



# **FCC TEST REPORT**

**FCC ID: 2AAD8-U1835**

**On Behalf of**

**HAOLIYUAN (SHENZHEN) ELECTRONIC CO., LTD**

**802.11ac Wireless USB Adapter**

**Model No.: U1835**

Prepared for : HAO LIYUAN (SHENZHEN) ELECTRONIC CO., LTD  
Address : 3/F, Building A1, Junfeng Industrial Park Yonghe Road,  
Fuyong, Bao'an District, Shenzhen, Guangdong, China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.  
Address : Building i, No.2, Lixin Road, Fuyong Street, Bao'an  
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Report Number : T1881968 03  
Date of Receipt : December 24, 2018  
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Date of Report : February 21, 2019  
Version Number : REV0

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## TEST REPORT DECLARATION

Applicant : HAOLIYUAN (SHENZHEN) ELECTRONIC CO., LTD  
Address : 3/F, Building A1, Junfeng Industrial Park Yonghe Road, Fuyong,  
Bao'an District, Shenzhen, Guangdong, China  
Manufacturer : HAOLIYUAN (SHENZHEN) ELECTRONIC CO., LTD  
Address : 3/F, Building A1, Junfeng Industrial Park Yonghe Road, Fuyong,  
Bao'an District, Shenzhen, Guangdong, China  
EUT Description : 802.11ac Wireless USB Adapter  
(A) Model No. : U1835  
(B) Trademark : N/A

Measurement Standard Used:

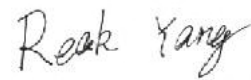
**FCC CFR Title 47 Part 15 Subpart E Section 15.407:2017**

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both conducted and radiated emissions. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

After the test, our opinion is that EUT compliance with the requirement of the above standards.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Tested by (name + signature).....: Reak Yang  
Project Engineer



Approved by (name + signature).....: Simple Guan  
Project Manager



Date of issue.....: February 21, 2019

**Revision History**

| Revision | Issue Date        | Revisions              | Revised By  |
|----------|-------------------|------------------------|-------------|
| 00       | February 21, 2019 | Initial released Issue | Simple Guan |

## 1 Test Summary

| Test Item                        | Section in CFR 47           | Result |
|----------------------------------|-----------------------------|--------|
| Antenna requirement              | 15.203                      | PASS   |
| AC Power Line Conducted Emission | 15.207                      | PASS   |
| Peak Transmit Power              | 15.407(a)(1)                | PASS   |
| Power Spectral Density           | 15.407(a)(1)                | PASS   |
| Undesirable Emission             | 15.407(b)(6), 15.205/15.209 | PASS   |
| Radiated Emission                | 15.205/15.209               | PASS   |
| Band Edge                        | 15.205                      | PASS   |
| Frequency Stability              | 15.407(g)                   | PASS   |

*Remark:*

*Pass: The EUT complies with the essential requirements in the standard.*

*Frequency Stability : The manufacturer stated in the user's manual.*

### 1.1 Measurement Uncertainty

| Test Item                        | Frequency Range | Measurement Uncertainty | Notes |
|----------------------------------|-----------------|-------------------------|-------|
| Radiated Emission                | 9kHz ~ 30MHz    | $\pm 4.34\text{dB}$     | (1)   |
| Radiated Emission                | 30MHz ~ 1000MHz | $\pm 4.24\text{dB}$     | (1)   |
| Radiated Emission                | 1GHz ~ 40GHz    | $\pm 4.68\text{dB}$     | (1)   |
| AC Power Line Conducted Emission | 0.15MHz ~ 30MHz | $\pm 3.45\text{dB}$     | (1)   |

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

Remark: Test according to ANSI C63.10:2013

## 2 General Information

### 2.1 General Description of EUT

|                     |                                                                                                                                                                                        |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Description         | : 802.11ac Wireless USB Adapter                                                                                                                                                        |
| Model Number        | : U1835                                                                                                                                                                                |
| Diff                | : N/A                                                                                                                                                                                  |
| Trademark           | : N/A                                                                                                                                                                                  |
| Test Voltage        | : DC 5V by USB port                                                                                                                                                                    |
| Operation frequency | : 802.11a/n(HT20)/ac(HT20): 5180~5240MHz; 5745~5825MHz<br>802.11n(HT40)/ac(HT40): 5190~5230MHz; 5755~5795MHz<br>802.11ac(HT80): 5210MHz, 5775MHz                                       |
| Channel separation: | : 802.11a/n(HT20)/ac(HT20): 20MHz;<br>802.11n(HT40)/ac(HT40): 40MHz<br>802.11ac(HT80): 80MHz                                                                                           |
| Modulation type     | : CCK/OFDM/DBPSK/DAPSK                                                                                                                                                                 |
| Antenna Type        | : ANT1: PCB Antenna, Maximum Gain is 3.0dBi<br>ANT2: PCB Antenna, Maximum Gain is 3.0dBi<br>ANT3: PCB Antenna, Maximum Gain is 3.0dBi<br>ANT AUX: PCB Antenna ,Receiving function only |
| Note                | : Between ANT1, ANT2 and ANT3, only one antenna randomly transmits 5G Wi-Fi signals. The product does not have MIMO technology. And ANT AUX only has the function of receiving.        |
| Software version    | : 1030.28                                                                                                                                                                              |
| Hardware version    | : V1.1                                                                                                                                                                                 |

## 2.2 Test mode

|                                                                                                                                                                                                                                              |                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| Transmitting mode                                                                                                                                                                                                                            | Keep the EUT in transmitting with modulation.<br>EUT was test with 99% duty cycle at its maximum power control level. |
| <i>Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.</i> |                                                                                                                       |

|         |             |
|---------|-------------|
| Channel | Power level |
| Lowest  | 5dBm        |
| Middle  | 5dBm        |
| Highest | 5dBm        |

## 2.3 Test Facility

Shenzhen Alpha Product Testing Co., Ltd

Building i, No.2, Lixin Road, Fuyong Street, Bao'an District, 518103, Shenzhen, Guangdong, China

June 21, 2018 File on Federal Communication Commission

Registration Number: 293961

July 25, 2017 Certificated by IC

Registration Number: 12135A

## 2.4 Accessories of Device (EUT)

|              |   |   |
|--------------|---|---|
| Accessories1 | : | / |
| Manufacturer | : | / |
| Model        | : | / |
| Power supply | : | / |

## 2.5 Tested Supporting System Details

| No. | Description | Manufacturer | Model | Serial Number | Certification or DOC |
|-----|-------------|--------------|-------|---------------|----------------------|
| 1   | Notebook    | ACER         | ZQT   | N/A           | DOC                  |

### 3 Test Instruments list

| Equipment              | Manufacture   | Model No.               | Serial No.        | Last cal.  | Cal Interval |
|------------------------|---------------|-------------------------|-------------------|------------|--------------|
| 3m Semi-Anechoic       | ETS-LINDGREN  | N/A                     | SEL0017           | 2018.09.21 | 1Year        |
| Spectrum analyzer      | Agilent       | E4407B                  | MY46185649        | 2018.09.21 | 1Year        |
| Receiver               | R&S           | ESCI                    | 1166.5950K03-1011 | 2018.09.21 | 1Year        |
| Receiver               | R&S           | ESCI                    | 101202            | 2018.09.21 | 1Year        |
| Bilog Antenna          | Schwarzbeck   | VULB 9168               | VULB9168-438      | 2018.04.13 | 2Year        |
| Horn Antenna           | EMCO          | 3115                    | 640201028-06      | 2018.04.13 | 2Year        |
| Active Loop Antenna    | Beijing Daze  | ZN30900A                | SEL0097           | 2018.04.13 | 2Year        |
| Cable                  | Resenberger   | N/A                     | No.1              | 2018.09.21 | 1Year        |
| Cable                  | SCHWARZBECK   | N/A                     | No.2              | 2018.09.21 | 1Year        |
| Cable                  | SCHWARZBECK   | N/A                     | No.3              | 2018.09.21 | 1Year        |
| Pre-amplifier          | Schwarzbeck   | BBV9743                 | 9743-019          | 2018.09.21 | 1Year        |
| Pre-amplifier          | R&S           | AFS33-18002650-30-8P-44 | SEL0080           | 2018.09.21 | 1Year        |
| Temperature controller | Terchy        | MHQ                     | 120               | 2018.09.21 | 1Year        |
| L.I.S.N.#1             | Schwarzbeck   | NSLK8126                | 8126466           | 2018.09.21 | 1Year        |
| L.I.S.N.#2             | ROHDE&SCHWARZ | ENV216                  | 101043            | 2018.09.21 | 1 Year       |
| 20db Attenuator        | ICPROBING     | IATS1                   | 82347             | 2018.09.21 | 1 Year       |
| Horn Antenna           | SCHWARZBECK   | BBHA 9170               | BBHA 9170294      | 2018.04.13 | 2 Year       |
| Power Meter            | Anritsu       | ML2487A                 | 6K00001491        | 2018.09.21 | 1 Year       |

## 4 Test results and Measurement Data

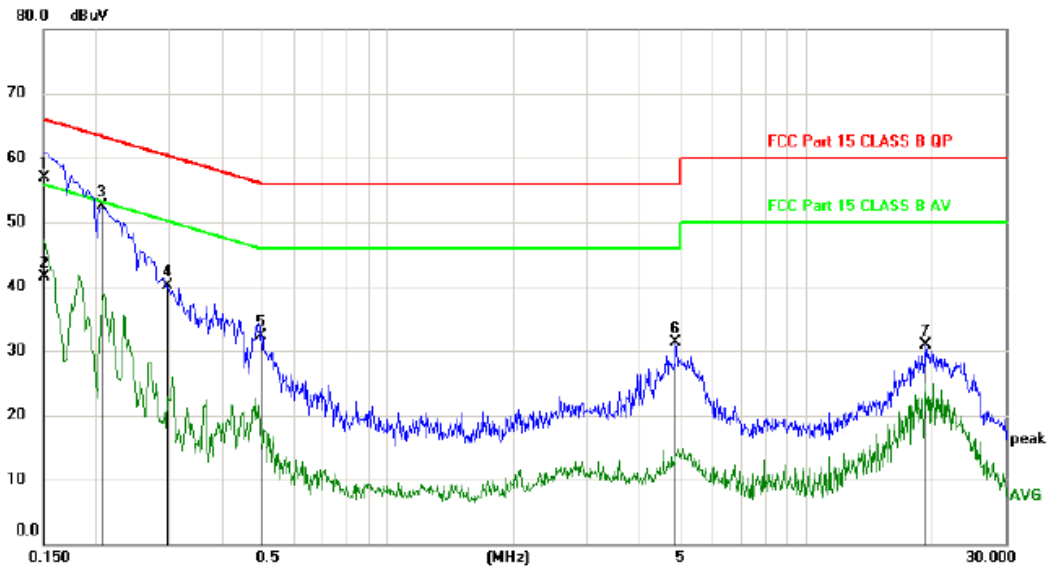
### 4.1 Conducted Emissions

|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |           |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| Test Requirement:                                | FCC Part15 C Section 15.207                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |              |           |
| Test Method:                                     | ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |              |           |
| Test Frequency Range:                            | 150KHz to 30MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |           |
| Class / Severity:                                | Class B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |              |           |
| Receiver setup:                                  | RBW=9KHz, VBW=30KHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |              |           |
| Limit:                                           | Frequency range (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Limit (dBuV) |           |
|                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Quasi-peak   | Average   |
|                                                  | 0.15-0.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 66 to 56*    | 56 to 46* |
|                                                  | 0.5-5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 56           | 46        |
|                                                  | 5-30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 60           | 50        |
| * Decreases with the logarithm of the frequency. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |              |           |
| Test procedure                                   | The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.                                                                                                                                                                                                                                                                                                                                                                                       |              |           |
| Test setup:                                      | <div><p style="text-align: center;"><b>Reference Plane</b></p><p>The diagram illustrates the test setup. A horizontal line at the top represents the <b>Reference Plane</b>. Below it, on the left, is a box labeled <b>AUX Equipment</b> connected to a <b>LISN</b> box. To the right of <b>AUX Equipment</b> is a box labeled <b>E.U.T</b> (Equipment Under Test). A vertical double-headed arrow between the <b>Reference Plane</b> and the <b>AUX Equipment</b> box is labeled <b>40cm</b>. A diagonal line connects the <b>Reference Plane</b> to the <b>E.U.T</b> box, labeled <b>80cm</b>. To the right of the <b>E.U.T</b> box is another <b>LISN</b> box, which is connected to a <b>Filter</b> box, which in turn is connected to <b>AC power</b>. Below the <b>Filter</b> box is a box labeled <b>EMI Receiver</b> connected to the <b>LISN</b> box. The entire setup is on a <b>Test table/Insulation plane</b>.</p><p><i>Remark:</i><br/>E.U.T: Equipment Under Test<br/>LISN: Line Impedance Stabilization Network<br/>Test table height=0.8m</p></div> |              |           |
| Test results:                                    | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |              |           |

#### Measurement Data

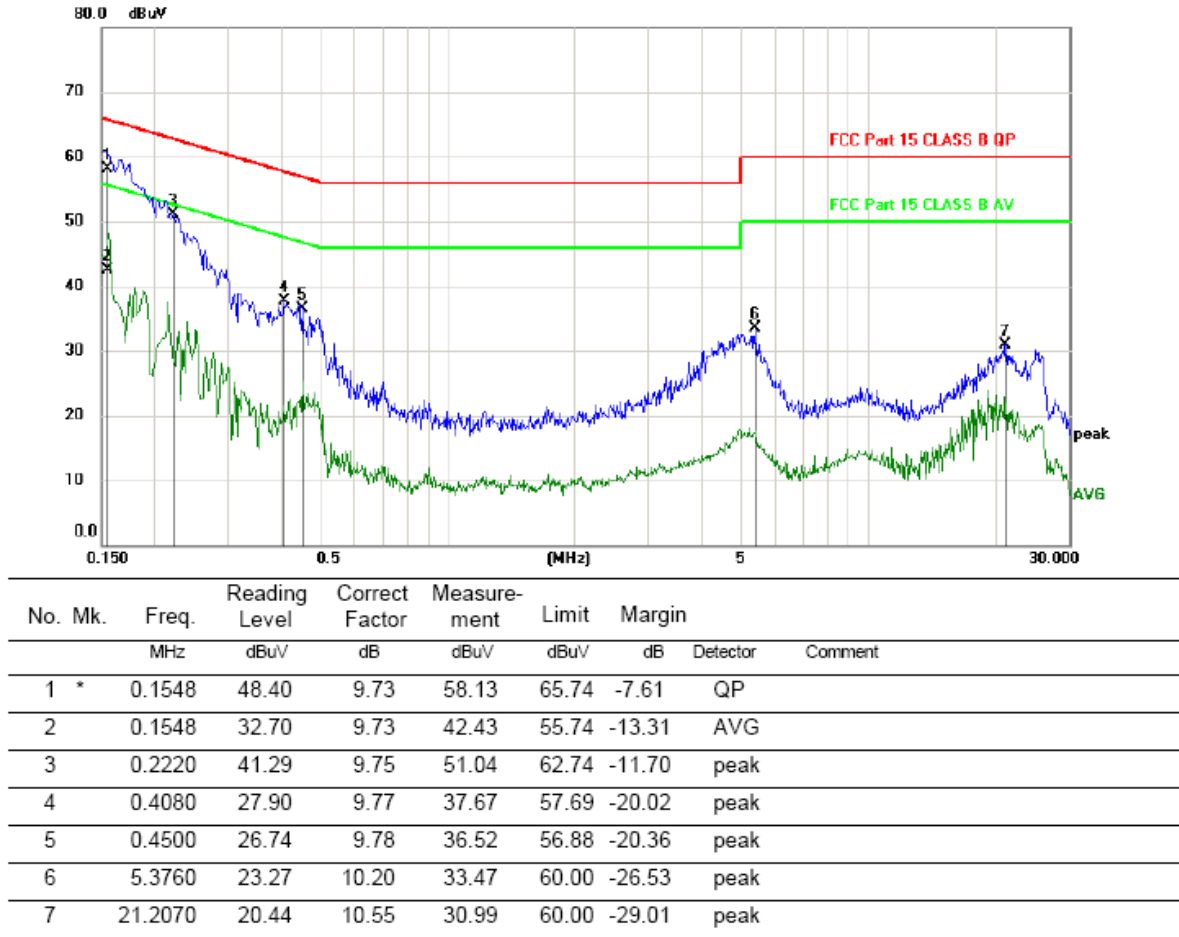
An initial pre-scan was performed on the line and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Line:



