

FCC TEST REPORT

for

YICHEN (SHENZHEN) TECHNOLOGY CO., LTD

Wi-Fi Range Extender

Model Number: JWA-AC2320M

Serial Number: JWA-AC2323M, WRAC1200

FCC ID: 2AJSTJWA-AC2320M

Prepared for : YICHEN (SHENZHEN) TECHNOLOGY CO., LTD  
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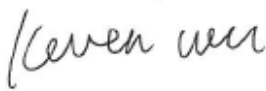
Report No. : 17KWE025075F  
Date of Test : Jan. 20 ~ Feb. 20, 2017  
Date of Report : Feb. 20, 2017

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## Keyway Testing Technology Co., Ltd.

|                                                                                                                                                                                                                     |                                                                                                           |                                                                                       |                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|------------------------|
| <b>Applicant:</b>                                                                                                                                                                                                   | YICHEN (SHENZHEN) TECHNOLOGY CO., LTD                                                                     |                                                                                       |                        |
| <b>Address:</b>                                                                                                                                                                                                     | 23/F, Block C1, Nanshan I Park, No. 1001, Xueyuan Road, Taoyuan Street, Nanshan District, Shenzhen, China |                                                                                       |                        |
| <b>Manufacturer:</b>                                                                                                                                                                                                | YICHEN (SHENZHEN) TECHNOLOGY CO., LTD                                                                     |                                                                                       |                        |
| <b>Address:</b>                                                                                                                                                                                                     | 23/F, Block C1, Nanshan I Park, No. 1001, Xueyuan Road, Taoyuan Street, Nanshan District, Shenzhen, China |                                                                                       |                        |
| <b>E.U.T:</b>                                                                                                                                                                                                       | Wi-Fi Range Extender                                                                                      |                                                                                       |                        |
| <b>Model Number:</b>                                                                                                                                                                                                | JWA-AC2320M                                                                                               |                                                                                       |                        |
| <b>Serial Model:</b>                                                                                                                                                                                                | JWA-AC2323M, WRAC1200                                                                                     |                                                                                       |                        |
| <b>Trade Name:</b>                                                                                                                                                                                                  |                          | <b>Serial No.:</b>                                                                    | -----                  |
| <b>Date of Receipt:</b>                                                                                                                                                                                             | Jan. 18, 2017                                                                                             | <b>Date of Test:</b>                                                                  | Jan. 20 ~ Feb.20, 2017 |
| <b>Test Specification:</b>                                                                                                                                                                                          | FCC Part 15, Subpart 15.407: 2016<br>ANSI C63.10:2013<br>KDB789033 D02 v01r03                             |                                                                                       |                        |
| <b>Test Result:</b>                                                                                                                                                                                                 | The equipment under test was found to be compliance with the requirements of the standards applied.       |                                                                                       |                        |
| <b>Issue Date: Feb. 20, 2017</b>                                                                                                                                                                                    |                                                                                                           |                                                                                       |                        |
| Tested by:                                                                                                                                                                                                          | Reviewed by:                                                                                              | Approved by:                                                                          |                        |
|                                                                                                                                  |                        |  |                        |
| Keven Wu/ Engineer                                                                                                                                                                                                  | Mark Li / Supervisor                                                                                      | Andy Gao/ Supervisor                                                                  |                        |
| <b>Other Aspects:</b>                                                                                                                                                                                               | None.                                                                                                     |                                                                                       |                        |
| <i>Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested</i>                                                                                                                   |                                                                                                           |                                                                                       |                        |
| <i>This test report is based on a single evaluation of one sample of above mentioned products. It is not permitted to be duplicated in extracts without written approval of Keyway Testing Technology Co., Ltd.</i> |                                                                                                           |                                                                                       |                        |

## 1. TEST SUMMARY

| Test Items                         | Test Requirement | Result |
|------------------------------------|------------------|--------|
| Conducted Emissions                | 15.207           | PASS   |
| Radiated Emissions                 | 15.407(b)        | PASS   |
| 26dB bandwidth and 99%dB Bandwidth | 15.407 (a)       | PASS   |
| Power density                      | 15.407 (a)       | PASS   |
| Maximum Peak Output Power          | 15.407 (a)       | PASS   |
| Emissions from out of band         | 15.407 (b)       | PASS   |
| Frequency Stability                | 15.407 (g)       | PASS   |
| Antenna Requirement                | 15.203           | PASS   |

## 2. GENERAL PRODUCT INFORMATION

### 2.1.Product Function

Refer to Technical Construction Form and User Manual.

