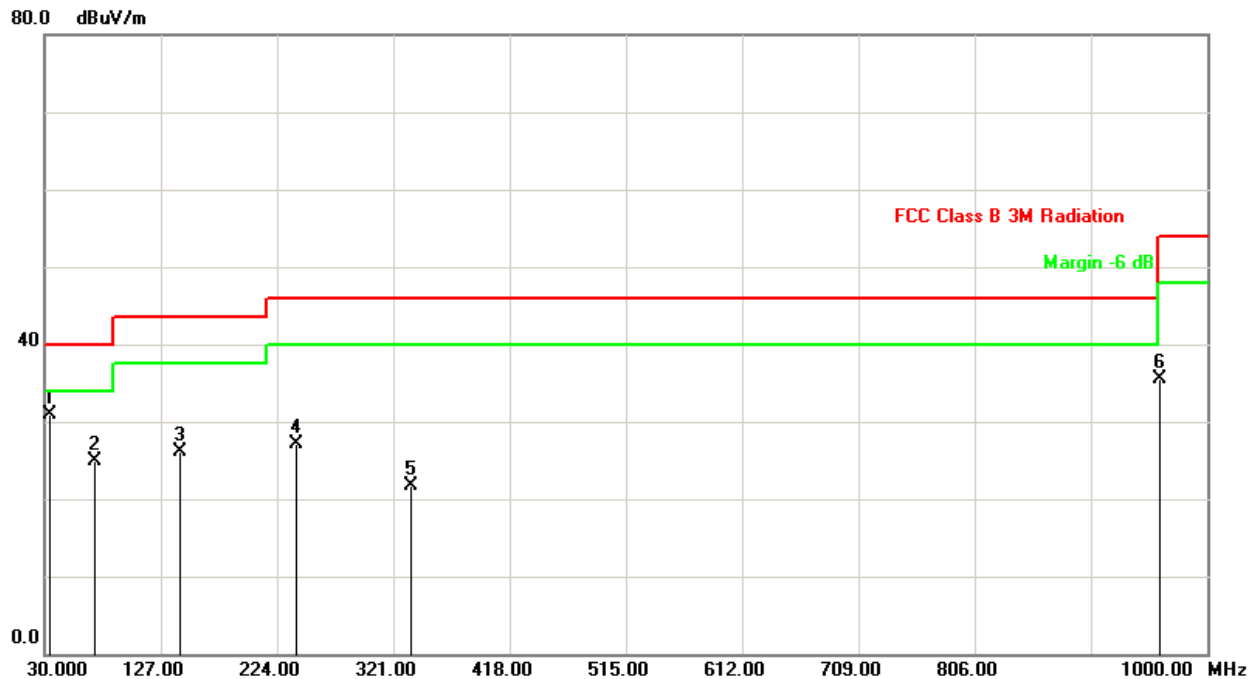


#### 6.4. Test Result and Data (9kHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

#### 6.5. Test Result and Data (30MHz ~ 1GHz)

|           |                  |             |            |
|-----------|------------------|-------------|------------|
| Power     | : DC 5V          | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, Band 1 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018  | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1   | 33.8800         | -5.41         | 36.26          | 30.85          | 40.00          | -9.15       | peak | 100         | 74            |
| 2   | 71.7099         | -14.83        | 39.72          | 24.89          | 40.00          | -15.11      | peak | 100         | 314           |
| 3   | 143.4900        | -10.80        | 36.95          | 26.15          | 43.50          | -17.35      | peak | 100         | 225           |
| 4   | 239.5200        | -9.06         | 36.17          | 27.11          | 46.00          | -18.89      | peak | 100         | 69            |
| 5   | 335.5500        | -4.22         | 26.02          | 21.80          | 46.00          | -24.20      | peak | 100         | 102           |
| 6   | 960.2300        | 3.17          | 32.33          | 35.50          | 54.00          | -18.50      | peak | 100         | 78            |

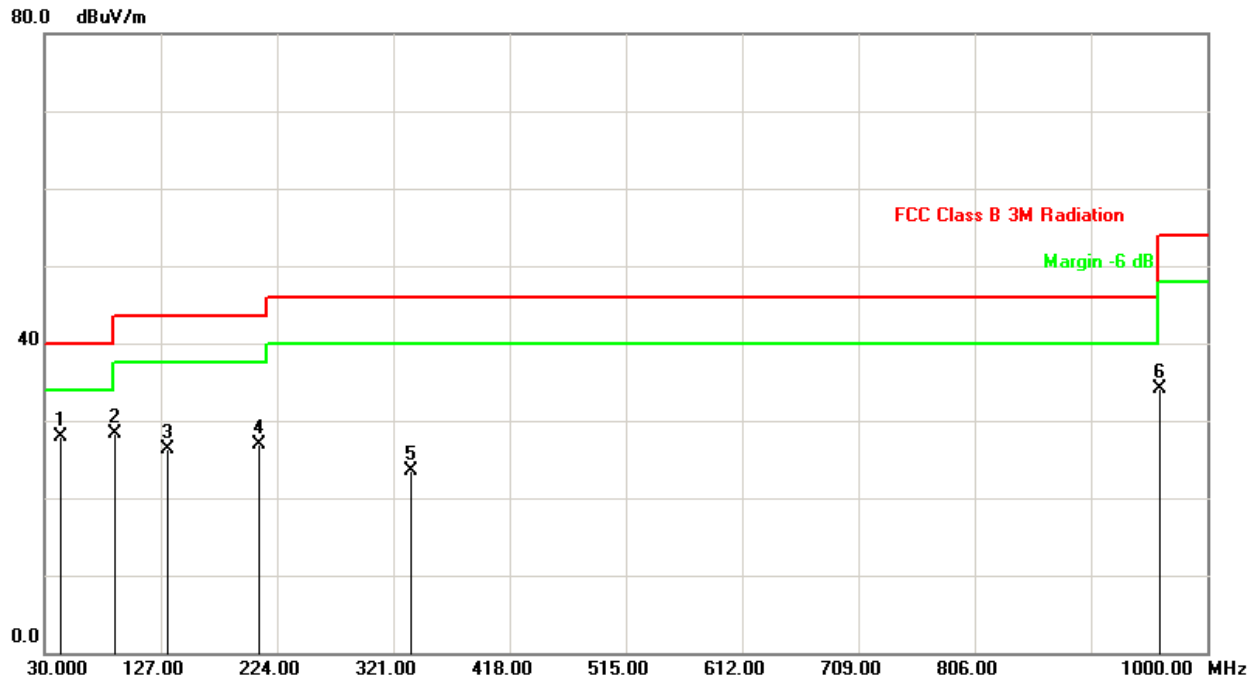
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                  |             |              |
|-----------|------------------|-------------|--------------|
| Power     | : DC 5V          | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, Band 1 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018  | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1   | 43.5799         | -11.77        | 39.75          | 27.98          | 40.00          | -12.02      | peak | 200         | 31            |
| 2   | 89.1700         | -11.48        | 39.84          | 28.36          | 43.50          | -15.14      | peak | 100         | 225           |
| 3   | 132.8199        | -9.28         | 35.49          | 26.21          | 43.50          | -17.29      | peak | 100         | 76            |
| 4   | 209.4499        | -9.50         | 36.35          | 26.85          | 43.50          | -16.65      | peak | 200         | 119           |
| 5   | 335.5500        | -4.22         | 27.65          | 23.43          | 46.00          | -22.57      | peak | 200         | 208           |
| 6   | 960.2300        | 3.17          | 30.84          | 34.01          | 54.00          | -19.99      | peak | 100         | 37            |

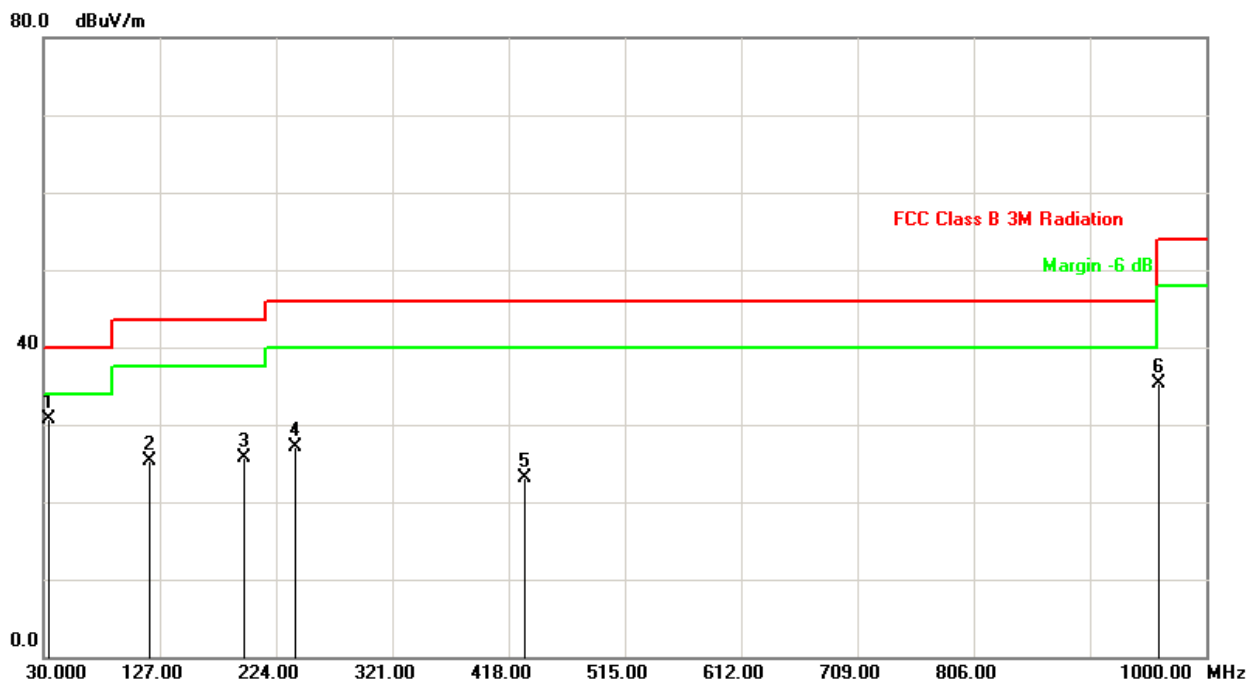
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                  |             |            |
|-----------|------------------|-------------|------------|
| Power     | : DC 5V          | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, Band 4 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018  | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1   | 33.8800         | -5.41         | 36.06          | 30.65          | 40.00          | -9.35       | peak | 100         | 214           |
| 2   | 119.2399        | -8.17         | 33.48          | 25.31          | 43.50          | -18.19      | peak | 100         | 53            |
| 3   | 197.8100        | -9.77         | 35.52          | 25.75          | 43.50          | -17.75      | peak | 100         | 116           |
| 4   | 239.5200        | -9.06         | 36.18          | 27.12          | 46.00          | -18.88      | peak | 100         | 78            |
| 5   | 431.5799        | -4.60         | 27.80          | 23.20          | 46.00          | -22.80      | peak | 100         | 128           |
| 6   | 960.2300        | 3.17          | 32.08          | 35.25          | 54.00          | -18.75      | peak | 100         | 56            |

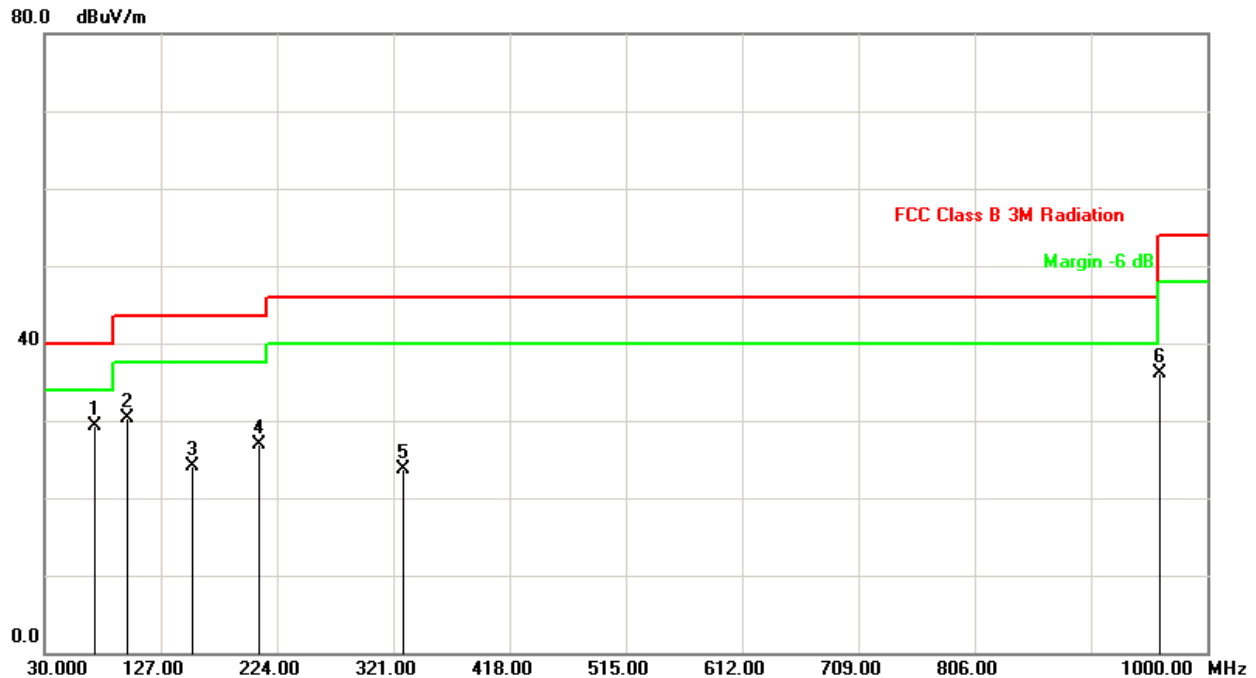
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                  |             |              |
|-----------|------------------|-------------|--------------|
| Power     | : DC 5V          | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, Band 4 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018  | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. | Height (cm) | Azimuth (deg) |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|-------------|---------------|
| 1   | 71.7099         | -14.83        | 44.10          | 29.27          | 40.00          | -10.73      | peak | 100         | 23            |
| 2   | 99.8399         | -9.63         | 39.87          | 30.24          | 43.50          | -13.26      | peak | 200         | 114           |
| 3   | 154.1598        | -11.53        | 35.61          | 24.08          | 43.50          | -19.42      | peak | 100         | 79            |
| 4   | 209.4499        | -9.50         | 36.40          | 26.90          | 43.50          | -16.60      | peak | 100         | 116           |
| 5   | 329.7300        | -4.13         | 27.93          | 23.80          | 46.00          | -22.20      | peak | 200         | 237           |
| 6   | 960.2300        | 3.17          | 32.92          | 36.09          | 54.00          | -17.91      | peak | 200         | 24            |

Note: Level = Reading + Factor

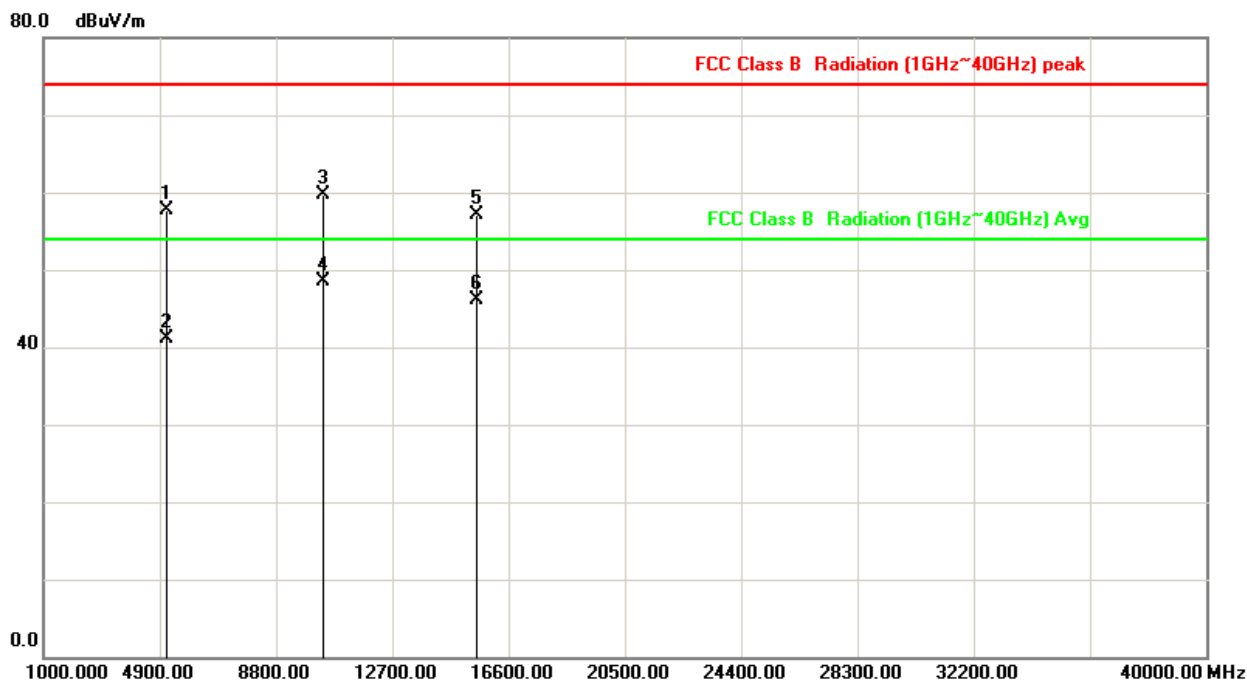
Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



## 6.6. Test Result and Data (1GHz ~ 40GHz)

|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : DC 5V                | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, CH36, Band 1 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 42.96          | 57.69          | 74.00          | -16.31      | peak |
| 2   | 5150.000        | 14.73         | 26.39          | 41.12          | 54.00          | -12.88      | AVG  |
| 3   | 10360.000       | 25.85         | 33.81          | 59.66          | 74.00          | -14.34      | peak |
| 4   | 10360.000       | 25.85         | 22.69          | 48.54          | 54.00          | -5.46       | AVG  |
| 5   | 15540.000       | 38.25         | 18.93          | 57.18          | 74.00          | -16.82      | peak |
| 6   | 15540.000       | 38.25         | 7.88           | 46.13          | 54.00          | -7.87       | AVG  |

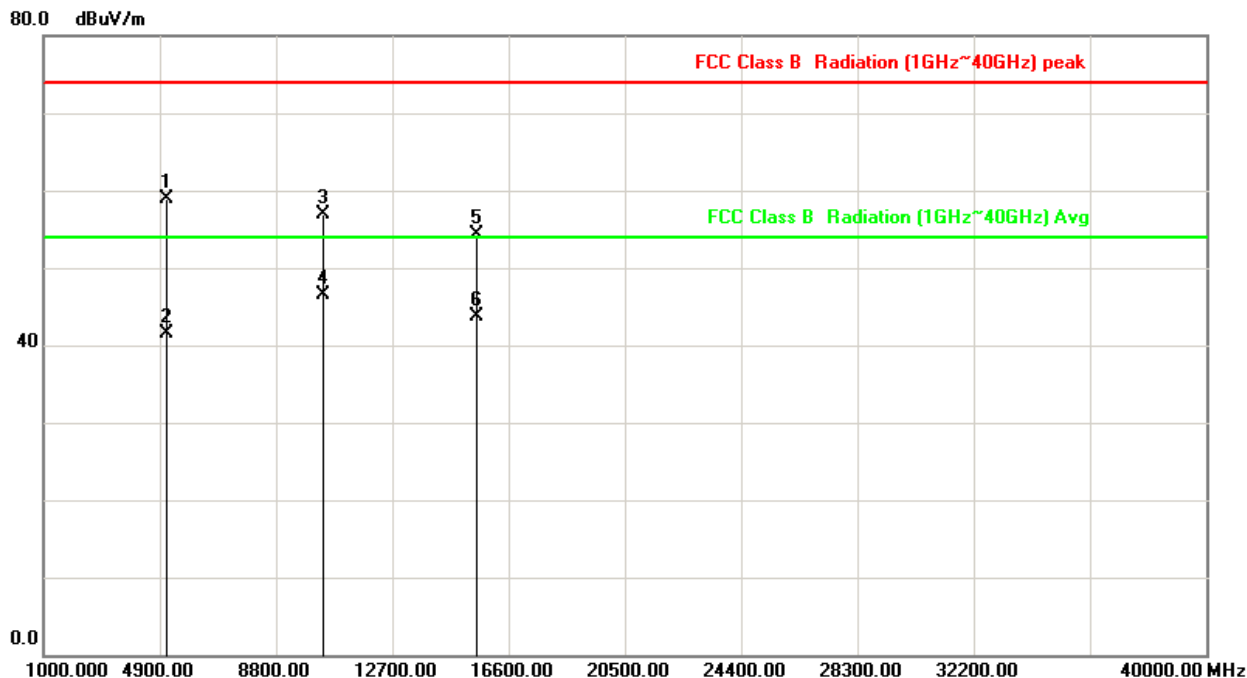
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : DC 5V                | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, CH36, Band 1 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 44.10          | 58.83          | 74.00          | -15.17      | peak |
| 2   | 5150.000        | 14.73         | 26.78          | 41.51          | 54.00          | -12.49      | AVG  |
| 3   | 10360.000       | 25.85         | 31.12          | 56.97          | 74.00          | -17.03      | peak |
| 4   | 10360.000       | 25.85         | 20.59          | 46.44          | 54.00          | -7.56       | AVG  |
| 5   | 15540.000       | 38.25         | 16.14          | 54.39          | 74.00          | -19.61      | peak |
| 6   | 15540.000       | 38.25         | 5.49           | 43.74          | 54.00          | -10.26      | AVG  |

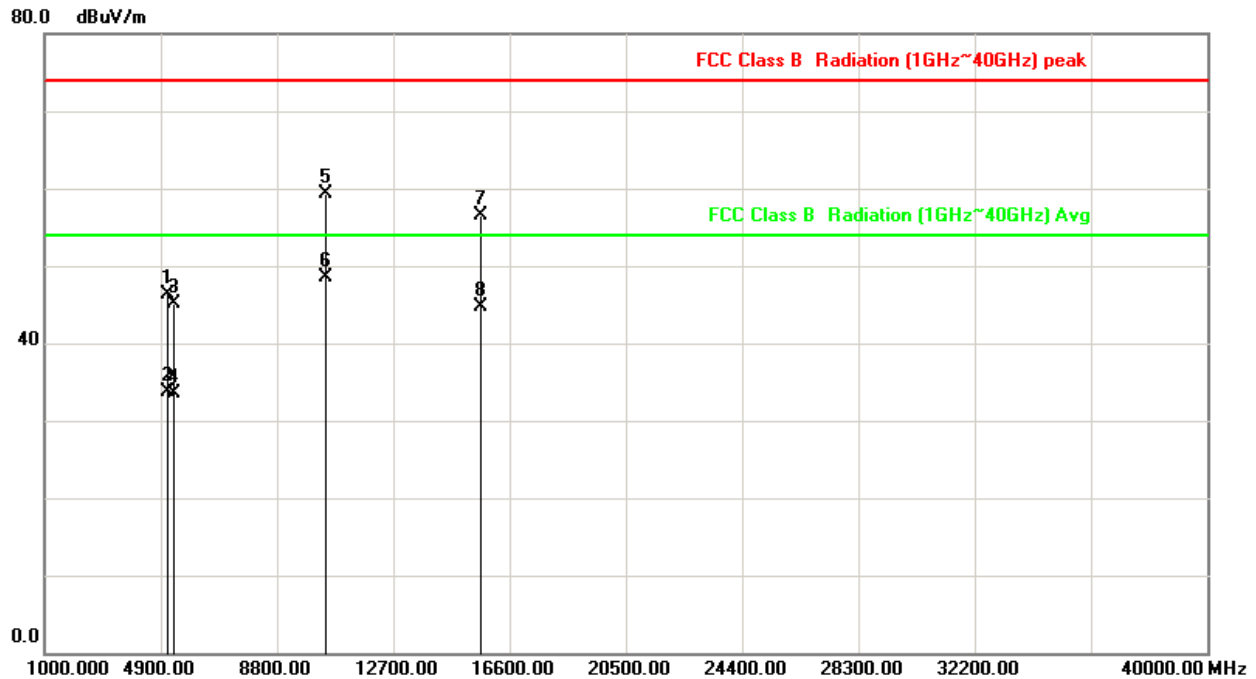
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : DC 5V                | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, CH44, Band 1 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 31.54          | 46.27          | 74.00          | -27.73      | peak |
| 2   | 5150.000        | 14.73         | 18.95          | 33.68          | 54.00          | -20.32      | AVG  |
| 3   | 5350.000        | 14.89         | 30.26          | 45.15          | 74.00          | -28.85      | peak |
| 4   | 5350.000        | 14.89         | 18.56          | 33.45          | 54.00          | -20.55      | AVG  |
| 5   | 10440.000       | 26.03         | 33.24          | 59.27          | 74.00          | -14.73      | peak |
| 6   | 10440.000       | 26.03         | 22.41          | 48.44          | 54.00          | -5.56       | AVG  |
| 7   | 15660.000       | 38.30         | 18.12          | 56.42          | 74.00          | -17.58      | peak |
| 8   | 15660.000       | 38.30         | 6.38           | 44.68          | 54.00          | -9.32       | AVG  |

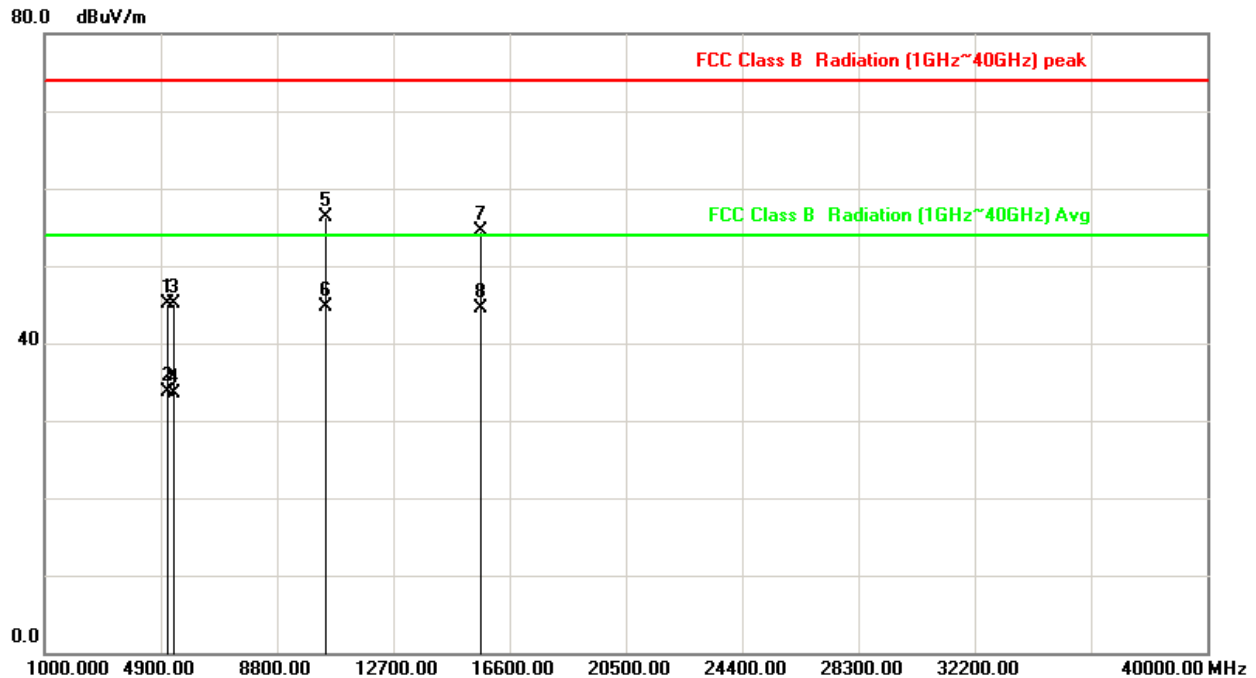
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : DC 5V                | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, CH44, Band 1 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 30.28          | 45.01          | 74.00          | -28.99      | peak |
| 2   | 5150.000        | 14.73         | 18.95          | 33.68          | 54.00          | -20.32      | AVG  |
| 3   | 5350.000        | 14.89         | 30.13          | 45.02          | 74.00          | -28.98      | peak |
| 4   | 5350.000        | 14.89         | 18.66          | 33.55          | 54.00          | -20.45      | AVG  |
| 5   | 10440.000       | 26.03         | 30.29          | 56.32          | 74.00          | -17.68      | peak |
| 6   | 10440.000       | 26.03         | 18.72          | 44.75          | 54.00          | -9.25       | AVG  |
| 7   | 15660.000       | 38.30         | 16.23          | 54.53          | 74.00          | -19.47      | peak |
| 8   | 15660.000       | 38.30         | 6.27           | 44.57          | 54.00          | -9.43       | AVG  |

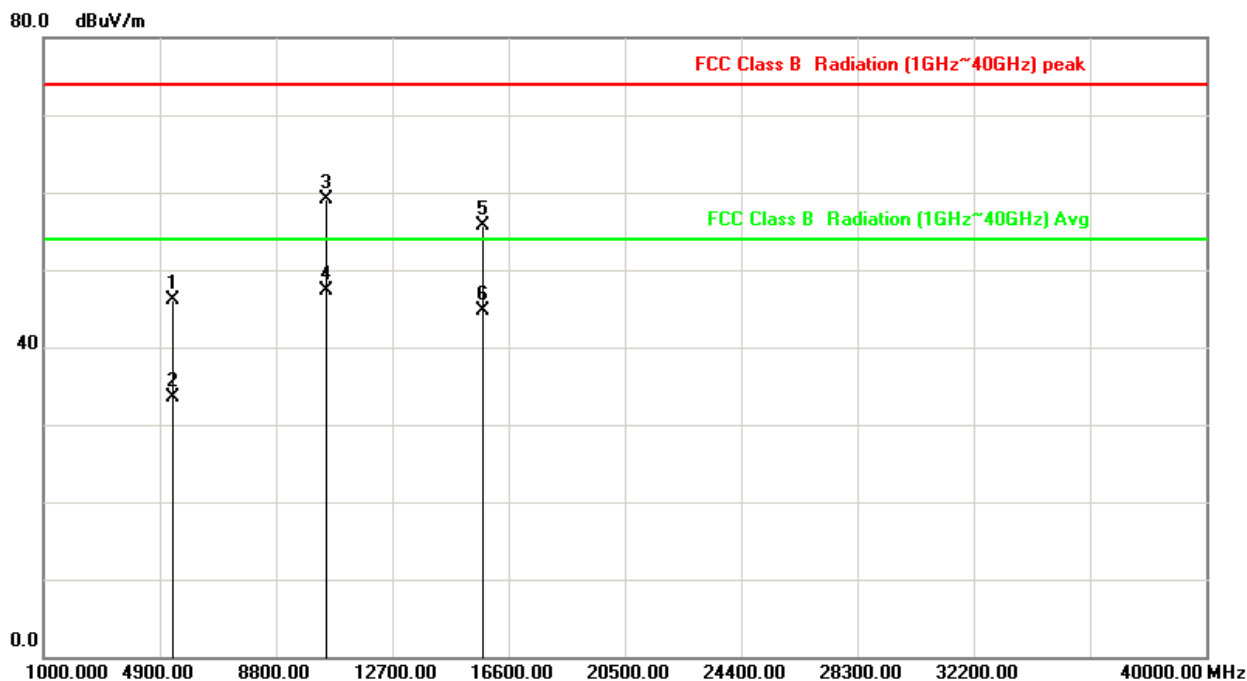
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : DC 5V                | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, CH48, Band 1 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5350.000        | 14.89         | 31.30          | 46.19          | 74.00          | -27.81      | peak |
| 2   | 5350.000        | 14.89         | 18.67          | 33.56          | 54.00          | -20.44      | AVG  |
| 3   | 10480.000       | 26.12         | 32.89          | 59.01          | 74.00          | -14.99      | peak |
| 4   | 10480.000       | 26.12         | 21.16          | 47.28          | 54.00          | -6.72       | AVG  |
| 5   | 15720.000       | 38.33         | 17.31          | 55.64          | 74.00          | -18.36      | peak |
| 6   | 15720.000       | 38.33         | 6.45           | 44.78          | 54.00          | -9.22       | AVG  |