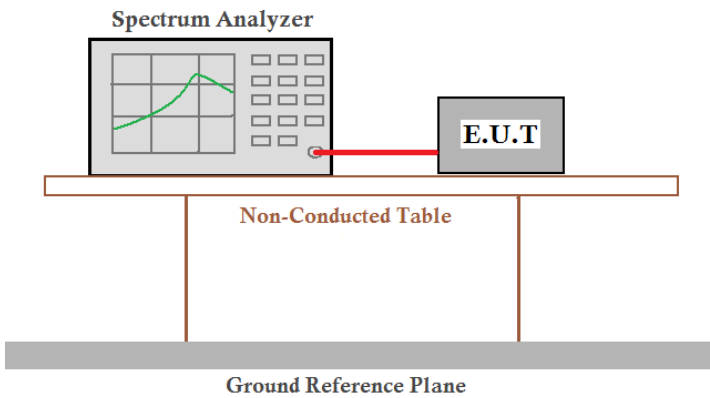
| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Margin<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|--------------|----------|---------|
| 1   | *   | 0.1500       | 47.16                    | 9.73                    | 56.89                    | 66.00         | -9.11        | QP       |         |
| 2   |     | 0.1500       | 31.81                    | 9.73                    | 41.54                    | 56.00         | -14.46       | AVG      |         |
| 3   |     | 0.2070       | 42.68                    | 9.74                    | 52.42                    | 63.32         | -10.90       | peak     |         |
| 4   |     | 0.2940       | 30.39                    | 9.76                    | 40.15                    | 60.41         | -20.26       | peak     |         |
| 5   |     | 0.4980       | 22.44                    | 9.78                    | 32.22                    | 56.03         | -23.81       | peak     |         |
| 6   |     | 4.8750       | 21.09                    | 10.18                   | 31.27                    | 56.00         | -24.73       | peak     |         |
| 7   |     | 19.2360      | 20.37                    | 10.49                   | 30.86                    | 60.00         | -29.14       | peak     |         |

## Neutral:



NOTE: Test Result 802.11 n/HT40 (High Channel, ANT1), AC 120V/60Hz (Worst Case)

## 4.2 Emission Bandwidth and 99% Occupied Bandwidth

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 E Section 15.407                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Test Method:      | KDB 789033 D02 General UNII Test Procedures New Rules v02r01                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Limit:            | N/A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green curve, is connected to an E.U.T. (Equipment Under Test) box by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a 'Non-Conducted Table', which is a rectangular platform supported by two vertical legs. Below this table is a 'Ground Reference Plane', represented by a thick grey horizontal bar.</p> |
| Test procedure:   | According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01.                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Test results:     | Pass<br><i>Note: Only record the worst case data of ANT 1.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

ANT1:

Measurement Data:

Band 1 (5150-5250 MHz):

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                |                 | 26dB Occupied Bandwidth (MHz) |                |                 |
|---------|-----------------|------------------------------|----------------|-----------------|-------------------------------|----------------|-----------------|
|         |                 | 802.11a                      | 802.11n (HT20) | 802.11ac (HT20) | 802.11a                       | 802.11n (HT20) | 802.11ac (HT20) |
| 36      | 5180.00         | 16.788                       | 17.850         | 17.910          | 21.93                         | 22.18          | 22.19           |
| 40      | 5200.00         | 16.821                       | 17.885         | 17.883          | 22.04                         | 22.19          | 22.02           |
| 48      | 5240.00         | 16.764                       | 17.850         | 17.890          | 22.22                         | 22.11          | 22.51           |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                | 26dB Occupied Bandwidth (MHz) |                |
|---------|-----------------|------------------------------|----------------|-------------------------------|----------------|
|         |                 | 802.11n(HT40)                | 802.11ac(HT40) | 802.11n(HT40)                 | 802.11ac(HT40) |
| 38      | 5190.00         | 36.476                       | 36.512         | 44.13                         | 43.57          |
| 46      | 5230.00         | 36.563                       | 36.477         | 43.79                         | 43.78          |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26dB Occupied Bandwidth (MHz) |
|---------|-----------------|------------------------------|-------------------------------|
|         |                 | 802.11ac(HT80)               | 802.11ac(HT80)                |
| 42      | 5210.00         | 75.756                       | 83.02                         |

Band 4 (5725-5850 MHz):

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                |                 | 6dB Occupied Bandwidth (MHz) |                |                 |
|---------|-----------------|------------------------------|----------------|-----------------|------------------------------|----------------|-----------------|
|         |                 | 802.11a                      | 802.11n (HT20) | 802.11ac (HT20) | 802.11a                      | 802.11n (HT20) | 802.11ac (HT20) |
| 149     | 5745.00         | 17.679                       | 17.915         | 18.197          | 16.37                        | 17.77          | 17.57           |
| 157     | 5785.00         | 16.539                       | 17.704         | 17.715          | 16.39                        | 17.59          | 17.59           |
| 165     | 5825.00         | 16.834                       | 17.792         | 17.834          | 16.38                        | 17.62          | 17.33           |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                | 6dB Occupied Bandwidth (MHz) |                |
|---------|-----------------|------------------------------|----------------|------------------------------|----------------|
|         |                 | 802.11n(HT40)                | 802.11ac(HT40) | 802.11n(HT40)                | 802.11ac(HT40) |
| 151     | 5755.00         | 36.464                       | 36.492         | 35.93                        | 36.35          |
| 159     | 5795.00         | 36.196                       | 36.196         | 36.04                        | 35.77          |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 6dB Occupied Bandwidth (MHz) |
|---------|-----------------|------------------------------|------------------------------|
|         |                 | 802.11ac(HT80)               | 802.11ac(HT80)               |
| 155     | 5775.00         | 75.420                       | 75.39                        |

Test plots as followed:

ANT1: Band I (5150 - 5250 MHz)

802.11a mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)

802.11n(HT20) mode



Channel 36 (5180MHz)

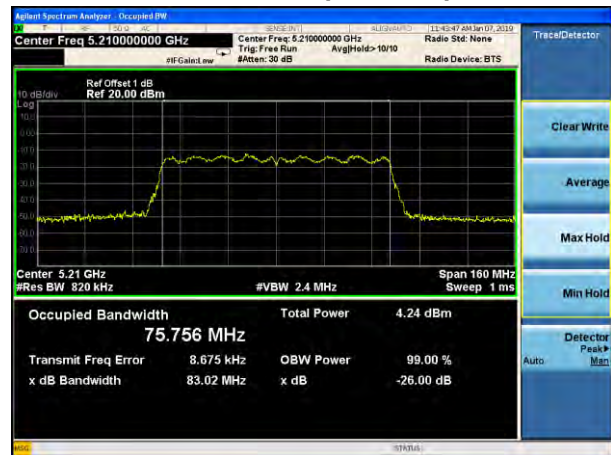
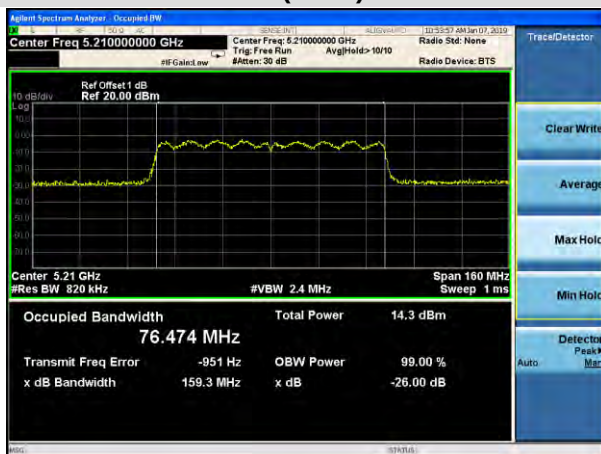


Channel 40 (5200MHz)



Channel 48 (5240MHz)

**802.11ac(HT20) mode****Channel 36 (5180MHz)****Channel 40 (5200MHz)****Channel 48 (5240MHz)**

**802.11n(HT40) mode****Channel 38 (5190MHz)****802.11ac(HT40) mode****Channel 38 (5190MHz)****Channel 46 (5230MHz)****Channel 46 (5230MHz)****802.11ac(HT80) mode****Channel 40 (5210MHz)**

## ANT1: Band 4 (5725 - 5850 MHz)

## 802.11a mode



Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)

## 802.11n(HT20) mode



Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)

**802.11ac(HT20) mode****Channel 149 (5745MHz)****Channel 157 (5785MHz)****Channel 165 (5825MHz)**

**802.11n(HT40) mode****Channel 151 (5755MHz)****802.11ac(HT40) mode****Channel 151 (5755MHz)****Channel 159 (5795MHz)****Channel 159 (5795MHz)****802.11ac(HT80) mode****Channel 155(5775MHz)**

ANT2:

Measurement Data:

Band 1 (5150-5250 MHz):

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                |                 | 26dB Occupied Bandwidth (MHz) |                |                 |
|---------|-----------------|------------------------------|----------------|-----------------|-------------------------------|----------------|-----------------|
|         |                 | 802.11a                      | 802.11n (HT20) | 802.11ac (HT20) | 802.11a                       | 802.11n (HT20) | 802.11ac (HT20) |
| 36      | 5180.00         | 16.788                       | 17.850         | 17.910          | 21.93                         | 22.18          | 22.19           |
| 40      | 5200.00         | 16.821                       | 17.885         | 17.883          | 22.04                         | 22.19          | 22.02           |
| 48      | 5240.00         | 16.764                       | 17.850         | 17.890          | 22.22                         | 22.11          | 22.51           |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                | 26dB Occupied Bandwidth (MHz) |                |
|---------|-----------------|------------------------------|----------------|-------------------------------|----------------|
|         |                 | 802.11n(HT40)                | 802.11ac(HT40) | 802.11n(HT40)                 | 802.11ac(HT40) |
| 38      | 5190.00         | 36.476                       | 36.512         | 44.13                         | 43.57          |
| 46      | 5230.00         | 36.563                       | 36.477         | 43.79                         | 43.78          |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26dB Occupied Bandwidth (MHz) |
|---------|-----------------|------------------------------|-------------------------------|
|         |                 | 802.11ac(HT80)               | 802.11ac(HT80)                |
| 42      | 5210.00         | 75.756                       | 83.02                         |

Band 4 (5725-5850 MHz):

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                |                 | 6dB Occupied Bandwidth (MHz) |                |                 |
|---------|-----------------|------------------------------|----------------|-----------------|------------------------------|----------------|-----------------|
|         |                 | 802.11a                      | 802.11n (HT20) | 802.11ac (HT20) | 802.11a                      | 802.11n (HT20) | 802.11ac (HT20) |
| 149     | 5745.00         | 17.679                       | 17.915         | 18.197          | 16.37                        | 17.77          | 17.57           |
| 157     | 5785.00         | 16.539                       | 17.704         | 17.715          | 16.39                        | 17.59          | 17.59           |
| 165     | 5825.00         | 16.834                       | 17.792         | 17.834          | 16.38                        | 17.62          | 17.33           |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                | 6dB Occupied Bandwidth (MHz) |                |
|---------|-----------------|------------------------------|----------------|------------------------------|----------------|
|         |                 | 802.11n(HT40)                | 802.11ac(HT40) | 802.11n(HT40)                | 802.11ac(HT40) |
| 151     | 5755.00         | 36.464                       | 36.492         | 35.93                        | 36.35          |
| 159     | 5795.00         | 36.196                       | 36.196         | 36.04                        | 35.77          |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 6dB Occupied Bandwidth (MHz) |
|---------|-----------------|------------------------------|------------------------------|
|         |                 | 802.11ac(HT80)               | 802.11ac(HT80)               |
| 155     | 5775.00         | 75.420                       | 75.39                        |

Test plots as followed:

ANT2: Band I (5150 - 5250 MHz)

802.11a mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)

802.11n(HT20) mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)

## 802.11ac(HT20) mode



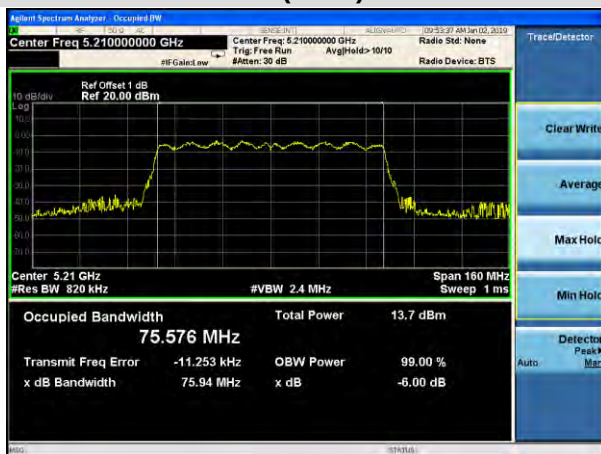
## Channel 36 (5180MHz)



## Channel 40 (5200MHz)



## Channel 48 (5240MHz)

**802.11n(HT40) mode****Channel 38 (5190MHz)****802.11ac(HT40) mode****Channel 38 (5190MHz)****Channel 46 (5230MHz)****Channel 46 (5230MHz)****802.11ac(HT80) mode****Channel 40 (5210MHz)**

## ANT2: Band 4 (5725 - 5850 MHz)

## 802.11a mode



Channel 149 (5745MHz)