### 2.2.Description of Device (EUT)

|                         |                                                                                                                                                            |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name:           | Wi-Fi Range Extender                                                                                                                                       |
| Model No.:              | JWA-AC2320M                                                                                                                                                |
| Serial Model:           | JWA-AC2323M, WRAC1200                                                                                                                                      |
| Model Difference        | All the models are the same circuit and RF module, except the model names and colour.                                                                      |
| Operation Frequency:    | 5.15GHz ~ 5.24GHz                                                                                                                                          |
| Channel numbers:        | 4 for 802.11a, 802.11n (HT20)<br>2 for 802.11n (HT40)                                                                                                      |
| Modulation technology:  | OFDM                                                                                                                                                       |
| Bit Rate of Transmitter | 802.11a: 54/48/36/24/18/12/9/6Mbps<br>802.11n(HT20): 150/144.44/130/117/115.56/104/86.67/<br>78/52/6.5Mbps<br>802.11n(HT40): 150/120/108/90/54/45/13.5Mbps |
| Antenna Type:           | PIFA Antenna                                                                                                                                               |
| Antenna gain:           | 2.29dBi                                                                                                                                                    |

### 2.3.Test Supporting System

None.

## 2.4.Independent Operation Modes

The basic operation modes are:

The EUT was configured for testing in an engineering mode which was provided by the manufacturer.

For 5150~5250 MHz band:

802.11a, 802.11n(HT20) mode Channel 5180MHz, 5200MHz, 5240MHz were tested.

802.11n(HT40) mode Channel 5190MHz, 5230MHz were tested.

The software "RFTTestTool" was used for testing, which was provided by manufacturer.

## 2.5.Test Sites

### Test Facilities

Lab Qualifications :   Certificated by Industry Canada  
                                  Registration No.: 9868A  
                                  Date of registration: December 8, 2011

                                  Certificated by FCC, USA  
                                  Registration No.: 370994  
                                  Date of registration: February21, 2012

                                  Certificated by CNASChina  
                                  Registration No.: CNAS L5783  
                                  Date of registration: August 8, 2012

## 2.6.List of Test and Measurement Instruments

For conducted emission at the mains terminals test

| Equipment                      | Manufacturer  | Model No. | Serial No. | Last Cal.  | Next Cal.  |
|--------------------------------|---------------|-----------|------------|------------|------------|
| EMI Test Receiver              | Rohde&Schwarz | ESCI      | 101156     | Apr. 09,16 | Apr. 09,17 |
| Artificial Mains Network       | Rohde&Schwarz | ENV216    | 101315     | Apr. 09,16 | Apr. 09,17 |
| Artificial Mains Network (AUX) | Rohde&Schwarz | ENV216    | 101314     | Apr. 09,16 | Apr. 09,17 |
| RF Cable                       | FUJIKURA      | 3D-2W     | 944 Cable  | Apr. 09,16 | Apr. 09,17 |