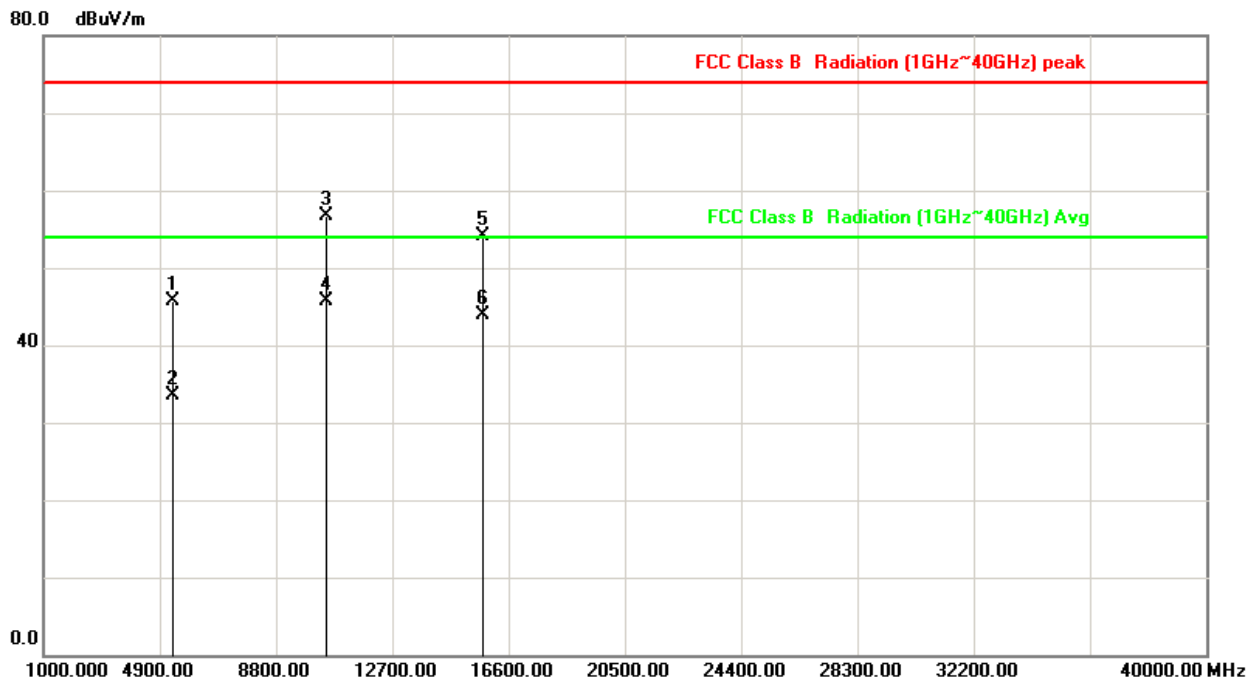
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : DC 5V                | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, CH48, Band 1 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5350.000        | 14.89         | 30.81          | 45.70          | 74.00          | -28.30      | peak |
| 2   | 5350.000        | 14.89         | 18.68          | 33.57          | 54.00          | -20.43      | AVG  |
| 3   | 10480.000       | 26.12         | 30.65          | 56.77          | 74.00          | -17.23      | peak |
| 4   | 10480.000       | 26.12         | 19.67          | 45.79          | 54.00          | -8.21       | AVG  |
| 5   | 15720.000       | 38.33         | 15.74          | 54.07          | 74.00          | -19.93      | peak |
| 6   | 15720.000       | 38.33         | 5.64           | 43.97          | 54.00          | -10.03      | AVG  |

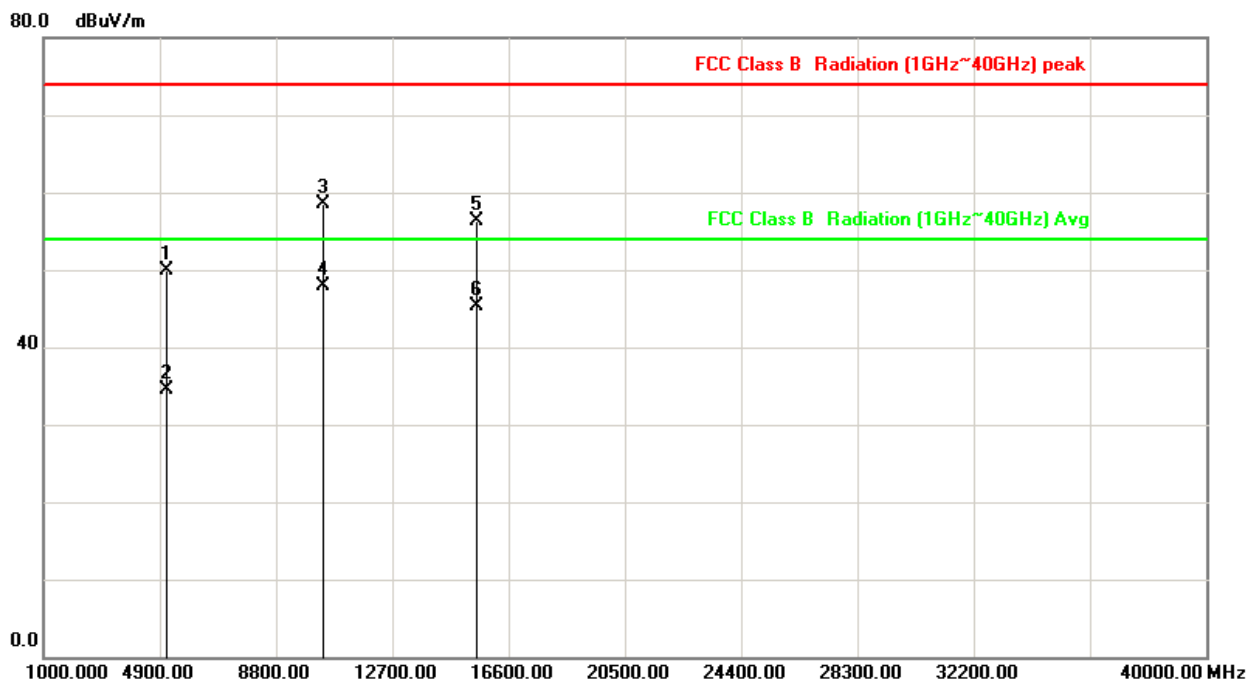
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : DC 5V                | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 2, CH36, Band 1 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 35.24          | 49.97          | 74.00          | -24.03      | peak |
| 2   | 5150.000        | 14.73         | 19.68          | 34.41          | 54.00          | -19.59      | AVG  |
| 3   | 10360.000       | 25.85         | 32.57          | 58.42          | 74.00          | -15.58      | peak |
| 4   | 10360.000       | 25.85         | 21.96          | 47.81          | 54.00          | -6.19       | AVG  |
| 5   | 15540.000       | 38.25         | 18.10          | 56.35          | 74.00          | -17.65      | peak |
| 6   | 15540.000       | 38.25         | 7.13           | 45.38          | 54.00          | -8.62       | AVG  |

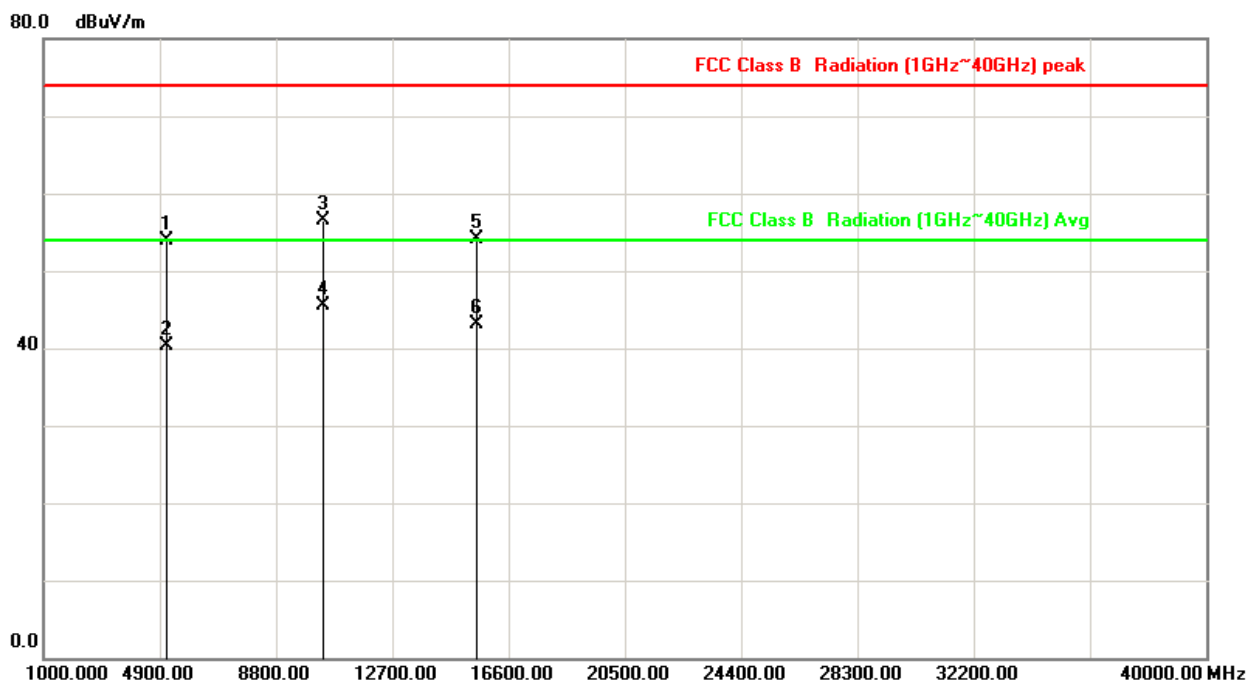
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : DC 5V                | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 2, CH36, Band 1 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 39.21          | 53.94          | 74.00          | -20.06      | peak |
| 2   | 5150.000        | 14.73         | 25.67          | 40.40          | 54.00          | -13.60      | AVG  |
| 3   | 10360.000       | 25.85         | 30.58          | 56.43          | 74.00          | -17.57      | peak |
| 4   | 10360.000       | 25.85         | 19.66          | 45.51          | 54.00          | -8.49       | AVG  |
| 5   | 15540.000       | 38.25         | 15.92          | 54.17          | 74.00          | -19.83      | peak |
| 6   | 15540.000       | 38.25         | 4.87           | 43.12          | 54.00          | -10.88      | AVG  |

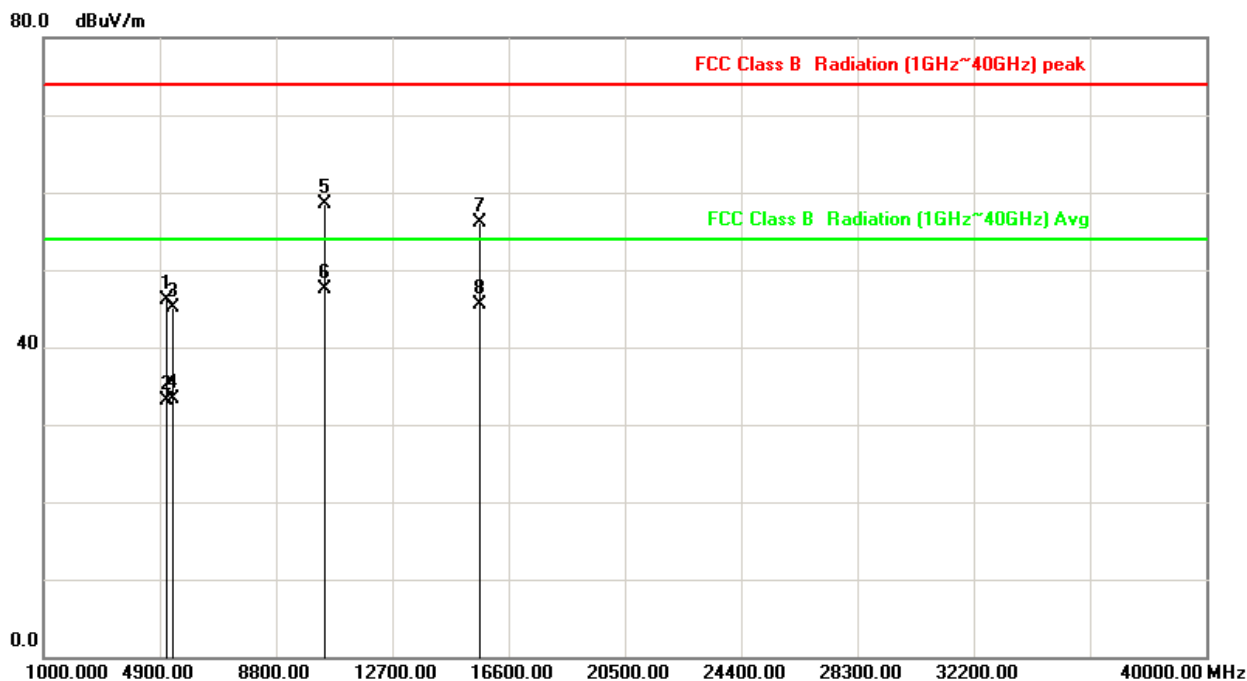
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : DC 5V                | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 2, CH44, Band 1 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 31.33          | 46.06          | 74.00          | -27.94      | peak |
| 2   | 5150.000        | 14.73         | 18.42          | 33.15          | 54.00          | -20.85      | AVG  |
| 3   | 5350.000        | 14.89         | 30.15          | 45.04          | 74.00          | -28.96      | peak |
| 4   | 5350.000        | 14.89         | 18.37          | 33.26          | 54.00          | -20.74      | AVG  |
| 5   | 10440.000       | 26.03         | 32.52          | 58.55          | 74.00          | -15.45      | peak |
| 6   | 10440.000       | 26.03         | 21.44          | 47.47          | 54.00          | -6.53       | AVG  |
| 7   | 15660.000       | 38.30         | 17.73          | 56.03          | 74.00          | -17.97      | peak |
| 8   | 15660.000       | 38.30         | 7.16           | 45.46          | 54.00          | -8.54       | AVG  |

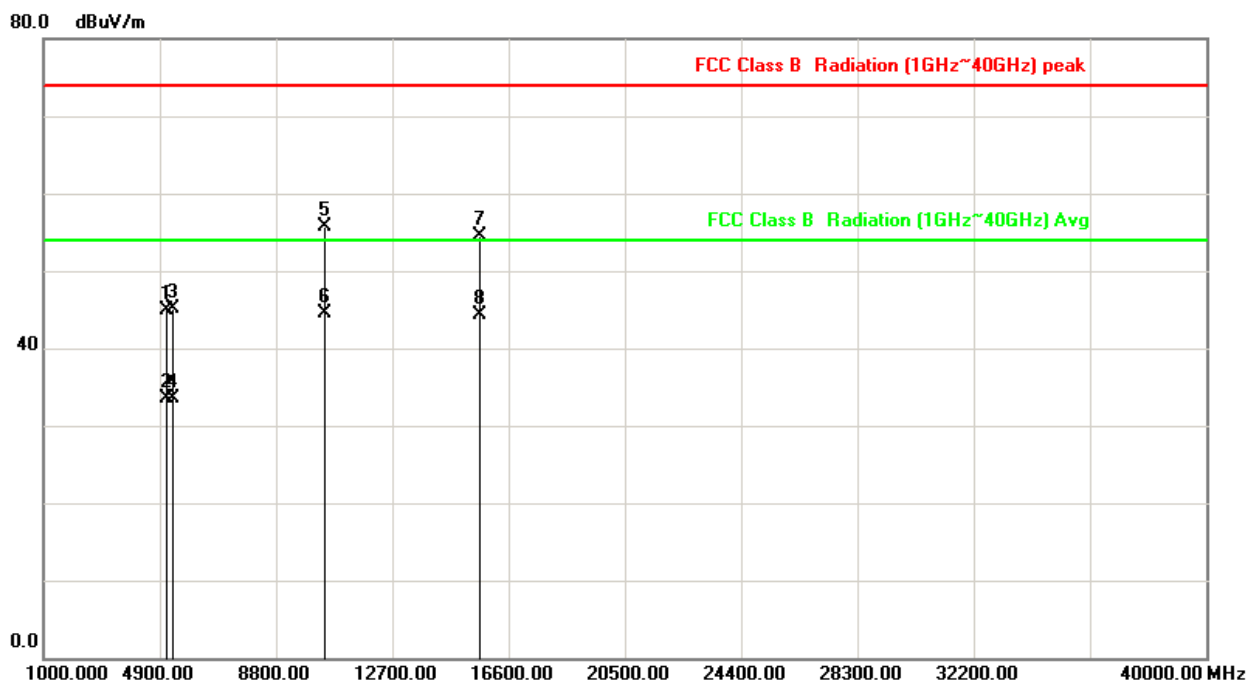
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : DC 5V                | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 2, CH44, Band 1 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 30.25          | 44.98          | 74.00          | -29.02      | peak |
| 2   | 5150.000        | 14.73         | 18.79          | 33.52          | 54.00          | -20.48      | AVG  |
| 3   | 5350.000        | 14.89         | 30.24          | 45.13          | 74.00          | -28.87      | peak |
| 4   | 5350.000        | 14.89         | 18.59          | 33.48          | 54.00          | -20.52      | AVG  |
| 5   | 10440.000       | 26.03         | 29.66          | 55.69          | 74.00          | -18.31      | peak |
| 6   | 10440.000       | 26.03         | 18.53          | 44.56          | 54.00          | -9.44       | AVG  |
| 7   | 15660.000       | 38.30         | 16.22          | 54.52          | 74.00          | -19.48      | peak |
| 8   | 15660.000       | 38.30         | 5.91           | 44.21          | 54.00          | -9.79       | AVG  |

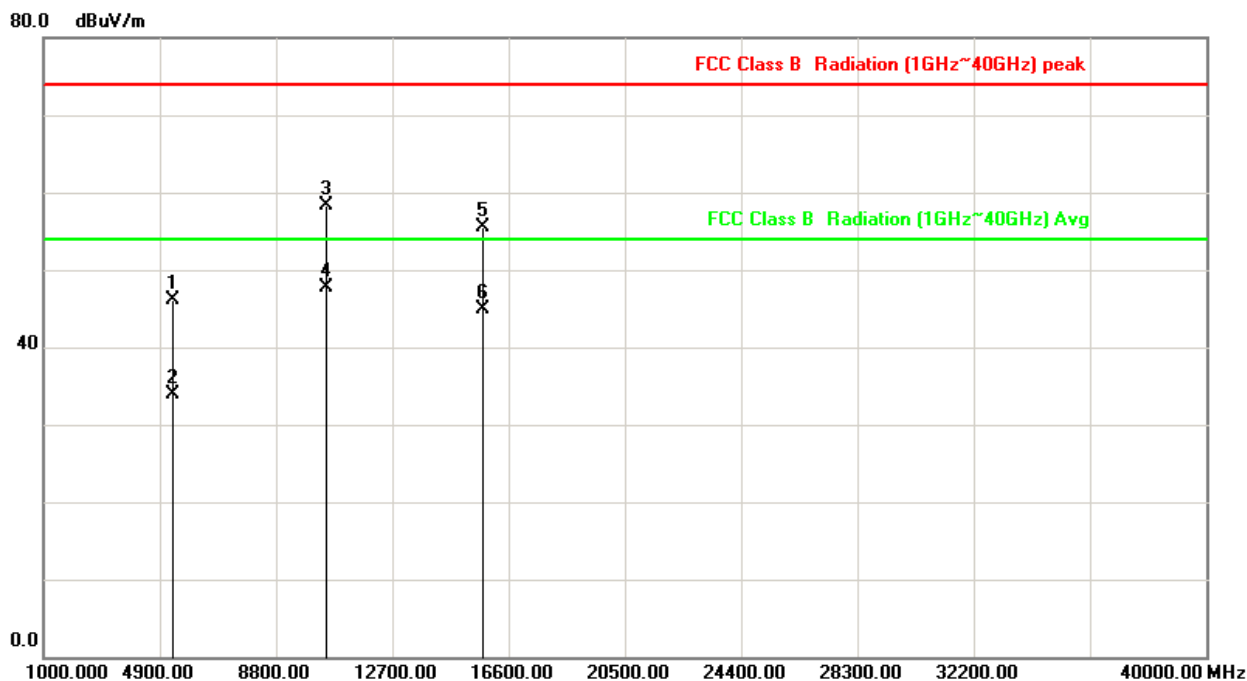
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : DC 5V                | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 2, CH48, Band 1 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5350.000        | 14.89         | 31.30          | 46.19          | 74.00          | -27.81      | peak |
| 2   | 5350.000        | 14.89         | 18.97          | 33.86          | 54.00          | -20.14      | AVG  |
| 3   | 10480.000       | 26.12         | 32.21          | 58.33          | 74.00          | -15.67      | peak |
| 4   | 10480.000       | 26.12         | 21.58          | 47.70          | 54.00          | -6.30       | AVG  |
| 5   | 15720.000       | 38.33         | 17.10          | 55.43          | 74.00          | -18.57      | peak |
| 6   | 15720.000       | 38.33         | 6.59           | 44.92          | 54.00          | -9.08       | AVG  |

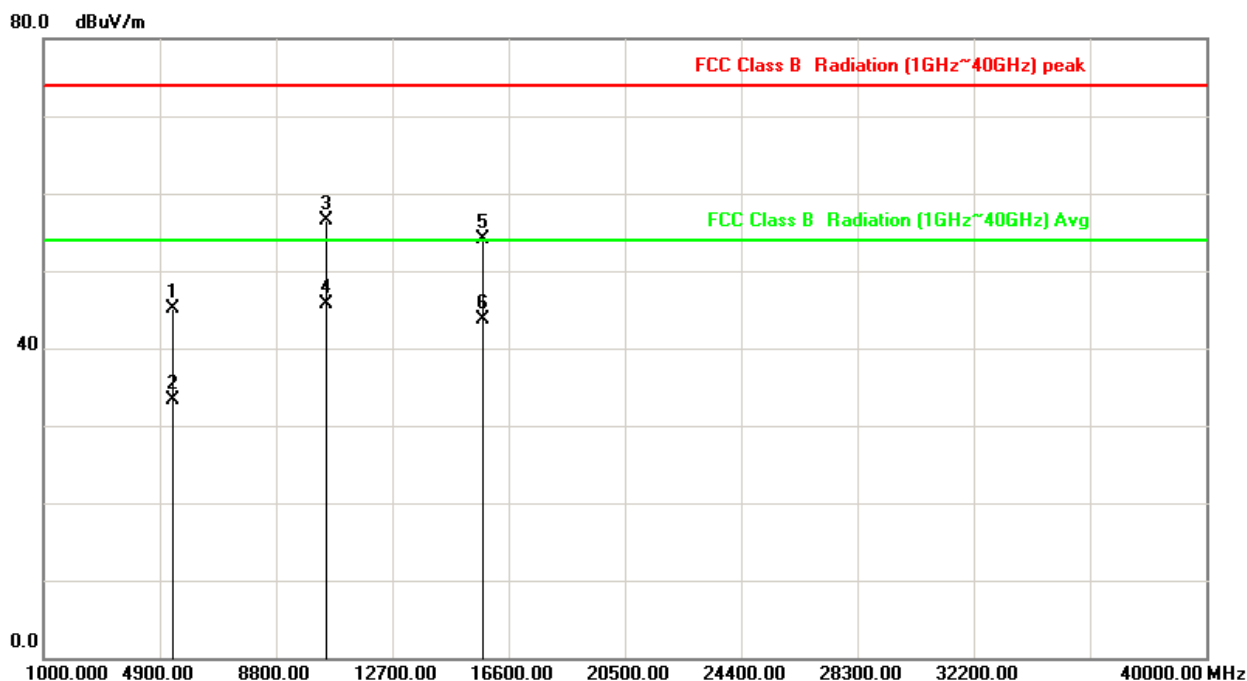
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : DC 5V                | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 2, CH48, Band 1 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5350.000        | 14.89         | 30.21          | 45.10          | 74.00          | -28.90      | peak |
| 2   | 5350.000        | 14.89         | 18.44          | 33.33          | 54.00          | -20.67      | AVG  |
| 3   | 10480.000       | 26.12         | 30.45          | 56.57          | 74.00          | -17.43      | peak |
| 4   | 10480.000       | 26.12         | 19.51          | 45.63          | 54.00          | -8.37       | AVG  |
| 5   | 15720.000       | 38.33         | 15.77          | 54.10          | 74.00          | -19.90      | peak |
| 6   | 15720.000       | 38.33         | 5.31           | 43.64          | 54.00          | -10.36      | AVG  |

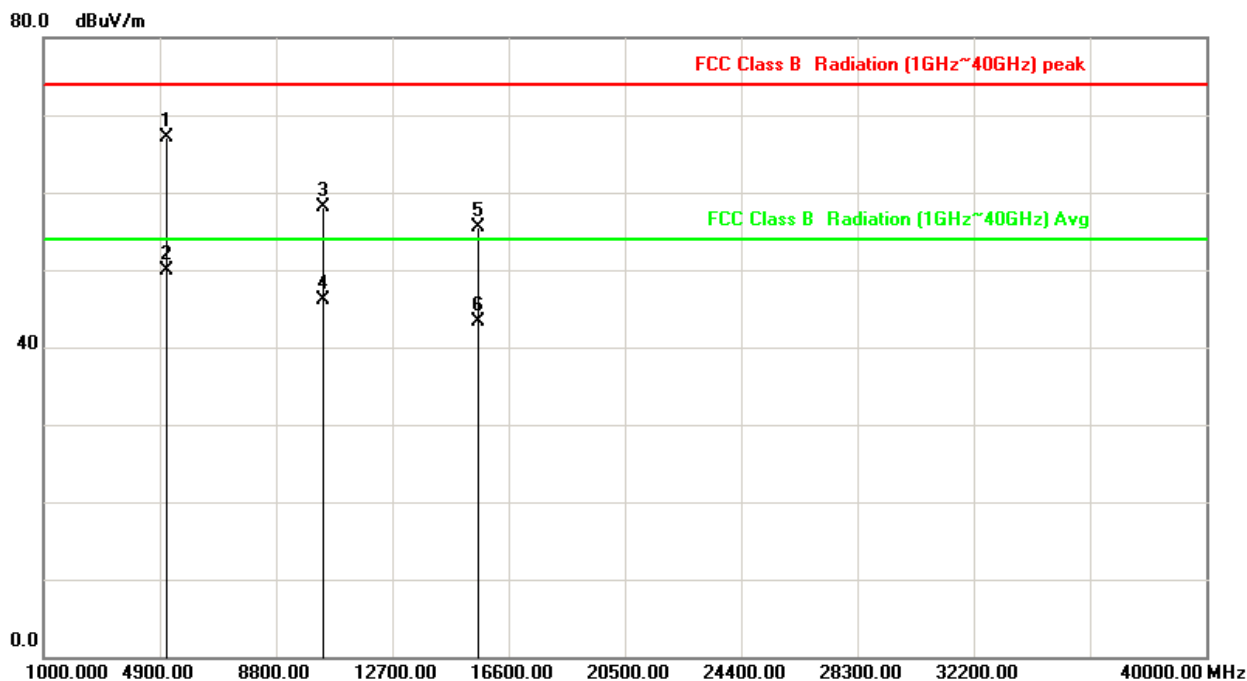
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : DC 5V                | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 3, CH38, Band 1 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 52.34          | 67.07          | 74.00          | -6.93       | peak |
| 2   | 5150.000        | 14.73         | 35.15          | 49.88          | 54.00          | -4.12       | AVG  |
| 3   | 10380.000       | 25.89         | 32.25          | 58.14          | 74.00          | -15.86      | peak |
| 4   | 10380.000       | 25.89         | 20.21          | 46.10          | 54.00          | -7.90       | AVG  |
| 5   | 15570.000       | 38.26         | 17.19          | 55.45          | 74.00          | -18.55      | peak |
| 6   | 15570.000       | 38.26         | 5.03           | 43.29          | 54.00          | -10.71      | AVG  |

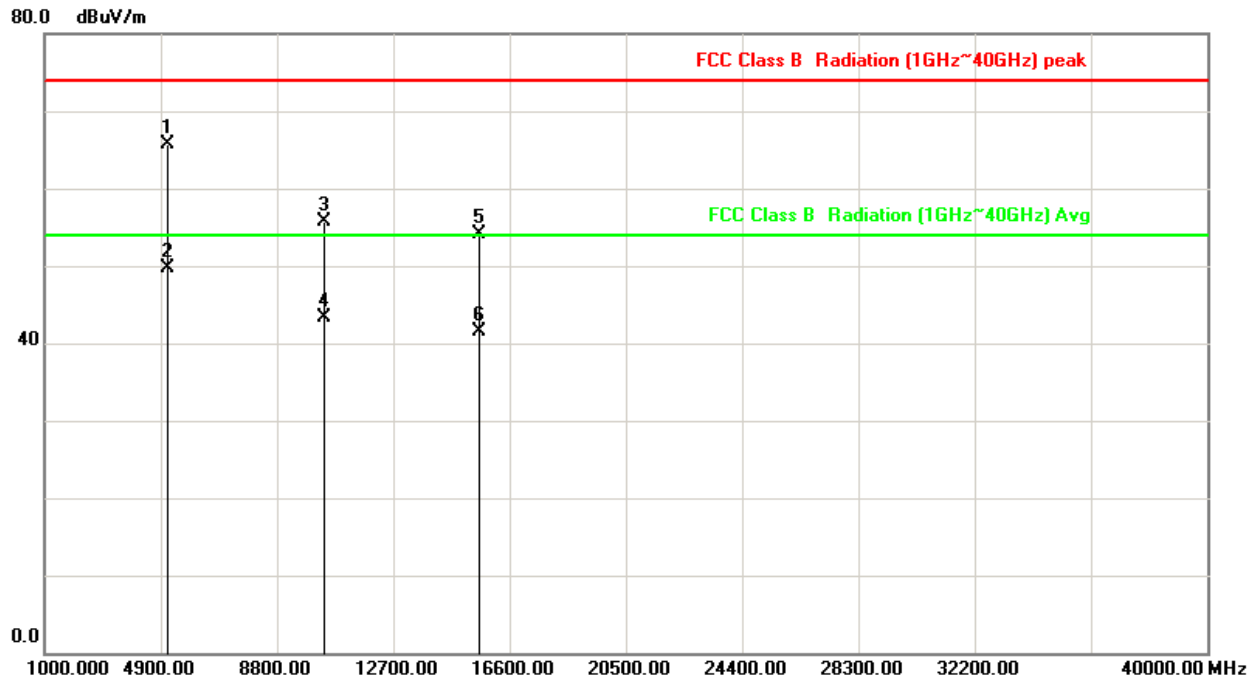
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : DC 5V                | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 3, CH38, Band 1 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 51.02          | 65.75          | 74.00          | -8.25       | peak |
| 2   | 5150.000        | 14.73         | 34.98          | 49.71          | 54.00          | -4.29       | AVG  |
| 3   | 10380.000       | 25.89         | 29.81          | 55.70          | 74.00          | -18.30      | peak |
| 4   | 10380.000       | 25.89         | 17.42          | 43.31          | 54.00          | -10.69      | AVG  |
| 5   | 15570.000       | 38.26         | 15.83          | 54.09          | 74.00          | -19.91      | peak |
| 6   | 15570.000       | 38.26         | 3.29           | 41.55          | 54.00          | -12.45      | AVG  |

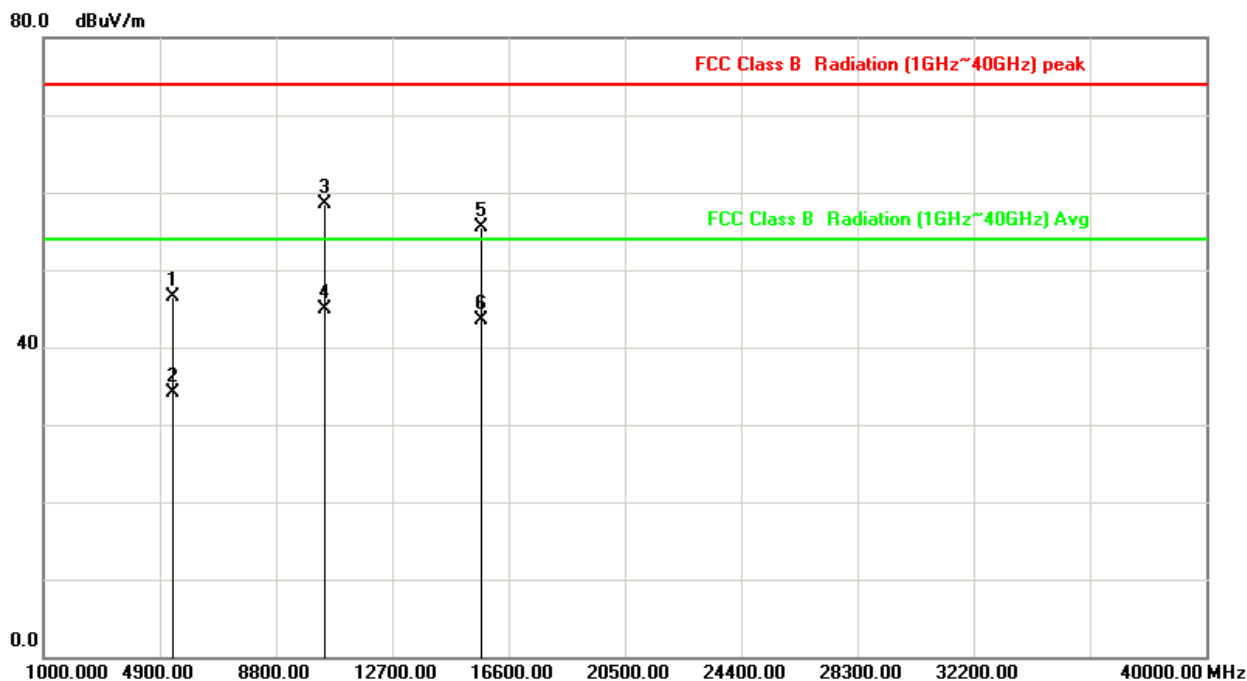
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : DC 5V                | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 3, CH46, Band 1 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5350.000        | 14.89         | 31.66          | 46.55          | 74.00          | -27.45      | peak |
| 2   | 5350.000        | 14.89         | 19.15          | 34.04          | 54.00          | -19.96      | AVG  |
| 3   | 10460.000       | 26.07         | 32.45          | 58.52          | 74.00          | -15.48      | peak |
| 4   | 10460.000       | 26.07         | 18.89          | 44.96          | 54.00          | -9.04       | AVG  |
| 5   | 15690.000       | 38.32         | 17.26          | 55.58          | 74.00          | -18.42      | peak |
| 6   | 15690.000       | 38.32         | 5.10           | 43.42          | 54.00          | -10.58      | AVG  |