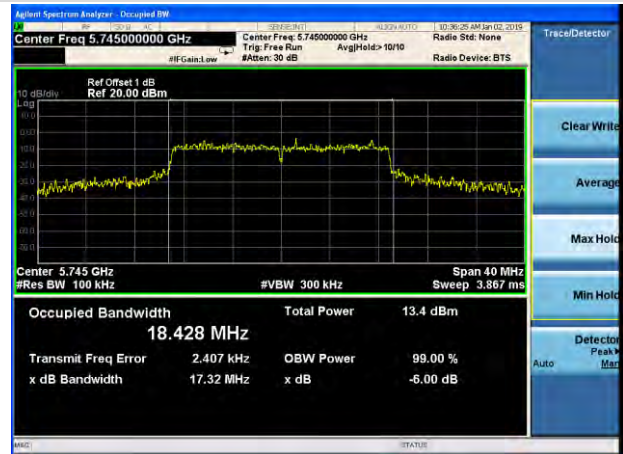


Channel 157 (5785MHz)



Channel 165 (5825MHz)

## 802.11n(HT20) mode



Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)

**802.11ac(HT20) mode****Channel 149 (5745MHz)****Channel 157 (5785MHz)****Channel 165 (5825MHz)**

**802.11n(HT40) mode****Channel 151 (5755MHz)****802.11ac(HT40) mode****Channel 151 (5755MHz)****Channel 159 (5795MHz)****Channel 159 (5795MHz)****802.11ac(HT80) mode****Channel 155(5775MHz)**

ANT3:

Measurement Data:

Band 1 (5150-5250 MHz):

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                |                 | 26dB Occupied Bandwidth (MHz) |                |                 |
|---------|-----------------|------------------------------|----------------|-----------------|-------------------------------|----------------|-----------------|
|         |                 | 802.11a                      | 802.11n (HT20) | 802.11ac (HT20) | 802.11a                       | 802.11n (HT20) | 802.11ac (HT20) |
| 36      | 5180.00         | 16.788                       | 17.850         | 17.910          | 21.93                         | 22.18          | 22.19           |
| 40      | 5200.00         | 16.821                       | 17.885         | 17.883          | 22.04                         | 22.19          | 22.02           |
| 48      | 5240.00         | 16.764                       | 17.850         | 17.890          | 22.22                         | 22.11          | 22.51           |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                | 26dB Occupied Bandwidth (MHz) |                |
|---------|-----------------|------------------------------|----------------|-------------------------------|----------------|
|         |                 | 802.11n(HT40)                | 802.11ac(HT40) | 802.11n(HT40)                 | 802.11ac(HT40) |
| 38      | 5190.00         | 36.476                       | 36.512         | 44.13                         | 43.57          |
| 46      | 5230.00         | 36.563                       | 36.477         | 43.79                         | 43.78          |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 26dB Occupied Bandwidth (MHz) |
|---------|-----------------|------------------------------|-------------------------------|
|         |                 | 802.11ac(HT80)               | 802.11ac(HT80)                |
| 42      | 5210.00         | 75.756                       | 83.02                         |

Band 4 (5725-5850 MHz):

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                |                 | 6dB Occupied Bandwidth (MHz) |                |                 |
|---------|-----------------|------------------------------|----------------|-----------------|------------------------------|----------------|-----------------|
|         |                 | 802.11a                      | 802.11n (HT20) | 802.11ac (HT20) | 802.11a                      | 802.11n (HT20) | 802.11ac (HT20) |
| 149     | 5745.00         | 17.679                       | 17.915         | 18.197          | 16.37                        | 17.77          | 17.57           |
| 157     | 5785.00         | 16.539                       | 17.704         | 17.715          | 16.39                        | 17.59          | 17.59           |
| 165     | 5825.00         | 16.834                       | 17.792         | 17.834          | 16.38                        | 17.62          | 17.33           |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) |                | 6dB Occupied Bandwidth (MHz) |                |
|---------|-----------------|------------------------------|----------------|------------------------------|----------------|
|         |                 | 802.11n(HT40)                | 802.11ac(HT40) | 802.11n(HT40)                | 802.11ac(HT40) |
| 151     | 5755.00         | 36.464                       | 36.492         | 35.93                        | 36.35          |
| 159     | 5795.00         | 36.196                       | 36.196         | 36.04                        | 35.77          |

| CH. No. | Frequency (MHz) | 99% Occupied Bandwidth (MHz) | 6dB Occupied Bandwidth (MHz) |
|---------|-----------------|------------------------------|------------------------------|
|         |                 | 802.11ac(HT80)               | 802.11ac(HT80)               |
| 155     | 5775.00         | 75.420                       | 75.39                        |

Test plots as followed:

ANT3: Band I (5150 - 5250 MHz)

802.11a mode



Channel 36 (5180MHz)

802.11n(HT20) mode



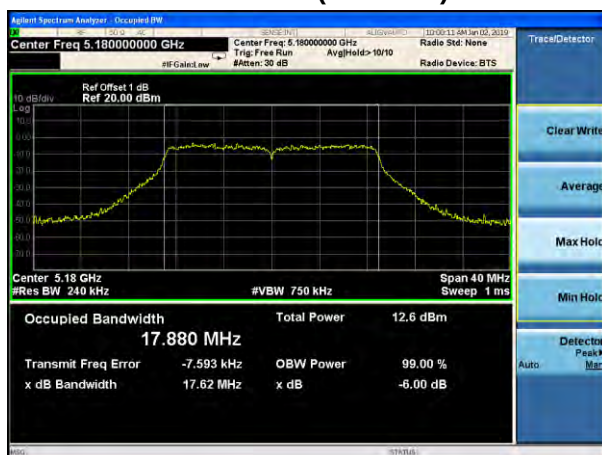
Channel 36 (5180MHz)



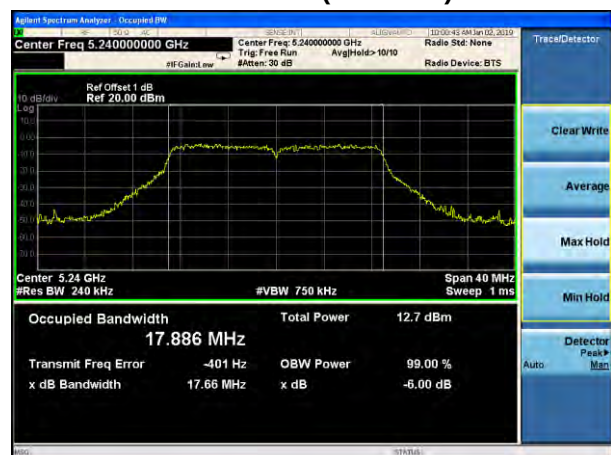
Channel 40 (5200MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)



Channel 48 (5240MHz)

**802.11ac(HT20) mode****Channel 36 (5180MHz)****Channel 40 (5200MHz)****Channel 48 (5240MHz)**

## 802.11n(HT40) mode



Channel 38 (5190MHz)

## 802.11ac(HT40) mode



Channel 38 (5190MHz)

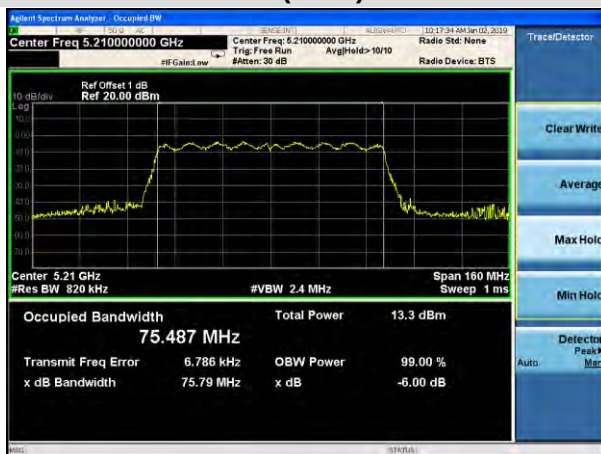


Channel 46 (5230MHz)



Channel 46 (5230MHz)

## 802.11ac(HT80) mode



Channel 40 (5210MHz)

## ANT3: Band 4 (5725 - 5850 MHz)

## 802.11a mode



Channel 149 (5745MHz)

## 802.11n(HT20) mode



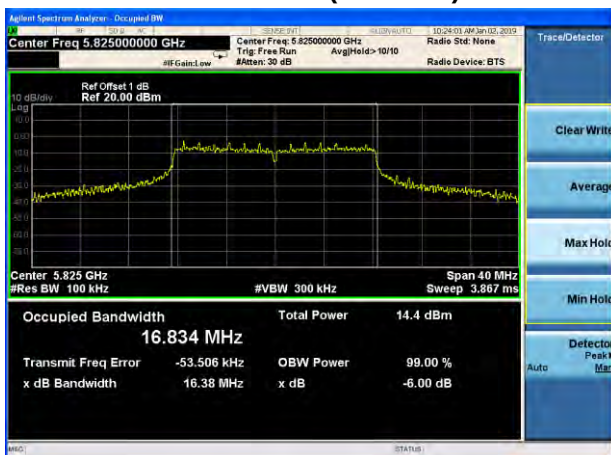
Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)



Channel 165 (5825MHz)

## 802.11ac(HT20) mode



Channel 149 (5745MHz)



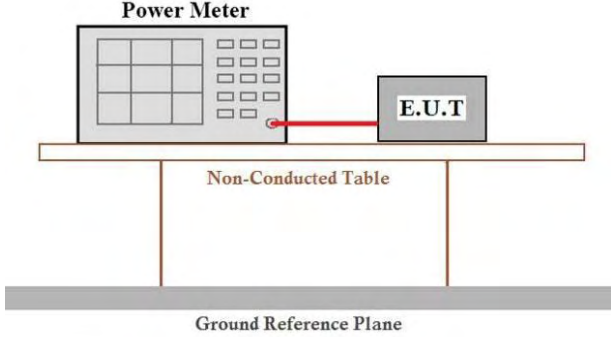
Channel 157 (5785MHz)



Channel 165 (5825MHz)

**802.11n(HT40) mode****Channel 151 (5755MHz)****802.11ac(HT40) mode****Channel 151 (5755MHz)****Channel 159 (5795MHz)****Channel 159 (5795MHz)****802.11ac(HT80) mode****Channel 155(5775MHz)**

### 4.3 Peak Transmit Power

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 E Section 15.407                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Test Method:      | KDB 789033 D02 General UNII Test Procedures New Rules v02r01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Limit:            | For the band 5.15-5.25GHz, 5.25-5.35GHz, 5.47-5.725GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 250mW.<br>For the band 5.725-5.85GHz, the maximum conducted output power over the frequency bands of operation shall not exceed 1W.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Test setup:       |  <p>The diagram illustrates the test setup. A Power Meter is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Power Meter and the E.U.T. are placed on a Non-Conducted Table. The table is supported by two vertical legs. Below the table is a Ground Reference Plane.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test procedure:   | <p><b>Measurement using an RF average power meter</b></p> <ul style="list-style-type: none"> <li>(i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied <ul style="list-style-type: none"> <li>a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle.</li> <li>b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level.</li> <li>c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.</li> </ul> </li> <li>(ii) If the transmitter does not transmit continuously, measure the duty cycle, <math>x</math>, of the transmitter output signal as described in section B).</li> <li>(iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter.</li> <li>(iv) Adjust the measurement in dBm by adding <math>10 \log(1/x)</math> where <math>x</math> is the duty cycle (e.g., <math>10 \log(1/0.25)</math> if the duty cycle is 25 percent).</li> </ul> |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

**Measurement Data****Band 1 (5150-5250 MHz)**

| Test Mode        | Channel | Frequency (MHz) | Measured Power (dBm) |      |      | Duty Factor (dB) | Sum Power (dBm) | Max. Limit (dBm) | Result |
|------------------|---------|-----------------|----------------------|------|------|------------------|-----------------|------------------|--------|
|                  |         |                 | ANT1                 | ANT2 | ANT3 |                  |                 |                  |        |
| 802.11a          | 36      | 5180.00         | 4.68                 | 4.45 | 4.39 | 0.41             | /               | 23.98            | Pass   |
|                  | 40      | 5200.00         | 4.43                 | 4.37 | 4.31 | 0.41             | /               | 23.98            | Pass   |
|                  | 48      | 5240.00         | 4.64                 | 4.34 | 4.41 | 0.41             | /               | 23.98            | Pass   |
| 802.11n (HT20)   | 36      | 5180.00         | 4.64                 | 4.59 | 4.21 | 0.13             | /               | 23.98            | Pass   |
|                  | 40      | 5200.00         | 3.73                 | 3.71 | 3.65 | 0.13             | /               | 23.98            | Pass   |
|                  | 48      | 5240.00         | 3.76                 | 3.99 | 3.96 | 0.13             | /               | 23.98            | Pass   |
| 802.11ac (HT20)  | 36      | 5180.00         | 3.24                 | 3.22 | 3.26 | 0.66             | /               | 23.98            | Pass   |
|                  | 40      | 5200.00         | 3.43                 | 3.48 | 3.45 | 0.66             | /               | 23.98            | Pass   |
|                  | 48      | 5240.00         | 3.63                 | 3.85 | 3.92 | 0.66             | /               | 23.98            | Pass   |
| 802.11n (HT40)   | 38      | 5190.00         | 3.55                 | 3.46 | 3.52 | 0.86             | /               | 23.98            | Pass   |
|                  | 46      | 5230.00         | 3.83                 | 3.89 | 3.89 | 0.86             | /               | 23.98            | Pass   |
| 802.11 ac (HT40) | 38      | 5190.00         | 3.55                 | 3.55 | 3.51 | 0.71             | /               | 23.98            | Pass   |
|                  | 46      | 5230.00         | 3.46                 | 3.40 | 3.48 | 0.71             | /               | 23.98            | Pass   |
| 802.11ac (HT80)  | 42      | 5210.00         | 3.24                 | 3.24 | 3.15 | 1.30             | /               | 23.98            | Pass   |

Note:

1, Sum Power = Measured Power + Duty Factor

2, Duty Factor =  $10 \log (1/\text{Duty Cycle})$

**Band 4 (5725 - 5850)**

| Test Mode        | Channel | Frequency (MHz) | Measured Power (dBm) |      |      | Duty Factor (dB) | Sum Power (dBm) | Max. Limit (dBm) | Result |
|------------------|---------|-----------------|----------------------|------|------|------------------|-----------------|------------------|--------|
|                  |         |                 | ANT1                 | ANT2 | ANT3 |                  |                 |                  |        |
| 802.11a          | 149     | 5745.00         | 4.53                 | 4.50 | 4.54 | 0.41             | /               | 30.00            | Pass   |
|                  | 157     | 5785.00         | 4.47                 | 4.44 | 4.49 | 0.41             | /               | 30.00            | Pass   |
|                  | 165     | 5825.00         | 4.34                 | 4.42 | 4.31 | 0.41             | /               | 30.00            | Pass   |
| 802.11n (HT20)   | 149     | 5745.00         | 3.34                 | 3.33 | 3.44 | 0.13             | /               | 30.00            | Pass   |
|                  | 157     | 5785.00         | 3.76                 | 3.82 | 3.74 | 0.13             | /               | 30.00            | Pass   |
|                  | 165     | 5825.00         | 3.56                 | 3.65 | 3.53 | 0.13             | /               | 30.00            | Pass   |
| 802.11ac (HT20)  | 149     | 5745.00         | 3.33                 | 3.35 | 3.43 | 0.66             | /               | 30.00            | Pass   |
|                  | 157     | 5785.00         | 3.44                 | 3.38 | 3.45 | 0.66             | /               | 30.00            | Pass   |
|                  | 165     | 5825.00         | 3.42                 | 3.40 | 3.39 | 0.66             | /               | 30.00            | Pass   |
| 802.11n (HT40)   | 151     | 5755.00         | 3.02                 | 3.09 | 3.98 | 0.86             | /               | 30.00            | Pass   |
|                  | 159     | 5795.00         | 3.88                 | 3.90 | 3.88 | 0.86             | /               | 30.00            | Pass   |
| 802.11 ac (HT40) | 151     | 5755.00         | 3.31                 | 3.31 | 3.40 | 0.71             | /               | 30.00            | Pass   |
|                  | 159     | 5795.00         | 3.38                 | 3.47 | 3.38 | 0.71             | /               | 30.00            | Pass   |
| 802.11ac (HT80)  | 155     | 5775.00         | 3.32                 | 3.31 | 3.36 | 1.30             | /               | 30.00            | Pass   |

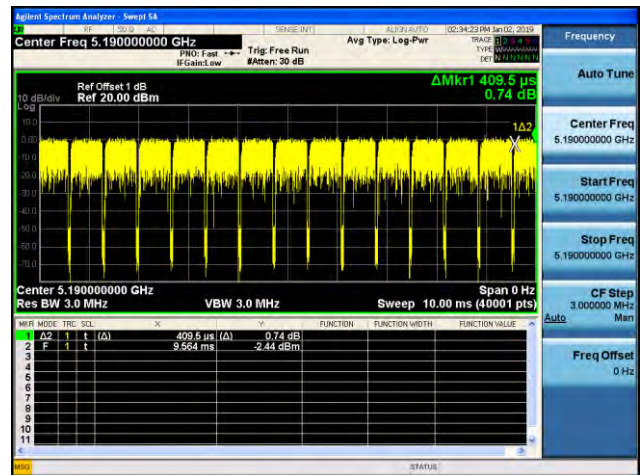
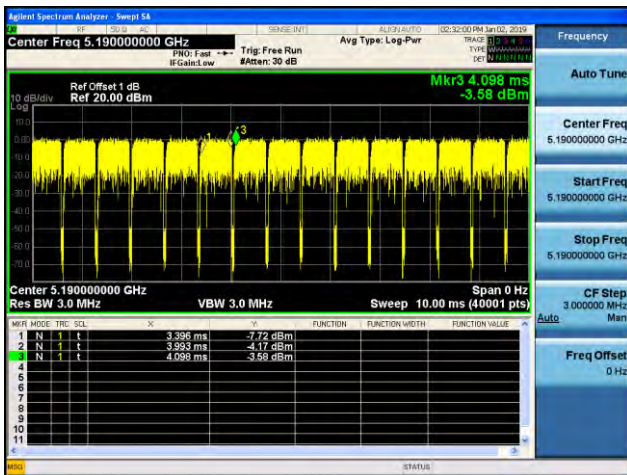
Note:

1, Sum Power = Measured Power + Duty Factor

2, Duty Factor = 10 log (1/Duty Cycle)



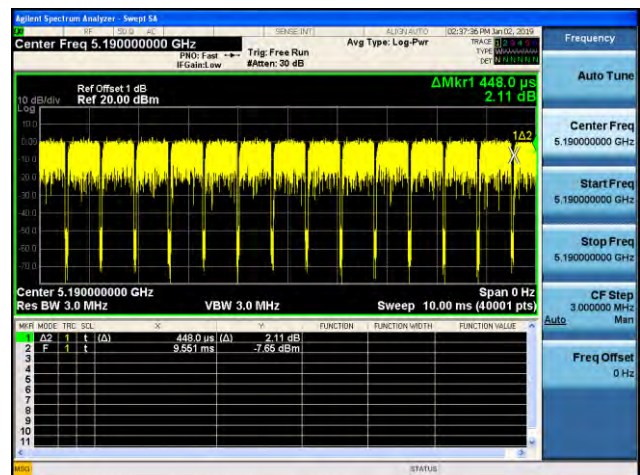
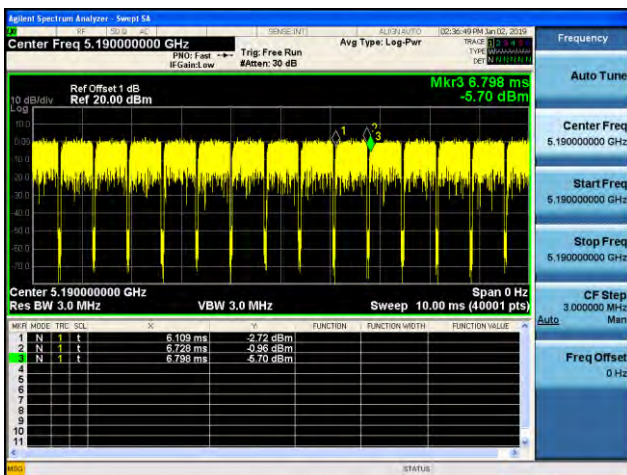
## 802.11n40



$$\text{Duty Cycle} = T_{\text{ON}}/T = ((T_{\text{mark2}} - T_{\text{mark1}}) * \text{NUM} + T_{\Delta}) / 10\text{ms} = ((3.993 - 3.996) * 13 + 0.409) / 10\text{ms} = 0.82$$

$$\text{Duty Factor} = 10 \log (1/\text{Duty Cycle}) = 10 \log (1/0.82) = 0.86$$

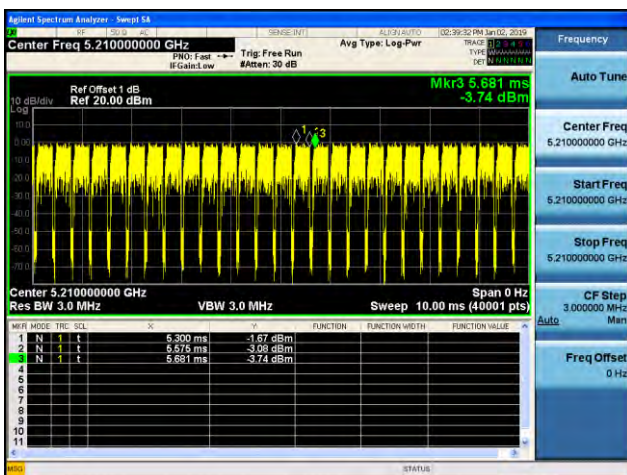
## 802.11ac40



$$\text{Duty Cycle} = T_{\text{ON}}/T = ((T_{\text{mark2}} - T_{\text{mark1}}) * \text{NUM} + T_{\Delta}) / 10\text{ms} = ((6.728 - 6.109) * 13 + 0.448) / 10\text{ms} = 0.85$$

$$\text{Duty Factor} = 10 \log (1/\text{Duty Cycle}) = 10 \log (1/0.85) = 0.71$$

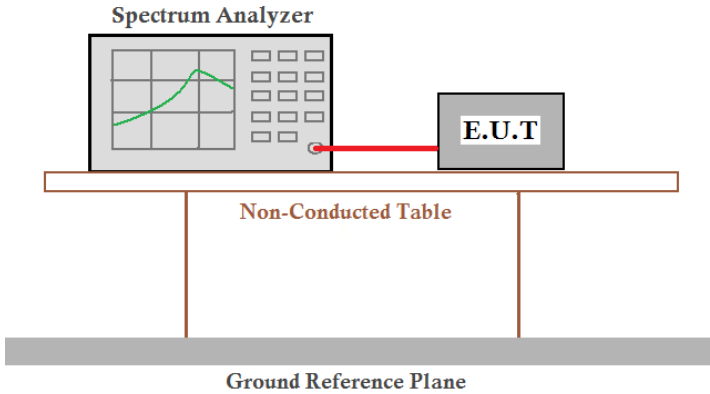
## 802.11ac80



$$\text{Duty Cycle} = T_{\text{ON}}/T = ((T_{\text{mark2}} - T_{\text{mark1}}) * \text{NUM} + T_{\Delta}) / 10\text{ms} = ((5.575 - 5.300) * 26 + 0.260) / 10\text{ms} = 0.74$$

$$\text{Duty Factor} = 10 \log (1/\text{Duty Cycle}) = 10 \log (1/0.73) = 1.30$$

#### 4.4 Power Spectral Density

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 E Section 15.407                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Test Method:      | KDB 789033 D02 General UNII Test Procedures New Rules v02r01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Limit:            | $\leq 11.00\text{dBm/MHz}$ for 5150MHz-5250MHz, 5250-5350MHz and 5470-5725 MHz<br>$\leq 30.00\text{dBm/500KHz}$ for 5725MHz-5850MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Test setup:       |  <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Test procedure:   | <ol style="list-style-type: none"> <li>1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...".</li> <li>2) Use the peak search function on the instrument to find the peak of the spectrum.</li> <li>3) Make the following adjustments to the peak value of the spectrum, if applicable:             <ol style="list-style-type: none"> <li>a) If Method SA-2 or SA-2 Alternative was used, add <math>10 \log(1/x)</math>, where <math>x</math> is the duty cycle, to the peak of the spectrum.</li> <li>b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.</li> </ol> </li> <li>4) The result is the PSD.</li> </ol> |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

**Measurement Data****Band 1 (5150-5250 MHz )**

| Test Mode        | Channel | Frequency (MHz) | Power Density (dBm/MHz) |         |         | Duty Factor (dB) | Sum PSD (dBm/MHz) | Max. Limit (dBm) | Result |
|------------------|---------|-----------------|-------------------------|---------|---------|------------------|-------------------|------------------|--------|
|                  |         |                 | ANT1                    | ANT2    | ANT3    |                  |                   |                  |        |
| 802.11a          | 36      | 5180.00         | -5.777                  | -5.779  | -6.154  | 0.41             | /                 | 11               | Pass   |
|                  | 40      | 5200.00         | -6.005                  | -6.017  | -5.984  | 0.41             | /                 | 11               | Pass   |
|                  | 48      | 5240.00         | -6.138                  | -5.882  | -6.004  | 0.41             | /                 | 11               | Pass   |
| 802.11n (HT20)   | 36      | 5180.00         | -6.157                  | -5.461  | -5.461  | 0.13             | /                 | 11               | Pass   |
|                  | 40      | 5200.00         | -6.103                  | -5.882  | -6.086  | 0.13             | /                 | 11               | Pass   |
|                  | 48      | 5240.00         | -6.763                  | -6.471  | -6.673  | 0.13             | /                 | 11               | Pass   |
| 802.11ac (HT20)  | 36      | 5180.00         | -6.631                  | -6.679  | -5.792  | 0.66             | /                 | 11               | Pass   |
|                  | 40      | 5200.00         | -6.323                  | -6.226  | -6.903  | 0.66             | /                 | 11               | Pass   |
|                  | 48      | 5240.00         | -6.322                  | -6.305  | -6.119  | 0.66             | /                 | 11               | Pass   |
| 802.11n (HT40)   | 38      | 5190.00         | -10.461                 | -10.816 | -10.732 | 0.86             | /                 | 11               | Pass   |
|                  | 46      | 5230.00         | -8.610                  | -8.762  | -8.804  | 0.86             | /                 | 11               | Pass   |
| 802.11 ac (HT40) | 38      | 5190.00         | -10.878                 | -10.682 | -10.774 | 0.71             | /                 | 11               | Pass   |
|                  | 46      | 5230.00         | -8.735                  | -8.975  | -8.665  | 0.71             | /                 | 11               | Pass   |
| 802.11ac (HT80)  | 42      | 5210.00         | -11.055                 | -11.182 | -11.127 | 1.30             | /                 | 11               | Pass   |

Note:

1, Sum PSD(dBm/MHz)= PSD(dBm/MHz)+ Duty factor.

2, Duty Factor = 10 log (1/Duty Cycle)

**Band 4 (5725 - 5850)**

| Test Mode        | Channel | Frequency (MHz) | Power Density (dBm/500 KHz) |         |         | Duty Factor (dB) | Sum PSD (dBm/500 KHz) | Max. Limit (dBm) | Result |
|------------------|---------|-----------------|-----------------------------|---------|---------|------------------|-----------------------|------------------|--------|
|                  |         |                 | ANT1                        | ANT2    | ANT3    |                  |                       |                  |        |
| 802.11a          | 149     | 5745.00         | -8.972                      | -9.137  | -9.137  | 0.41             | /                     | 30               | Pass   |
|                  | 157     | 5785.00         | -9.543                      | -9.122  | -9.122  | 0.41             | /                     | 30               | Pass   |
|                  | 165     | 5825.00         | -9.419                      | -9.013  | -9.013  | 0.41             | /                     | 30               | Pass   |
| 802.11n (HT20)   | 149     | 5745.00         | -8.951                      | -9.083  | -9.083  | 0.13             | /                     | 30               | Pass   |
|                  | 157     | 5785.00         | -9.512                      | -9.990  | -9.998  | 0.13             | /                     | 30               | Pass   |
|                  | 165     | 5825.00         | -8.662                      | -8.790  | -8.790  | 0.13             | /                     | 30               | Pass   |
| 802.11ac (HT20)  | 149     | 5745.00         | -9.755                      | -8.995  | -8.995  | 0.66             | /                     | 30               | Pass   |
|                  | 157     | 5785.00         | -8.968                      | -8.789  | -8.789  | 0.66             | /                     | 30               | Pass   |
|                  | 165     | 5825.00         | -8.850                      | -8.722  | -8.722  | 0.66             | /                     | 30               | Pass   |
| 802.11n (HT40)   | 151     | 5755.00         | -10.436                     | -10.485 | -10.485 | 0.86             | /                     | 30               | Pass   |
|                  | 159     | 5795.00         | -11.773                     | -11.262 | -11.262 | 0.86             | /                     | 30               | Pass   |
| 802.11 ac (HT40) | 151     | 5755.00         | -12.991                     | -10.762 | -10.762 | 0.71             | /                     | 30               | Pass   |
|                  | 159     | 5795.00         | -10.973                     | -11.154 | -11.154 | 0.71             | /                     | 30               | Pass   |
| 802.11ac (HT80)  | 155     | 5775.00         | -12.563                     | -12.571 | -12.571 | 1.30             | /                     | 30               | Pass   |

Note:

1, Sum PSD(dBm/MHz)= PSD(dBm/MHz)+ Duty factor.