For radiated emission test

| Equipment                                       | Manufacturer  | Model No.          | Serial No.           | Last Cal.  | Next Cal.  |
|-------------------------------------------------|---------------|--------------------|----------------------|------------|------------|
| EMI Test Receiver                               | Rohde&Schwarz | ESCI               | 101156               | Apr. 09,16 | Apr. 09,17 |
| System Simulator                                | Agilent       | E5515C             | GB43130245           | Apr. 09,16 | Apr. 09,17 |
| Power Splitter                                  | Weinschel     | 1506A              | NW425                | Apr. 09,16 | Apr. 09,17 |
| Bilog Antenna                                   | ETS-LINDGREN  | 3142D              | 135452               | Apr. 09,16 | Apr. 09,17 |
| Remark: Testable Frequency Range: 26MHz-6GHz    |               |                    |                      |            |            |
| Spectrum Analyzer                               | Agilent       | E4407B             | MY4511304            | Apr. 09,16 | Apr. 09,17 |
| Remark: Testable Frequency Range: 100Hz-26.5GHz |               |                    |                      |            |            |
| Spectrum Analyzer                               | R&S           | FSV40              | 132.1.3008K39-100967 | Apr. 09,16 | Apr. 09,17 |
| Remark: Testable Frequency Range: 10Hz-40GHz    |               |                    |                      |            |            |
| 3m Semi-anechoic Chamber                        | ETS-LINDGREN  | 966                | KW01                 | Apr. 09,16 | Apr. 09,17 |
| Signal Amplifier                                | SONOMA        | 310                | 187016               | Apr. 09,16 | Apr. 09,17 |
| Signal Amplifier                                | Agilent       | 8449B              | 3008A00251           | Apr. 09,16 | Apr. 09,17 |
| RF Cable                                        | IMRO          | IMRO-400           | 966 Cable 1#         | N/A        | N/A        |
| MULTI-DEVICE Controller                         | ETS-LINDGREN  | 2090               | 126913               | N/A        | N/A        |
| Horn Antenna                                    | DAZE          | ZN30701            | 11003                | Apr. 09,16 | Apr. 09,17 |
| Remark: Testable Frequency Range: 1GHz-18GHz    |               |                    |                      |            |            |
| Horn Antenna                                    | SCHWARZBECK   | BBHA9170           | 9170-068             | Apr. 09,16 | Apr. 09,17 |
| Remark: Testable Frequency Range: 18GHz-40GHz   |               |                    |                      |            |            |
| Spectrum Analyzer                               | Agilent       | 8593E              | 3911A04271           | Apr. 09,16 | Apr. 09,17 |
| Remark: Testable Frequency Range: 9kHz-22GHz    |               |                    |                      |            |            |
| Spectrum Analyzer                               | Agilent       | E4408B             | MY44211125           | Apr. 09,16 | Apr. 09,17 |
| Remark: Testable Frequency Range: 9kHz-26.5GHz  |               |                    |                      |            |            |
| Signal Amplifier                                | DAZE          | ZN3380C            | 11001                | Apr. 09,16 | Apr. 09,17 |
| HighPass filter                                 | Micro         | HPM50111           | 324216               | Apr. 09,16 | Apr. 09,17 |
| Filter                                          | COM-MW        | ZBSF-C836.5-25-X   | KW032                | Apr. 09,16 | Apr. 09,17 |
| Filter                                          | COM-MW        | ZBSF-C1747.5-75-X2 | KW035                | Apr. 09,16 | Apr. 09,17 |
| Filter                                          | COM-MW        | ZBSF-C1880-60-X2   | KW037                | Apr. 09,16 | Apr. 09,17 |
| Constant temperature and humidity box           | GF            | GTH-800-40-1P      | MAA9906-005          | Apr. 09,16 | Apr. 09,17 |
| Splitter                                        | Agilent       | 11636B             | 0025164              | Apr. 09,16 | Apr. 09,17 |
| Power Meter                                     | Anritsu       | ML2495A            | 1204003              | Apr. 24,16 | Apr. 24,17 |
| Power Sensor                                    | Anritsu       | MA2411B            | 1126150              | Apr. 24,16 | Apr. 24,17 |
| Spectrum Analyzer                               | Agilent       | N9020A             | MY56070279           | Jul.26,16  | Jul.25,17  |
| Remark: Testable Frequency Range: 10Hz-26.5GHz  |               |                    |                      |            |            |

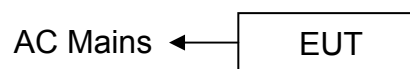
### 3. TEST SET-UP AND OPERATION MODES

#### 3.1.Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

#### 3.2.Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



*(EUT: Wi-Fi Range Extender)*

#### 3.3.Special Accessories and Auxiliary Equipment

None.

#### 3.4.Countermeasures to Achieve EMC Compliance

None.

## 4. EMISSION TEST RESULTS

### 4.1. Conducted Emission at the Mains Terminals Test

Limit 15.207 limits

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dB $\mu$ V) |          |
|-----------------------------|------------------------------|----------|
|                             | Quasi-peak                   | Average  |
| 0.15-0.5                    | 66 to 56                     | 56 to 46 |
| 0.5-5                       | 56                           | 46       |
| 5-30                        | 60                           | 50       |

#### Test Setup

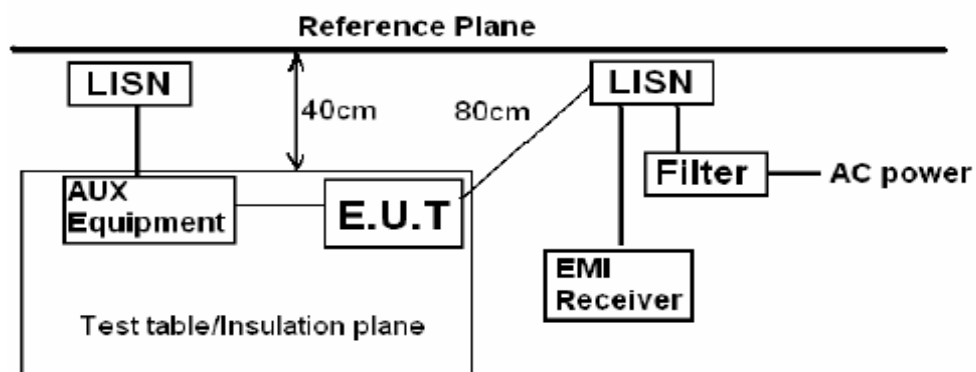
1. The EUT was put on a wooden table which was 0.8 m high above the ground and connected to the AC mains through the Artificial Mains Network (AMN). Where the mains cable supplied by the manufacture was longer than 0.8 m, the excess was folded back and forth parallel to the cable at the center so as to form a bundle no longer than 0.4 m.