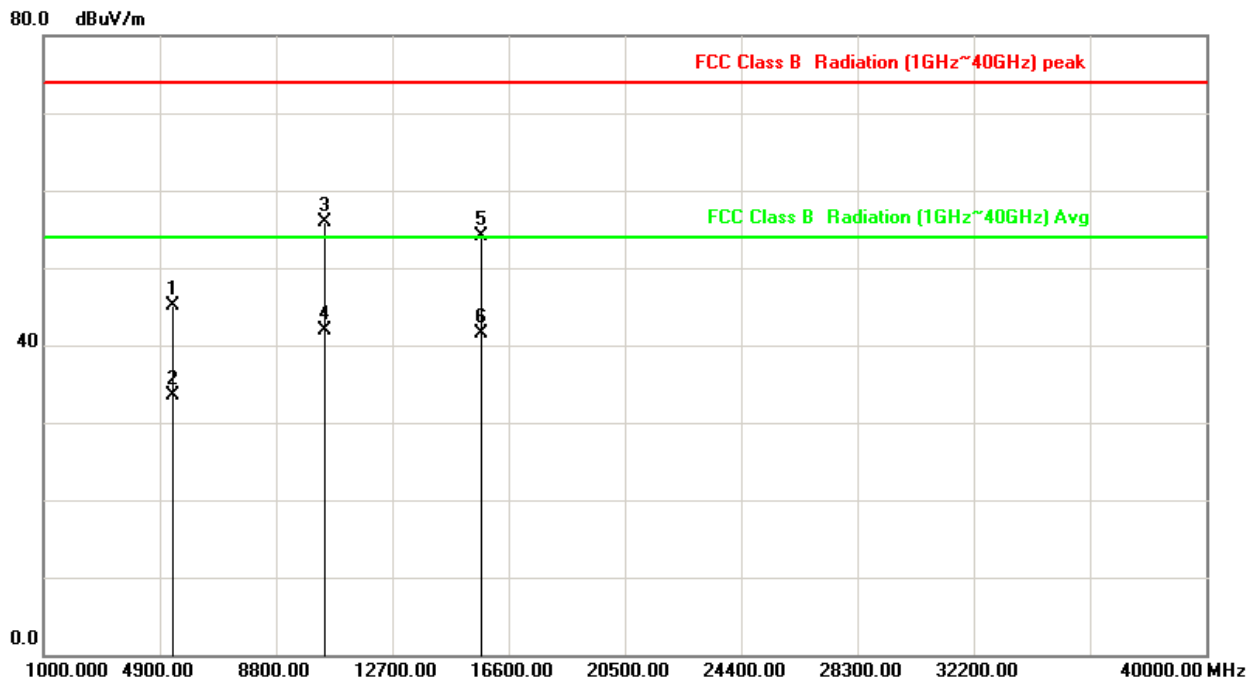
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : DC 5V                | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 3, CH46, Band 1 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5350.000        | 14.89         | 30.21          | 45.10          | 74.00          | -28.90      | peak |
| 2   | 5350.000        | 14.89         | 18.66          | 33.55          | 54.00          | -20.45      | AVG  |
| 3   | 10460.000       | 26.07         | 29.91          | 55.98          | 74.00          | -18.02      | peak |
| 4   | 10460.000       | 26.07         | 15.81          | 41.88          | 54.00          | -12.12      | AVG  |
| 5   | 15690.000       | 38.32         | 15.77          | 54.09          | 74.00          | -19.91      | peak |
| 6   | 15690.000       | 38.32         | 3.24           | 41.56          | 54.00          | -12.44      | AVG  |

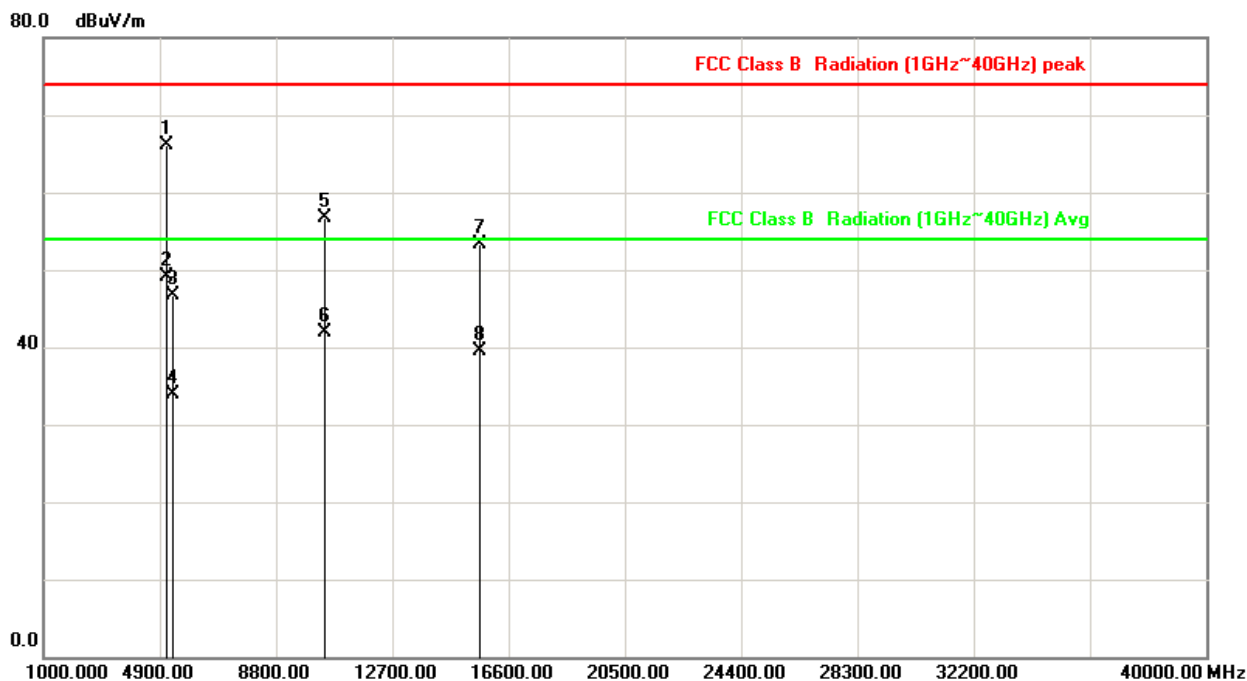
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |            |
|-----------|------------------------|-------------|------------|
| Power     | : DC 5V                | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 4, CH42, Band 1 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 51.45          | 66.18          | 74.00          | -7.82       | peak |
| 2   | 5150.000        | 14.73         | 34.29          | 49.02          | 54.00          | -4.98       | AVG  |
| 3   | 5350.000        | 14.89         | 31.84          | 46.73          | 74.00          | -27.27      | peak |
| 4   | 5350.000        | 14.89         | 18.95          | 33.84          | 54.00          | -20.16      | AVG  |
| 5   | 10420.000       | 25.98         | 30.68          | 56.66          | 74.00          | -17.34      | peak |
| 6   | 10420.000       | 25.98         | 15.88          | 41.86          | 54.00          | -12.14      | AVG  |
| 7   | 15630.000       | 38.29         | 15.11          | 53.40          | 74.00          | -20.60      | peak |
| 8   | 15630.000       | 38.29         | 1.25           | 39.54          | 54.00          | -14.46      | AVG  |

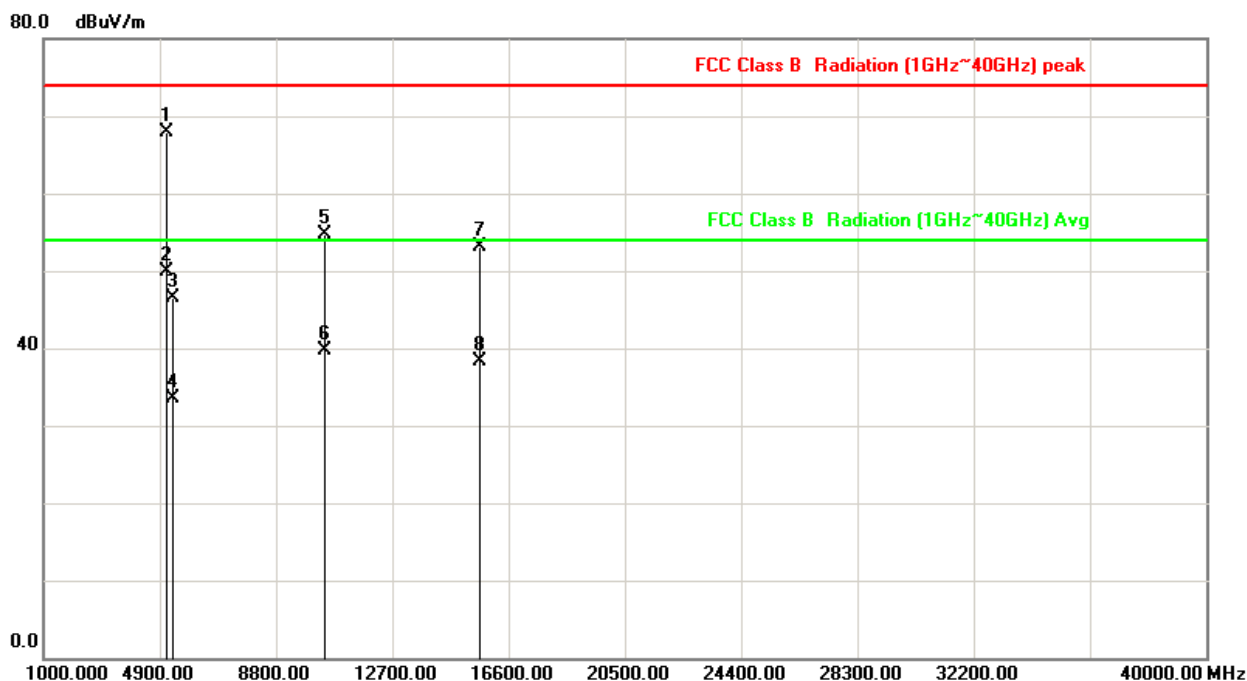
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                        |             |              |
|-----------|------------------------|-------------|--------------|
| Power     | : DC 5V                | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 4, CH42, Band 1 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018        | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5150.000        | 14.73         | 53.20          | 67.93          | 74.00          | -6.07       | peak |
| 2   | 5150.000        | 14.73         | 35.12          | 49.85          | 54.00          | -4.15       | AVG  |
| 3   | 5350.000        | 14.89         | 31.62          | 46.51          | 74.00          | -27.49      | peak |
| 4   | 5350.000        | 14.89         | 18.65          | 33.54          | 54.00          | -20.46      | AVG  |
| 5   | 10420.000       | 25.98         | 28.67          | 54.65          | 74.00          | -19.35      | peak |
| 6   | 10420.000       | 25.98         | 13.66          | 39.64          | 54.00          | -14.36      | AVG  |
| 7   | 15630.000       | 38.29         | 14.91          | 53.20          | 74.00          | -20.80      | peak |
| 8   | 15630.000       | 38.29         | 0.11           | 38.40          | 54.00          | -15.60      | AVG  |

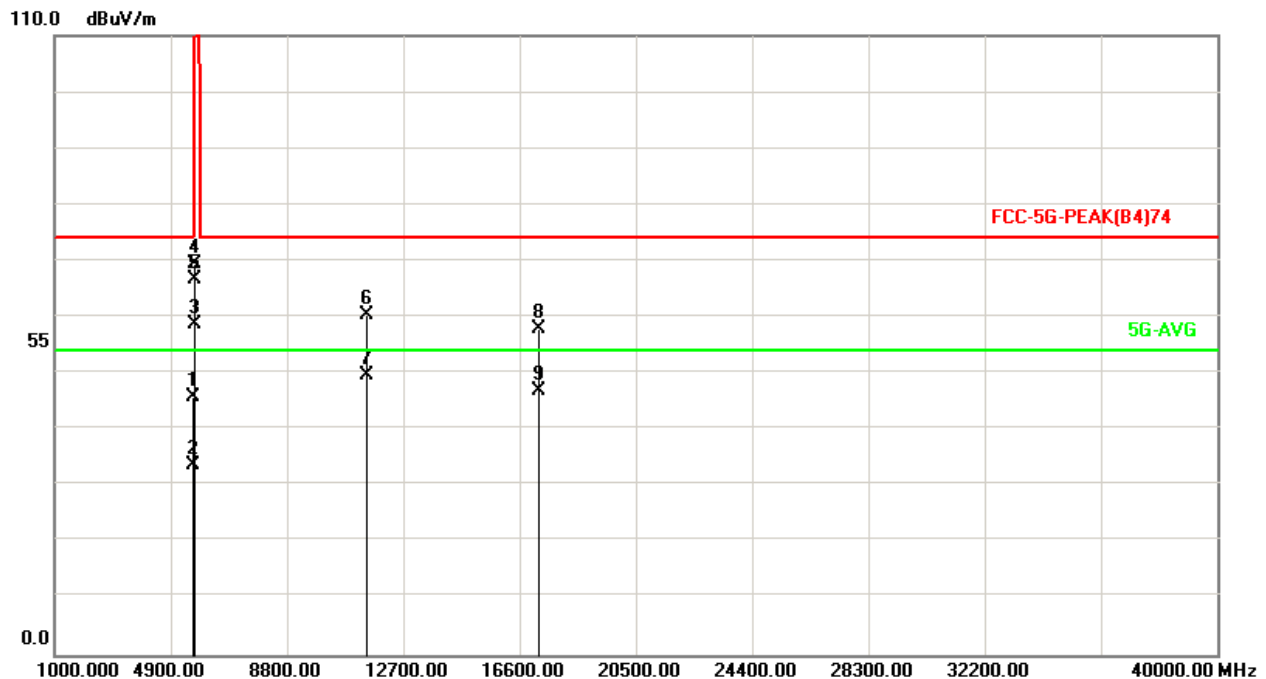
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |            |
|-----------|-------------------------|-------------|------------|
| Power     | : DC 5V                 | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, CH149, Band 4 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 30.52          | 45.91          | 74.00          | -28.09      | peak |
| 2   | 5650.000        | 15.39         | 18.22          | 33.61          | 54.00          | -20.39      | AVG  |
| 3   | 5700.000        | 15.52         | 43.25          | 58.77          | 105.20         | -46.43      | peak |
| 4   | 5720.000        | 15.57         | 53.74          | 69.31          | 110.80         | -41.49      | peak |
| 5   | 5725.000        | 15.58         | 51.23          | 66.81          | 122.20         | -55.39      | peak |
| 6   | 11490.000       | 28.84         | 31.62          | 60.46          | 74.00          | -13.54      | peak |
| 7   | 11490.000       | 28.84         | 20.89          | 49.73          | 54.00          | -4.27       | AVG  |
| 8   | 17235.000       | 43.26         | 14.56          | 57.82          | 74.00          | -16.18      | peak |
| 9   | 17235.000       | 43.26         | 3.71           | 46.97          | 54.00          | -7.03       | AVG  |

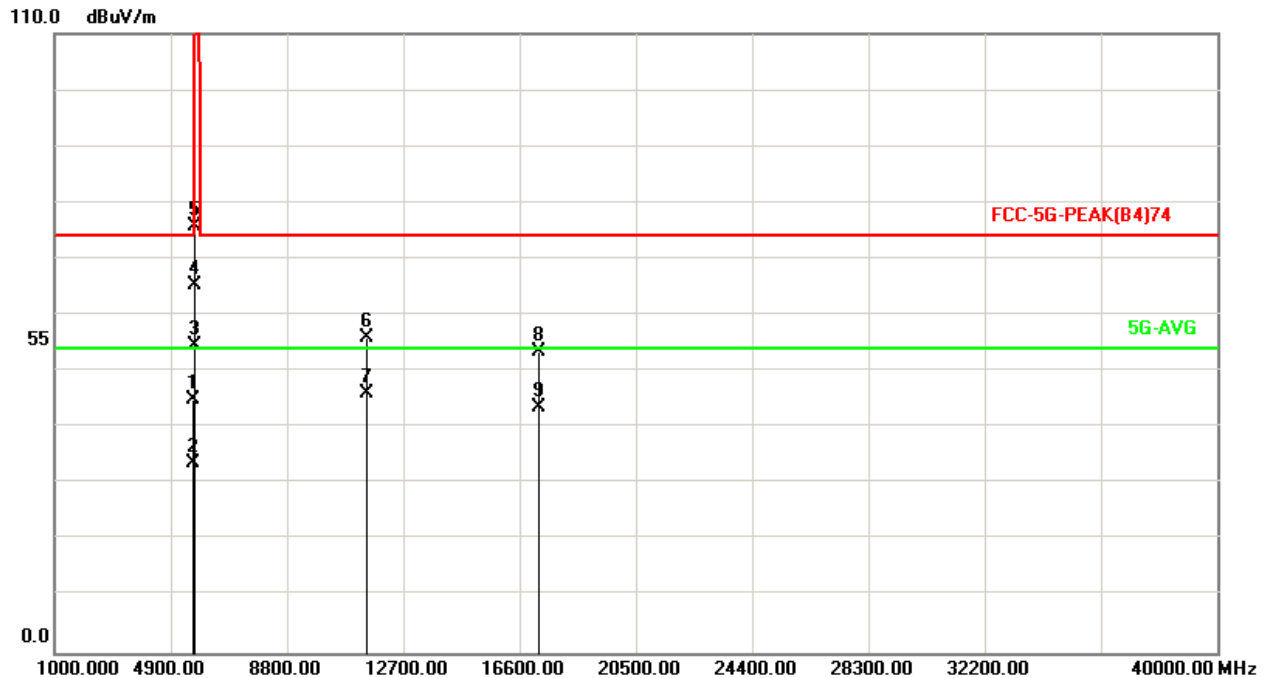
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |              |
|-----------|-------------------------|-------------|--------------|
| Power     | : DC 5V                 | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, CH149, Band 4 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 29.54          | 44.93          | 74.00          | -29.07      | peak |
| 2   | 5650.000        | 15.39         | 18.23          | 33.62          | 54.00          | -20.38      | AVG  |
| 3   | 5700.000        | 15.52         | 39.13          | 54.65          | 105.20         | -50.55      | peak |
| 4   | 5720.000        | 15.57         | 49.76          | 65.33          | 110.80         | -45.47      | peak |
| 5   | 5725.000        | 15.58         | 60.07          | 75.65          | 122.20         | -46.55      | peak |
| 6   | 11490.000       | 28.84         | 27.21          | 56.05          | 74.00          | -17.95      | peak |
| 7   | 11490.000       | 28.84         | 17.34          | 46.18          | 54.00          | -7.82       | AVG  |
| 8   | 17235.000       | 43.26         | 10.36          | 53.62          | 74.00          | -20.38      | peak |
| 9   | 17235.000       | 43.26         | 0.24           | 43.50          | 54.00          | -10.50      | AVG  |

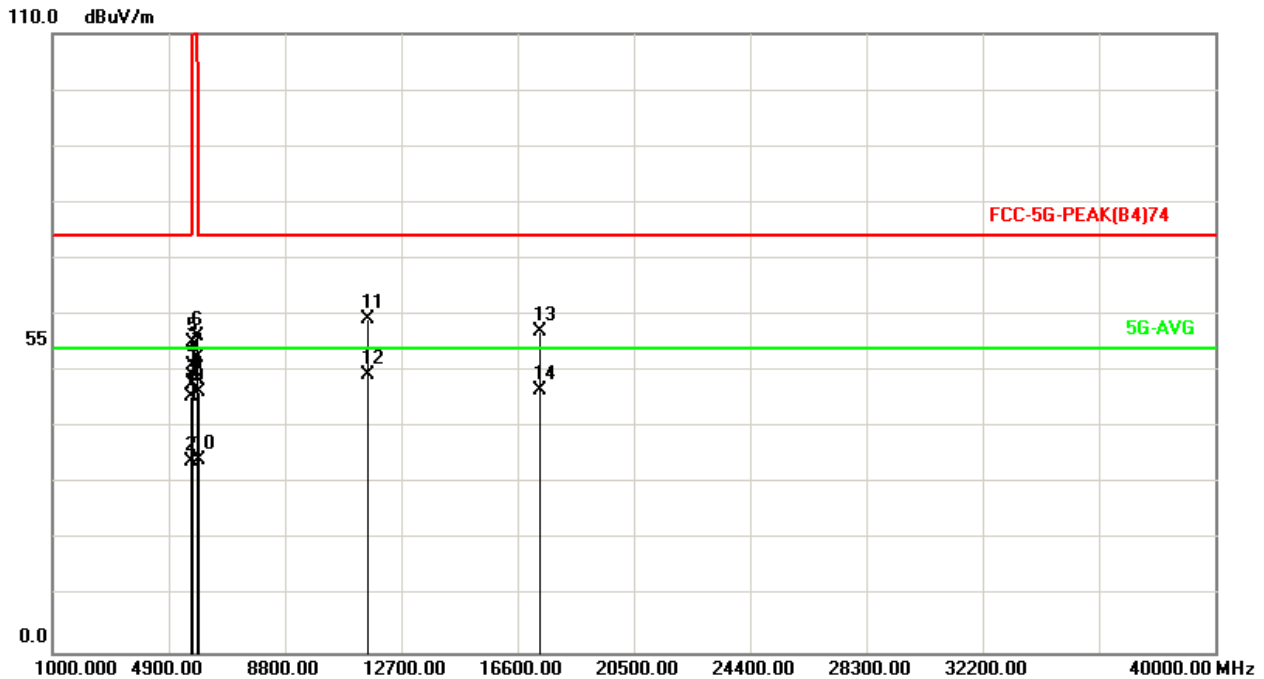
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |            |
|-----------|-------------------------|-------------|------------|
| Power     | : DC 5V                 | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, CH157, Band 4 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 30.26          | 45.65          | 74.00          | -28.35      | peak |
| 2   | 5650.000        | 15.39         | 18.66          | 34.05          | 54.00          | -19.95      | AVG  |
| 3   | 5700.000        | 15.52         | 32.19          | 47.71          | 105.20         | -57.49      | peak |
| 4   | 5720.000        | 15.57         | 35.45          | 51.02          | 110.80         | -59.78      | peak |
| 5   | 5725.000        | 15.58         | 39.69          | 55.27          | 122.20         | -66.93      | peak |
| 6   | 5850.000        | 15.89         | 40.31          | 56.20          | 122.20         | -66.00      | peak |
| 7   | 5855.000        | 15.90         | 36.49          | 52.39          | 110.80         | -58.41      | peak |
| 8   | 5875.000        | 15.95         | 32.57          | 48.52          | 105.20         | -56.68      | peak |
| 9   | 5925.000        | 16.07         | 30.21          | 46.28          | 74.00          | -27.72      | peak |
| 10  | 5925.000        | 16.07         | 18.25          | 34.32          | 54.00          | -19.68      | AVG  |
| 11  | 11570.000       | 29.00         | 30.26          | 59.26          | 74.00          | -14.74      | peak |
| 12  | 11570.000       | 29.00         | 20.42          | 49.42          | 54.00          | -4.58       | AVG  |
| 13  | 17355.000       | 43.74         | 13.26          | 57.00          | 74.00          | -17.00      | peak |
| 14  | 17355.000       | 43.74         | 2.86           | 46.60          | 54.00          | -7.40       | AVG  |

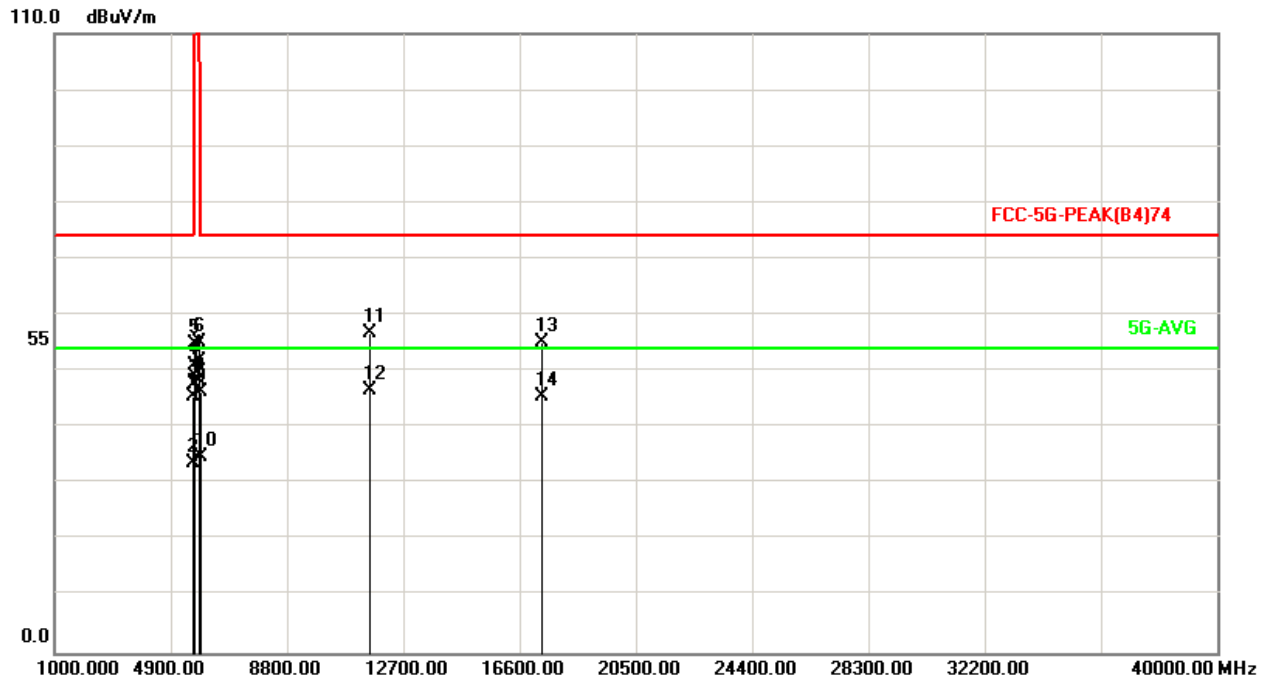
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |              |
|-----------|-------------------------|-------------|--------------|
| Power     | : DC 5V                 | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, CH157, Band 4 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 30.15          | 45.54          | 74.00          | -28.46      | peak |
| 2   | 5650.000        | 15.39         | 18.25          | 33.64          | 54.00          | -20.36      | AVG  |
| 3   | 5700.000        | 15.52         | 32.10          | 47.62          | 105.20         | -57.58      | peak |
| 4   | 5720.000        | 15.57         | 35.38          | 50.95          | 110.80         | -59.85      | peak |
| 5   | 5725.000        | 15.58         | 39.27          | 54.85          | 122.20         | -67.35      | peak |
| 6   | 5850.000        | 15.89         | 39.18          | 55.07          | 122.20         | -67.13      | peak |
| 7   | 5855.000        | 15.90         | 35.91          | 51.81          | 110.80         | -58.99      | peak |
| 8   | 5875.000        | 15.95         | 32.22          | 48.17          | 105.20         | -57.03      | peak |
| 9   | 5925.000        | 16.07         | 30.14          | 46.21          | 74.00          | -27.79      | peak |
| 10  | 5925.000        | 16.07         | 18.79          | 34.86          | 54.00          | -19.14      | AVG  |
| 11  | 11570.000       | 29.00         | 27.71          | 56.71          | 74.00          | -17.29      | peak |
| 12  | 11570.000       | 29.00         | 17.67          | 46.67          | 54.00          | -7.33       | AVG  |
| 13  | 17355.000       | 43.74         | 11.43          | 55.17          | 74.00          | -18.83      | peak |
| 14  | 17355.000       | 43.74         | 1.74           | 45.48          | 54.00          | -8.52       | AVG  |

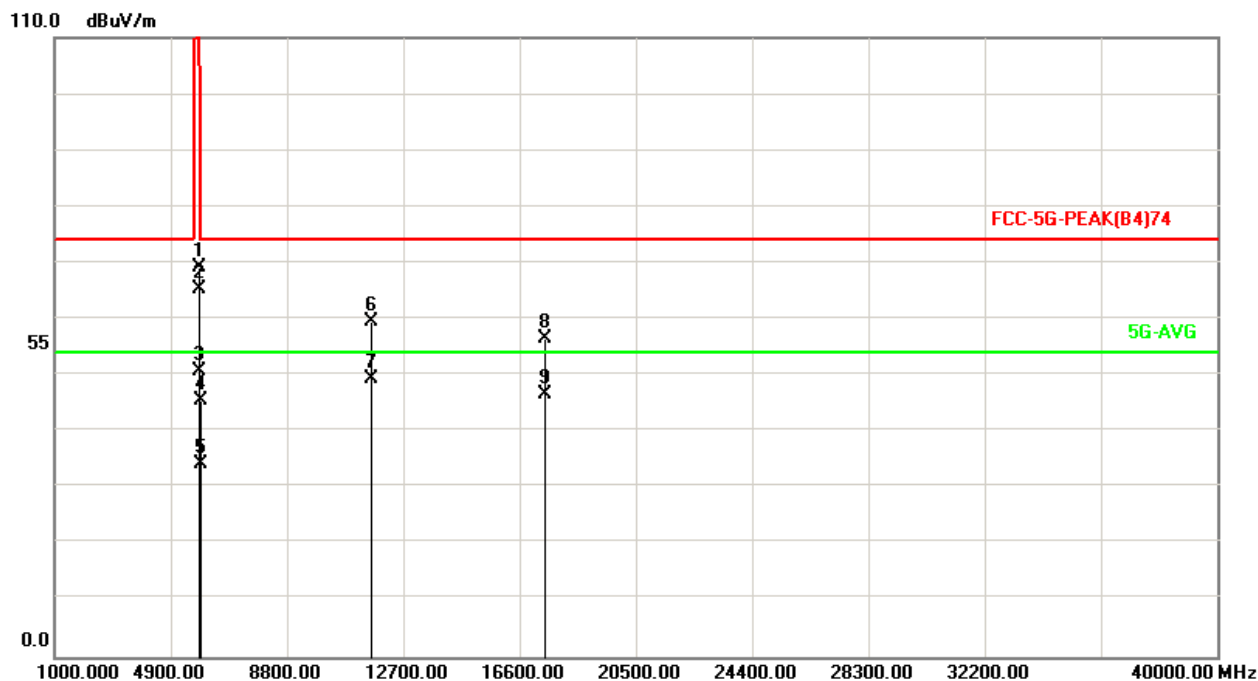
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |            |
|-----------|-------------------------|-------------|------------|
| Power     | : DC 5V                 | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 1, CH165, Band 4 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5850.000        | 15.89         | 53.26          | 69.15          | 122.20         | -53.05      | peak |
| 2   | 5855.000        | 15.90         | 49.29          | 65.19          | 110.80         | -45.61      | peak |
| 3   | 5875.000        | 15.95         | 34.81          | 50.76          | 105.20         | -54.44      | peak |
| 4   | 5925.000        | 16.07         | 29.32          | 45.39          | 74.00          | -28.61      | peak |
| 5   | 5925.000        | 16.07         | 18.15          | 34.22          | 54.00          | -19.78      | AVG  |
| 6   | 11650.000       | 29.16         | 30.42          | 59.58          | 74.00          | -14.42      | peak |
| 7   | 11650.000       | 29.16         | 20.16          | 49.32          | 54.00          | -4.68       | AVG  |
| 8   | 17475.000       | 44.21         | 12.41          | 56.62          | 74.00          | -17.38      | peak |
| 9   | 17475.000       | 44.21         | 2.33           | 46.54          | 54.00          | -7.46       | AVG  |

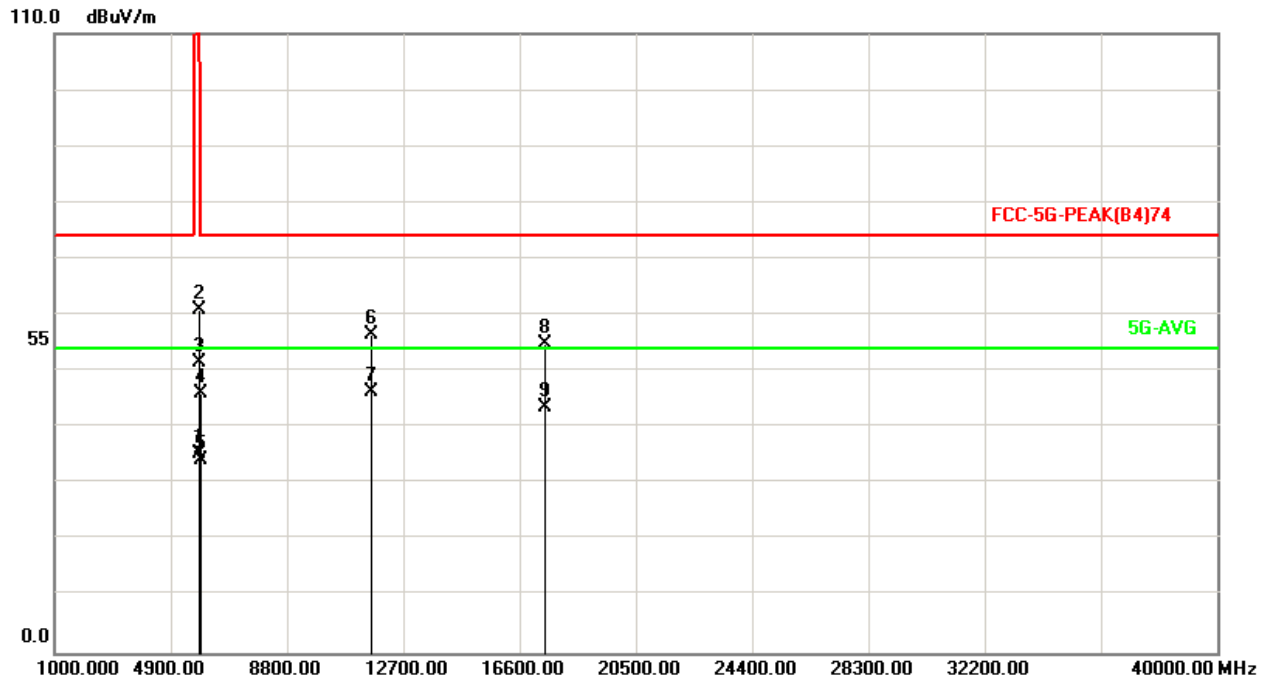
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |              |
|-----------|-------------------------|-------------|--------------|
| Power     | : DC 5V                 | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 1, CH165, Band 4 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5850.000        | 15.89         | 19.45          | 35.34          | 122.20         | -86.86      | peak |
| 2   | 5855.000        | 15.90         | 45.14          | 61.04          | 110.80         | -49.76      | peak |
| 3   | 5875.000        | 15.95         | 35.49          | 51.44          | 105.20         | -53.76      | peak |
| 4   | 5925.000        | 16.07         | 30.03          | 46.10          | 74.00          | -27.90      | peak |
| 5   | 5925.000        | 16.07         | 18.16          | 34.23          | 54.00          | -19.77      | AVG  |
| 6   | 11650.000       | 29.16         | 27.39          | 56.55          | 74.00          | -17.45      | peak |
| 7   | 11650.000       | 29.16         | 17.31          | 46.47          | 54.00          | -7.53       | AVG  |
| 8   | 17475.000       | 44.21         | 10.71          | 54.92          | 74.00          | -19.08      | peak |
| 9   | 17475.000       | 44.21         | -0.57          | 43.64          | 54.00          | -10.36      | AVG  |