2, Duty Factor = 10 log (1/Duty Cycle)

Test plots as followed:

ANT1: Band 1 (5150 - 5250 MHz)

802.11a mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)

802.11n(HT20) mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)

## 802.11ac(HT20) mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)

## 802.11n(HT40) mode



Channel 38 (5190MHz)



Channel 46 (5230MHz)

## 802.11ac(HT40) mode



Channel 38 (5190MHz)



Channel 46 (5230MHz)

## 802.11ac(HT80) mode



Channel 40 (5210MHz)

## ANT1: Band 4 (5725 - 5850 MHz)

## 802.11a mode



## 802.11n(HT20) mode



## Channel 149 (5745MHz)



## Channel 149 (5745MHz)



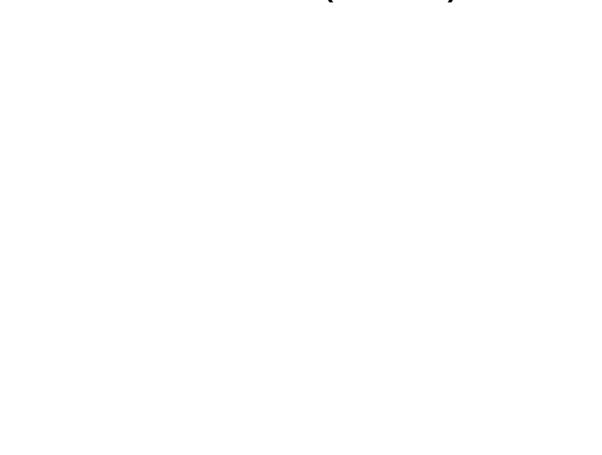
## Channel 157 (5785MHz)



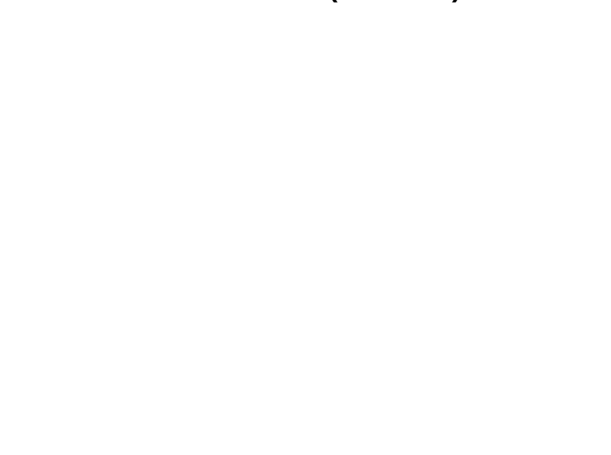
## Channel 157 (5785MHz)



## Channel 165 (5825MHz)



## Channel 165 (5825MHz)



## 802.11ac(HT20) mode



Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)

## 802.11n(HT40) mode



Channel 151 (5755MHz)



Channel 159 (5795MHz)

## 802.11ac(HT40) mode



Channel 151 (5755MHz)



Channel 159 (5795MHz)

## 802.11ac(HT80) mode



Channel 155(5775MHz)

## ANT2: Band 1 (5150 - 5250 MHz)

## 802.11a mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)

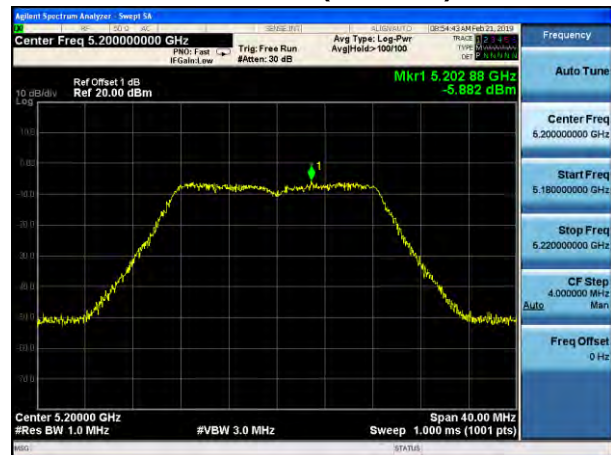


Channel 48 (5240MHz)

## 802.11n(HT20) mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)

## 802.11ac(HT20) mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)

## 802.11n(HT40) mode



Channel 38 (5190MHz)



Channel 46 (5230MHz)

## 802.11ac(HT40) mode

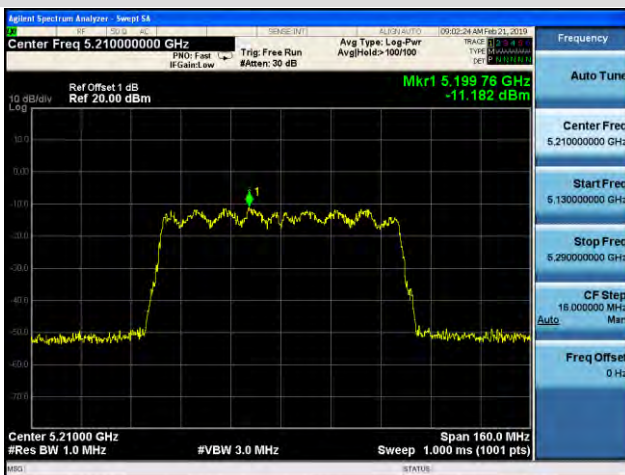


Channel 38 (5190MHz)



Channel 46 (5230MHz)

## 802.11ac(HT80) mode



Channel 40 (5210MHz)

## ANT2: Band 4 (5725 - 5850 MHz)

## 802.11a mode



## 802.11n(HT20) mode



## Channel 149 (5745MHz)



## Channel 149 (5745MHz)



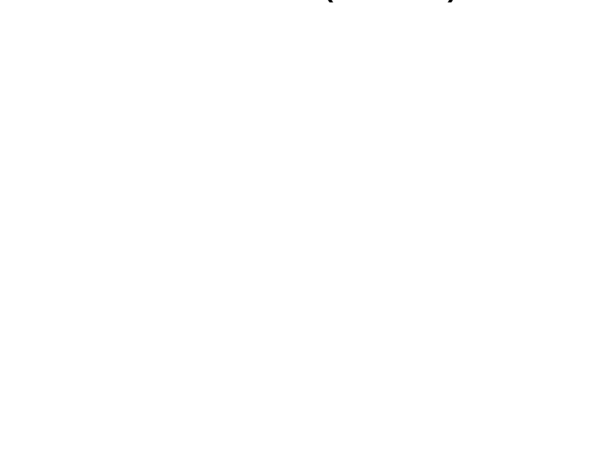
## Channel 157 (5785MHz)



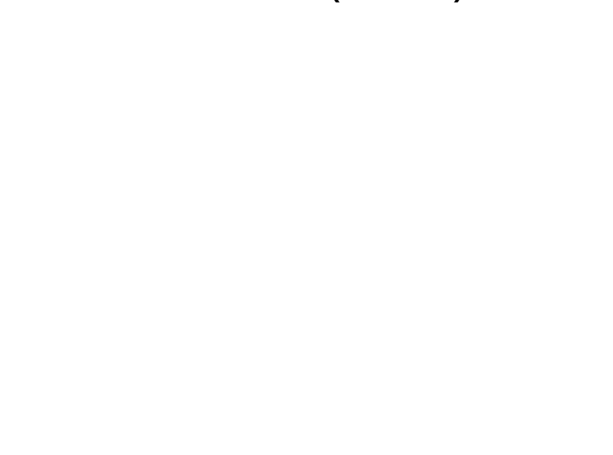
## Channel 157 (5785MHz)



## Channel 165 (5825MHz)



## Channel 165 (5825MHz)



## 802.11ac(HT20) mode



Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)

## 802.11n(HT40) mode



Channel 151 (5755MHz)



Channel 159 (5795MHz)

## 802.11ac(HT40) mode



Channel 151 (5755MHz)



Channel 159 (5795MHz)

## 802.11ac(HT80) mode



Channel 155(5775MHz)

## ANT3: Band 1 (5150 - 5250 MHz)

## 802.11a mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)

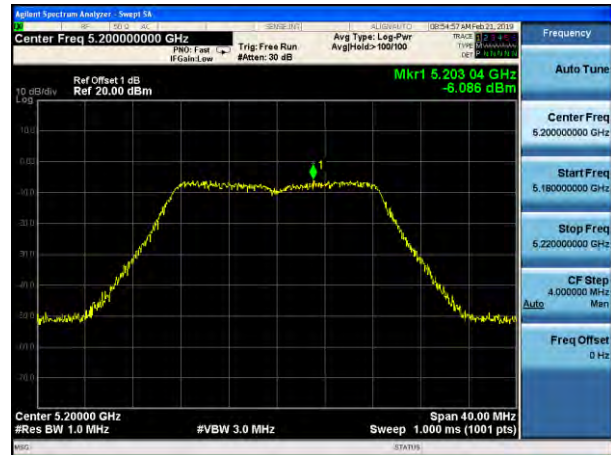


Channel 48 (5240MHz)

## 802.11n(HT20) mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)

## 802.11ac(HT20) mode



Channel 36 (5180MHz)



Channel 40 (5200MHz)



Channel 48 (5240MHz)

## 802.11n(HT40) mode



Channel 38 (5190MHz)



Channel 46 (5230MHz)

## 802.11ac(HT40) mode

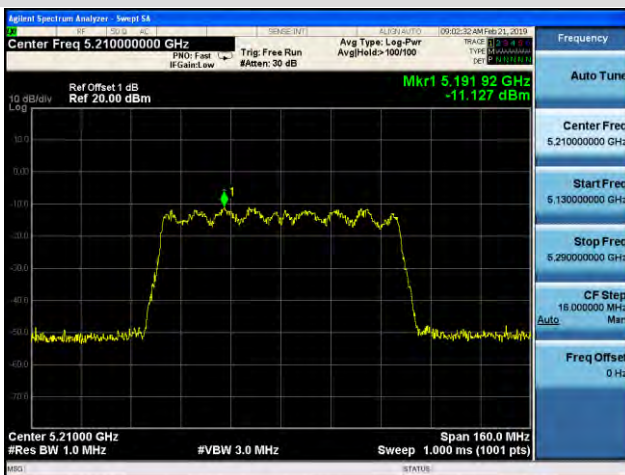


Channel 38 (5190MHz)



Channel 46 (5230MHz)

## 802.11ac(HT80) mode



Channel 40 (5210MHz)

## ANT3: Band 4 (5725 - 5850 MHz)

## 802.11a mode



## 802.11n(HT20) mode



## Channel 149 (5745MHz)



## Channel 149 (5745MHz)



## Channel 157 (5785MHz)



## Channel 157 (5785MHz)



## Channel 165 (5825MHz)



## Channel 165 (5825MHz)



## 802.11ac(HT20) mode



Channel 149 (5745MHz)



Channel 157 (5785MHz)



Channel 165 (5825MHz)

## 802.11n(HT40) mode



Channel 151 (5755MHz)



Channel 159 (5795MHz)

## 802.11ac(HT40) mode



Channel 151 (5755MHz)



Channel 159 (5795MHz)

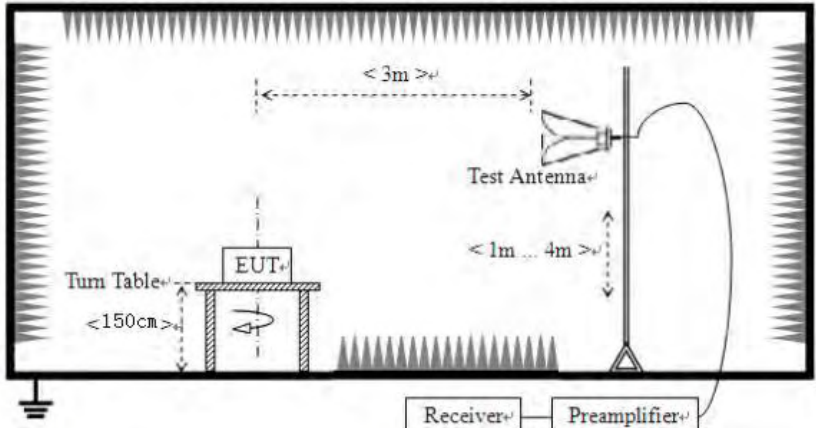
## 802.11ac(HT80) mode



Channel 155(5775MHz)

#### 4.5 Band Edge

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------|------------------|--|-----------|--------------------|--------|-------------|--------|------------------|--------------|--------|------------------|------------------|------------|------------------|-------------|------|------------------|------------|------|---------------|---------------|------------|
| Test Requirement: | FCC Part15 E Section 15.407 and 15.205                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                  |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| Test Method:      | ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| Test site:        | Measurement Distance: 3m (Semi-Anechoic Chamber)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| Receiver setup:   | <table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr><tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr></table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |        |                  |  | Frequency | Detector           | RBW    | VBW         | Remark | 30MHz-1GHz       | Quasi-peak   | 100KHz | 300KHz           | Quasi-peak Value | Above 1GHz | Peak             | 1MHz        | 3MHz | Peak Value       | AV         | 1MHz | 3MHz          | Average Value |            |
| Frequency         | Detector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | RBW              | VBW    | Remark           |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| 30MHz-1GHz        | Quasi-peak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 100KHz           | 300KHz | Quasi-peak Value |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| Above 1GHz        | Peak                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1MHz             | 3MHz   | Peak Value       |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
|                   | AV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1MHz             | 3MHz   | Average Value    |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| Limit:            | <table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr><tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr><tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr><tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr><tr><td>68.2</td><td>Peak Value</td></tr></table> <p>Undesirable emission limits:</p> <p>(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 EIRP of -27 dBm/MHz.</p> <p>(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 EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.</p> <p>(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 EIRP of -27 dBm/MHz.</p> |                  |        |                  |  | Frequency | Limit (dBuV/m @3m) | Remark | 30MHz-88MHz | 40.0   | Quasi-peak Value | 88MHz-216MHz | 43.5   | Quasi-peak Value | 216MHz-960MHz    | 46.0       | Quasi-peak Value | 960MHz-1GHz | 54.0 | Quasi-peak Value | Above 1GHz | 54.0 | Average Value | 68.2          | Peak Value |
| Frequency         | Limit (dBuV/m @3m)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Remark           |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| 30MHz-88MHz       | 40.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Quasi-peak Value |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| 88MHz-216MHz      | 43.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Quasi-peak Value |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| 216MHz-960MHz     | 46.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Quasi-peak Value |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| 960MHz-1GHz       | 54.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Quasi-peak Value |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| Above 1GHz        | 54.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Average Value    |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
|                   | 68.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Peak Value       |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| Test Procedure:   | <p>a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</p> <p>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</p> <p>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p>      |                  |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |
| Test setup:       | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |        |                  |  |           |                    |        |             |        |                  |              |        |                  |                  |            |                  |             |      |                  |            |      |               |               |            |

|               |                                                                                    |
|---------------|------------------------------------------------------------------------------------|
|               |  |
| Test results: | Pass                                                                               |

**Remark:**

According to KDB 789033 D02 v02r01 section G) 1) (d), for For measurements above 1000 MHz @ 3m distance, the limit of field strength is computed as follows:

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2;$$

For example, if  $\text{EIRP} = -27\text{dBm}$

$$E[\text{dBuV/m}] = -27 + 95.2 = 68.2\text{dBuV/m}.$$

**Measurement Data:****Band1**

| Mode:        |                 | 802.11a              |               | Frequency:             |                | 5180MHz        |          |
|--------------|-----------------|----------------------|---------------|------------------------|----------------|----------------|----------|
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 34.36                | 17.18         | 51.54                  | 68.20          | -16.66         | PK       |
| V            | 5150.00         | 36.68                | 17.18         | 53.86                  | 68.20          | -14.34         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11a              |               | Frequency:             |                | 5180MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 24.97                | 17.18         | 42.15                  | 54.00          | -11.85         | AV       |
| V            | 5150.00         | 27.65                | 17.18         | 44.83                  | 54.00          | -9.17          | AV       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11a              |               | Frequency:             |                | 5240MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 33.32                | 17.18         | 50.50                  | 68.20          | -17.70         | PK       |
| V            | 5350.00         | 34.81                | 17.18         | 51.99                  | 68.20          | -16.21         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11a              |               | Frequency:             |                | 5240MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 24.01                | 17.18         | 41.19                  | 54.00          | -12.81         | AV       |
| V            | 5350.00         | 25.53                | 17.18         | 42.71                  | 54.00          | -11.29         | AV       |

| Mode:        |                 | 802.11n(HT20)        |               | Frequency:             |                | 5180MHz        |          |
|--------------|-----------------|----------------------|---------------|------------------------|----------------|----------------|----------|
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 33.32                | 17.18         | 50.50                  | 68.20          | -17.70         | PK       |
| V            | 5150.00         | 34.72                | 17.18         | 51.90                  | 68.20          | -16.30         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11n(HT20)        |               | Frequency:             |                | 5180MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 23.91                | 17.18         | 41.09                  | 54.00          | -12.91         | AV       |
| V            | 5150.00         | 24.80                | 17.18         | 41.98                  | 54.00          | -12.02         | AV       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11n(HT20)        |               | Frequency:             |                | 5240MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 33.47                | 17.18         | 50.65                  | 68.20          | -17.55         | PK       |
| V            | 5350.00         | 34.35                | 17.18         | 51.53                  | 68.20          | -16.67         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11n(HT20)        |               | Frequency:             |                | 5240MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 23.65                | 17.18         | 40.83                  | 54.00          | -13.17         | AV       |
| V            | 5350.00         | 24.82                | 17.18         | 42.00                  | 54.00          | -12.00         | AV       |

| Mode:        |                 | 802.11ac(HT20)       |               | Frequency:             |                | 5180MHz        |          |
|--------------|-----------------|----------------------|---------------|------------------------|----------------|----------------|----------|
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 34.70                | 17.18         | 51.88                  | 68.20          | -16.32         | PK       |
| V            | 5150.00         | 36.87                | 17.18         | 54.05                  | 68.20          | -14.15         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11ac(HT20)       |               | Frequency:             |                | 5180MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 25.49                | 17.18         | 42.67                  | 54.00          | -11.33         | AV       |
| V            | 5150.00         | 27.44                | 17.18         | 44.62                  | 54.00          | -9.38          | AV       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11ac(HT20)       |               | Frequency:             |                | 5240MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 32.90                | 17.18         | 50.08                  | 68.20          | -18.12         | PK       |
| V            | 5350.00         | 34.68                | 17.18         | 51.86                  | 68.20          | -16.34         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11ac(HT20)       |               | Frequency:             |                | 5240MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 24.34                | 17.18         | 41.52                  | 54.00          | -12.48         | AV       |
| V            | 5350.00         | 25.34                | 17.18         | 42.52                  | 54.00          | -11.48         | AV       |

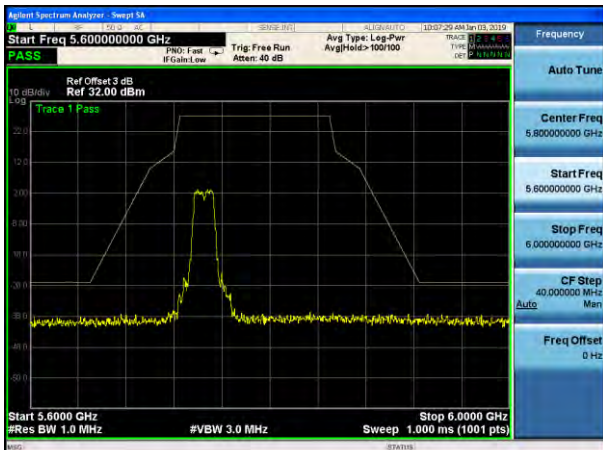
|              |                 |                      |               |                        |                |                |          |
|--------------|-----------------|----------------------|---------------|------------------------|----------------|----------------|----------|
| Mode:        |                 | 802.11n(HT40)        |               | Frequency:             |                | 5190MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 34.76                | 17.18         | 51.94                  | 68.20          | -16.26         | PK       |
| V            | 5150.00         | 37.24                | 17.18         | 54.42                  | 68.20          | -13.78         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11n(HT40)        |               | Frequency:             |                | 5190MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 23.25                | 17.20         | 40.45                  | 54.00          | -13.55         | AV       |
| V            | 5150.00         | 28.92                | 17.20         | 46.12                  | 54.00          | -7.88          | AV       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11n(HT40)        |               | Frequency:             |                | 5230MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 33.09                | 17.18         | 50.27                  | 68.20          | -17.93         | PK       |
| V            | 5350.00         | 35.09                | 17.18         | 52.27                  | 68.20          | -15.93         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11n(HT40)        |               | Frequency:             |                | 5230MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 24.75                | 17.18         | 41.93                  | 54.00          | -12.07         | AV       |
| V            | 5350.00         | 27.31                | 17.18         | 44.49                  | 54.00          | -9.51          | AV       |

|              |                 |                      |               |                        |                |                |          |
|--------------|-----------------|----------------------|---------------|------------------------|----------------|----------------|----------|
| Mode:        |                 | 802.11ac(HT40)       |               | Frequency:             |                | 5190MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 34.61                | 17.18         | 51.79                  | 68.20          | -16.41         | PK       |
| V            | 5150.00         | 36.64                | 17.18         | 53.82                  | 68.20          | -14.38         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11ac(HT40)       |               | Frequency:             |                | 5190MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 25.10                | 17.18         | 42.28                  | 54.00          | -11.72         | AV       |
| V            | 5150.00         | 27.35                | 17.18         | 44.53                  | 54.00          | -9.47          | AV       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11ac(HT40)       |               | Frequency:             |                | 5230MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 33.17                | 17.18         | 50.35                  | 68.20          | -17.85         | PK       |
| V            | 5350.00         | 34.55                | 17.18         | 51.73                  | 68.20          | -16.47         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11ac(HT40)       |               | Frequency:             |                | 5230MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 23.68                | 17.18         | 40.86                  | 54.00          | -13.14         | AV       |
| V            | 5350.00         | 24.97                | 17.18         | 42.15                  | 54.00          | -11.85         | AV       |

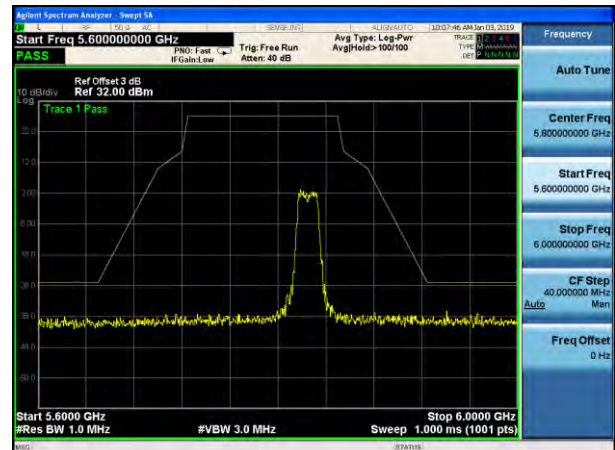
|              |                 |                      |               |                        |                |                |          |
|--------------|-----------------|----------------------|---------------|------------------------|----------------|----------------|----------|
| Mode:        |                 | 802.11ac(HT80)       |               | Frequency:             |                | 5210MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 34.81                | 17.18         | 51.99                  | 68.20          | -16.21         | PK       |
| V            | 5150.00         | 36.73                | 17.18         | 53.91                  | 68.20          | -14.29         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11ac(HT80)       |               | Frequency:             |                | 5210MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5150.00         | 24.91                | 17.20         | 42.11                  | 54.00          | -11.89         | AV       |
| V            | 5150.00         | 28.82                | 17.20         | 46.02                  | 54.00          | -7.98          | AV       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11ac(HT80)       |               | Frequency:             |                | 5210MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 32.93                | 17.18         | 50.11                  | 68.20          | -18.09         | PK       |
| V            | 5350.00         | 34.44                | 17.18         | 51.62                  | 68.20          | -16.58         | PK       |
|              |                 |                      |               |                        |                |                |          |
| Mode:        |                 | 802.11ac(HT80)       |               | Frequency:             |                | 5210MHz        |          |
| Antenna Pol. | Frequency (MHz) | Reading Level (dBuV) | Factor (dB/m) | Measure Level (dBuV/m) | Limit (dBuV/m) | Over limit(dB) | Detector |
| H            | 5350.00         | 23.65                | 17.18         | 40.83                  | 54.00          | -13.17         | AV       |
| V            | 5350.00         | 25.30                | 17.18         | 42.48                  | 54.00          | -11.52         | AV       |

## Band4

802.11a

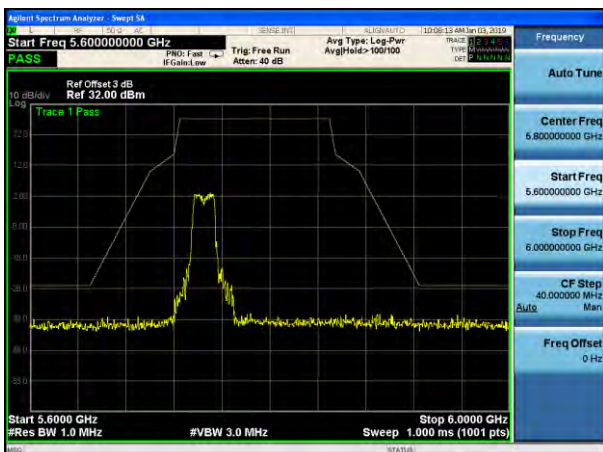


Low: 5745MHz

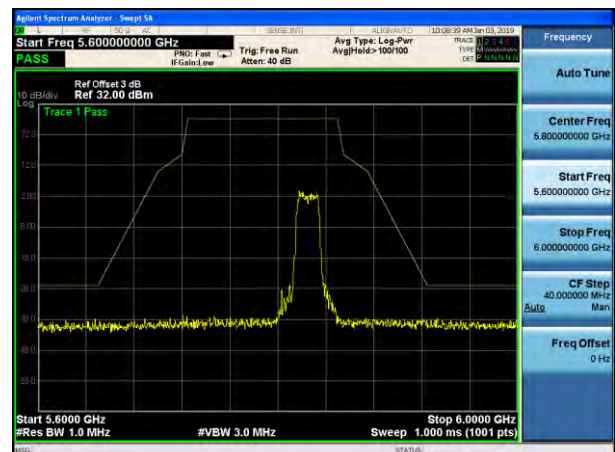


High: 5825MHz

802.11n(HT20)

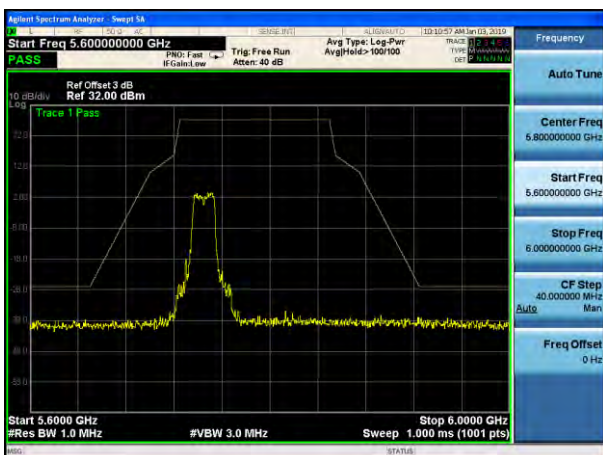


Low: 5745MHz

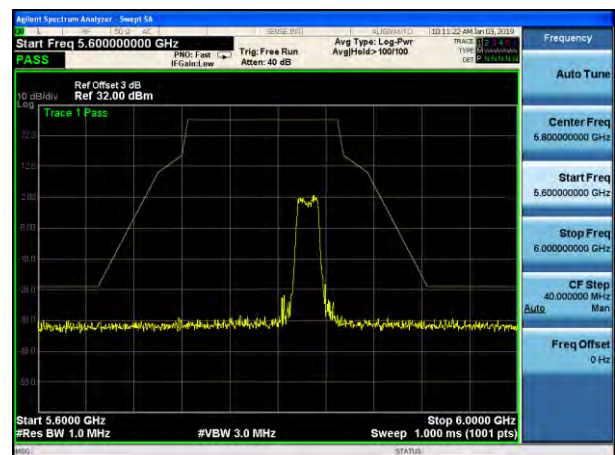


High: 5825MHz

802.11ac(HT20)