2. The EUT was kept 0.4 m from any other earthed conducting surface. Both sides of AC line were checked to find out the maximum conducted emission levels according to the test procedure during the conducted emission test.

3. The frequency range from 150 kHz to 30 MHz was investigated.

4. The bandwidth of the test receiver was set at 9 kHz.

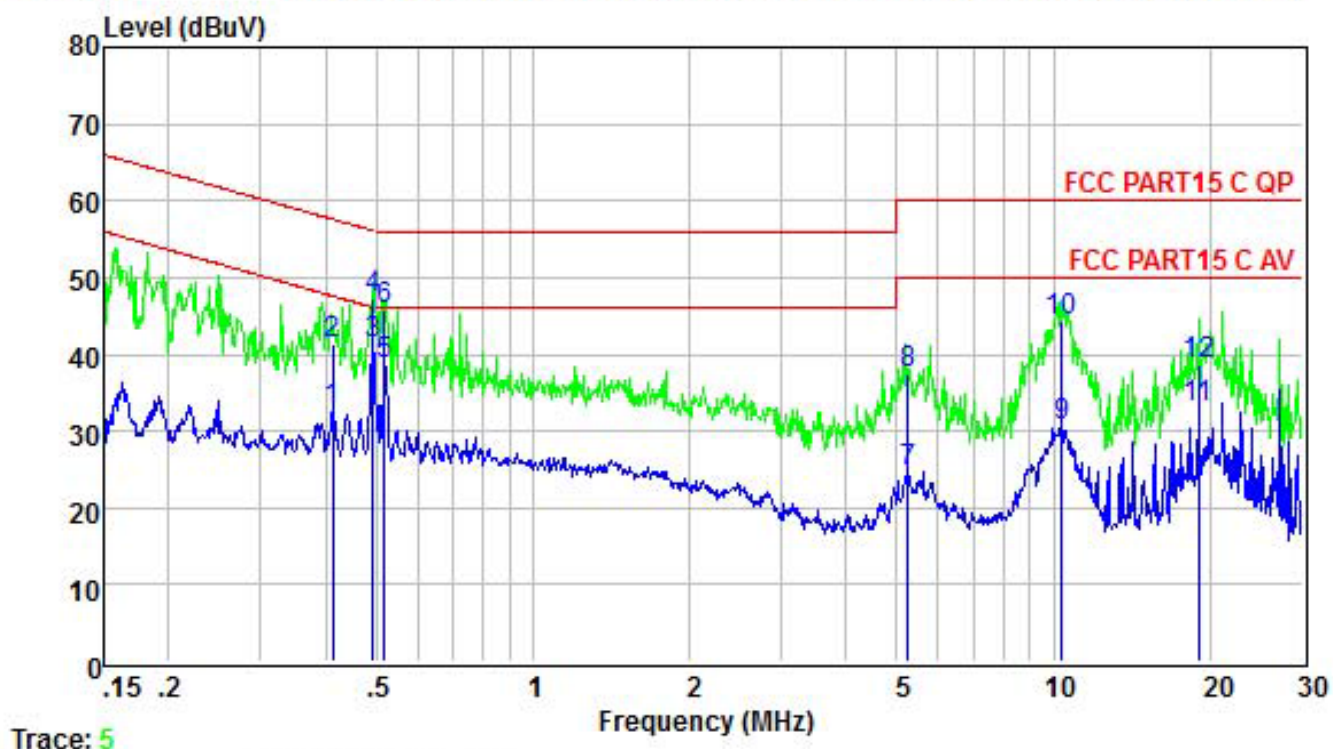
5. Pretest for all mode, and the test data of the worst case condition(s) was reported on the following page.



*Remark:*  
*E.U.T: Equipment Under Test*  
*LISN: Line Impedance Stabilization Network*  
*Test table height=0.8m*