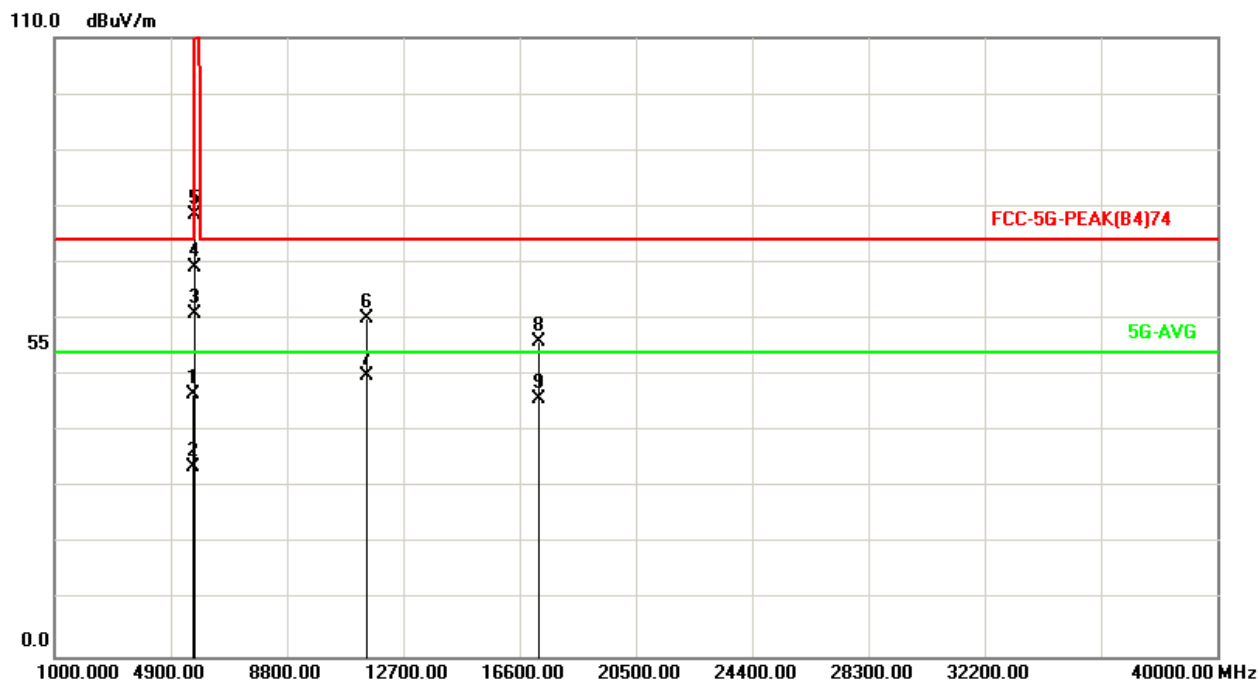
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |            |
|-----------|-------------------------|-------------|------------|
| Power     | : DC 5V                 | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 2, CH149, Band 4 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 31.10          | 46.49          | 74.00          | -27.51      | peak |
| 2   | 5650.000        | 15.39         | 18.33          | 33.72          | 54.00          | -20.28      | AVG  |
| 3   | 5700.000        | 15.52         | 45.47          | 60.99          | 105.20         | -44.21      | peak |
| 4   | 5720.000        | 15.57         | 53.66          | 69.23          | 110.80         | -41.57      | peak |
| 5   | 5725.000        | 15.58         | 62.94          | 78.52          | 122.20         | -43.68      | peak |
| 6   | 11490.000       | 28.84         | 31.20          | 60.04          | 74.00          | -13.96      | peak |
| 7   | 11490.000       | 28.84         | 21.03          | 49.87          | 54.00          | -4.13       | AVG  |
| 8   | 17235.000       | 43.26         | 12.81          | 56.07          | 74.00          | -17.93      | peak |
| 9   | 17235.000       | 43.26         | 2.52           | 45.78          | 54.00          | -8.22       | AVG  |

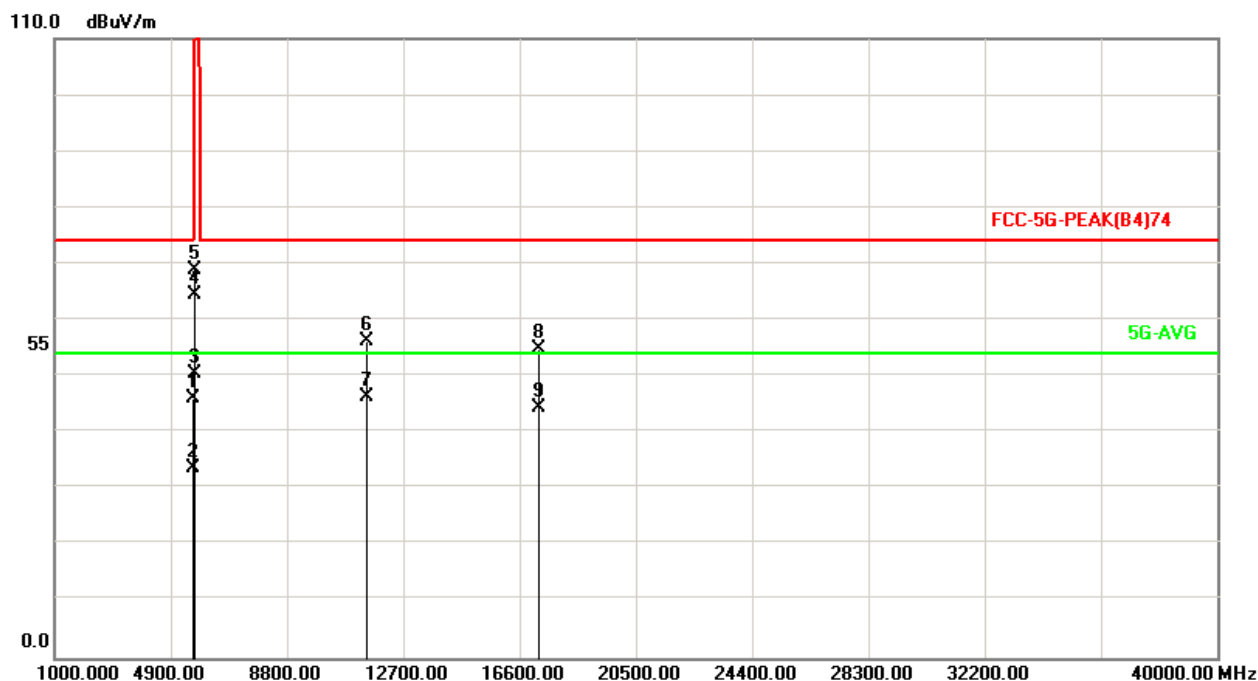
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |              |
|-----------|-------------------------|-------------|--------------|
| Power     | : DC 5V                 | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 2, CH149, Band 4 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 30.57          | 45.96          | 74.00          | -28.04      | peak |
| 2   | 5650.000        | 15.39         | 18.35          | 33.74          | 54.00          | -20.26      | AVG  |
| 3   | 5700.000        | 15.52         | 34.83          | 50.35          | 105.20         | -54.85      | peak |
| 4   | 5720.000        | 15.57         | 49.05          | 64.62          | 110.80         | -46.18      | peak |
| 5   | 5725.000        | 15.58         | 53.31          | 68.89          | 122.20         | -53.31      | peak |
| 6   | 11490.000       | 28.84         | 27.33          | 56.17          | 74.00          | -17.83      | peak |
| 7   | 11490.000       | 28.84         | 17.46          | 46.30          | 54.00          | -7.70       | AVG  |
| 8   | 17235.000       | 43.26         | 11.56          | 54.82          | 74.00          | -19.18      | peak |
| 9   | 17235.000       | 43.26         | 1.05           | 44.31          | 54.00          | -9.69       | AVG  |

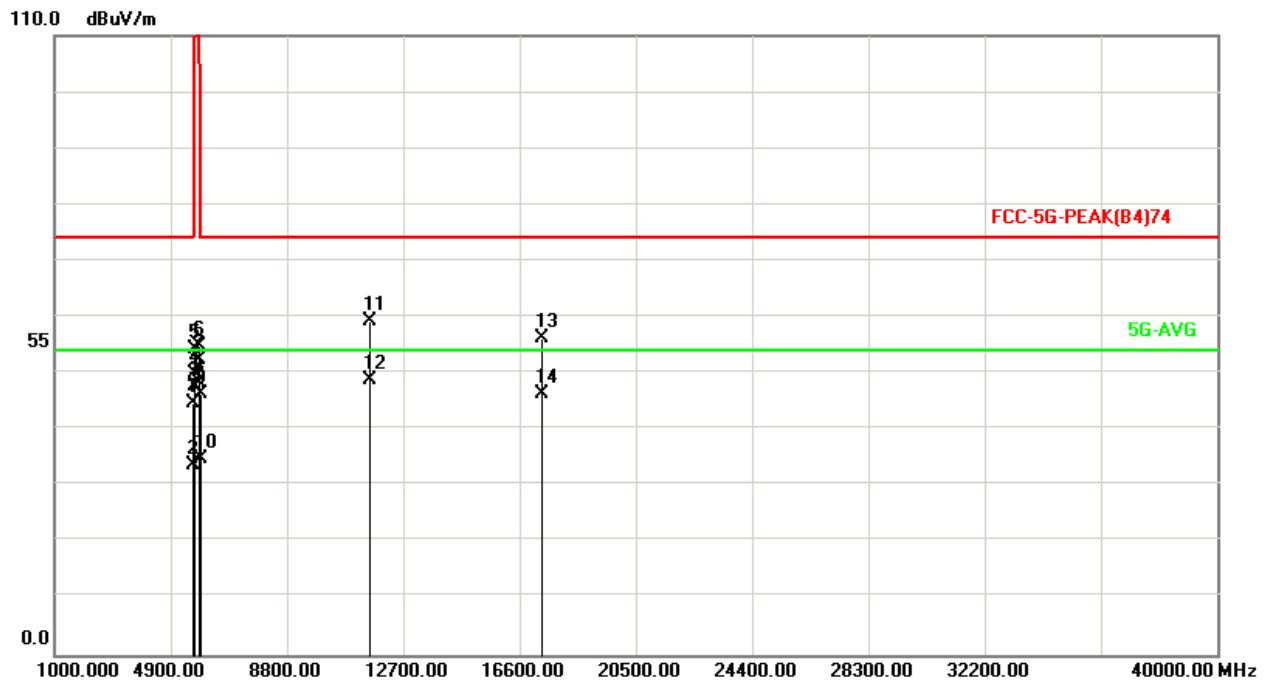
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |            |
|-----------|-------------------------|-------------|------------|
| Power     | : DC 5V                 | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 2, CH157, Band 4 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 29.19          | 44.58          | 74.00          | -29.42      | peak |
| 2   | 5650.000        | 15.39         | 18.23          | 33.62          | 54.00          | -20.38      | AVG  |
| 3   | 5700.000        | 15.52         | 32.14          | 47.66          | 105.20         | -57.54      | peak |
| 4   | 5720.000        | 15.57         | 34.26          | 49.83          | 110.80         | -60.97      | peak |
| 5   | 5725.000        | 15.58         | 38.81          | 54.39          | 122.20         | -67.81      | peak |
| 6   | 5850.000        | 15.89         | 39.10          | 54.99          | 122.20         | -67.21      | peak |
| 7   | 5855.000        | 15.90         | 36.47          | 52.37          | 110.80         | -58.43      | peak |
| 8   | 5875.000        | 15.95         | 32.42          | 48.37          | 105.20         | -56.83      | peak |
| 9   | 5925.000        | 16.07         | 30.20          | 46.27          | 74.00          | -27.73      | peak |
| 10  | 5925.000        | 16.07         | 18.79          | 34.86          | 54.00          | -19.14      | AVG  |
| 11  | 11570.000       | 29.00         | 30.16          | 59.16          | 74.00          | -14.84      | peak |
| 12  | 11570.000       | 29.00         | 19.72          | 48.72          | 54.00          | -5.28       | AVG  |
| 13  | 17355.000       | 43.74         | 12.54          | 56.28          | 74.00          | -17.72      | peak |
| 14  | 17355.000       | 43.74         | 2.61           | 46.35          | 54.00          | -7.65       | AVG  |

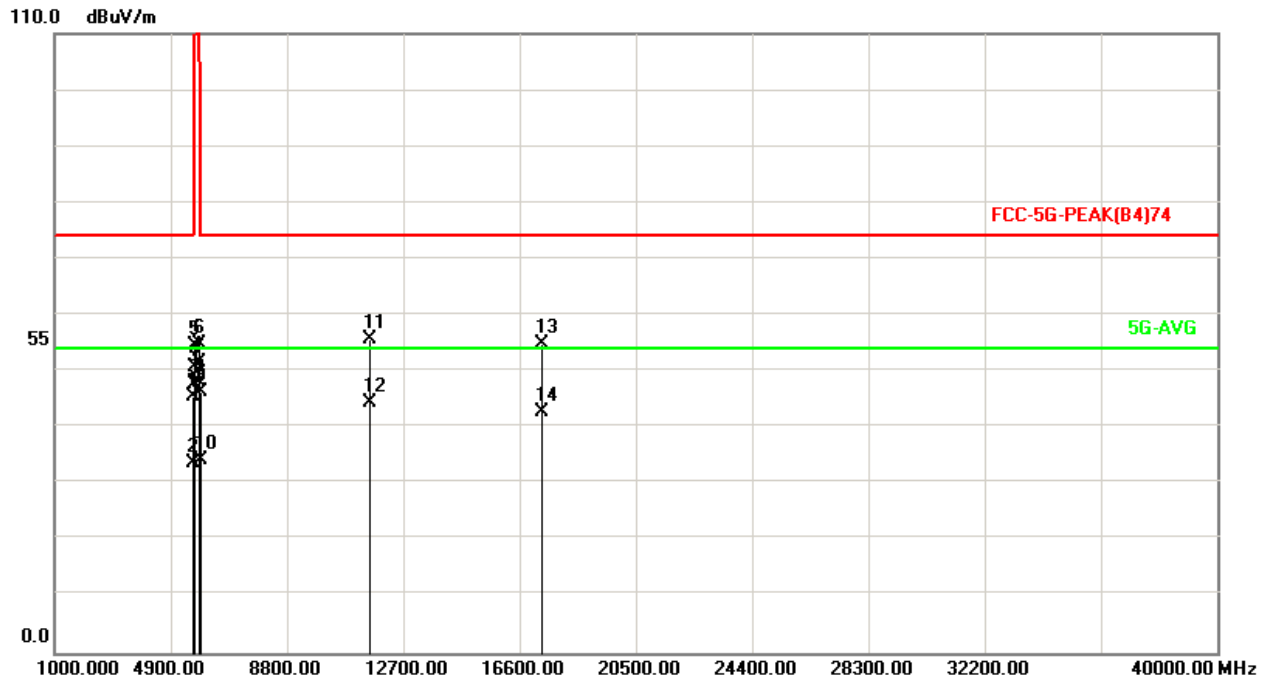
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |              |
|-----------|-------------------------|-------------|--------------|
| Power     | : DC 5V                 | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 2, CH157, Band 4 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 30.23          | 45.62          | 74.00          | -28.38      | peak |
| 2   | 5650.000        | 15.39         | 18.21          | 33.60          | 54.00          | -20.40      | AVG  |
| 3   | 5700.000        | 15.52         | 32.16          | 47.68          | 105.20         | -57.52      | peak |
| 4   | 5720.000        | 15.57         | 35.27          | 50.84          | 110.80         | -59.96      | peak |
| 5   | 5725.000        | 15.58         | 39.02          | 54.60          | 122.20         | -67.60      | peak |
| 6   | 5850.000        | 15.89         | 39.11          | 55.00          | 122.20         | -67.20      | peak |
| 7   | 5855.000        | 15.90         | 35.64          | 51.54          | 110.80         | -59.26      | peak |
| 8   | 5875.000        | 15.95         | 32.16          | 48.11          | 105.20         | -57.09      | peak |
| 9   | 5925.000        | 16.07         | 30.32          | 46.39          | 74.00          | -27.61      | peak |
| 10  | 5925.000        | 16.07         | 18.20          | 34.27          | 54.00          | -19.73      | AVG  |
| 11  | 11570.000       | 29.00         | 26.79          | 55.79          | 74.00          | -18.21      | peak |
| 12  | 11570.000       | 29.00         | 15.45          | 44.45          | 54.00          | -9.55       | AVG  |
| 13  | 17355.000       | 43.74         | 11.01          | 54.75          | 74.00          | -19.25      | peak |
| 14  | 17355.000       | 43.74         | -1.03          | 42.71          | 54.00          | -11.29      | AVG  |

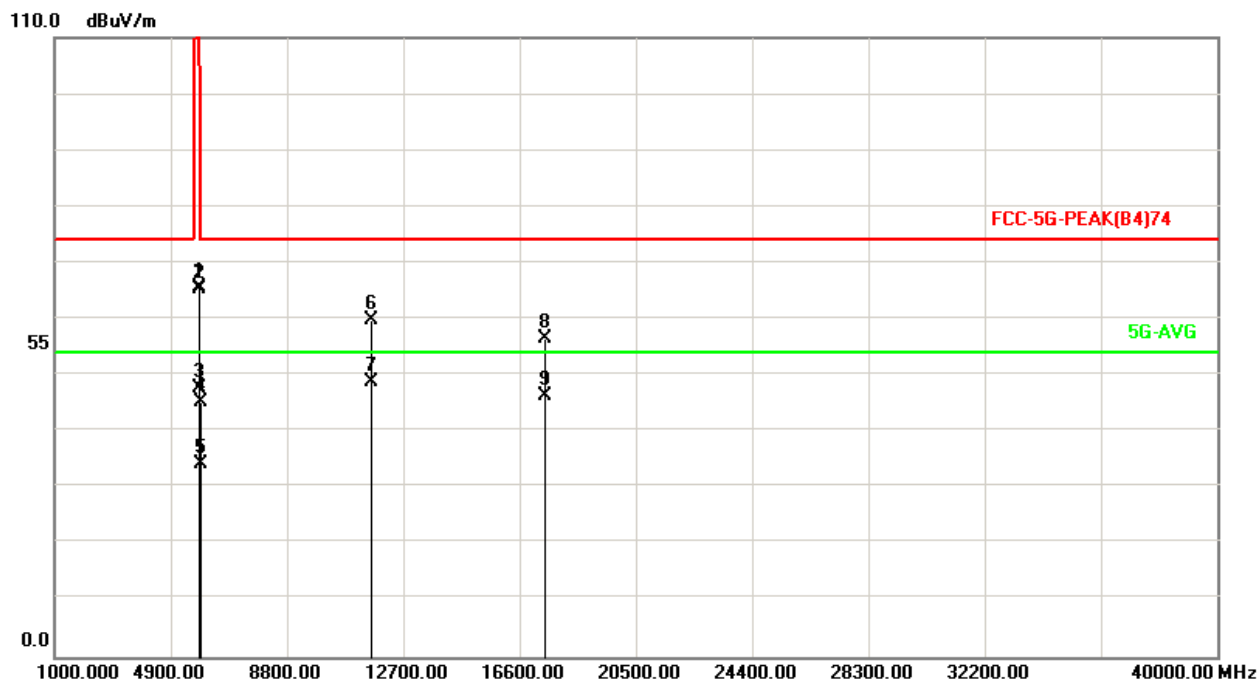
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |            |
|-----------|-------------------------|-------------|------------|
| Power     | : DC 5V                 | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 2, CH165, Band 4 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5850.000        | 15.89         | 49.61          | 65.50          | 122.20         | -56.70      | peak |
| 2   | 5855.000        | 15.90         | 49.32          | 65.22          | 110.80         | -45.58      | peak |
| 3   | 5875.000        | 15.95         | 31.74          | 47.69          | 105.20         | -57.51      | peak |
| 4   | 5925.000        | 16.07         | 29.13          | 45.20          | 74.00          | -28.80      | peak |
| 5   | 5925.000        | 16.07         | 18.15          | 34.22          | 54.00          | -19.78      | AVG  |
| 6   | 11650.000       | 29.16         | 30.59          | 59.75          | 74.00          | -14.25      | peak |
| 7   | 11650.000       | 29.16         | 19.66          | 48.82          | 54.00          | -5.18       | AVG  |
| 8   | 17475.000       | 44.21         | 12.26          | 56.47          | 74.00          | -17.53      | peak |
| 9   | 17475.000       | 44.21         | 2.14           | 46.35          | 54.00          | -7.65       | AVG  |

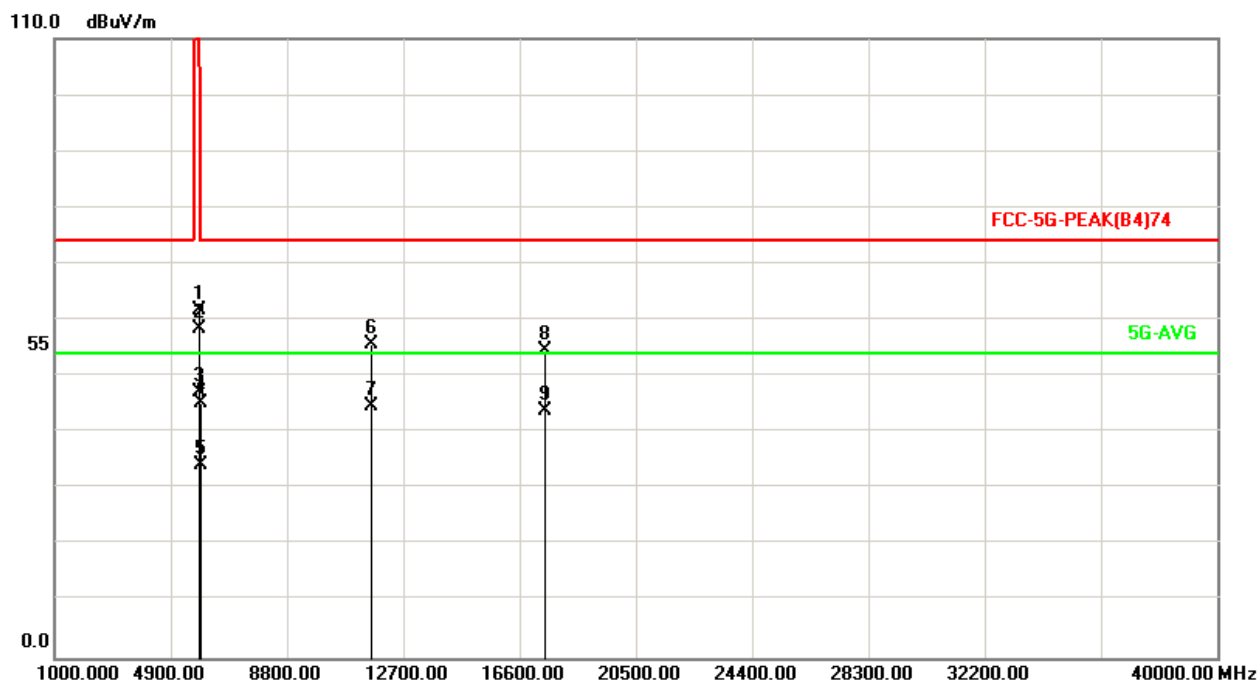
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |              |
|-----------|-------------------------|-------------|--------------|
| Power     | : DC 5V                 | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 2, CH165, Band 4 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5850.000        | 15.89         | 45.96          | 61.85          | 122.20         | -60.35      | peak |
| 2   | 5855.000        | 15.90         | 42.60          | 58.50          | 110.80         | -52.30      | peak |
| 3   | 5875.000        | 15.95         | 31.23          | 47.18          | 105.20         | -58.02      | peak |
| 4   | 5925.000        | 16.07         | 29.12          | 45.19          | 74.00          | -28.81      | peak |
| 5   | 5925.000        | 16.07         | 18.17          | 34.24          | 54.00          | -19.76      | AVG  |
| 6   | 11650.000       | 29.16         | 26.45          | 55.61          | 74.00          | -18.39      | peak |
| 7   | 11650.000       | 29.16         | 15.41          | 44.57          | 54.00          | -9.43       | AVG  |
| 8   | 17475.000       | 44.21         | 10.25          | 54.46          | 74.00          | -19.54      | peak |
| 9   | 17475.000       | 44.21         | -0.37          | 43.84          | 54.00          | -10.16      | AVG  |

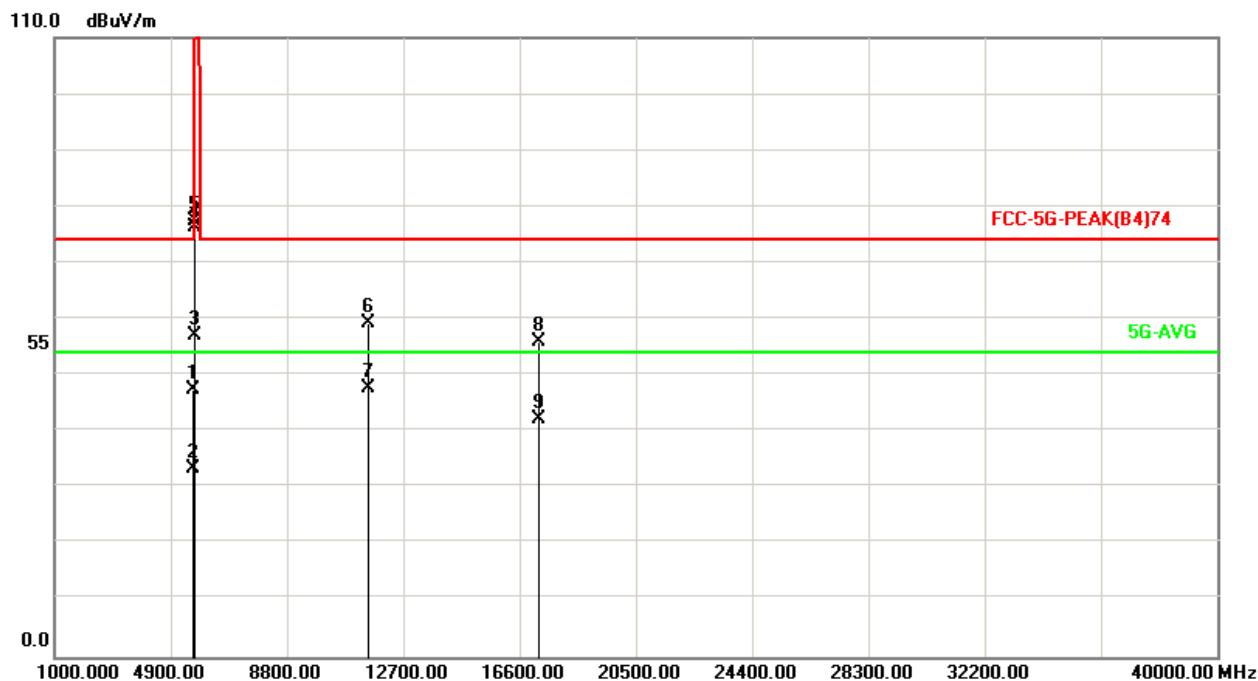
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |            |
|-----------|-------------------------|-------------|------------|
| Power     | : DC 5V                 | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 3, CH151, Band 4 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 32.15          | 47.54          | 74.00          | -26.46      | peak |
| 2   | 5650.000        | 15.39         | 18.16          | 33.55          | 54.00          | -20.45      | AVG  |
| 3   | 5700.000        | 15.52         | 41.53          | 57.05          | 105.20         | -48.15      | peak |
| 4   | 5720.000        | 15.57         | 60.65          | 76.22          | 110.80         | -34.58      | peak |
| 5   | 5725.000        | 15.58         | 61.74          | 77.32          | 122.20         | -44.88      | peak |
| 6   | 11510.000       | 28.88         | 30.46          | 59.34          | 74.00          | -14.66      | peak |
| 7   | 11510.000       | 28.88         | 18.89          | 47.77          | 54.00          | -6.23       | AVG  |
| 8   | 17265.000       | 43.38         | 12.47          | 55.85          | 74.00          | -18.15      | peak |
| 9   | 17265.000       | 43.38         | -1.15          | 42.23          | 54.00          | -11.77      | AVG  |

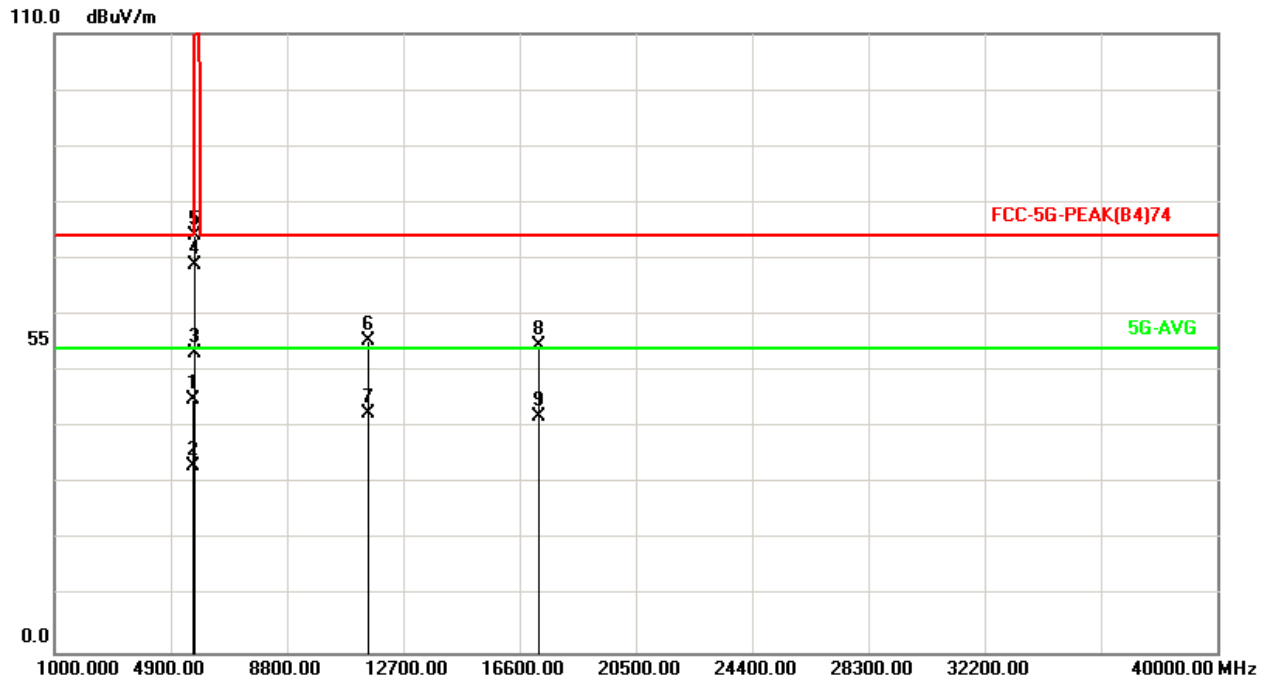
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |              |
|-----------|-------------------------|-------------|--------------|
| Power     | : DC 5V                 | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 3, CH151, Band 4 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 29.71          | 45.10          | 74.00          | -28.90      | peak |
| 2   | 5650.000        | 15.39         | 17.88          | 33.27          | 54.00          | -20.73      | AVG  |
| 3   | 5700.000        | 15.52         | 37.69          | 53.21          | 105.20         | -51.99      | peak |
| 4   | 5720.000        | 15.57         | 53.41          | 68.98          | 110.80         | -41.82      | peak |
| 5   | 5725.000        | 15.58         | 58.60          | 74.18          | 122.20         | -48.02      | peak |
| 6   | 11510.000       | 28.88         | 26.45          | 55.33          | 74.00          | -18.67      | peak |
| 7   | 11510.000       | 28.88         | 13.58          | 42.46          | 54.00          | -11.54      | AVG  |
| 8   | 17265.000       | 43.38         | 11.29          | 54.67          | 74.00          | -19.33      | peak |
| 9   | 17265.000       | 43.38         | -1.37          | 42.01          | 54.00          | -11.99      | AVG  |