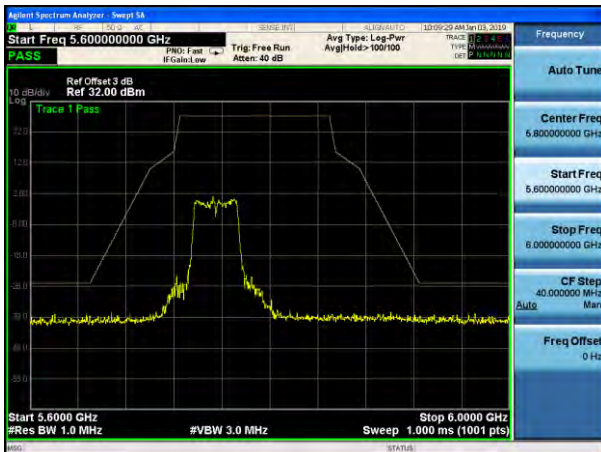


Low: 5745MHz

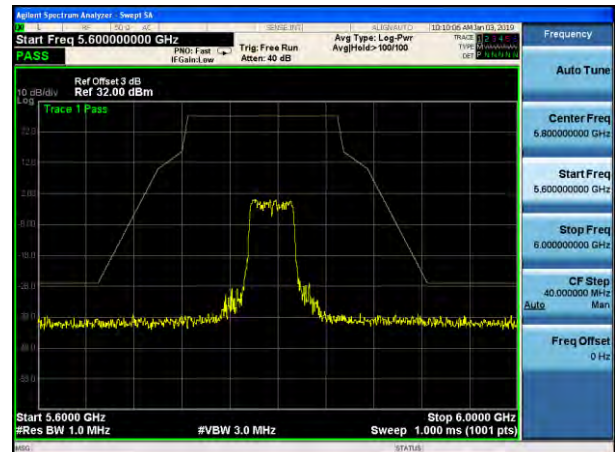


High: 5825MHz

## 802.11n(HT40)

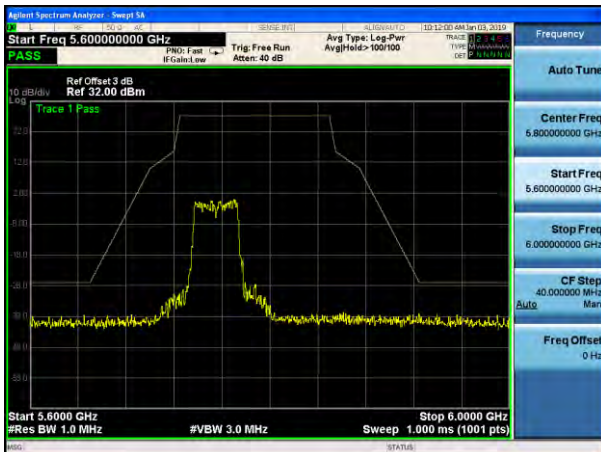


Low: 5755MHz

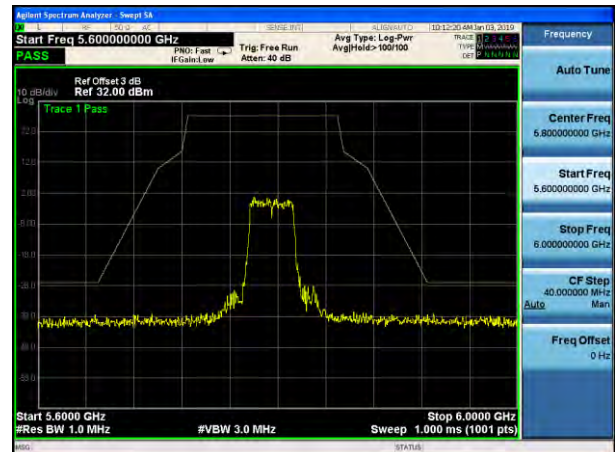


High: 5795MHz

## 802.11ac(HT40)



Low: 5755MHz



High: 5795MHz

## 802.11ac(HT80)

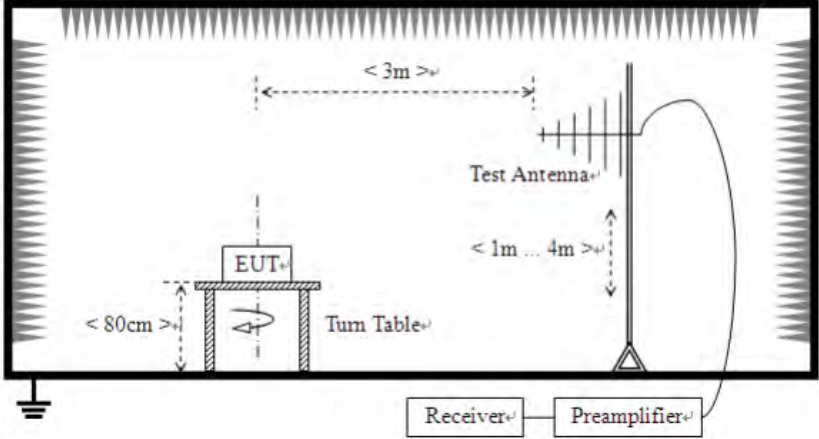


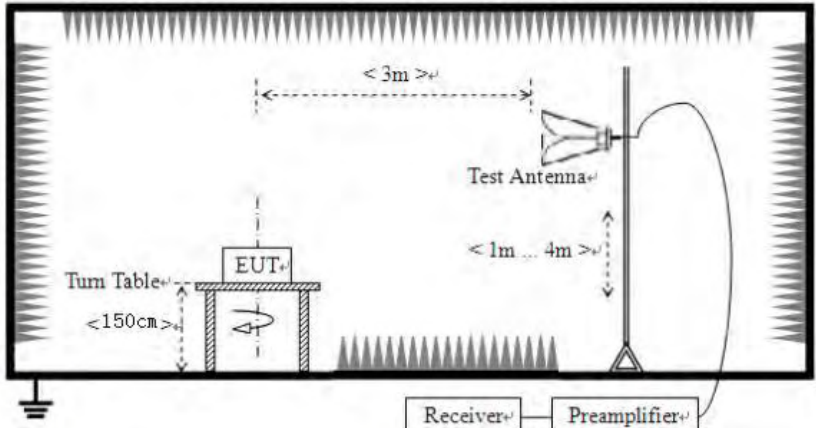
5775MHz

Note: Only record the worst case data of ANT 1.

#### 4.6 Radiated Emission

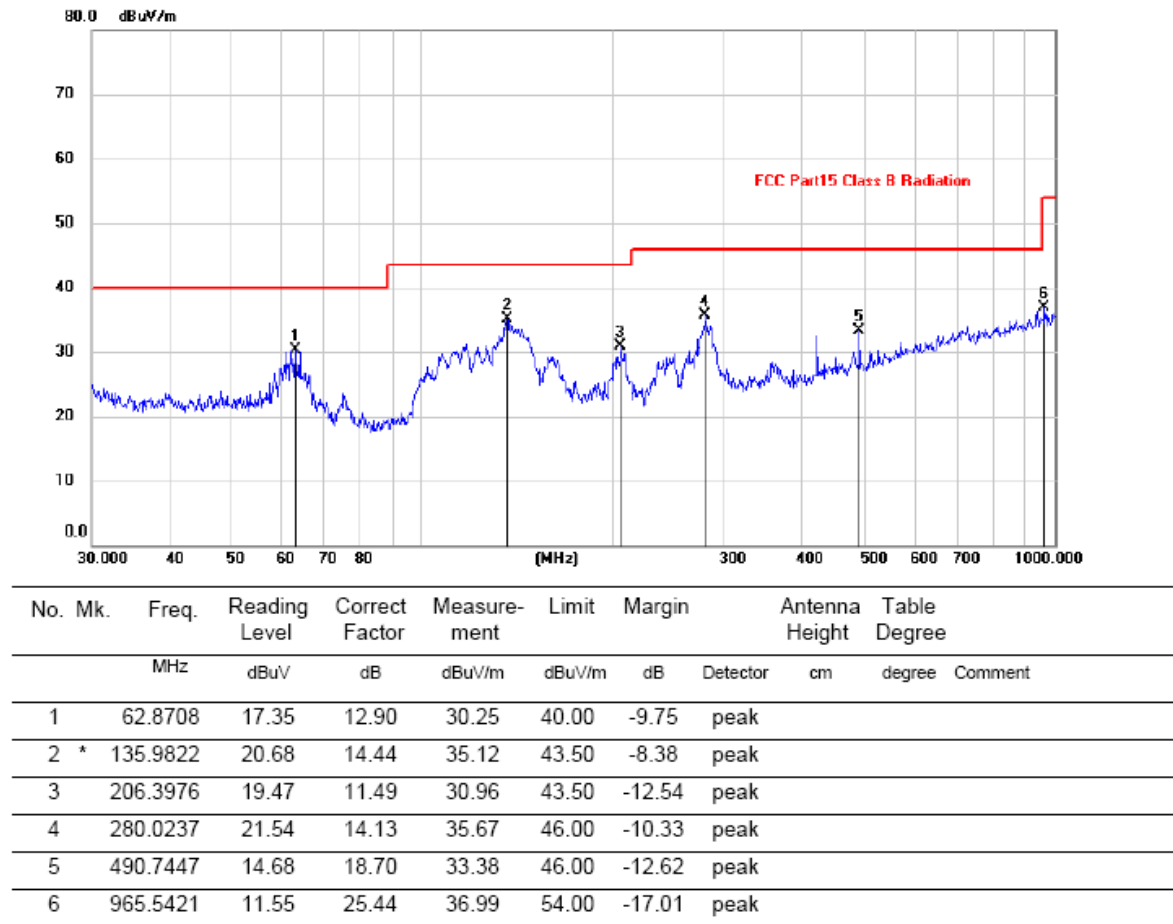
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            |                    |        |                  |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------------|--------|------------------|
| Test Requirement:     | FCC Part15 C Section 15.209 and 15.205                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |            |                    |        |                  |
| Test Method:          | ANSI C63.10:2013                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                    |        |                  |
| Test Frequency Range: | 30MHz to 40GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |                    |        |                  |
| Test site:            | Measurement Distance: 3m (Semi-Anechoic Chamber)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |                    |        |                  |
| Receiver setup:       | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Detector   | RBW                | VBW    | Value            |
|                       | 30MHz-1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Quasi-peak | 100KHz             | 300KHz | Quasi-peak Value |
|                       | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Peak       | 1MHz               | 3MHz   | Peak Value       |
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | AV         | 1MHz               | 3MHz   | Average Value    |
| Limit:                | Frequency                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            | Limit (dBuV/m @3m) |        | Remark           |
|                       | 30MHz-88MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            | 40.0               |        | Quasi-peak Value |
|                       | 88MHz-216MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |            | 43.5               |        | Quasi-peak Value |
|                       | 216MHz-960MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            | 46.0               |        | Quasi-peak Value |
|                       | 960MHz-1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            | 54.0               |        | Quasi-peak Value |
|                       | Above 1GHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            | 74.0               |        | Peak Value       |
|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |            | 54.0               |        | Average Value    |
| Test Procedure:       | <p>Substitution method was performed to determine the actual ERP emission levels of the EUT.</p> <p>The following test procedure as below:</p> <p>1&gt;.Below 1GHz test procedure:</p> <ol style="list-style-type: none"><li>1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li><li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li><li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li><li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</li><li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li><li>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</li></ol> <p>2&gt;.Above 1GHz test procedure:</p> <ol style="list-style-type: none"><li>1. On the test site as test setup graph above,the EUT shall be placed at the 1.5m support on the turntable and in the position closest to normal use as declared by the provider.</li><li>2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver.</li><li>3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test.</li></ol> |            |                    |        |                  |

|             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|             | <p>4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.</p> <p>5. Repeat step 4 for test frequency with the test antenna polarized horizontally.</p> <p>6. Remove the transmitter and replace it with a substitution antenna</p> <p>7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.</p> <p>8. Repeat step 7 with both antennas horizontally polarized for each test frequency.</p> <p>9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula:</p> $\text{EIRP(dBm)} = \text{Pg(dBm)} - \text{cable loss (dB)} + \text{antenna gain (dBi)}$ <p>where:</p> <p>Pg is the generator output power into the substitution antenna.</p> |
| Test setup: | <p>Below 1GHz</p>  <p>Above 1GHz</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

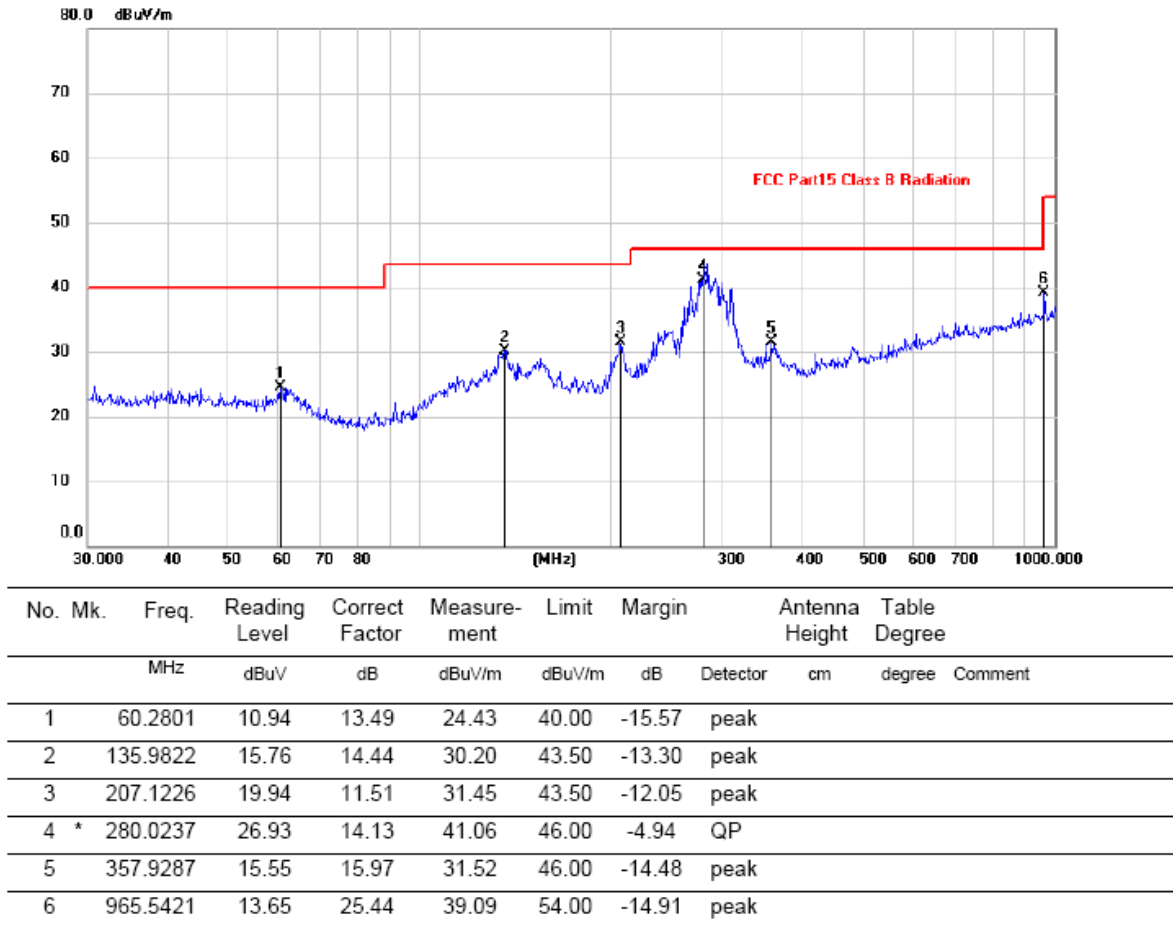
|               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|               |  <p>The diagram illustrates an EMC test setup within an anechoic chamber. A Turn Table, with a diameter of 150cm, is used to rotate the EUT (Equipment Under Test). The Test Antenna is positioned at a distance of less than 3m from the EUT and at a height of 1m to 4m. The antenna is connected to a Receiver and a Preamplifier. The chamber walls are lined with pyramidal absorbers to eliminate reflections.</p> |
| Test results: | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

**Measurement Data:**

Vertical:



## Horizontal



NOTE: Test Result 802.11 n/HT40 (High Channel, ANT1), AC 120V/60Hz (Worst Case)