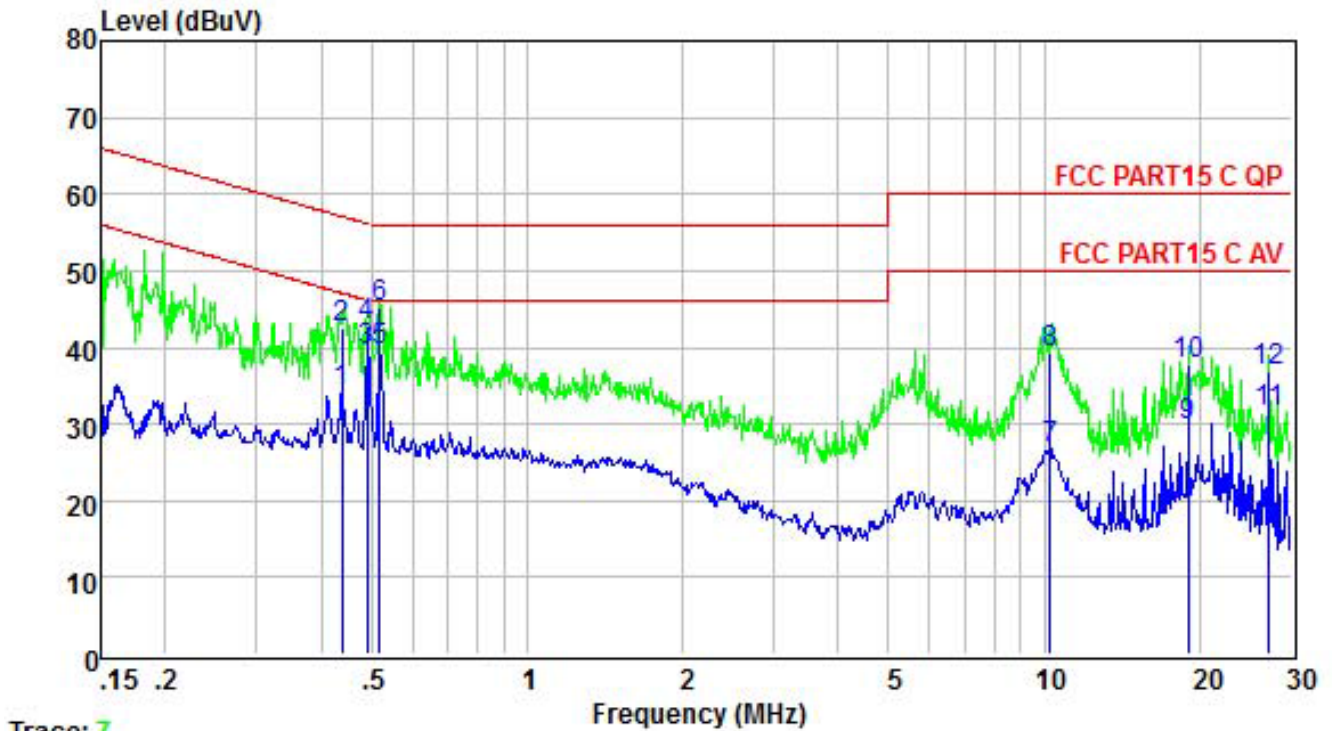


|                |                      |                     |             |
|----------------|----------------------|---------------------|-------------|
| EUT :          | Wi-Fi Range Extender | Model Name :        | JWA-AC2320M |
| Temperature :  | 26℃                  | Relative Humidity : | 54%         |
| Pressure :     | 1010hPa              | Phase:              | L           |
| Test Voltage : | AC 120V/60Hz         | Test Mode :         | Link Mode   |