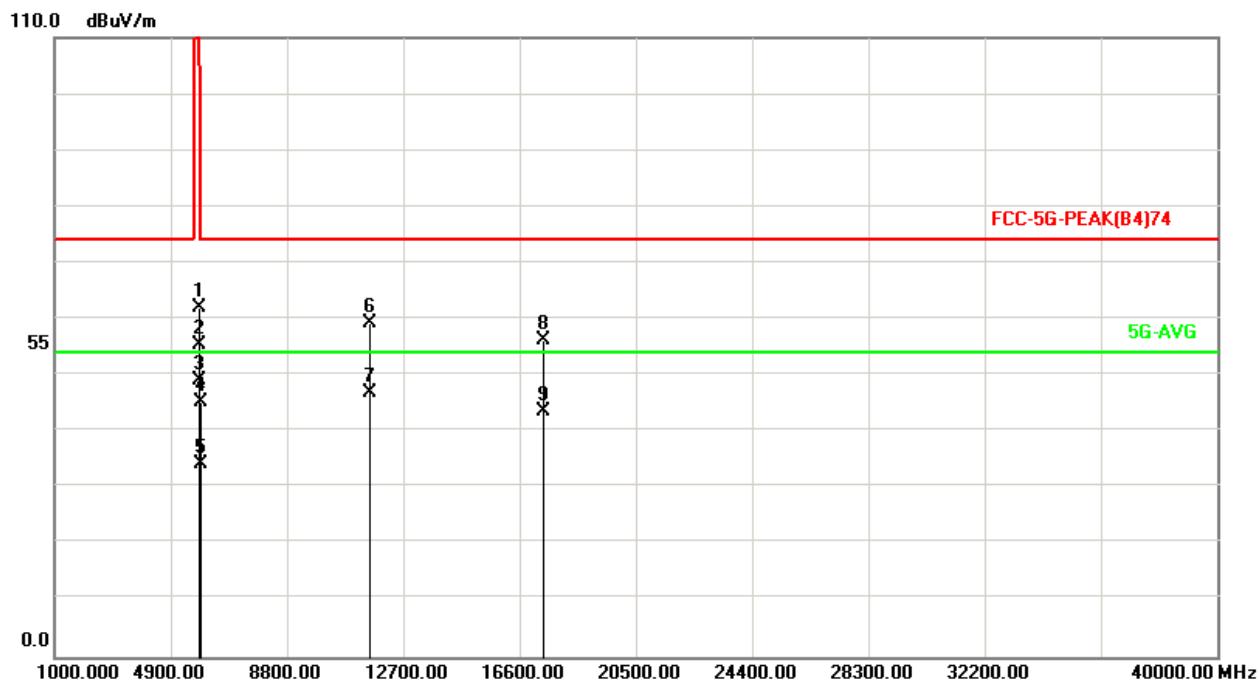
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |            |
|-----------|-------------------------|-------------|------------|
| Power     | : DC 5V                 | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 3, CH159, Band 4 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5850.000        | 15.89         | 46.11          | 62.00          | 122.20         | -60.20      | peak |
| 2   | 5855.000        | 15.90         | 39.59          | 55.49          | 110.80         | -55.31      | peak |
| 3   | 5875.000        | 15.95         | 33.01          | 48.96          | 105.20         | -56.24      | peak |
| 4   | 5925.000        | 16.07         | 29.15          | 45.22          | 74.00          | -28.78      | peak |
| 5   | 5925.000        | 16.07         | 18.12          | 34.19          | 54.00          | -19.81      | AVG  |
| 6   | 11590.000       | 29.04         | 30.23          | 59.27          | 74.00          | -14.73      | peak |
| 7   | 11590.000       | 29.04         | 17.98          | 47.02          | 54.00          | -6.98       | AVG  |
| 8   | 17385.000       | 43.85         | 12.48          | 56.33          | 74.00          | -17.67      | peak |
| 9   | 17385.000       | 43.85         | -0.30          | 43.55          | 54.00          | -10.45      | AVG  |

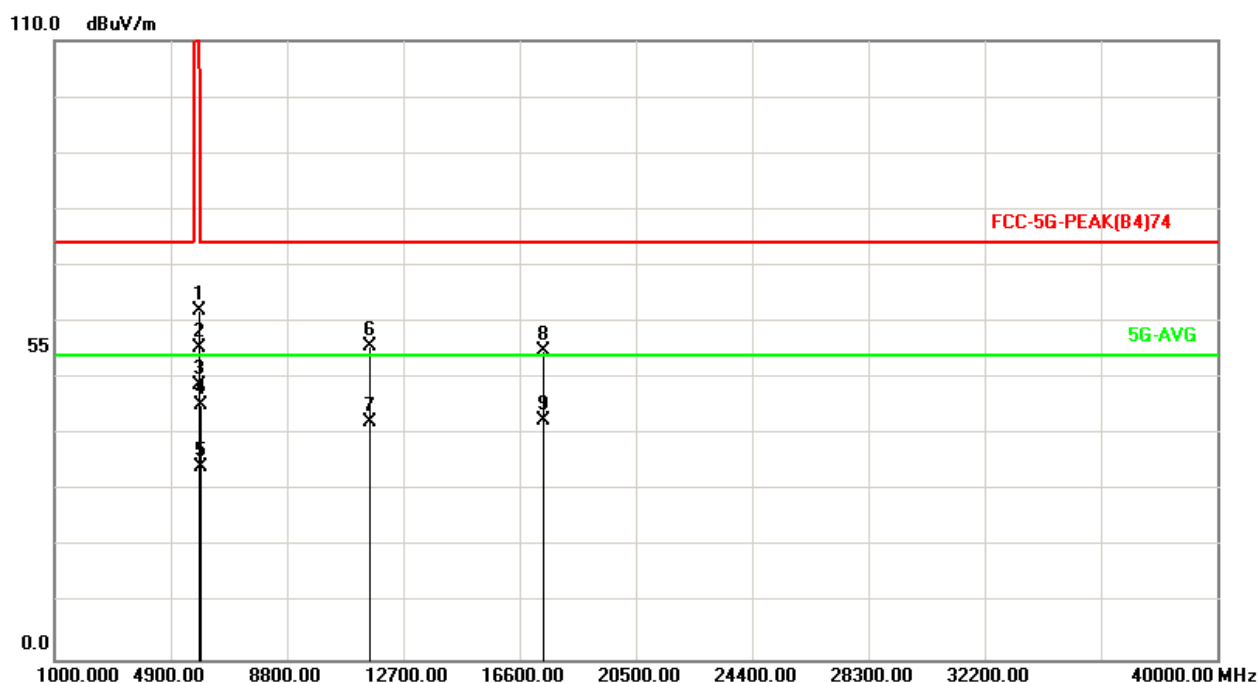
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |              |
|-----------|-------------------------|-------------|--------------|
| Power     | : DC 5V                 | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 3, CH159, Band 4 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5850.000        | 15.89         | 46.08          | 61.97          | 122.20         | -60.23      | peak |
| 2   | 5855.000        | 15.90         | 39.58          | 55.48          | 110.80         | -55.32      | peak |
| 3   | 5875.000        | 15.95         | 32.96          | 48.91          | 105.20         | -56.29      | peak |
| 4   | 5925.000        | 16.07         | 29.17          | 45.24          | 74.00          | -28.76      | peak |
| 5   | 5925.000        | 16.07         | 18.10          | 34.17          | 54.00          | -19.83      | AVG  |
| 6   | 11590.000       | 29.04         | 26.59          | 55.63          | 74.00          | -18.37      | peak |
| 7   | 11590.000       | 29.04         | 13.15          | 42.19          | 54.00          | -11.81      | AVG  |
| 8   | 17385.000       | 43.85         | 10.95          | 54.80          | 74.00          | -19.20      | peak |
| 9   | 17385.000       | 43.85         | -1.39          | 42.46          | 54.00          | -11.54      | AVG  |

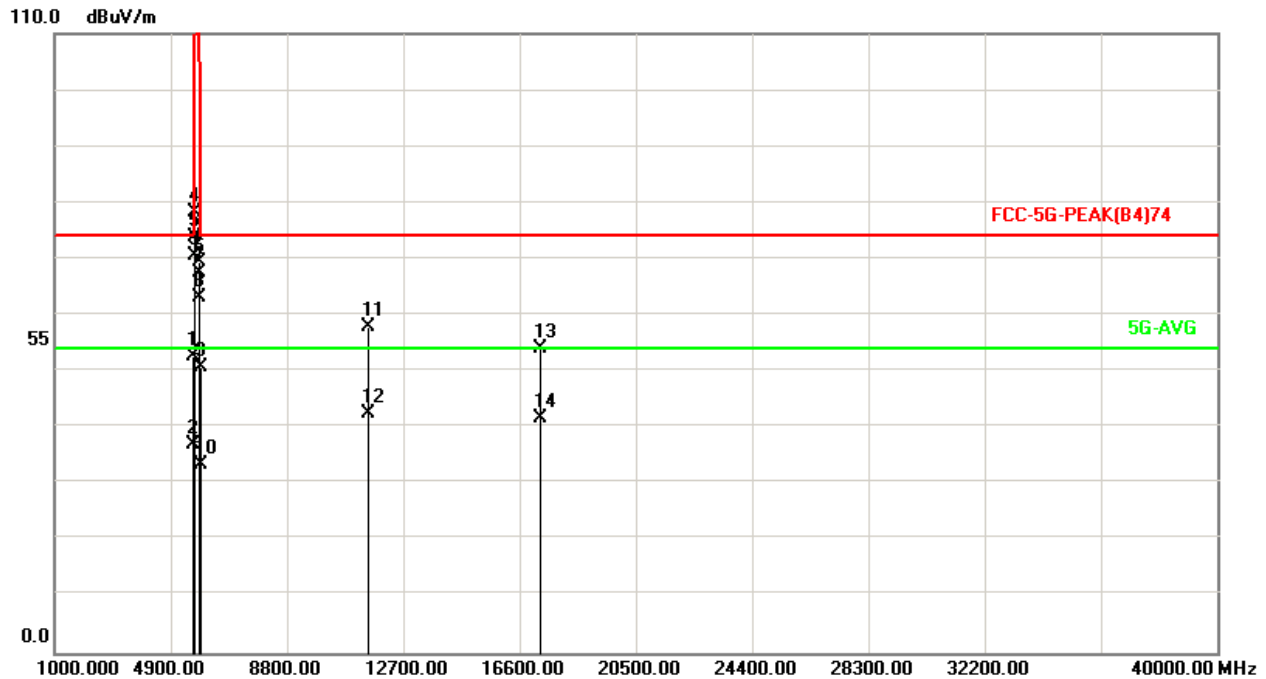
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |            |
|-----------|-------------------------|-------------|------------|
| Power     | : DC 5V                 | Pol/Phase   | : VERTICAL |
| Test Mode | : Mode 4, CH155, Band 4 | Temperature | : 26 °C    |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %     |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 37.24          | 52.63          | 74.00          | -21.37      | peak |
| 2   | 5650.000        | 15.39         | 21.56          | 36.95          | 54.00          | -17.05      | AVG  |
| 3   | 5700.000        | 15.52         | 55.04          | 70.56          | 105.20         | -34.64      | peak |
| 4   | 5720.000        | 15.57         | 62.76          | 78.33          | 110.80         | -32.47      | peak |
| 5   | 5725.000        | 15.58         | 58.27          | 73.85          | 122.20         | -48.35      | peak |
| 6   | 5850.000        | 15.89         | 53.61          | 69.50          | 122.20         | -52.70      | peak |
| 7   | 5855.000        | 15.90         | 51.65          | 67.55          | 110.80         | -43.25      | peak |
| 8   | 5875.000        | 15.95         | 47.07          | 63.02          | 105.20         | -42.18      | peak |
| 9   | 5925.000        | 16.07         | 34.68          | 50.75          | 74.00          | -23.25      | peak |
| 10  | 5925.000        | 16.07         | 17.45          | 33.52          | 54.00          | -20.48      | AVG  |
| 11  | 11550.000       | 28.96         | 28.93          | 57.89          | 74.00          | -16.11      | peak |
| 12  | 11550.000       | 28.96         | 13.55          | 42.51          | 54.00          | -11.49      | AVG  |
| 13  | 17325.000       | 43.62         | 10.36          | 53.98          | 74.00          | -20.02      | peak |
| 14  | 17325.000       | 43.62         | -1.85          | 41.77          | 54.00          | -12.23      | AVG  |

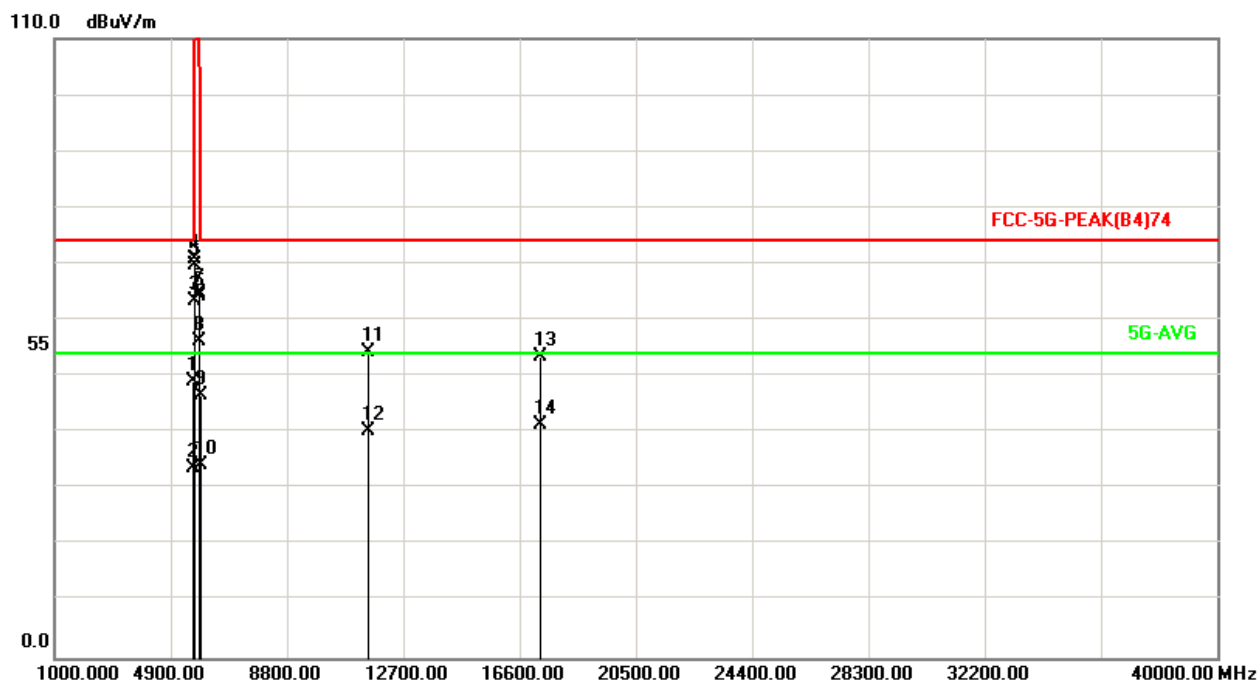
Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |                         |             |              |
|-----------|-------------------------|-------------|--------------|
| Power     | : DC 5V                 | Pol/Phase   | : HORIZONTAL |
| Test Mode | : Mode 4, CH155, Band 4 | Temperature | : 26 °C      |
| Test date | : Nov. 01, 2018         | Humidity    | : 48 %       |



| No. | Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Det. |
|-----|-----------------|---------------|----------------|----------------|----------------|-------------|------|
| 1   | 5650.000        | 15.39         | 33.78          | 49.17          | 74.00          | -24.83      | peak |
| 2   | 5650.000        | 15.39         | 18.36          | 33.75          | 54.00          | -20.25      | AVG  |
| 3   | 5700.000        | 15.52         | 47.85          | 63.37          | 105.20         | -41.83      | peak |
| 4   | 5720.000        | 15.57         | 55.19          | 70.76          | 110.80         | -40.04      | peak |
| 5   | 5725.000        | 15.58         | 54.25          | 69.83          | 122.20         | -52.37      | peak |
| 6   | 5850.000        | 15.89         | 48.32          | 64.21          | 122.20         | -57.99      | peak |
| 7   | 5855.000        | 15.90         | 48.84          | 64.74          | 110.80         | -46.06      | peak |
| 8   | 5875.000        | 15.95         | 40.29          | 56.24          | 105.20         | -48.96      | peak |
| 9   | 5925.000        | 16.07         | 30.48          | 46.55          | 74.00          | -27.45      | peak |
| 10  | 5925.000        | 16.07         | 18.16          | 34.23          | 54.00          | -19.77      | AVG  |
| 11  | 11550.000       | 28.96         | 25.40          | 54.36          | 74.00          | -19.64      | peak |
| 12  | 11550.000       | 28.96         | 11.39          | 40.35          | 54.00          | -13.65      | AVG  |
| 13  | 17325.000       | 43.62         | 9.77           | 53.39          | 74.00          | -20.61      | peak |
| 14  | 17325.000       | 43.62         | -2.11          | 41.51          | 54.00          | -12.49      | AVG  |

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



## 6.7. Restricted Bands of Operation

Only spurious emissions are permitted in any of the frequency bands listed below:

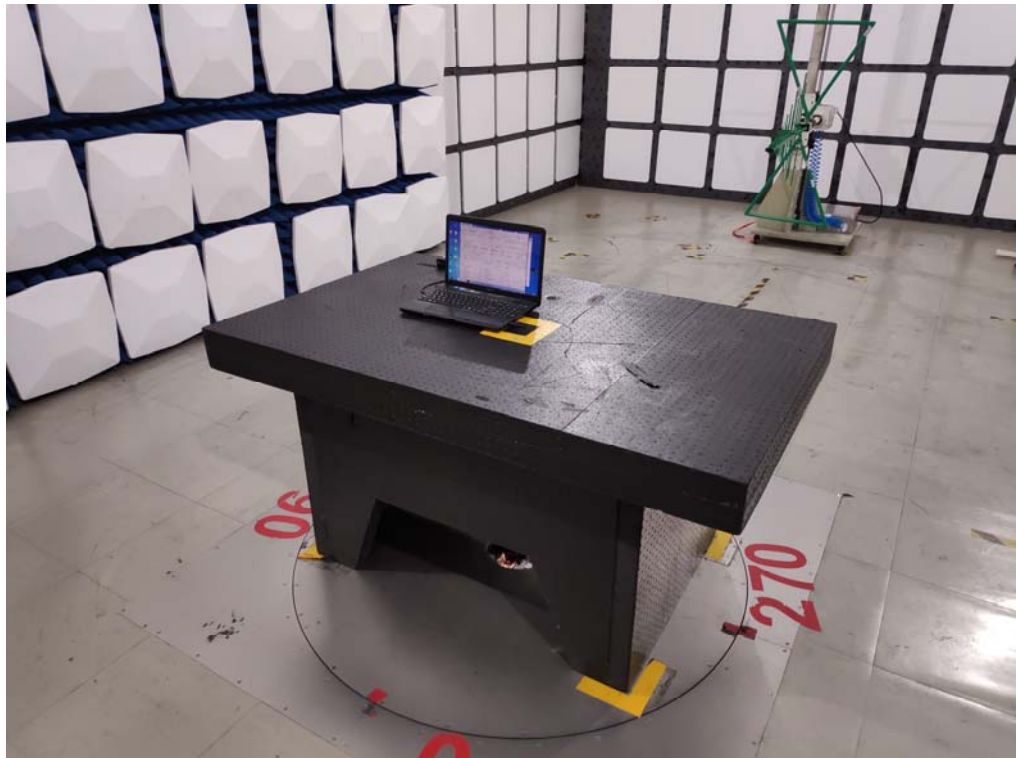
| MHz                 | MHz                   | MHz             | GHz             |
|---------------------|-----------------------|-----------------|-----------------|
| 0.09000 – 0.11000   | 16.42000 – 16.42300   | 399.9 – 410.0   | 4.500 – 5.150   |
| 0.49500 – 0.505**   | 16.69475 – 16.69525   | 608.0 – 614.0   | 5.350 – 5.460   |
| 2.17350 – 2.19050   | 16.80425 – 16.80475   | 960.0 – 1240.0  | 7.250 – 7.750   |
| 4.12500 – 4.12800   | 25.50000 – 25.67000   | 1300.0 – 1427.0 | 8.025 – 8.500   |
| 4.17725 – 4.17775   | 37.50000 – 38.25000   | 1435.0 – 1626.5 | 9.000 – 9.200   |
| 4.20725 – 4.20775   | 73.00000 – 74.60000   | 1645.5 – 1646.5 | 9.300 – 9.500   |
| 6.21500 – 6.21800   | 74.80000 – 75.20000   | 1660.0 – 1710.0 | 10.600 – 12.700 |
| 6.26775 – 6.26825   | 108.00000 – 121.94000 | 1718.8 – 1722.2 | 13.250 – 13.400 |
| 6.31175 – 6.31225   | 123.00000 – 138.00000 | 2200.0 – 2300.0 | 14.470 – 14.500 |
| 8.29100 – 8.29400   | 149.90000 – 150.05000 | 2310.0 – 2390.0 | 15.350 – 16.200 |
| 8.36200 – 8.36600   | 156.52475 – 156.52525 | 2483.5 – 2500.0 | 17.700 – 21.400 |
| 8.37625 – 8.38675   | 156.70000 – 156.90000 | 2655.0 – 2900.0 | 22.010 – 23.120 |
| 8.41425 – 8.41475   | 162.01250 – 167.17000 | 3260.0 – 3267.0 | 23.600 – 24.000 |
| 12.29000 – 12.29300 | 167.72000 – 173.20000 | 3332.0 – 3339.0 | 31.200 – 31.800 |
| 12.51975 – 12.52025 | 240.00000 – 285.00000 | 3345.8 – 3358.0 | 36.430 – 36.500 |
| 12.57675 – 12.57725 | 322.00000 – 335.40000 | 3600.0 – 4400.0 | Above 38.6      |
| 13.36000 – 13.41000 |                       |                 |                 |

\*\* : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz



## 6.8. Test Photographs (30MHz ~ 1GHz)

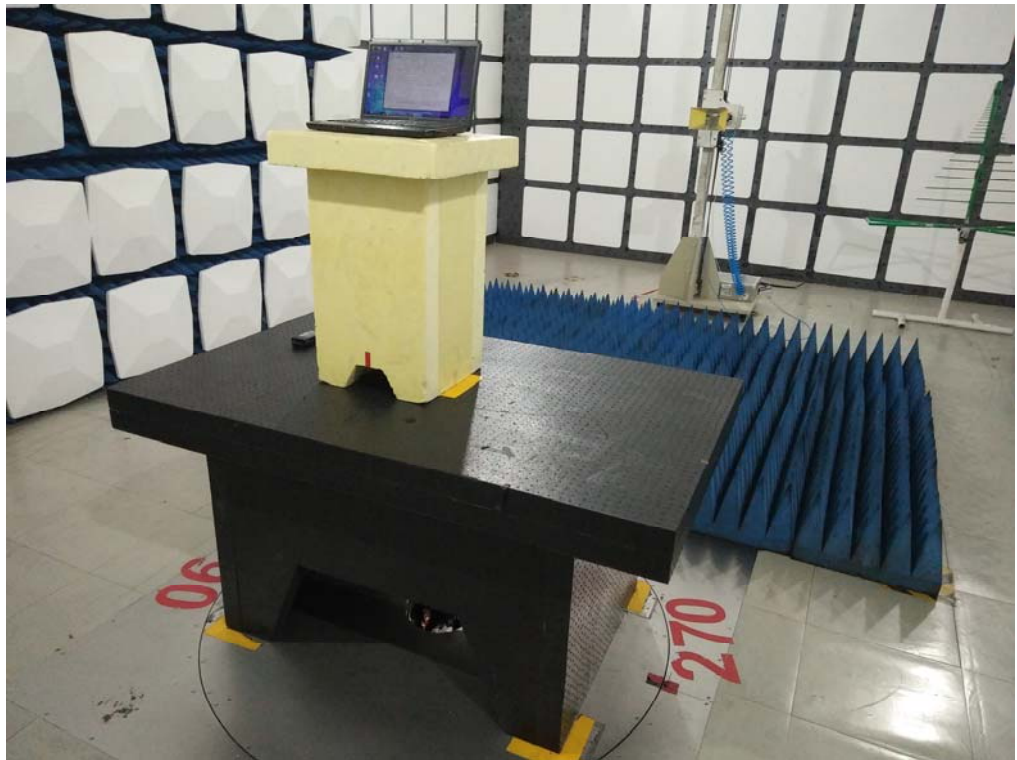
Front View





## 6.9. Test Photographs (1GHz ~ 40GHz)

Front View





## 7. On Time, Duty Cycle and Measurement methods

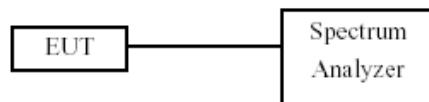
### 7.1. Test Limit

None; for reporting purposes only.

### 7.2. Test Procedure

KDB 789033 Zero-Span Spectrum Analyzer Method.

### 7.3. Test Setup Layout



### 7.4. Test Result and Data

Temperature: 21°C

Humidity: 56%

Test Date: Aug. 11, 2018

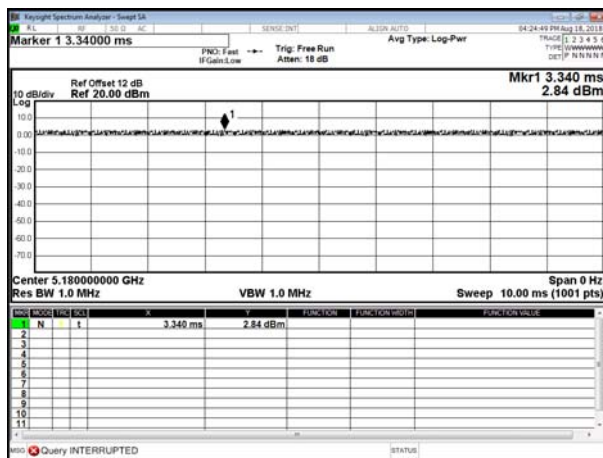
| Modulation Type | On Time (msec) | Period Time (msec) | Duty Cycle (%) | 1/T Minimum VBW(Hz) | Duty Cycle correction Factor (dB) |
|-----------------|----------------|--------------------|----------------|---------------------|-----------------------------------|
| 802.11a         | 100.00         | 100.00             | 100.00%        | 10.00               | 0.00                              |
| 802.11n HT20    | 100.00         | 100.00             | 100.00%        | 10.00               | 0.00                              |
| 802.11n HT40    | 100.00         | 100.00             | 100.00%        | 10.00               | 0.00                              |
| 802.11ac VHT20  | 100.00         | 100.00             | 100.00%        | 10.00               | 0.00                              |
| 802.11ac VHT40  | 100.00         | 100.00             | 100.00%        | 10.00               | 0.00                              |
| 802.11ac VHT80  | 100.00         | 100.00             | 100.00%        | 10.00               | 0.00                              |

### 7.5. Measurement Methods

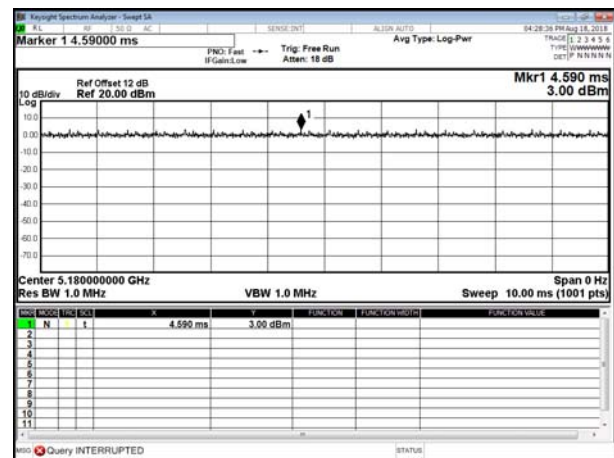
|                                            |                                                              |
|--------------------------------------------|--------------------------------------------------------------|
| 26 dB and 6dB Emission BW                  | KDB 789033 D02 v02r01, Section C                             |
| 99% Occupied BW                            | KDB 789033 D02 v02r01, Section D                             |
| Conducted Output Power                     | KDB 789033 D02 v02r01, Section E.2.d and E.3.b (Method PM-G) |
| Power Spectral Density                     | KDB 789033 D02 v02r01, Section F                             |
| Unwanted emissions in restricted bands     | KDB 789033 D02 v02r01, Sections G and H                      |
| Unwanted emissions in non-restricted bands | KDB 789033 D02 v02r01, Sections G and H                      |



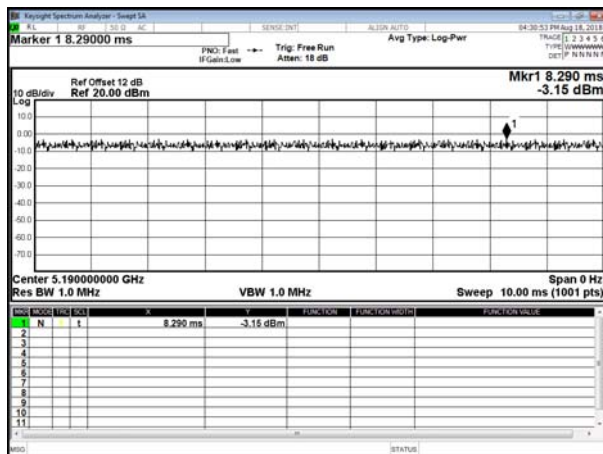
Modulation Standard: 802.11a (6Mbps)



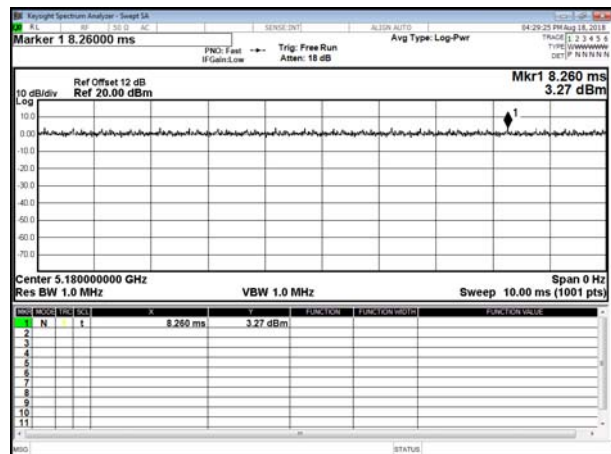
Modulation Standard: 802.11n HT20 (6.5Mbps)



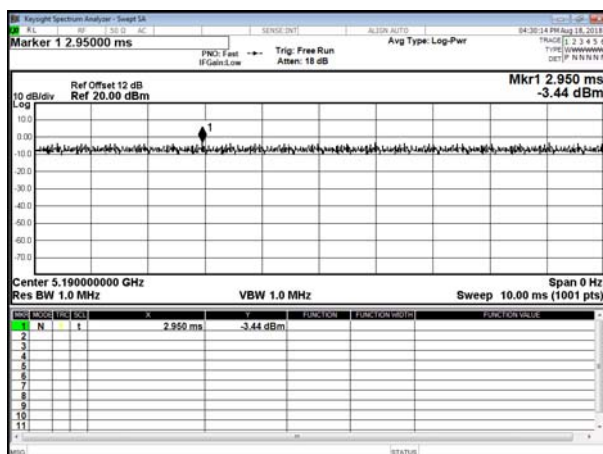
Modulation Standard: 802.11n HT40 (13.5Mbps)



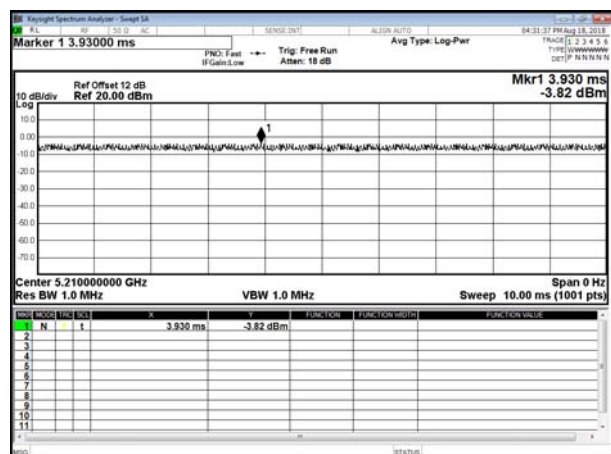
Modulation Standard: 802.11ac VHT20 (29.3Mbps)



Modulation Standard: 802.11ac VHT40 (13.5Mbps)



Modulation Standard: 802.11ac VHT80 (29.3Mbps)





## 8. 6dB Bandwidth & 99% Bandwidth

### 8.1. Test Limit

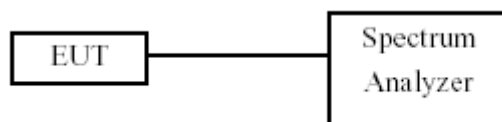
FCC §15.407

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

### 8.2. Test Procedure

Reference to 789033 D02 General UNII Test Procedures New Rules v01: The transmitter output is connected to a spectrum analyzer with the RBW set to 100KHz, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

### 8.3. Test Setup Layout



### 8.4. Test Result and Data (6dB Bandwidth)

Temperature: 21°C

Humidity: 56%

Test Date: Aug. 11, 2018

#### In the 5.8G Band

| Modulation Type | Channel | Frequency (MHz) | 6dB Bandwidth (MHz) |       | Minimum Limit (MHz) |
|-----------------|---------|-----------------|---------------------|-------|---------------------|
|                 |         |                 | ANT A               | ANT B |                     |
| 802.11a         | 149     | 5745            | 16.53               | 16.59 | 0.50                |
|                 | 157     | 5785            | 16.53               | 16.54 | 0.50                |
|                 | 165     | 5825            | 16.51               | 16.56 | 0.50                |
| 802.11ac VHT20  | 149     | 5745            | 17.67               | 17.70 | 0.50                |
|                 | 157     | 5785            | 17.68               | 17.69 | 0.50                |
|                 | 165     | 5825            | 17.65               | 17.68 | 0.50                |
| 802.11ac VHT40  | 155     | 5755            | 36.38               | 36.40 | 0.50                |
|                 | 159     | 5795            | 36.39               | 36.40 | 0.50                |
| 802.11ac VHT80  | 155     | 5775            | 74.89               | 75.91 | 0.50                |

**8.5. Test Result and Data (99% Bandwidth)**

Temperature: 21°C

Humidity: 56%

Test Date: Aug. 11, 2018

**In the 5.8G Band**

| Modulation Type | Channel | Frequency (MHz) | 99% Bandwidth (MHz) |        |
|-----------------|---------|-----------------|---------------------|--------|
|                 |         |                 | ANT A               | ANT B  |
| 802.11a         | 149     | 5745            | 16.925              | 16.753 |
|                 | 157     | 5785            | 16.689              | 16.832 |
|                 | 165     | 5825            | 16.874              | 16.852 |
| 802.11ac VHT20  | 149     | 5745            | 17.655              | 17.663 |
|                 | 157     | 5785            | 17.778              | 17.731 |
|                 | 165     | 5825            | 17.727              | 17.673 |
| 802.11ac VHT40  | 155     | 5755            | 36.056              | 36.011 |
|                 | 159     | 5795            | 36.110              | 36.078 |
| 802.11ac VHT80  | 155     | 5775            | 74.780              | 74.923 |