**Above 1GHz:****(worst case : ANT1)****802.11a(HT20) 5180MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10360           | 22.12             | 39.67                 | 14.62           | 32.65              | 43.76          | 74.00               | -30.24          | Vertical     |
| 15540           | 23.72             | 38.6                  | 17.66           | 34.46              | 45.52          | 74.00               | -28.48          | Vertical     |
| 10360           | 22.55             | 39.67                 | 14.62           | 32.65              | 44.19          | 74.00               | -29.81          | Horizontal   |
| 15540           | 24.23             | 38.6                  | 17.66           | 34.46              | 46.03          | 74.00               | -27.97          | Horizontal   |

**802.11a(HT20) 5200MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10400           | 22.17             | 39.67                 | 14.62           | 32.65              | 43.81          | 74.00               | -30.19          | Vertical     |
| 15600           | 23.69             | 38.6                  | 17.66           | 34.46              | 45.49          | 74.00               | -28.51          | Vertical     |
| 10400           | 22.05             | 39.67                 | 14.62           | 32.65              | 43.69          | 74.00               | -30.31          | Horizontal   |
| 15600           | 24.70             | 38.6                  | 17.66           | 34.46              | 46.50          | 74.00               | -27.50          | Horizontal   |

**802.11a(HT20) 5240MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10480           | 22.58             | 39.67                 | 14.62           | 32.65              | 44.22          | 74.00               | -29.78          | Vertical     |
| 15720           | 23.82             | 38.6                  | 17.66           | 34.46              | 45.62          | 74.00               | -28.38          | Vertical     |
| 10480           | 23.41             | 39.67                 | 14.62           | 32.65              | 45.05          | 74.00               | -28.95          | Horizontal   |
| 15720           | 25.77             | 38.6                  | 17.66           | 34.46              | 47.57          | 74.00               | -26.43          | Horizontal   |

**(worst case : ANT1)****802.11n(HT20) 5180MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10360           | 21.55             | 39.67                 | 14.62           | 32.65              | 43.19          | 74.00               | -30.81          | Vertical     |
| 15540           | 23.33             | 38.6                  | 17.66           | 34.46              | 45.13          | 74.00               | -28.87          | Vertical     |
| 10360           | 22.05             | 39.67                 | 14.62           | 32.65              | 43.69          | 74.00               | -30.31          | Horizontal   |
| 15540           | 24.13             | 38.6                  | 17.66           | 34.46              | 45.93          | 74.00               | -28.07          | Horizontal   |

**802.11n(HT20) 5200MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10400           | 22.22             | 39.67                 | 14.62           | 32.65              | 43.86          | 74.00               | -30.14          | Vertical     |
| 15600           | 23.98             | 38.6                  | 17.66           | 34.46              | 45.78          | 74.00               | -28.22          | Vertical     |
| 10400           | 23.69             | 39.67                 | 14.62           | 32.65              | 45.33          | 74.00               | -28.67          | Horizontal   |
| 15600           | 25.86             | 38.6                  | 17.66           | 34.46              | 47.66          | 74.00               | -26.34          | Horizontal   |

**802.11n(HT20) 5240MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10480           | 21.88             | 39.67                 | 14.62           | 32.65              | 43.52          | 74.00               | -30.48          | Vertical     |
| 15720           | 23.35             | 38.6                  | 17.66           | 34.46              | 45.15          | 74.00               | -28.85          | Vertical     |
| 10480           | 22.31             | 39.67                 | 14.62           | 32.65              | 43.95          | 74.00               | -30.05          | Horizontal   |
| 15720           | 24.26             | 38.6                  | 17.66           | 34.46              | 46.06          | 74.00               | -27.94          | Horizontal   |

(worst case : ANT1)

**802.11ac(HT20) 5180MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10360           | 21.81             | 39.67                 | 14.62           | 32.65              | 43.45          | 74.00               | -30.55          | Vertical     |
| 15540           | 22.95             | 38.6                  | 17.66           | 34.46              | 44.75          | 74.00               | -29.25          | Vertical     |
| 10360           | 22.06             | 39.67                 | 14.62           | 32.65              | 43.70          | 74.00               | -30.30          | Horizontal   |
| 15540           | 24.52             | 38.6                  | 17.66           | 34.46              | 46.32          | 74.00               | -27.68          | Horizontal   |

**802.11ac(HT20) 5200MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10400           | 22.72             | 39.67                 | 14.62           | 32.65              | 44.36          | 74.00               | -29.64          | Vertical     |
| 15600           | 23.98             | 38.6                  | 17.66           | 34.46              | 45.78          | 74.00               | -28.22          | Vertical     |
| 10400           | 23.51             | 39.67                 | 14.62           | 32.65              | 45.15          | 74.00               | -28.85          | Horizontal   |
| 15600           | 25.97             | 38.6                  | 17.66           | 34.46              | 47.77          | 74.00               | -26.23          | Horizontal   |

**802.11ac(HT20) 5240MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10480           | 21.90             | 39.67                 | 14.62           | 32.65              | 43.54          | 74.00               | -30.46          | Vertical     |
| 15720           | 23.22             | 38.6                  | 17.66           | 34.46              | 45.02          | 74.00               | -28.98          | Vertical     |
| 10480           | 22.58             | 39.67                 | 14.62           | 32.65              | 44.22          | 74.00               | -29.78          | Horizontal   |
| 15720           | 24.31             | 38.6                  | 17.66           | 34.46              | 46.11          | 74.00               | -27.89          | Horizontal   |

(worst case : ANT1)

**802.11n(HT40) 5190MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10380           | 22.34             | 39.67                 | 14.62           | 32.65              | 43.98          | 74.00               | -30.02          | Vertical     |
| 15570           | 24.27             | 38.6                  | 17.66           | 34.46              | 46.07          | 74.00               | -27.93          | Vertical     |
| 10380           | 23.07             | 39.67                 | 14.62           | 32.65              | 44.71          | 74.00               | -29.29          | Horizontal   |
| 15570           | 25.95             | 38.6                  | 17.66           | 34.46              | 47.75          | 74.00               | -26.25          | Horizontal   |

**802.11n(HT40) 5230MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10460           | 21.51             | 39.67                 | 14.62           | 32.65              | 43.15          | 74.00               | -30.85          | Vertical     |
| 15690           | 23.35             | 38.6                  | 17.66           | 34.46              | 45.15          | 74.00               | -28.85          | Vertical     |
| 10460           | 21.85             | 39.67                 | 14.62           | 32.65              | 43.49          | 74.00               | -30.51          | Horizontal   |
| 15690           | 24.85             | 38.6                  | 17.66           | 34.46              | 46.65          | 74.00               | -27.35          | Horizontal   |

**802.11ac(HT40) 5190MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10380           | 22.67             | 39.67                 | 14.62           | 32.65              | 44.31          | 74.00               | -29.69          | Vertical     |
| 15570           | 23.83             | 38.6                  | 17.66           | 34.46              | 45.63          | 74.00               | -28.37          | Vertical     |
| 10380           | 23.35             | 39.67                 | 14.62           | 32.65              | 44.99          | 74.00               | -29.01          | Horizontal   |
| 15570           | 25.73             | 38.6                  | 17.66           | 34.46              | 47.53          | 74.00               | -26.47          | Horizontal   |

**(worst case : ANT1)****802.11ac(HT40) 5230MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10460           | 21.91             | 39.67                 | 14.62           | 32.65              | 43.55          | 74.00               | -30.45          | Vertical     |
| 15690           | 23.66             | 38.6                  | 17.66           | 34.46              | 45.46          | 74.00               | -28.54          | Vertical     |
| 10460           | 22.12             | 39.67                 | 14.62           | 32.65              | 43.76          | 74.00               | -30.24          | Horizontal   |
| 15690           | 24.42             | 38.6                  | 17.66           | 34.46              | 46.22          | 74.00               | -27.78          | Horizontal   |

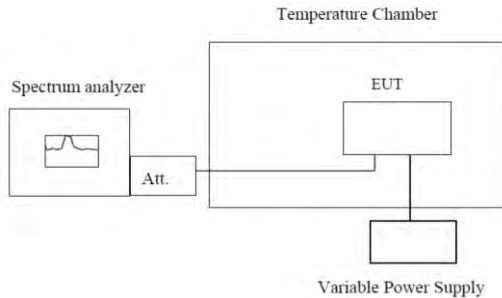
**(worst case : ANT1)****802.11ac(HT80) 5210MHz**

| Frequency (MHz) | Read Level (dBuV) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Level (dBuV/m) | Limit Line (dBuV/m) | Over Limit (dB) | polarization |
|-----------------|-------------------|-----------------------|-----------------|--------------------|----------------|---------------------|-----------------|--------------|
| 10420           | 22.64             | 39.67                 | 14.62           | 32.65              | 44.28          | 74.00               | -29.72          | Vertical     |
| 15630           | 23.80             | 38.6                  | 17.66           | 34.46              | 45.60          | 74.00               | -28.40          | Vertical     |
| 10420           | 22.99             | 39.67                 | 14.62           | 32.65              | 44.63          | 74.00               | -29.37          | Horizontal   |
| 15630           | 25.51             | 38.6                  | 17.66           | 34.46              | 47.31          | 74.00               | -26.69          | Horizontal   |

Note:

1. Level = Read Level + Antenna Factor+ Cable loss- Preamp Factor.
2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.
3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

## 5 Frequency Stability

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 E Section 15.407 (g)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 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 user's manual.                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Test setup:       |  <p>The diagram illustrates the test setup. A 'Spectrum analyzer' is connected to an 'Att.' (attenuator) block. The 'Att.' block is connected to the 'EUT' (Equipment Under Test) which is housed within a 'Temperature Chamber'. The 'EUT' is also connected to a 'Variable Power Supply'.</p>                                                                                                                                                                                                                                                                        |
| Test procedure:   | <ol style="list-style-type: none"> <li>1. The EUT is installed in an environment test chamber with external power source.</li> <li>2. Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT.</li> <li>3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.</li> <li>4. When temperature is stabilized, measure the frequency stability.</li> <li>5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.</li> </ol> |
| Test results:     | Pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

Measurement Data (the worst channel):

Band 1:

Voltage vs. Frequency Stability (Lowest channel=5180MHz)

| Voltage(%)         | Power(VDC) | TEMP(°C) | Test Fequency (MHz) | Target Frequency (MHz) | Deviation (ppm) |
|--------------------|------------|----------|---------------------|------------------------|-----------------|
| 100%               | 5.0        | -30      | 5179.965            | 5180                   | 6.75            |
| 100%               |            | -20      | 5179.974            | 5180                   | 5.01            |
| 100%               |            | -10      | 5179.963            | 5180                   | 7.14            |
| 100%               |            | 0        | 5179.972            | 5180                   | 5.41            |
| 100%               |            | 10       | 5179.971            | 5180                   | 5.60            |
| 100%               |            | 20       | 5179.978            | 5180                   | 4.24            |
| 100%               |            | 30       | 5179.977            | 5180                   | 4.44            |
| 100%               |            | 40       | 5179.981            | 5180                   | 3.66            |
| 100%               |            | 50       | 5179.973            | 5180                   | 5.21            |
| Low Battery power  | 4.5        | 20       | 5179.987            | 5180                   | 2.50            |
| High Battery power | 5.5        | 20       | 5179.986            | 5180                   | 2.70            |

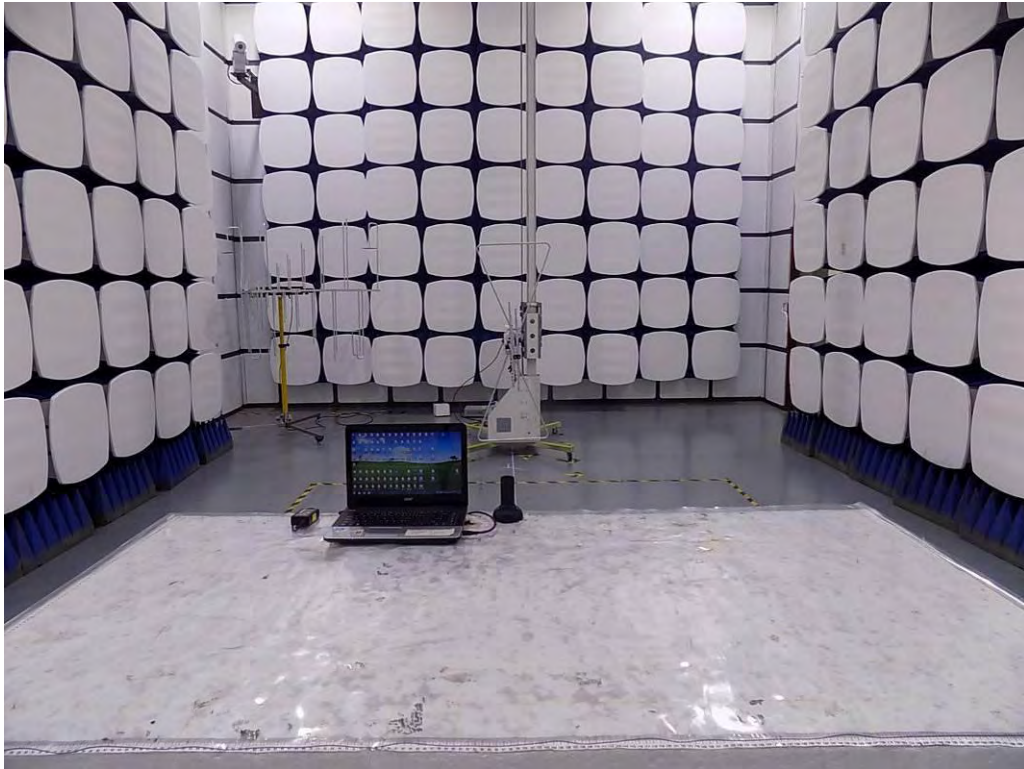
Band 4:

Voltage vs. Frequency Stability (Lowest channel=5745MHz)

| Voltage(%)         | Power(VDC) | TEMP(°C) | Test Fequency (MHz) | Target Frequency (MHz) | Deviation (ppm) |
|--------------------|------------|----------|---------------------|------------------------|-----------------|
| 100%               | 5.0        | -30      | 5744.983            | 5745                   | 2.96            |
| 100%               |            | -20      | 5744.972            | 5745                   | 4.87            |
| 100%               |            | -10      | 5744.962            | 5745                   | 6.61            |
| 100%               |            | 0        | 5744.962            | 5745                   | 6.61            |
| 100%               |            | 10       | 5744.975            | 5745                   | 4.35            |
| 100%               |            | 20       | 5744.966            | 5745                   | 5.91            |
| 100%               |            | 30       | 5744.975            | 5745                   | 4.35            |
| 100%               |            | 40       | 5744.954            | 5745                   | 8.01            |
| 100%               |            | 50       | 5744.967            | 5745                   | 5.74            |
| Low Battery power  | 4.5        | 20       | 5744.967            | 5745                   | 5.74            |
| High Battery power | 5.5        | 20       | 5744.939            | 5745                   | 1.06            |

## 6 Test Setup Photo

### Radiated Emission



## Conducted Emission



## **7 EUT Constructional Details**

Reference to the test report No. T1881968 02.

---END---