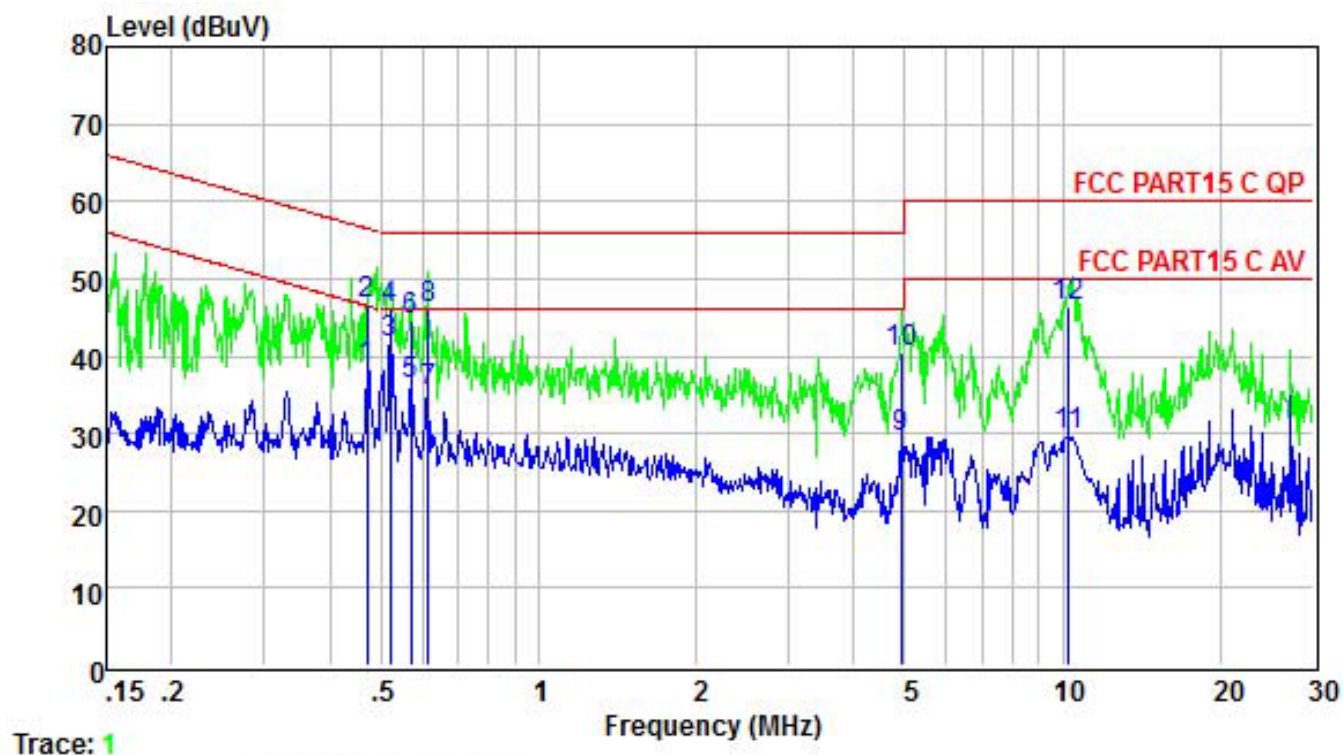
|    | Freq   | Level | Limit | Over   | Remark  |
|----|--------|-------|-------|--------|---------|
|    | MHz    | dBuV  | Line  | Limit  |         |
|    |        |       | dBuV  | dB     |         |
| 1  | 0.413  | 32.74 | 47.59 | -14.85 | Average |
| 2  | 0.413  | 41.20 | 57.59 | -16.39 | QP      |
| 3  | 0.494  | 41.45 | 46.10 | -4.65  | Average |
| 4  | 0.494  | 47.30 | 56.10 | -8.80  | QP      |
| 5  | 0.518  | 38.70 | 46.00 | -7.30  | Average |
| 6  | 0.518  | 45.90 | 56.00 | -10.10 | QP      |
| 7  | 5.249  | 24.57 | 50.00 | -25.43 | Average |
| 8  | 5.249  | 37.60 | 60.00 | -22.40 | QP      |
| 9  | 10.342 | 30.57 | 50.00 | -19.43 | Average |
| 10 | 10.342 | 44.20 | 60.00 | -15.80 | QP      |
| 11 | 18.920 | 33.14 | 50.00 | -16.86 | Average |
| 12 | 18.920 | 38.60 | 60.00 | -21.40 | QP      |

|                |                      |                     |             |
|----------------|----------------------|---------------------|-------------|
| EUT :          | Wi-Fi Range Extender | Model Name :        | JWA-AC2320M |
| Temperature :  | 26°C                 | Relative Humidity : | 54%         |
| Pressure :     | 1010hPa              | Phase:              | N           |
| Test Voltage : | AC 120V/60Hz         | Test Mode :         | Link Mode   |



|    | Freq   | Level | Limit | Over   | Remark  |
|----|--------|-------|-------|--------|---------|
|    | MHz    | dBuV  | Line  | Limit  |         |
|    |        |       | dBuV  | dB     |         |
| 1  | 0.440  | 34.16 | 47.07 | -12.91 | Average |
| 2  | 0.440  | 42.60 | 57.07 | -14.47 | QP      |
| 3  | 0.491  | 39.67 | 46.14 | -6.47  | Average |
| 4  | 0.491  | 42.80 | 56.14 | -13.34 | QP      |
| 5  | 0.518  | 39.42 | 46.00 | -6.58  | Average |
| 6  | 0.518  | 45.10 | 56.00 | -10.90 | QP      |
| 7  | 10.233 | 26.91 | 50.00 | -23.09 | Average |
| 8  | 10.233 | 39.30 | 60.00 | -20.70 | QP      |
| 9  | 18.920 | 29.75 | 50.00 | -20.25 | Average |
| 10 | 18.920 | 37.70 | 60.00 | -22.30 | QP      |
| 11 | 27.127 | 31.61 | 50.00 | -18.39 | Average |
| 12 | 27.127 | 36.90 | 60.00 | -23.10 | QP      |