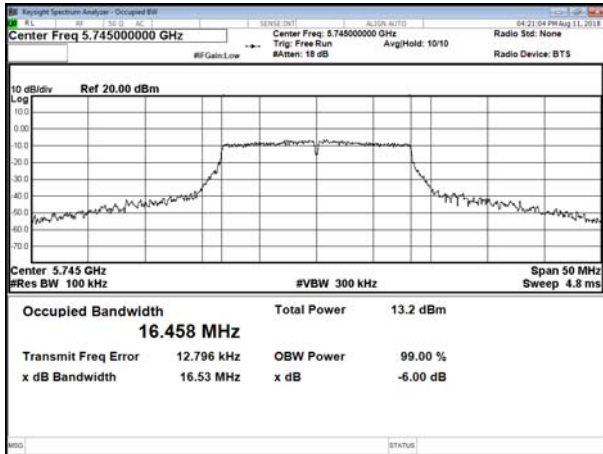


6dB Bandwidth

ANT A

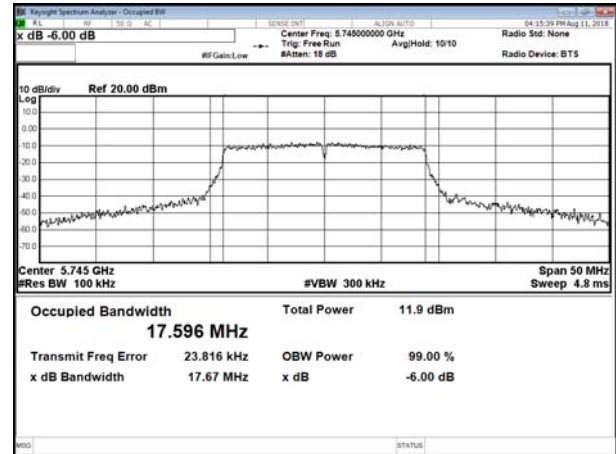
Modulation Standard: 802.11a (6Mbps)

CH149

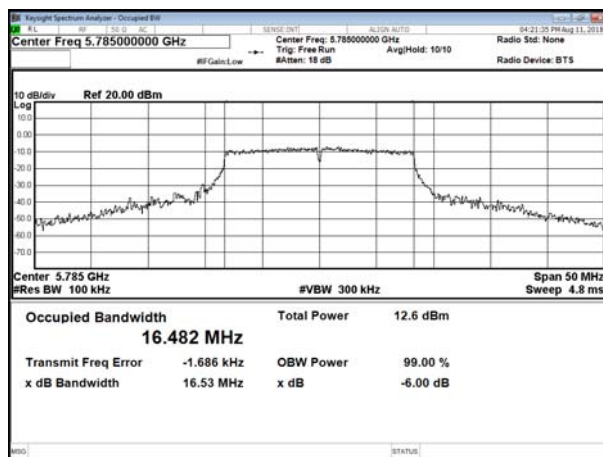


Modulation Standard: 802.11ac, VHT20 (6.5Mbps)

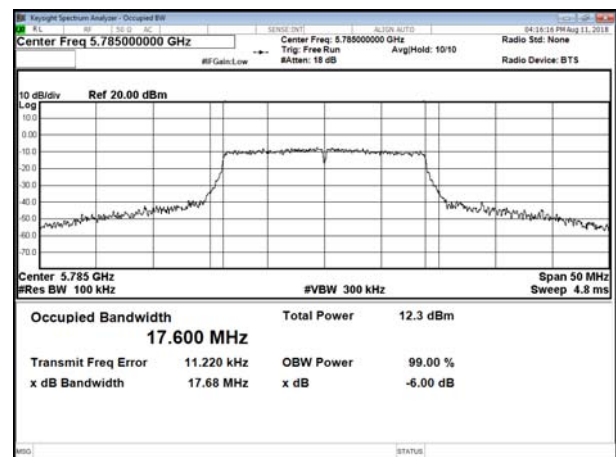
CH149



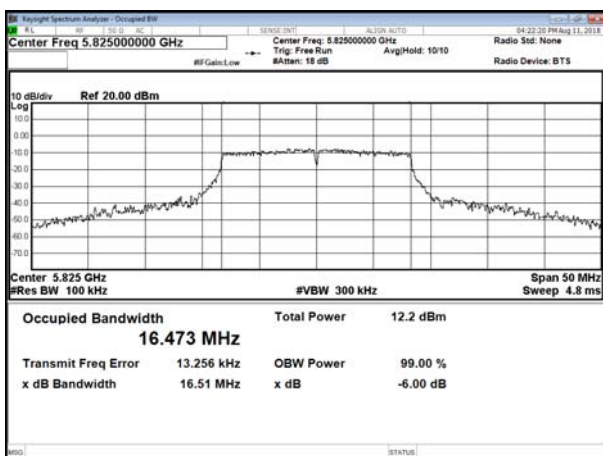
CH157



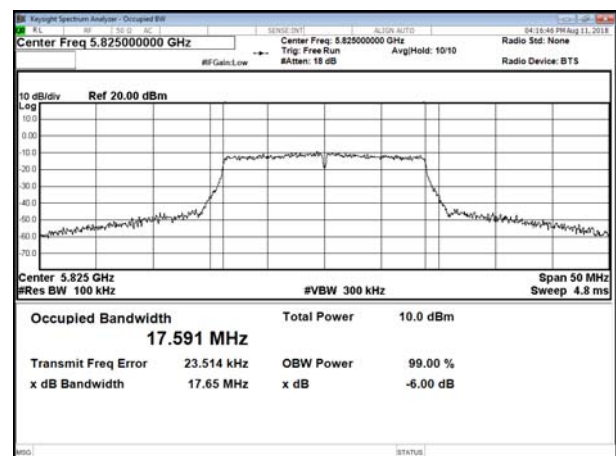
CH157



CH165

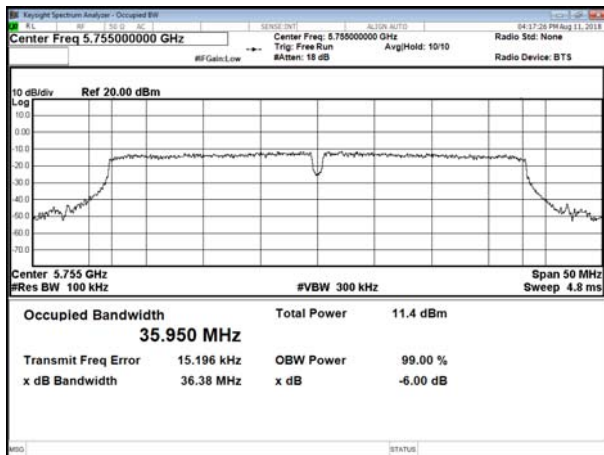


CH165

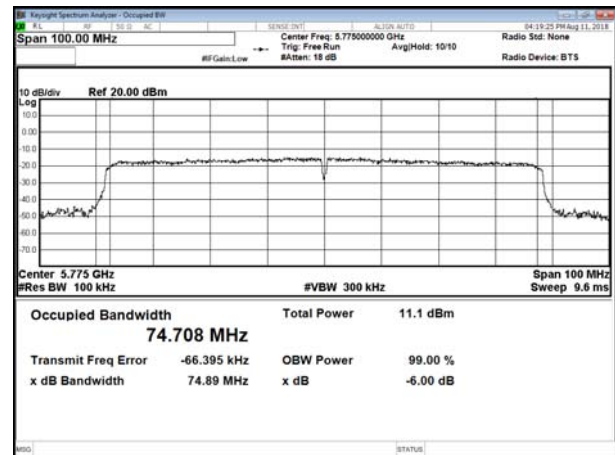




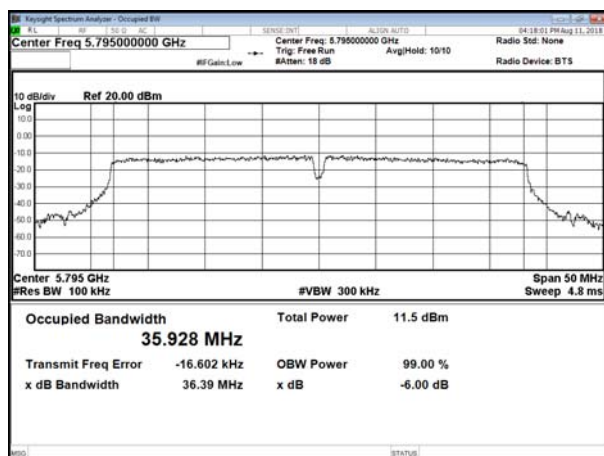
Modulation Standard: 802.11ac, VHT40 (13.5Mbps)  
CH151



Modulation Standard: 802.11ac, VHT80 (29.3Mbps)  
CH155

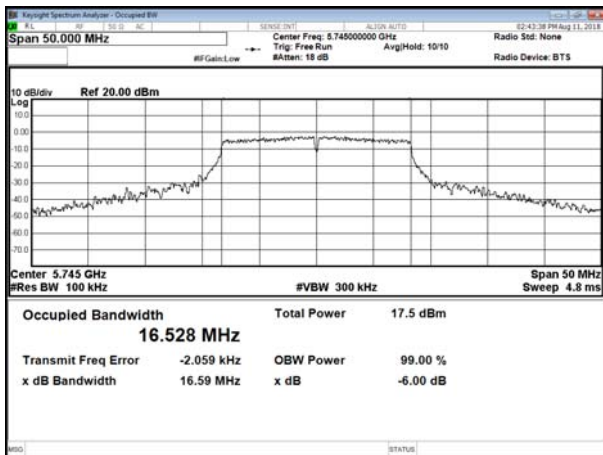
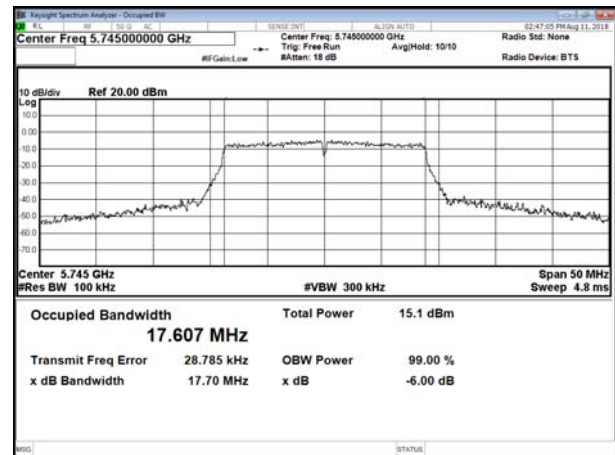


CH159

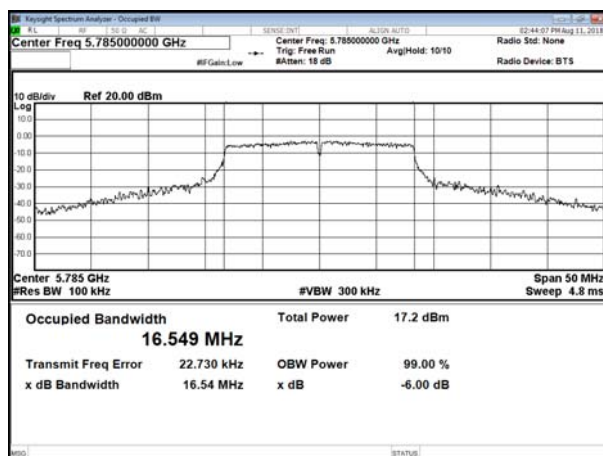




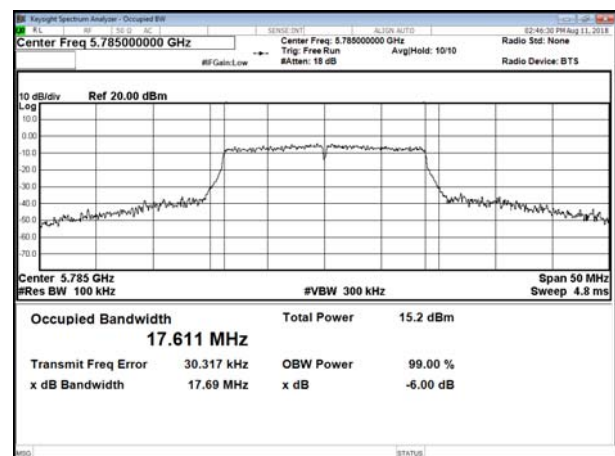
ANT B

Modulation Standard: 802.11a (6Mbps)  
CH149Modulation Standard: 802.11ac, VHT20 (6.5Mbps)  
CH149

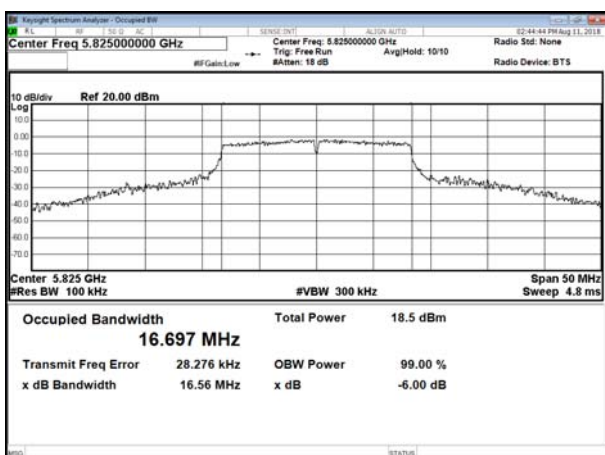
CH157



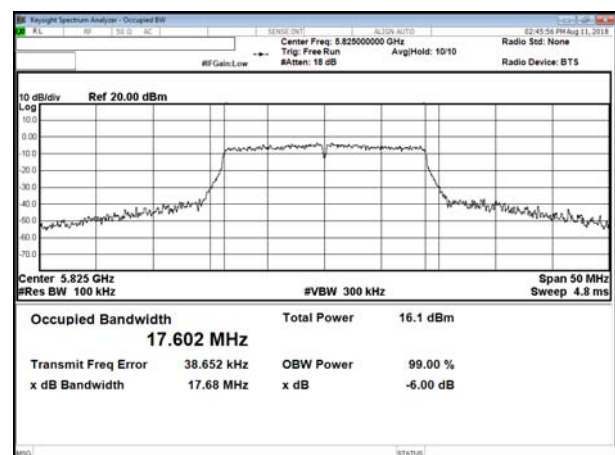
CH157



CH165

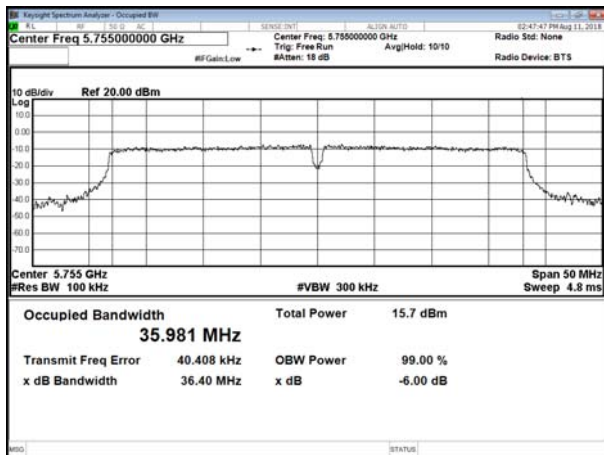


CH165

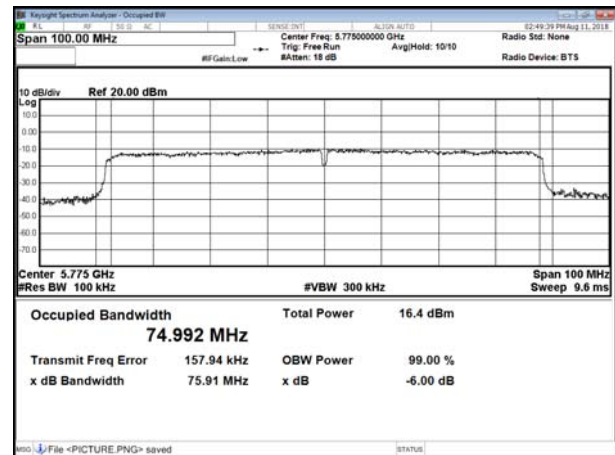




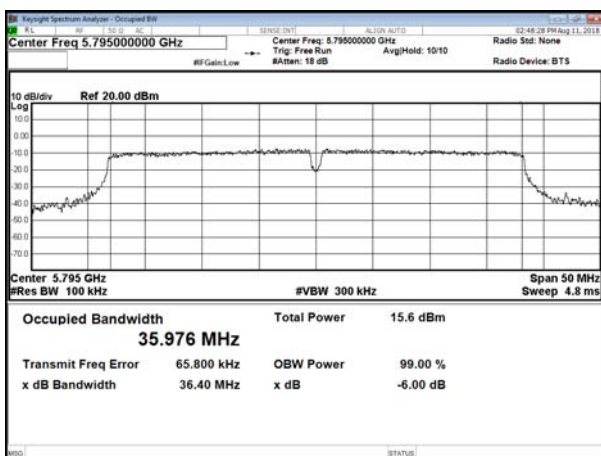
Modulation Standard: 802.11ac, VHT40 (13.5Mbps)  
CH151



Modulation Standard: 802.11ac, VHT80 (29.3Mbps)  
CH155



CH159





99% Bandwidth

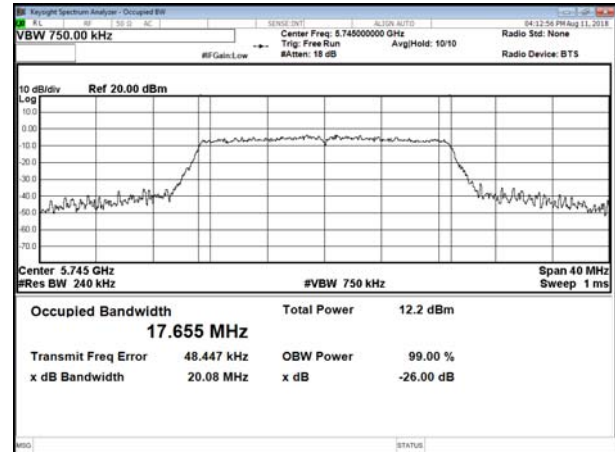
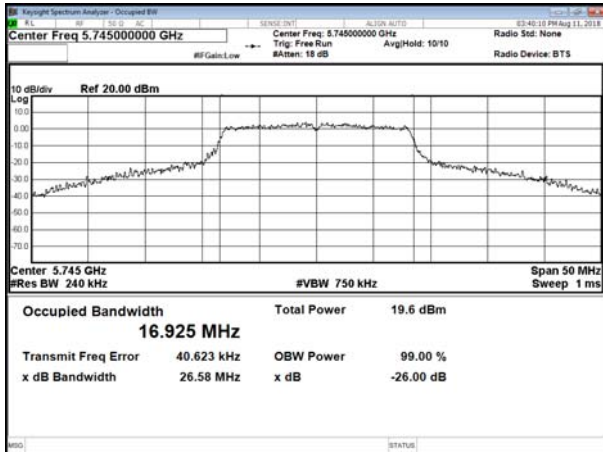
ANT A

Modulation Standard: 802.11a (6Mbps)

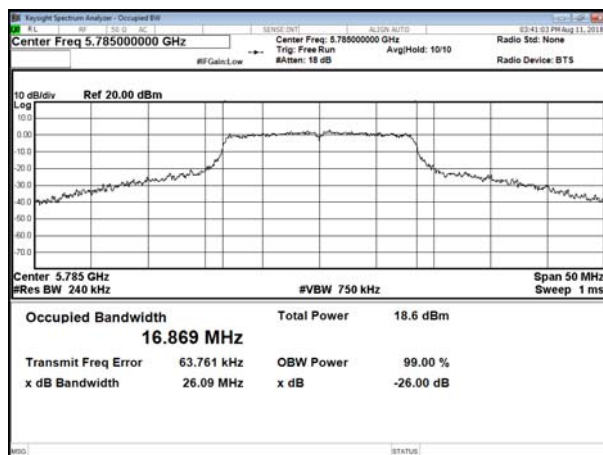
CH149

Modulation Standard: 802.11ac, VHT20 (6.5Mbps)

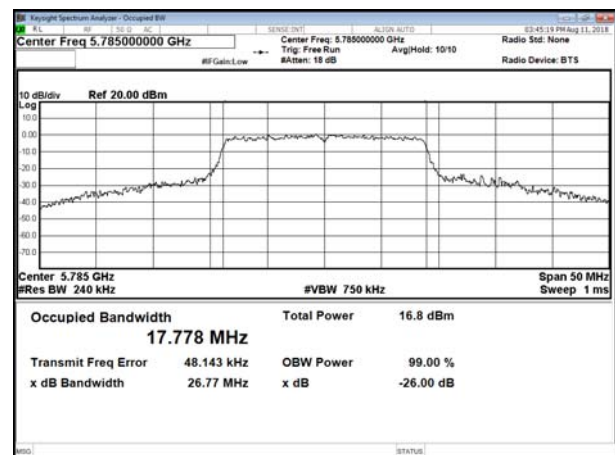
CH149



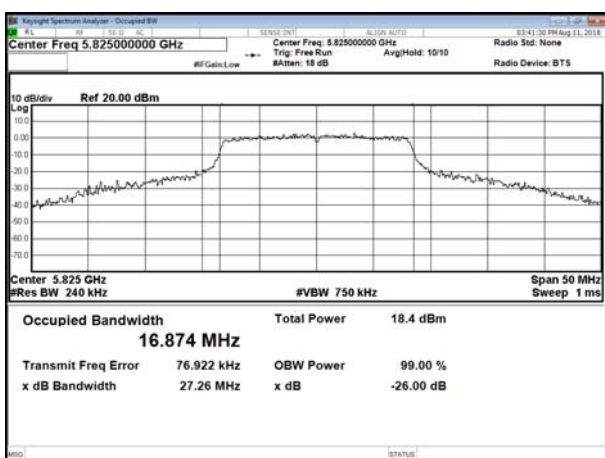
CH157



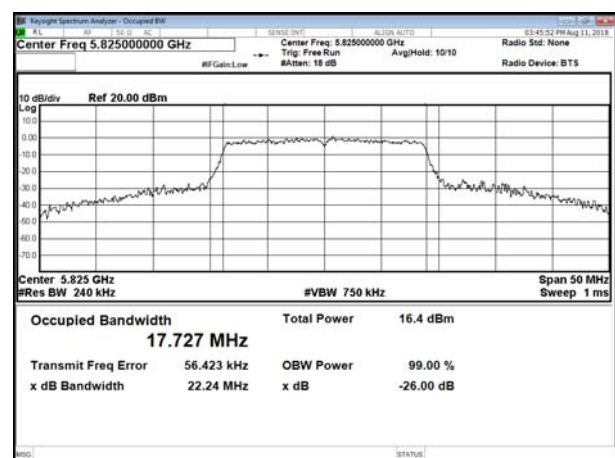
CH157



CH165

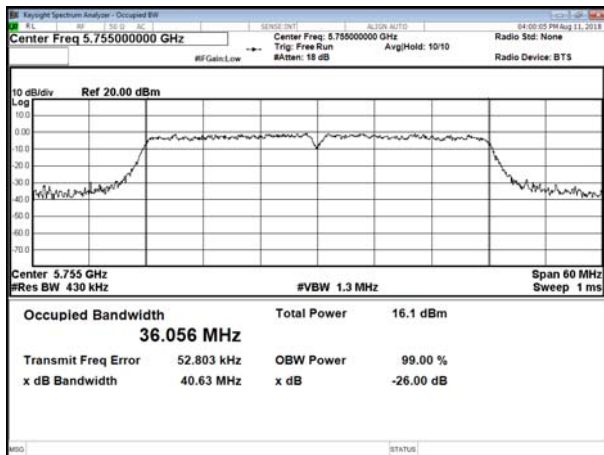


CH165

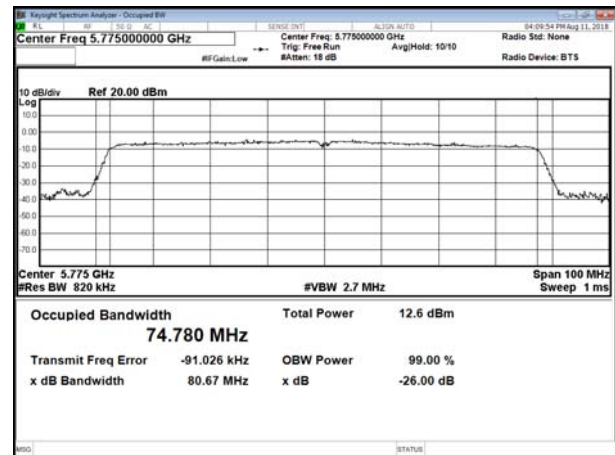




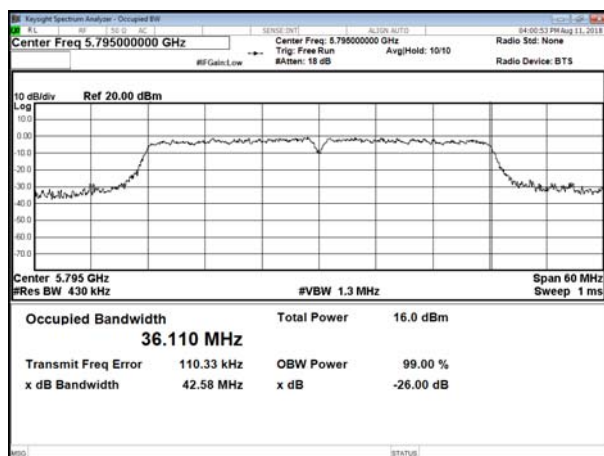
Modulation Standard: 802.11ac, VHT40 (13.5Mbps)  
CH151



Modulation Standard: 802.11ac, VHT80 (29.3Mbps)  
CH155

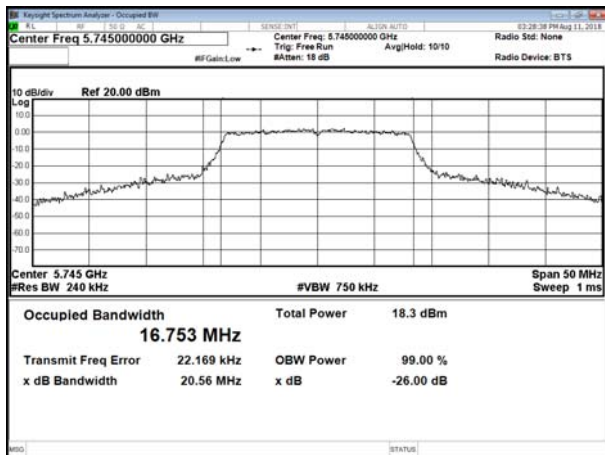


CH159

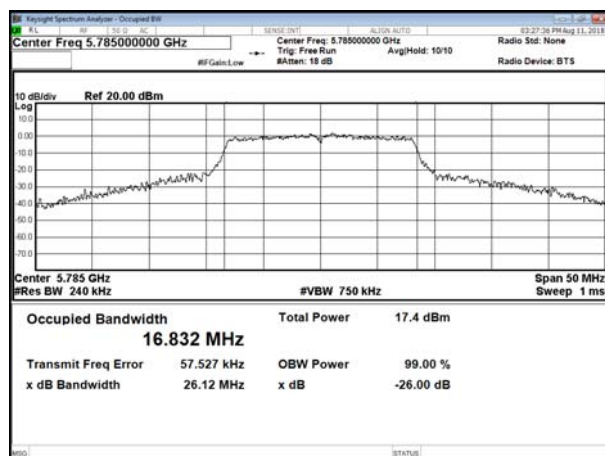




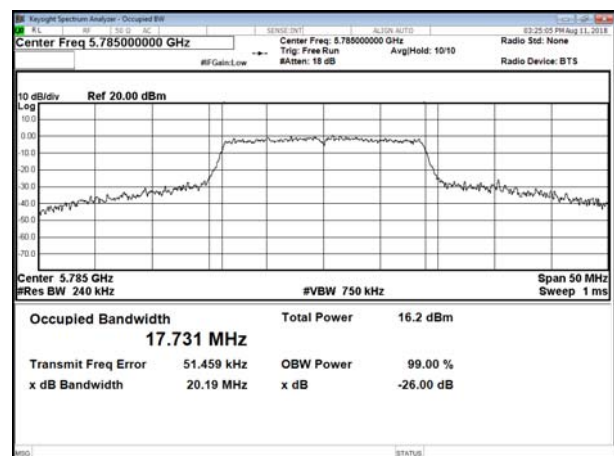
ANT B

Modulation Standard: 802.11a (6Mbps)  
CH149Modulation Standard: 802.11ac, VHT20 (6.5Mbps)  
CH149

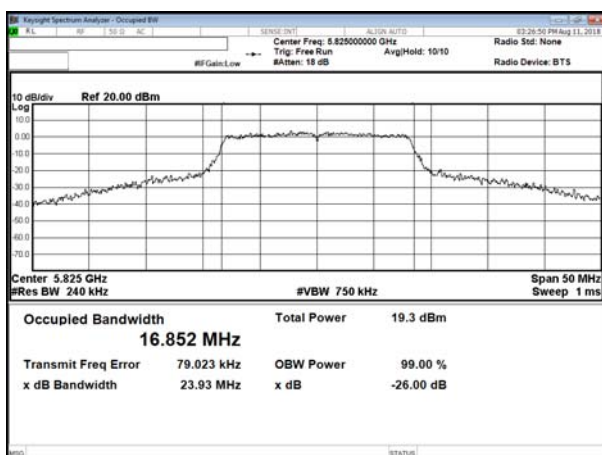
CH157



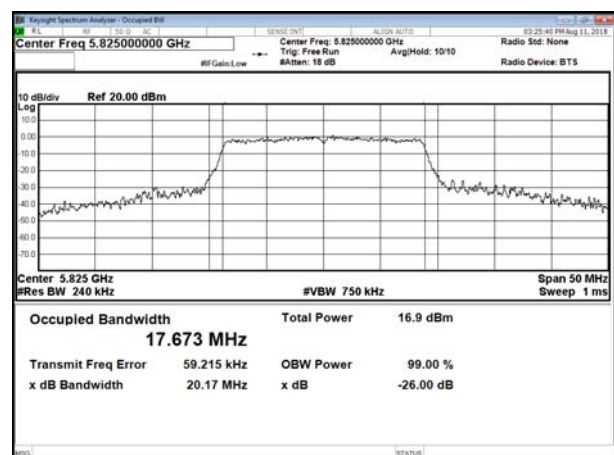
CH157



CH165

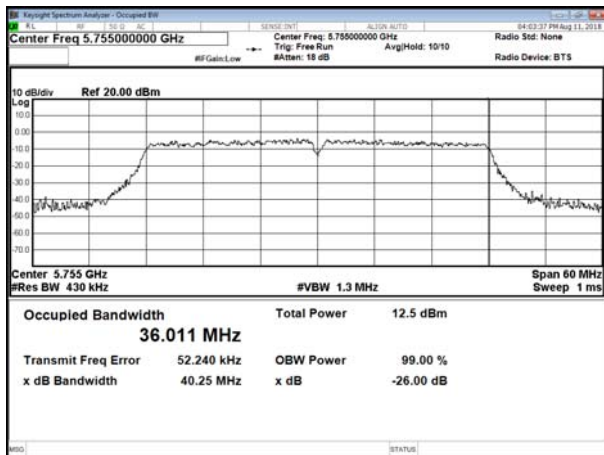


CH165

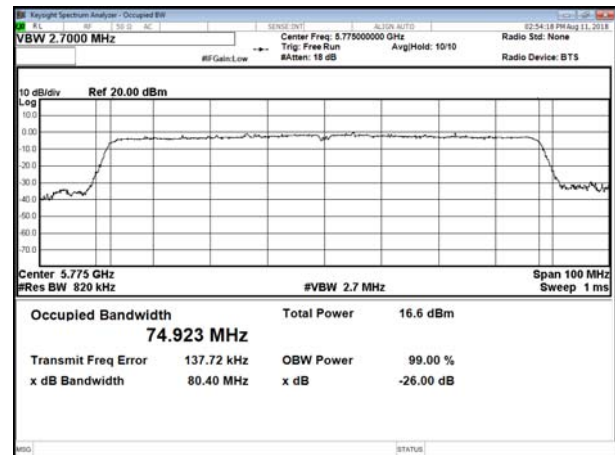




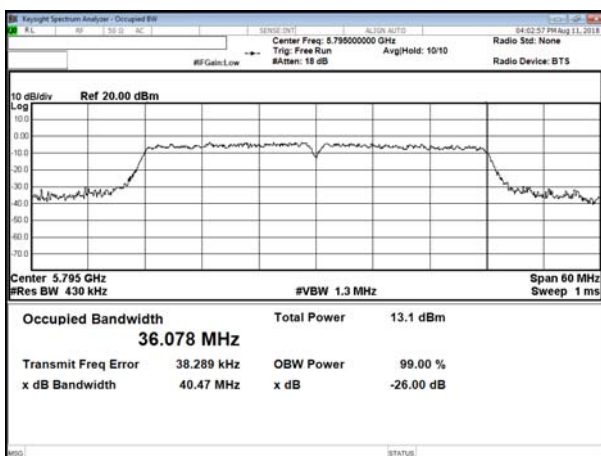
Modulation Standard: 802.11ac, VHT40 (13.5Mbps)  
CH151



Modulation Standard: 802.11ac, VHT80 (29.3Mbps)  
CH155



CH159





## 9. 26dB Bandwidth & 99% Bandwidth

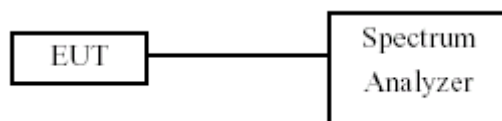
### 9.1. Test Limit

None; for reporting purposes only.

### 9.2. Test Procedure

Reference to 789033 D02 General UNII Test Procedures New Rules v01: The transmitter output is connected to a spectrum analyzer with the RBW = approximately 1% of the emission bandwidth, the VBW  $\geq 3 \times$  RBW, peak detector and max hold.

### 9.3. Test Setup Layout



### 9.4. Test Result and Data

Temperature: 21°C

Humidity: 56%

Test Date: Aug. 11, 2018

#### In the 5.2G Band

| Modulation Type | Channel | Frequency (MHz) | 26dB Bandwidth (MHz) |       | 99% Occupied Bandwidth (MHz) |        |
|-----------------|---------|-----------------|----------------------|-------|------------------------------|--------|
|                 |         |                 | ANT A                | ANT B | ANT A                        | ANT B  |
| 802.11a         | 36      | 5180            | 20.68                | 20.80 | 16.761                       | 16.737 |
|                 | 44      | 5220            | 21.91                | 20.82 | 16.759                       | 16.789 |
|                 | 48      | 5240            | 20.49                | 21.06 | 16.625                       | 16.762 |
| 802.11ac VHT20  | 36      | 5180            | 20.12                | 20.12 | 17.676                       | 17.660 |
|                 | 44      | 5220            | 20.09                | 20.04 | 17.658                       | 17.648 |
|                 | 48      | 5240            | 20.12                | 20.10 | 17.642                       | 17.652 |
| 802.11ac VHT40  | 38      | 5190            | 40.60                | 41.02 | 36.019                       | 36.055 |
|                 | 46      | 5230            | 40.69                | 40.70 | 36.042                       | 36.042 |
| 802.11ac VHT80  | 42      | 5210            | 81.36                | 80.70 | 75.070                       | 75.011 |



26dB Bandwidth &amp; 99% Bandwidth

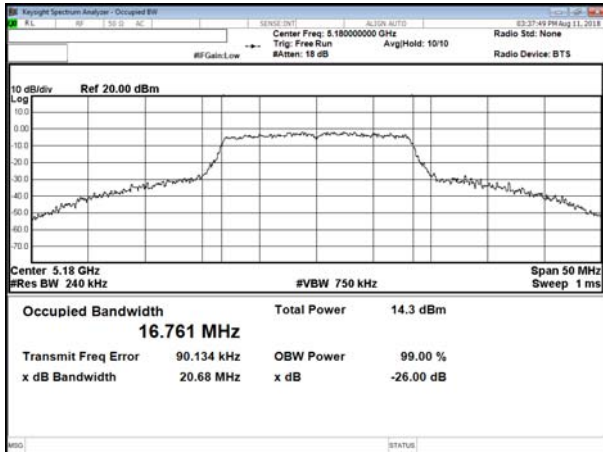
ANT A

Modulation Standard: 802.11a (6Mbps)

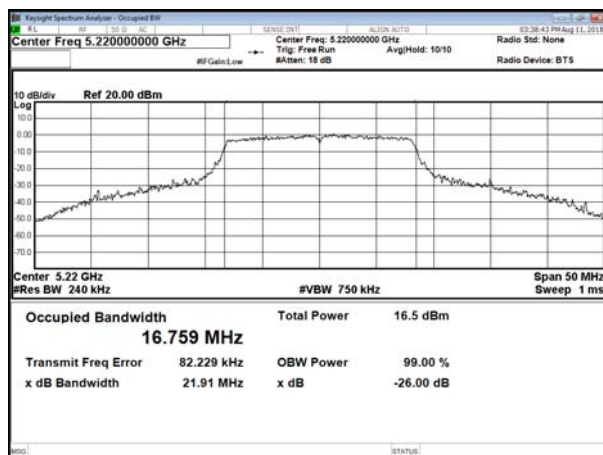
CH36

802.11ac VHT20 (6.5Mbps)

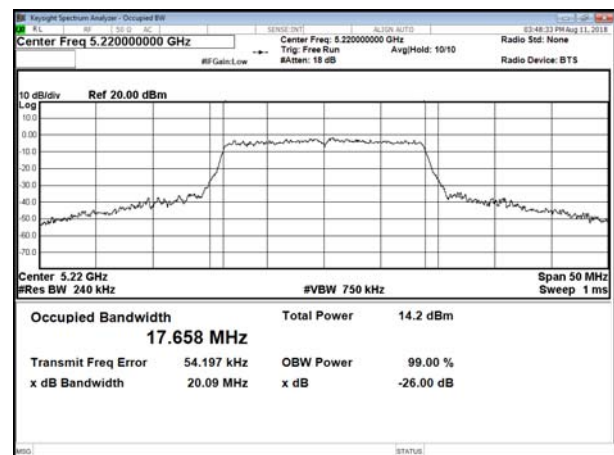
CH36



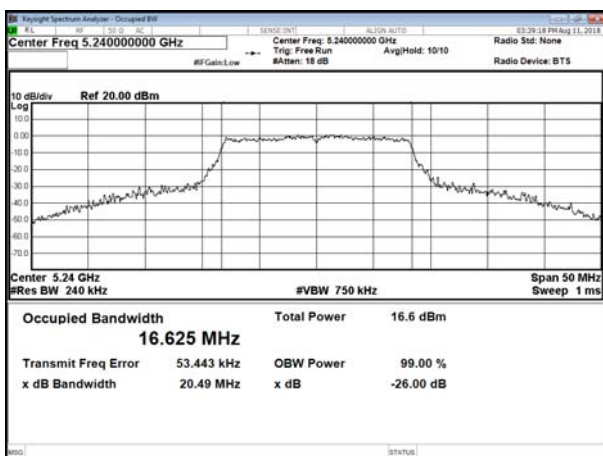
CH44



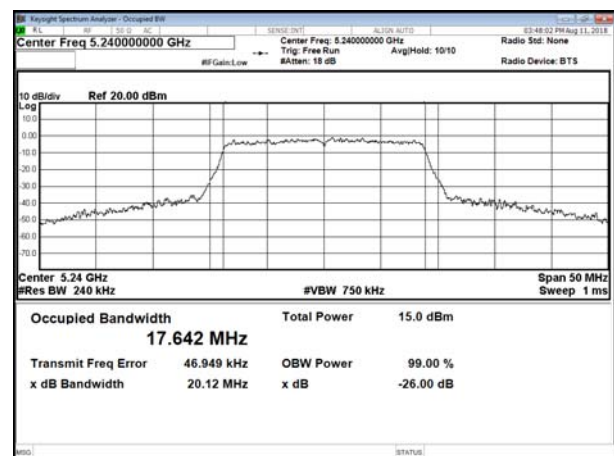
CH44



CH48

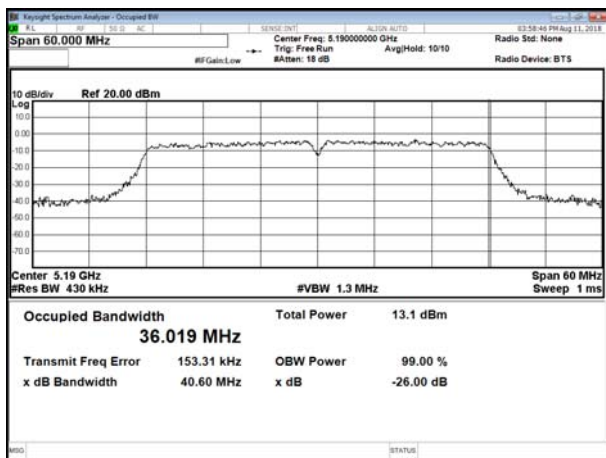


CH48

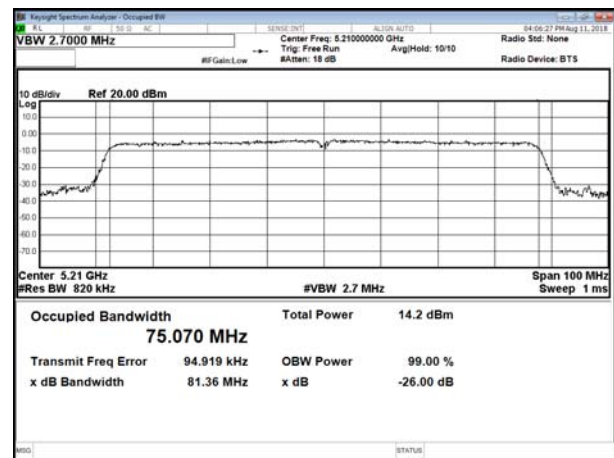




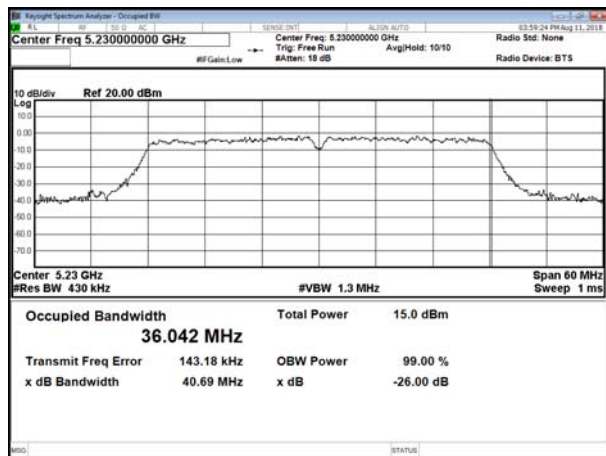
Modulation Standard: 802.11ac VHT40 (13.5Mbps)  
CH38



Modulation Standard: 802.11ac VHT80 (29.3Mbps)  
CH42



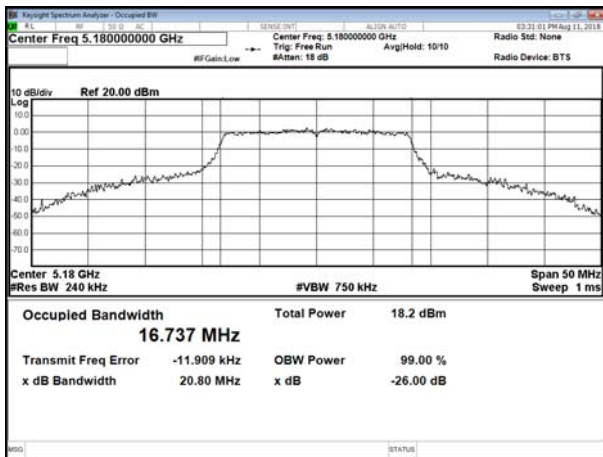
CH46



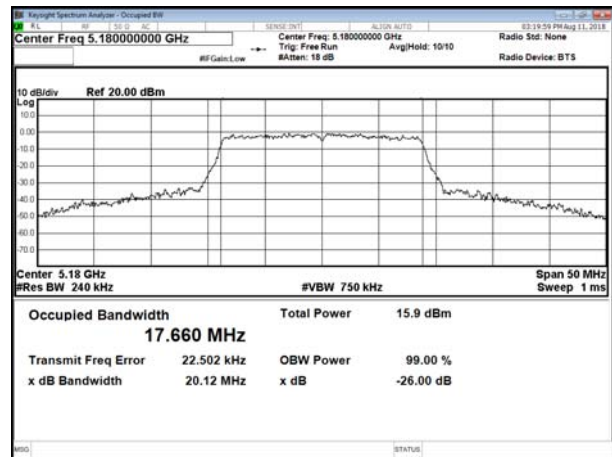


## ANT B

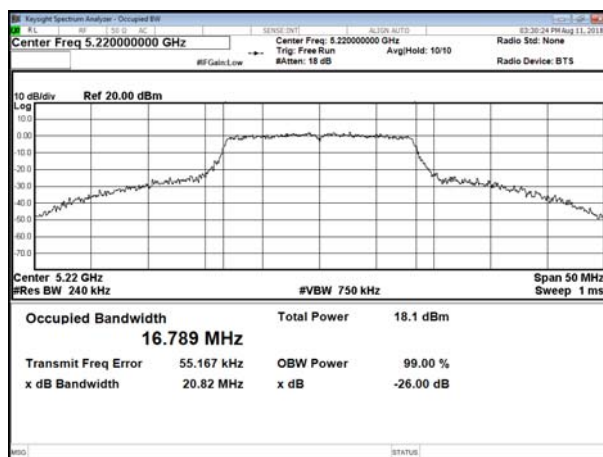
Modulation Standard: 802.11a (6Mbps)  
CH36



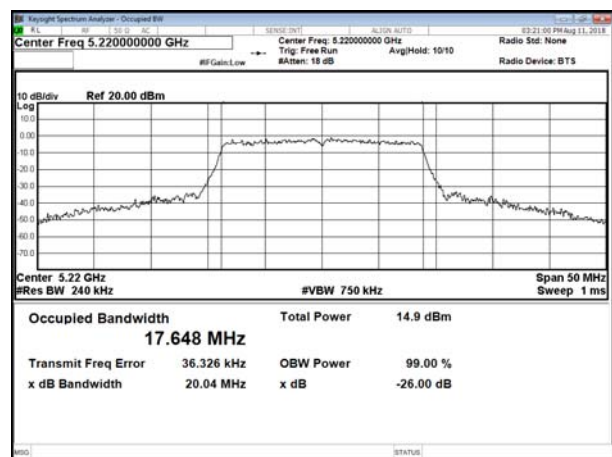
802.11ac VHT20 (6.5Mbps)  
CH36



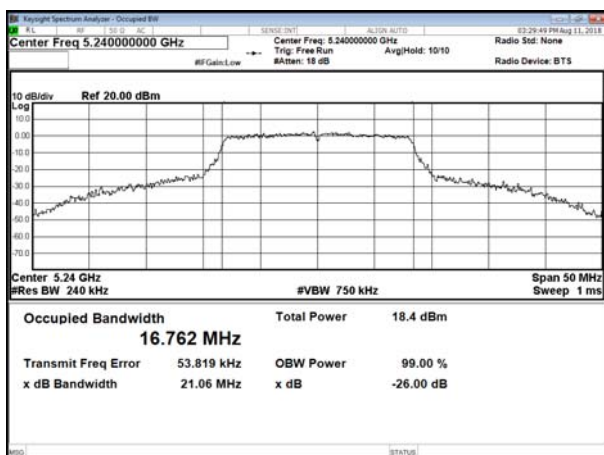
## CH44



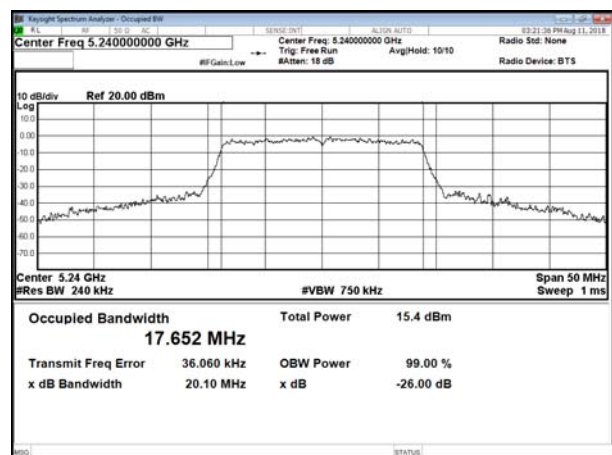
## CH44



## CH48

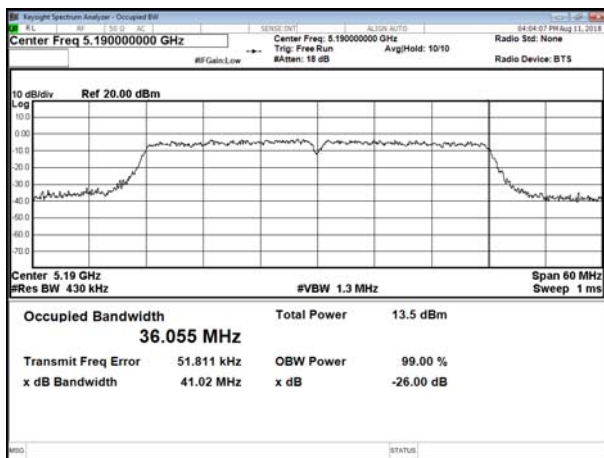


## CH48

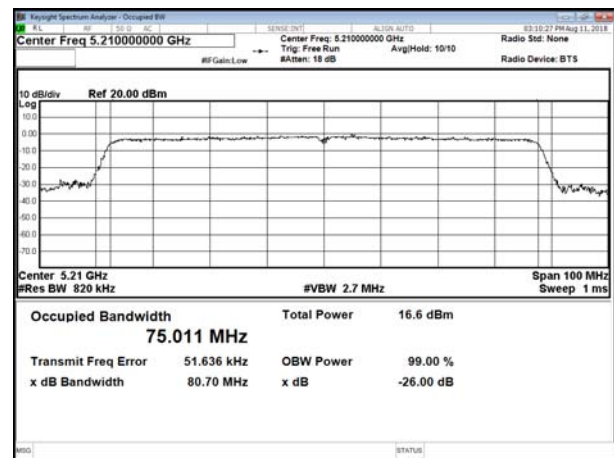




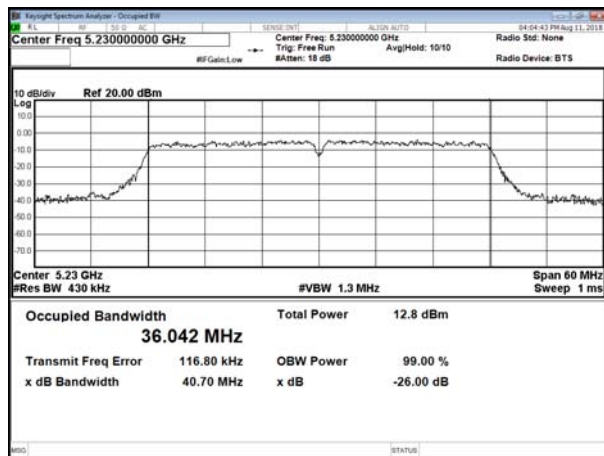
Modulation Standard: 802.11ac VHT40 (13.5Mbps)  
CH38



Modulation Standard: 802.11ac VHT80 (29.3Mbps)  
CH42



CH46





## 10. Average Power

### 10.1. Test Limit

#### Output Power:

| Frequency Band                      |                                    | Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 5.15~5.25GHz                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                                     | Operating Mode                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <input type="checkbox"/>            | Outdoor access point               | The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. 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 30degrees as measured from the horizon must not exceed 125 mW (21 dBm).                       |
| <input type="checkbox"/>            | Indoor access point                | The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. 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.                                                                                                                                                 |
| <input type="checkbox"/>            | Fixed point-to-point access points | The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). 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. |
| <input checked="" type="checkbox"/> | client devices                     | The maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24dBm) provided the maximum antenna gain does not exceed 6 dBi. 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.                                                                                                                                              |



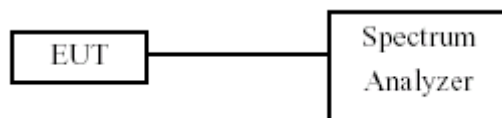
| Frequency Band                      |                 | Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <input type="checkbox"/>            | 5.25-5.35 GHz   | The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm $10 \log B$ , where B is the 26 dB emission bandwidth in megahertz. 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.                                                                                                                   |
| <input type="checkbox"/>            | 5.470-5.725 GHz |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <input checked="" type="checkbox"/> | 5.725~5.85 GHz  | The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). 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. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. |

## 10.2. Test Procedure

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

## 10.3. Test Setup Layout





## 10.4. Test Result and Data

Temperature: 21°C

Humidity: 56%

Test Date: Aug. 11, 2018

### In the 5.2G Band

| Modulation Type | Channel | Frequency (MHz) | Avg Power Output (dBm) |       | Total Power (dBm) | Total Power (mW) | Power Limit (dBm) |
|-----------------|---------|-----------------|------------------------|-------|-------------------|------------------|-------------------|
|                 |         |                 | ANT A                  | ANT B |                   |                  |                   |
| 802.11a         | 36      | 5180            | 13.75                  | 14.25 | 17.02             | 50.35            | 24.00             |
|                 | 44      | 5220            | 12.42                  | 13.55 | 16.03             | 40.09            | 24.00             |
|                 | 48      | 5240            | 12.45                  | 14.01 | 16.31             | 42.76            | 24.00             |
| 802.11an HT20   | 36      | 5180            | 10.24                  | 11.56 | 13.96             | 24.89            | 24.00             |
|                 | 44      | 5220            | 10.67                  | 11.58 | 14.16             | 26.06            | 24.00             |
|                 | 48      | 5240            | 11.21                  | 11.31 | 14.27             | 26.73            | 24.00             |
| 802.11an HT40   | 38      | 5190            | 11.38                  | 12.61 | 15.05             | 31.99            | 24.00             |
|                 | 46      | 5230            | 10.89                  | 11.47 | 14.20             | 26.30            | 24.00             |
| 802.11ac VHT20  | 36      | 5180            | 10.36                  | 11.71 | 14.10             | 25.70            | 24.00             |
|                 | 44      | 5220            | 10.72                  | 11.71 | 14.25             | 26.61            | 24.00             |
|                 | 48      | 5240            | 11.22                  | 11.35 | 14.30             | 26.92            | 24.00             |
| 802.11ac VHT40  | 38      | 5190            | 11.41                  | 12.66 | 15.09             | 32.28            | 24.00             |
|                 | 46      | 5230            | 10.89                  | 11.47 | 14.20             | 26.30            | 24.00             |
| 802.11ac VHT80  | 42      | 5210            | 10.75                  | 11.78 | 14.31             | 26.98            | 24.00             |

### In the 5.8G Band

| Modulation Type | Channel | Frequency (MHz) | Avg Power Output (dBm) |       | Total Power (dBm) | Total Power (mW) | Power Limit (dBm) |
|-----------------|---------|-----------------|------------------------|-------|-------------------|------------------|-------------------|
|                 |         |                 | ANT A                  | ANT B |                   |                  |                   |
| 802.11a         | 149     | 5745            | 11.39                  | 13.02 | 15.29             | 33.81            | 30.00             |
|                 | 157     | 5785            | 10.94                  | 12.01 | 14.52             | 28.31            | 30.00             |
|                 | 165     | 5825            | 11.21                  | 12.50 | 14.91             | 30.97            | 30.00             |
| 802.11an HT20   | 149     | 5745            | 10.30                  | 10.98 | 13.66             | 23.23            | 30.00             |
|                 | 157     | 5785            | 10.44                  | 11.85 | 14.21             | 26.36            | 30.00             |
|                 | 165     | 5825            | 11.37                  | 13.10 | 15.33             | 34.12            | 30.00             |
| 802.11an HT40   | 151     | 5755            | 10.92                  | 11.23 | 14.09             | 25.64            | 30.00             |
|                 | 159     | 5795            | 10.41                  | 11.52 | 14.01             | 25.18            | 30.00             |
| 802.11ac VHT20  | 149     | 5745            | 10.31                  | 11.01 | 13.68             | 23.33            | 30.00             |
|                 | 157     | 5785            | 10.47                  | 11.88 | 14.24             | 26.55            | 30.00             |
|                 | 165     | 5825            | 11.41                  | 13.11 | 15.35             | 34.28            | 30.00             |
| 802.11ac VHT40  | 151     | 5755            | 10.94                  | 11.27 | 14.12             | 25.82            | 30.00             |
|                 | 159     | 5795            | 10.46                  | 11.59 | 14.07             | 25.53            | 30.00             |
| 802.11ac VHT80  | 155     | 5775            | 11.43                  | 12.01 | 14.74             | 29.79            | 30.00             |



## 11. PPSD

### 11.1. Test Limit

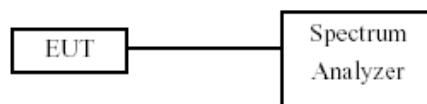
#### PSD:

| Frequency Band                      |                                    | Limit         |
|-------------------------------------|------------------------------------|---------------|
| <input checked="" type="checkbox"/> | 5.15~5.25GHz                       |               |
|                                     | Operating Mode                     |               |
| <input type="checkbox"/>            | Outdoor access point               | 17 dBm/MHz    |
| <input type="checkbox"/>            | Indoor access point                | 17 dBm/MHz    |
| <input type="checkbox"/>            | Fixed point-to-point access points | 17 dBm/MHz    |
| <input checked="" type="checkbox"/> | Mobile and portable client devices | 11 dBm/MHz    |
| <input type="checkbox"/>            | 5.725~5.85 GHz                     | 11 dBm/MHz    |
| <input type="checkbox"/>            | 5.470-5.725 GHz                    | 11 dBm/MHz    |
| <input checked="" type="checkbox"/> | 5.725~5.85 GHz                     | 30 dBm/500kHz |

### 11.2. Test Procedure

Reference to KDB789033 D02 General UNII Test Procedures New Rules v02r01

### 11.3. Test Setup Layout



**11.4. Test Result and Data**

Temperature: 21°C

Humidity: 56%

Test Date: Aug. 11, 2018

**In the 5.2G Band**

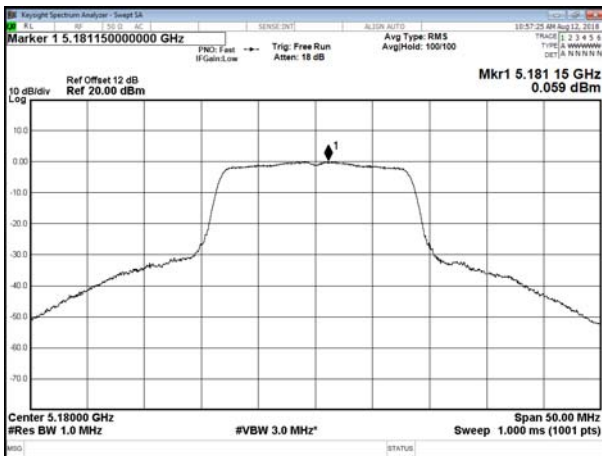
| Modulation Type | CH | Freq. (MHz) | Meas PPSD (dBm/MHz) |        | Sum chain (dBm) | Duty Cycle CF(dB) | Total Corr'd PPSD (dBm/MHz) | PPSD Limit (dBm/MHz) |
|-----------------|----|-------------|---------------------|--------|-----------------|-------------------|-----------------------------|----------------------|
|                 |    |             | ANT A               | ANT B  |                 |                   |                             |                      |
| 802.11a         | 36 | 5180        | 0.059               | 0.875  | 3.50            | 0.00              | 3.50                        | 11.00                |
|                 | 44 | 5220        | 0.616               | 0.449  | 3.54            | 0.00              | 3.54                        | 11.00                |
|                 | 48 | 5240        | 0.100               | 1.149  | 3.67            | 0.00              | 3.67                        | 11.00                |
| 802.11ac VHT20  | 36 | 5180        | -1.182              | -0.259 | 2.31            | 0.00              | 2.31                        | 11.00                |
|                 | 44 | 5220        | -1.285              | -1.085 | 1.83            | 0.00              | 1.83                        | 11.00                |
|                 | 48 | 5240        | -1.023              | -0.308 | 2.36            | 0.00              | 2.36                        | 11.00                |
| 802.11ac VHT40  | 38 | 5190        | -4.271              | -4.885 | -1.56           | 0.00              | -1.56                       | 11.00                |
|                 | 46 | 5230        | -4.524              | -4.685 | -1.59           | 0.00              | -1.59                       | 11.00                |
| 802.11ac VHT80  | 42 | 5210        | -7.078              | -7.004 | -4.03           | 0.00              | -4.03                       | 11.00                |

**In the 5.8G Band**

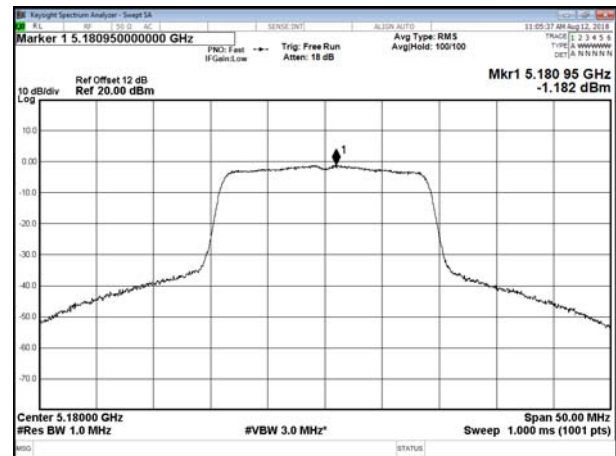
| Modulation Type | CH  | Freq. (MHz) | Meas PPSD (dBm/MHz) |        | Sum chain (dBm) | Duty Cycle CF(dB) | 10log(500K Hz/RBW) CF (dB) | Total Corr'd PPSD (dBm/500kHz) | PPSD Limit (dBm/500kHz) |
|-----------------|-----|-------------|---------------------|--------|-----------------|-------------------|----------------------------|--------------------------------|-------------------------|
|                 |     |             | ANT A               | ANT B  |                 |                   |                            |                                |                         |
| 802.11a         | 149 | 5745        | 0.290               | 1.250  | 3.81            | 0.00              | -3.01                      | 0.80                           | 30.00                   |
|                 | 157 | 5785        | 0.219               | 1.346  | 3.83            | 0.00              | -3.01                      | 0.82                           | 30.00                   |
|                 | 165 | 5825        | 0.471               | 1.463  | 4.01            | 0.00              | -3.01                      | 1.00                           | 30.00                   |
| 802.11ac VHT20  | 149 | 5745        | -1.169              | -0.473 | 2.20            | 0.00              | -3.01                      | -0.81                          | 30.00                   |
|                 | 157 | 5785        | -0.836              | -1.250 | 1.97            | 0.00              | -3.01                      | -1.04                          | 30.00                   |
|                 | 165 | 5825        | -0.471              | -1.034 | 2.27            | 0.00              | -3.01                      | -0.74                          | 30.00                   |
| 802.11ac VHT40  | 155 | 5755        | -4.402              | -4.314 | -1.35           | 0.00              | -3.01                      | -4.36                          | 30.00                   |
|                 | 159 | 5795        | -4.905              | -4.064 | -1.45           | 0.00              | -3.01                      | -4.46                          | 30.00                   |
| 802.11ac VHT80  | 155 | 5775        | -7.776              | -7.491 | -4.62           | 0.00              | -3.01                      | -7.63                          | 30.00                   |



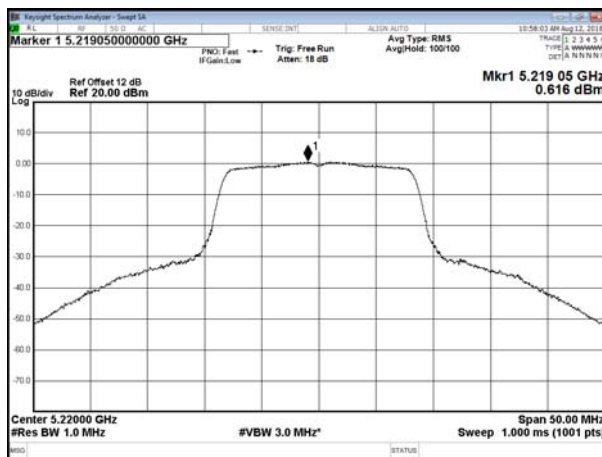
5.2G Band 1, ANT A  
Modulation Standard: 802.11a (6Mbps)  
CH36



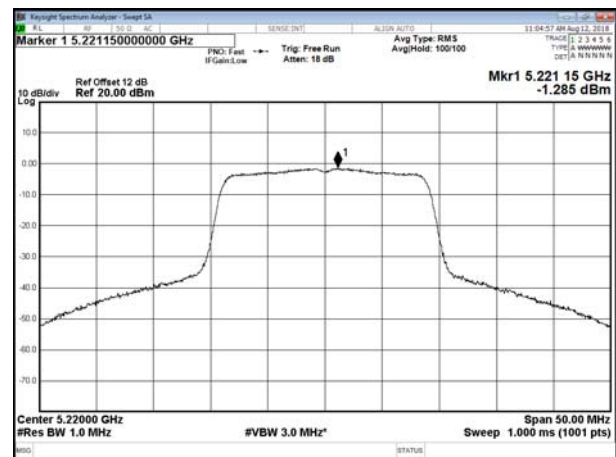
Modulation Standard: 802.11ac VHT20 (6.5Mbps)  
CH36