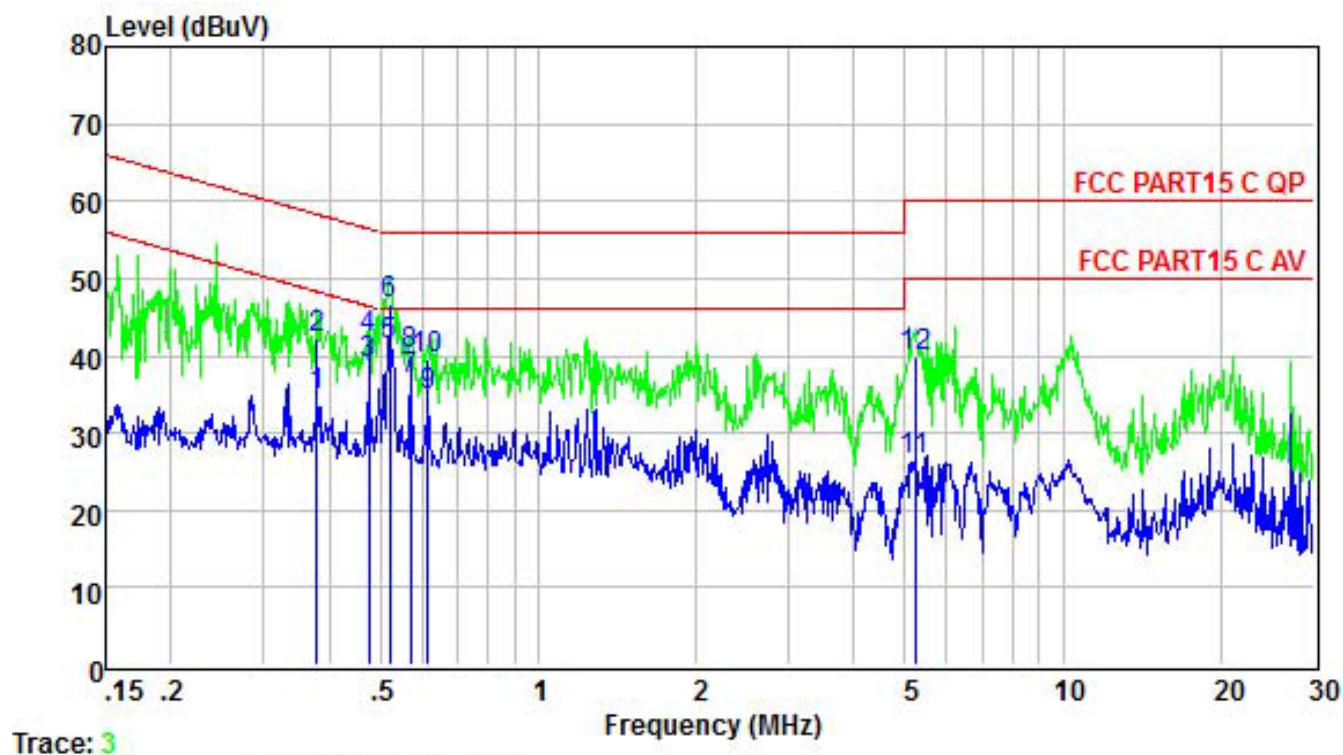
|                |                      |                     |             |
|----------------|----------------------|---------------------|-------------|
| EUT :          | Wi-Fi Range Extender | Model Name :        | JWA-AC2320M |
| Temperature :  | 26℃                  | Relative Humidity : | 54%         |
| Pressure :     | 1010hPa              | Phase:              | L           |
| Test Voltage : | AC 240V/60Hz         | Test Mode :         | Link Mode   |



|    | Freq   | Level | Limit | Over   | Remark  |
|----|--------|-------|-------|--------|---------|
|    | MHz    | dBuV  | Line  | Limit  |         |
|    |        |       | dBuV  | dB     |         |
| 1  | 0.471  | 38.30 | 46.49 | -8.19  | Average |
| 2  | 0.471  | 46.80 | 56.49 | -9.69  | QP      |
| 3  | 0.521  | 41.60 | 46.00 | -4.40  | Average |
| 4  | 0.521  | 46.20 | 56.00 | -9.80  | QP      |
| 5  | 0.570  | 36.20 | 46.00 | -9.80  | Average |
| 6  | 0.570  | 44.70 | 56.00 | -11.30 | QP      |
| 7  | 0.617  | 35.30 | 46.00 | -10.70 | Average |
| 8  | 0.617  | 46.10 | 56.00 | -9.90  | QP      |
| 9  | 4.926  | 29.57 | 46.00 | -16.43 | Average |
| 10 | 4.926  | 40.30 | 56.00 | -15.70 | QP      |
| 11 | 10.233 | 29.89 | 50.00 | -20.11 | Average |
| 12 | 10.233 | 46.30 | 60.00 | -13.70 | QP      |