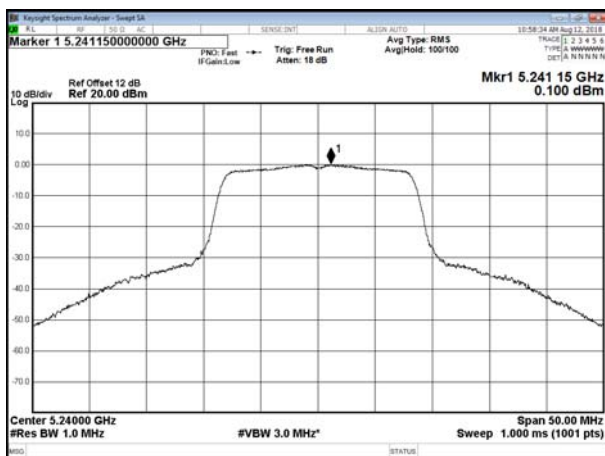
CH44



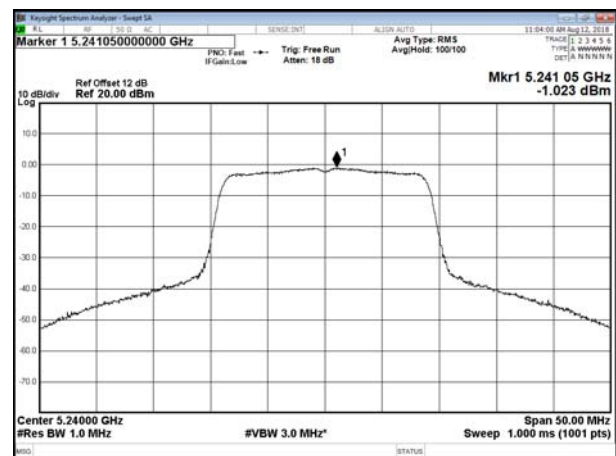
CH44



CH48

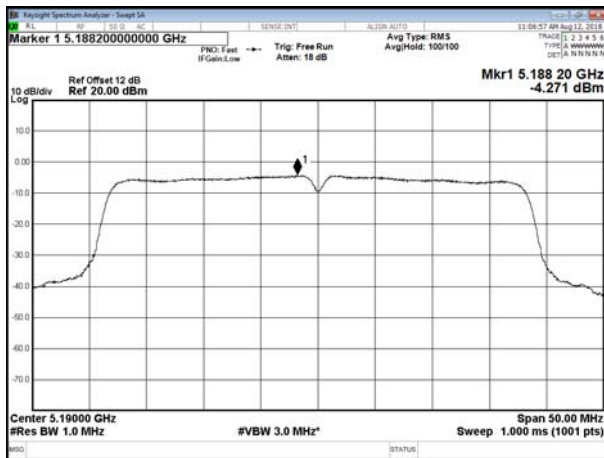


CH48

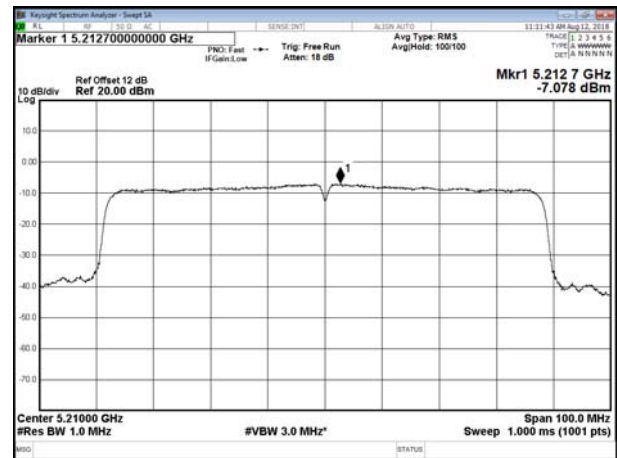




Modulation Standard: 802.11ac VHT40 (13.5Mbps)  
CH38



Modulation Standard: 802.11ac VHT80 (29.3Mbps)  
CH42

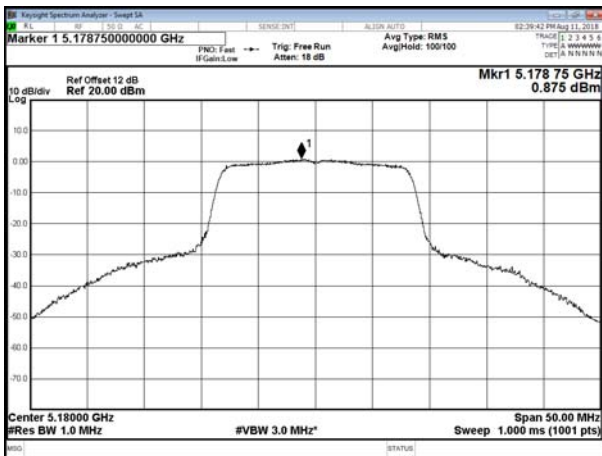


CH46

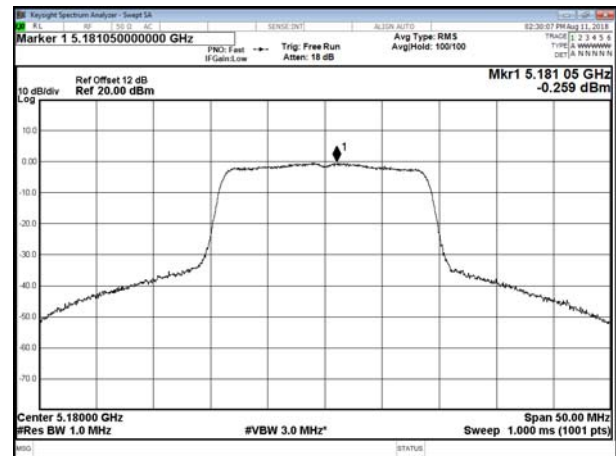




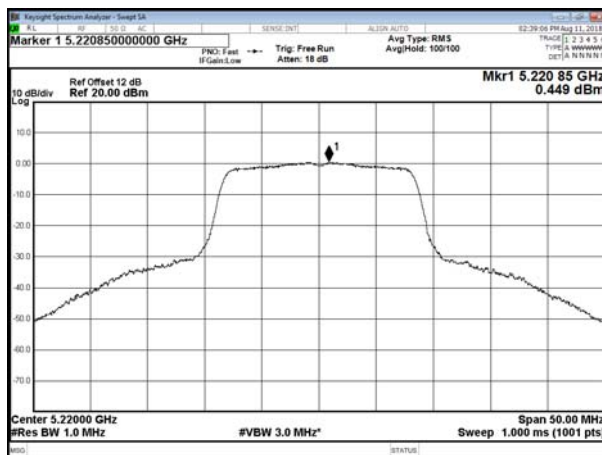
5.2G Band 1, ANT B  
Modulation Standard: 802.11a (6Mbps)  
CH36



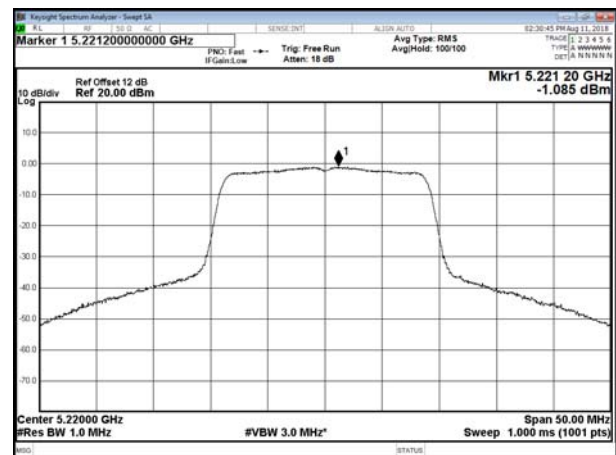
Modulation Standard: 802.11ac VHT20 (6.5Mbps)  
CH36



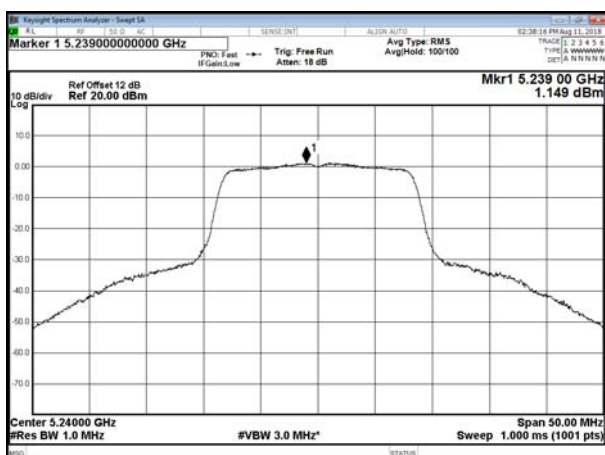
CH44



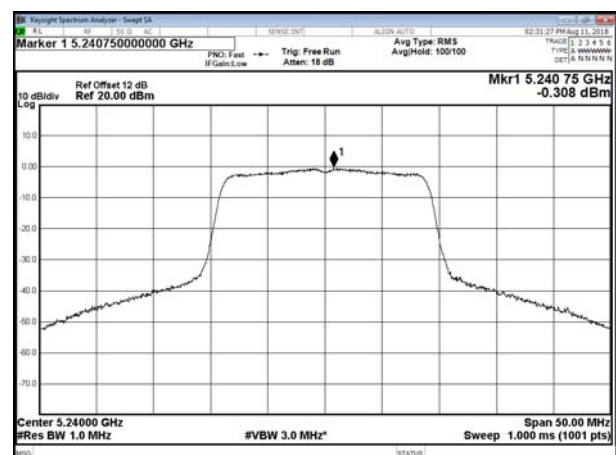
CH44



CH48

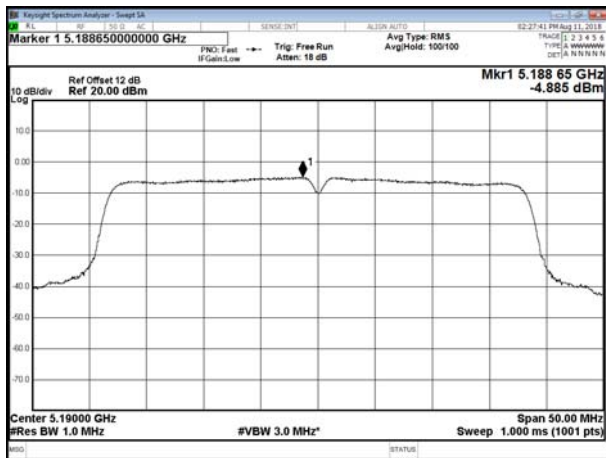


CH48

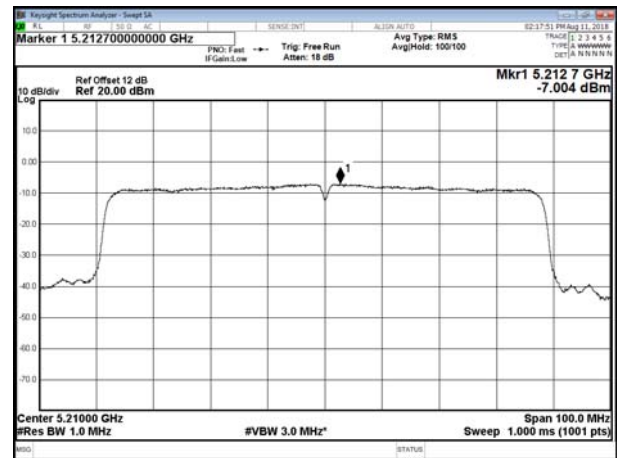




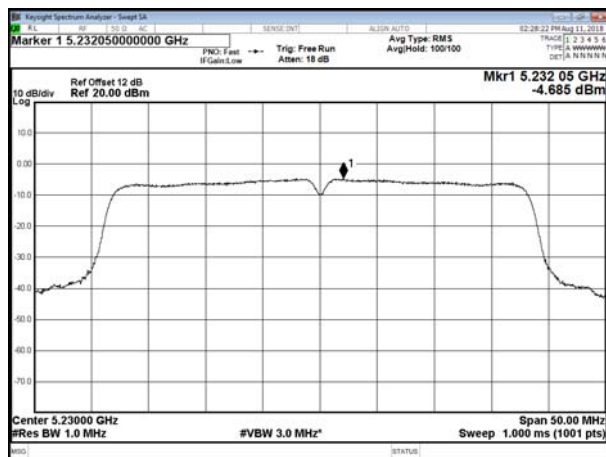
Modulation Standard: 802.11ac VHT40 (13.5Mbps)  
CH38



Modulation Standard: 802.11ac VHT80 (29.3Mbps)  
CH42

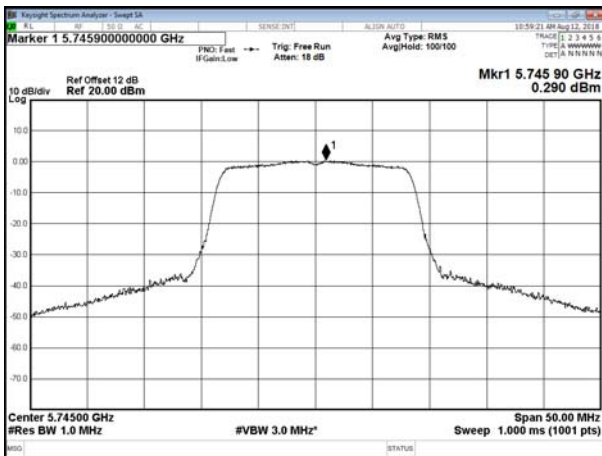


CH46

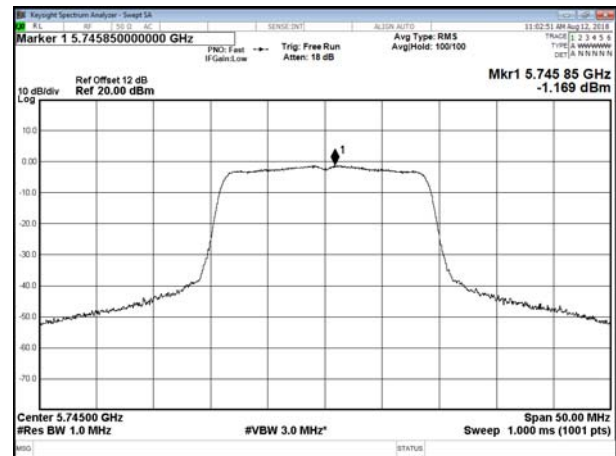




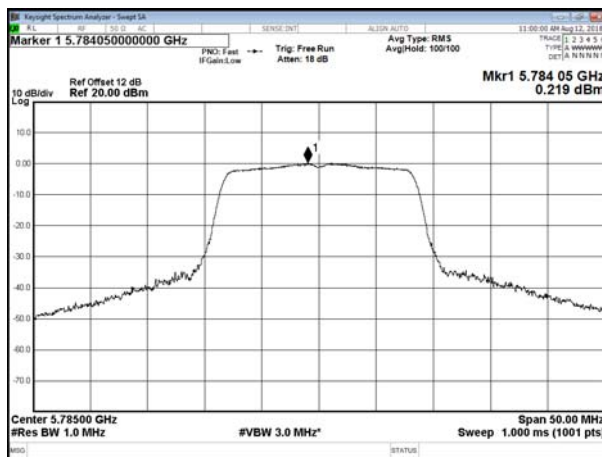
5.8G Band 4, ANT A  
Modulation Standard: 802.11a (6Mbps)  
CH149



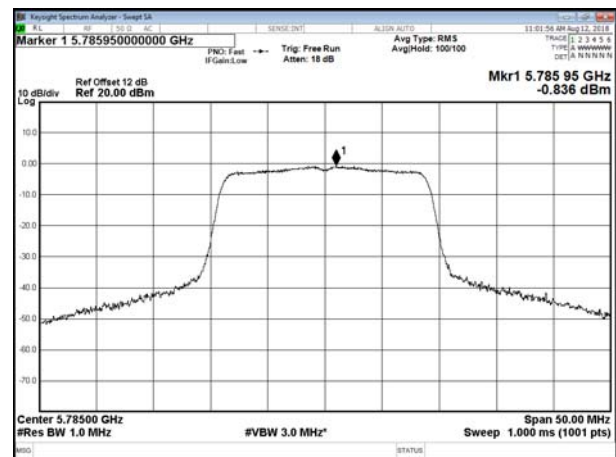
Modulation Standard: 802.11ac VHT20 (6.5Mbps)  
CH149



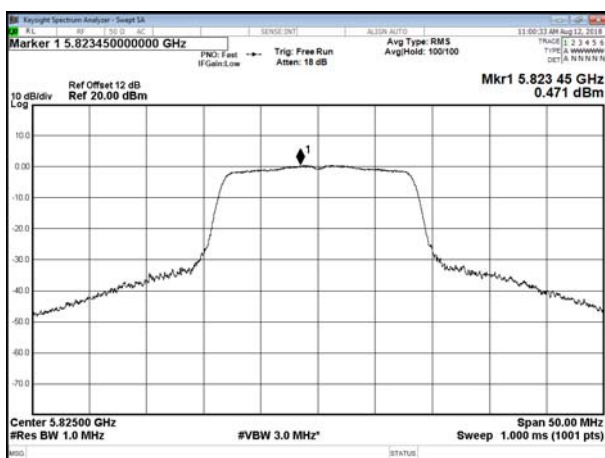
CH157



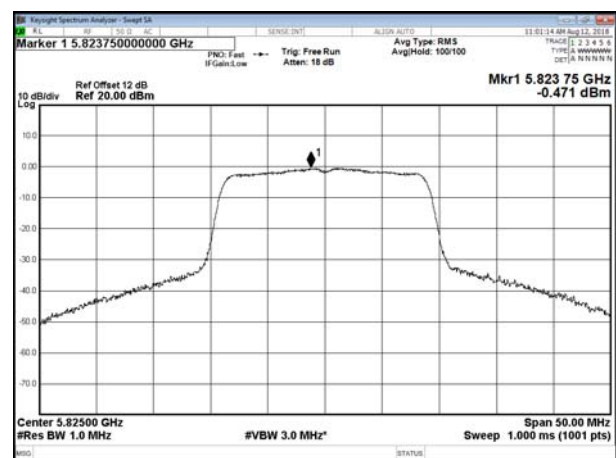
CH157



CH165

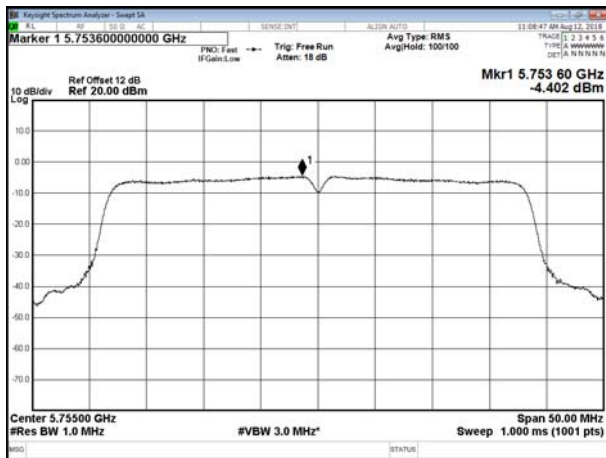


CH165

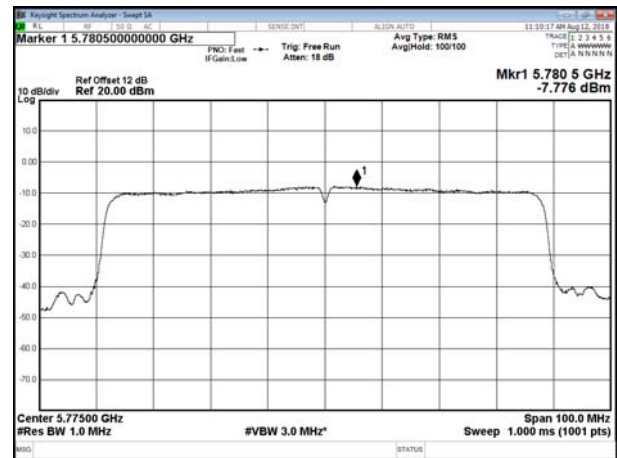




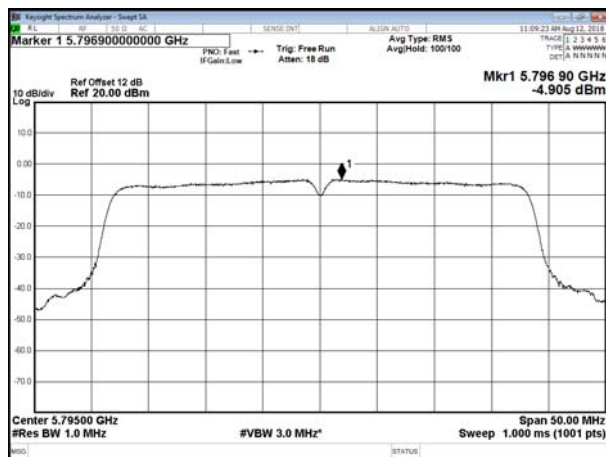
Modulation Standard: 802.11ac VHT40 (13.5Mbps)  
CH151



Modulation Standard: 802.11ac VHT80 (29.3Mbps)  
CH155

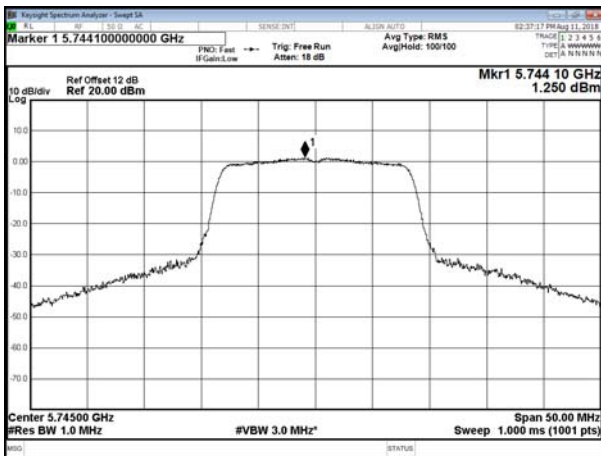


CH159

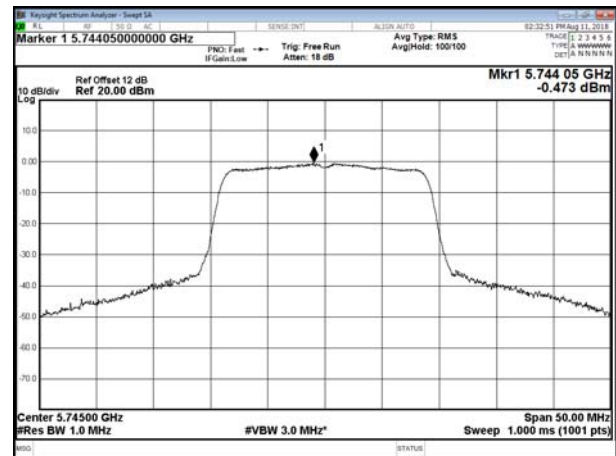




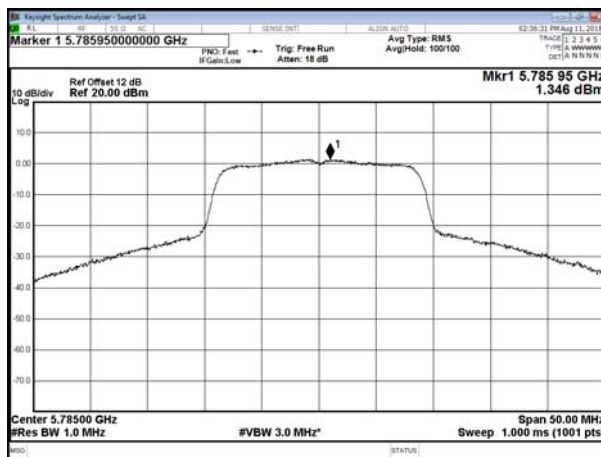
5.8G Band 4, ANT B  
Modulation Standard: 802.11a (6Mbps)  
CH149



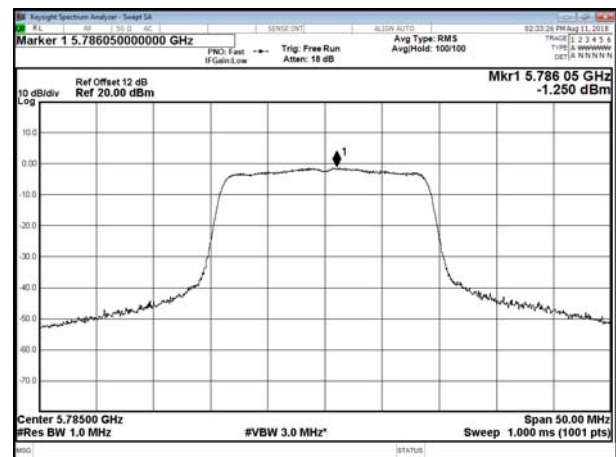
Modulation Standard: 802.11ac VHT20 (6.5Mbps)  
CH149



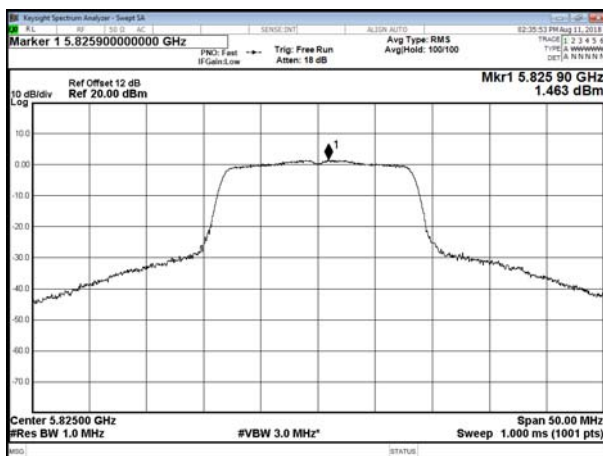
CH157



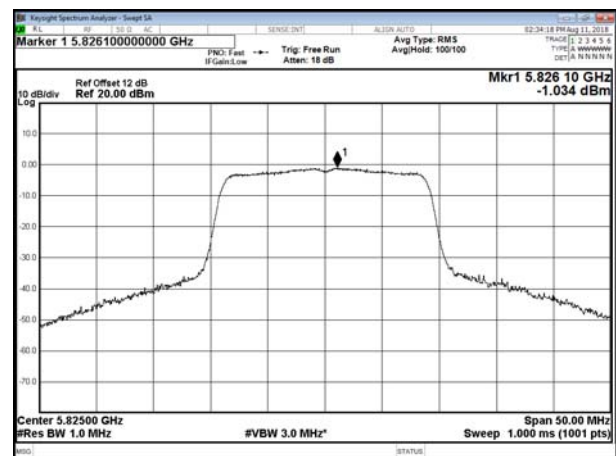
CH157



CH165

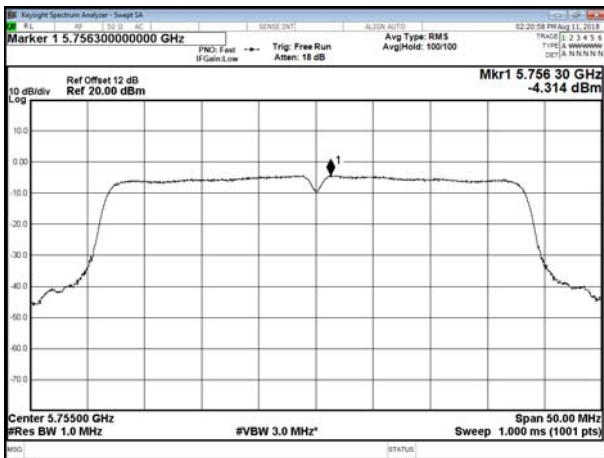


CH165

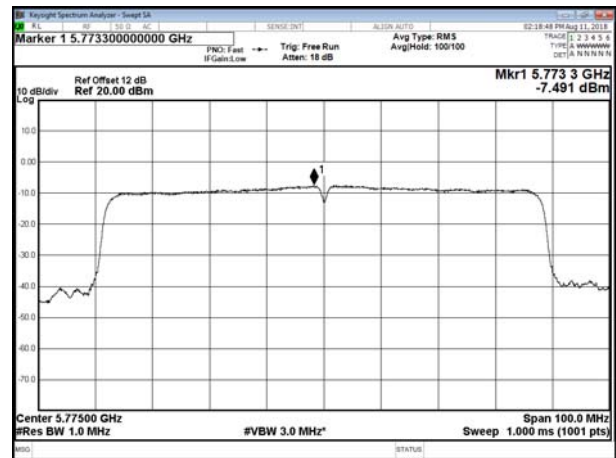




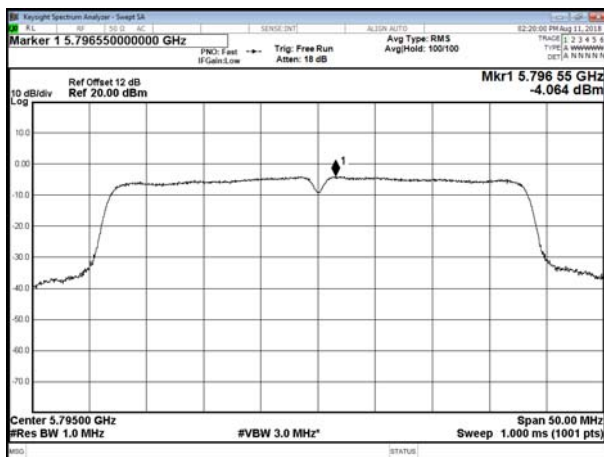
Modulation Standard: 802.11ac VHT40 (13.5Mbps)  
CH151



Modulation Standard: 802.11ac VHT80 (29.3Mbps)  
CH155



CH159



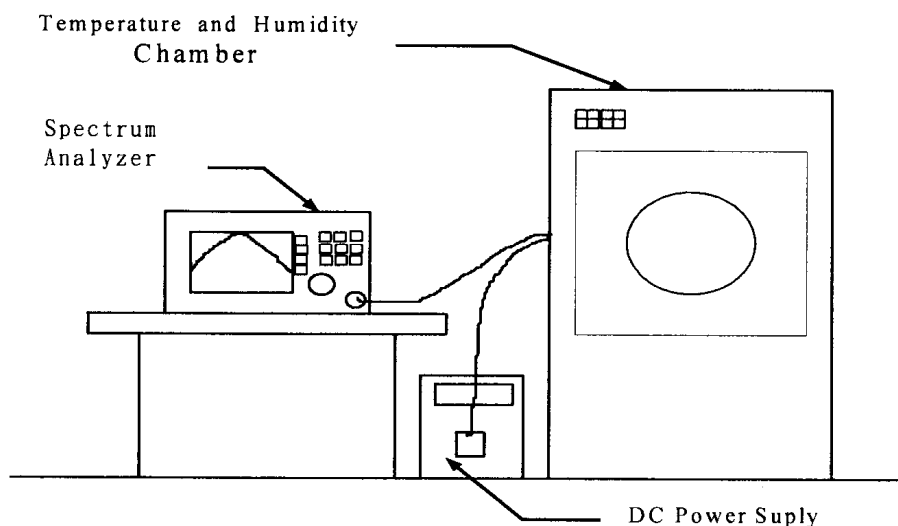


## 12. Frequency Stability

### 12.1. Test Procedure

1. The EUT was placed inside the Temperature and Humidity chamber.
2. The transmitter output was connected to spectrum analyzer.
3. Turn the EUT on and couple its output to a spectrum analyzer.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
6. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
7. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

### 12.2. Test Setup Layout





### 12.3. Test Result and Data

Temperature: 21°C

Humidity: 58%

Test Date: Nov. 01, 2018

| Operating frequency: 5220 MHz |              |           |          |           |          |           |          |
|-------------------------------|--------------|-----------|----------|-----------|----------|-----------|----------|
| Temp                          | Power supply | 2 minute  |          | 5 minute  |          | 10 minute |          |
| (°C)                          | (V)          | (MHz)     | (%)      | (MHz)     | (%)      | (MHz)     | (%)      |
| 55                            | 4.25         | 5220.2385 | 0.004569 | 5220.2354 | 0.004510 | 5220.2347 | 0.044923 |
|                               | 5.00         | 5220.2391 | 0.004580 | 5220.2351 | 0.004504 | 5220.2345 | 0.045134 |
|                               | 5.75         | 5220.2352 | 0.004506 | 5220.2344 | 0.004490 | 5220.2356 | 0.044176 |
| 40                            | 4.25         | 5220.2321 | 0.004446 | 5220.2257 | 0.004324 | 5220.2306 | 0.044674 |
|                               | 5.00         | 5220.2324 | 0.004452 | 5220.2324 | 0.004452 | 5220.2332 | 0.045057 |
|                               | 5.75         | 5220.2316 | 0.004437 | 5220.2332 | 0.004467 | 5220.2352 | 0.042414 |
| 30                            | 4.25         | 5220.2269 | 0.004347 | 5220.2202 | 0.004218 | 5220.2214 | 0.042874 |
|                               | 5.00         | 5220.2266 | 0.004341 | 5220.2214 | 0.004241 | 5220.2238 | 0.043180 |
|                               | 5.75         | 5220.2281 | 0.004370 | 5220.2234 | 0.004280 | 5220.2254 | 0.038966 |
| 20                            | 4.25         | 5220.2243 | 0.004297 | 5220.2124 | 0.004069 | 5220.2034 | 0.038333 |
|                               | 5.00         | 5220.2252 | 0.004314 | 5220.2151 | 0.004121 | 5220.2001 | 0.037471 |
|                               | 5.75         | 5220.2241 | 0.004293 | 5220.2089 | 0.004002 | 5220.1956 | 0.032682 |
| 10                            | 4.25         | 5220.1663 | 0.003186 | 5220.1455 | 0.002787 | 5220.1706 | 0.030900 |
|                               | 5.00         | 5220.1664 | 0.003188 | 5220.1374 | 0.002632 | 5220.1613 | 0.030402 |
|                               | 5.75         | 5220.1695 | 0.003247 | 5220.1365 | 0.002615 | 5220.1587 | 0.012625 |
| 0                             | 4.25         | 5220.0769 | 0.001473 | 5220.0653 | 0.001251 | 5220.0659 | 0.012529 |
|                               | 5.00         | 5220.0778 | 0.001490 | 5220.0666 | 0.001276 | 5220.0654 | 0.012433 |
|                               | 5.75         | 5220.0724 | 0.001387 | 5220.0658 | 0.001261 | 5220.0649 | 0.003621 |
| -10                           | 4.25         | 5220.0203 | 0.000389 | 5220.0201 | 0.000385 | 5220.0189 | 0.003678 |
|                               | 5.00         | 5220.0214 | 0.000410 | 5220.0196 | 0.000375 | 5220.0192 | 0.003506 |
|                               | 5.75         | 5220.0206 | 0.000395 | 5220.0184 | 0.000352 | 5220.0183 | 0.002375 |
| -20                           | 4.25         | 5220.0153 | 0.000293 | 5220.0136 | 0.000261 | 5220.0124 | 0.002395 |
|                               | 5.00         | 5220.0154 | 0.000295 | 5220.0142 | 0.000272 | 5220.0125 | 0.002510 |
|                               | 5.75         | 5220.0156 | 0.000299 | 5220.0150 | 0.000287 | 5220.0131 | 0.044923 |

Limit:

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.



## **13. Automatically Discontinue Transmission**

### **13.1.Limit of Automatically Discontinue Transmission**

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

### **13.2.Test Result of Automatically Discontinue Transmission**

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.