|                |                      |                     |             |
|----------------|----------------------|---------------------|-------------|
| EUT :          | Wi-Fi Range Extender | Model Name :        | JWA-AC2320M |
| Temperature :  | 26℃                  | Relative Humidity : | 54%         |
| Pressure :     | 1010hPa              | Phase:              | N           |
| Test Voltage : | AC 240V/60Hz         | Test Mode :         | Link Mode   |



|    | Freq  | Level | Limit | Over   | Remark  |
|----|-------|-------|-------|--------|---------|
|    | MHz   | dBuV  | Line  | Limit  |         |
|    |       |       | dBuV  | dB     |         |
| 1  | 0.379 | 34.81 | 48.30 | -13.49 | Average |
| 2  | 0.379 | 42.30 | 58.30 | -16.00 | QP      |
| 3  | 0.476 | 39.11 | 46.41 | -7.30  | Average |
| 4  | 0.476 | 42.30 | 56.41 | -14.11 | QP      |
| 5  | 0.521 | 41.30 | 46.00 | -4.70  | Average |
| 6  | 0.521 | 46.80 | 56.00 | -9.20  | QP      |
| 7  | 0.570 | 36.86 | 46.00 | -9.14  | Average |
| 8  | 0.570 | 40.20 | 56.00 | -15.80 | QP      |
| 9  | 0.617 | 34.76 | 46.00 | -11.24 | Average |
| 10 | 0.617 | 39.60 | 56.00 | -16.40 | QP      |
| 11 | 5.221 | 26.60 | 50.00 | -23.40 | Average |
| 12 | 5.221 | 39.80 | 60.00 | -20.20 | QP      |

## 4.2.Radiated Emission Test

### Limit 15.209 limits

| FREQUENCY<br>MHz | DISTANCE<br>Meters | FIELD STRENGTHS LIMIT                                                                             |                                   |
|------------------|--------------------|---------------------------------------------------------------------------------------------------|-----------------------------------|
|                  |                    | $\mu\text{V}/\text{m}$                                                                            | $\text{dB}(\mu\text{V})/\text{m}$ |
| 30 ~ 88          | 3                  | 100                                                                                               | 40.0                              |
| 88 ~ 216         | 3                  | 150                                                                                               | 43.5                              |
| 216 ~ 960        | 3                  | 200                                                                                               | 46.0                              |
| 960 ~ 1000       | 3                  | 500                                                                                               | 54.0                              |
| Above 1000       | 3                  | 74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak)<br>54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) |                                   |

### Restricted bands of operation

| MHz                        | MHz                   | MHz             | GHz              |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525   | 608 - 614       | 5.35 - 5.46      |
| 2.1735 - 2.1905            | 16.80425 - 16.80475   | 960 - 1240      | 7.25 - 7.75      |
| 4.125 - 4.128              | 25.5 - 25.67          | 1300 - 1427     | 8.025 - 8.5      |
| 4.17725 - 4.17775          | 37.5 - 38.25          | 1435 - 1626.5   | 9.0 - 9.2        |
| 4.20725 - 4.20775          | 73 - 74.6             | 1645.5 - 1646.5 | 9.3 - 9.5        |
| 6.215 - 6.218              | 74.8 - 75.2           | 1660 - 1710     | 10.6 - 12.7      |
| 6.26775 - 6.26825          | 108 - 121.94          | 1718.8 - 1722.2 | 13.25 - 13.4     |
| 6.31175 - 6.31225          | 123 - 138             | 2200 - 2300     | 14.47 - 14.5     |
| 8.291 - 8.294              | 149.9 - 150.05        | 2310 - 2390     | 15.35 - 16.2     |
| 8.362 - 8.366              | 156.52475 - 156.52525 | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.7 - 156.9         | 2690 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475          | 162.0125 - 167.17     | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293             | 167.72 - 173.2        | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025        | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 322 - 335.4           | 3600 - 4400     | ( <sup>2</sup> ) |

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

## Test setup

The EUT was placed on a turn table which was 0.8 m (above 1GHz, the high was 1.5m) above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was set 3 m away from the receiving antenna which was mounted on an antenna tower. The measuring antenna moved up and down to find out the maximum emission level. It moved from 1 m to 4 m for both horizontal and vertical polarizations.

The EUT was tested in the Chamber Site. It was pre-scanned with a Peak detector from the spectrum, and all the final readings from the test receiver were measured with the Quasi-Peak detector.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz, Both PK and AV measure, PK detector is used.

The frequency range from 30MHz to 10<sup>th</sup> harmonic are checked. and no any emissions were found from 18GHz to 40 GHz, So the radiated emissions from 18GHz to 40GHz were not record.

Notes: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading-Preamp Factor.

2. Measurement Uncertainty:  $\pm 3.2$  dB at a level of confidence of 95%.

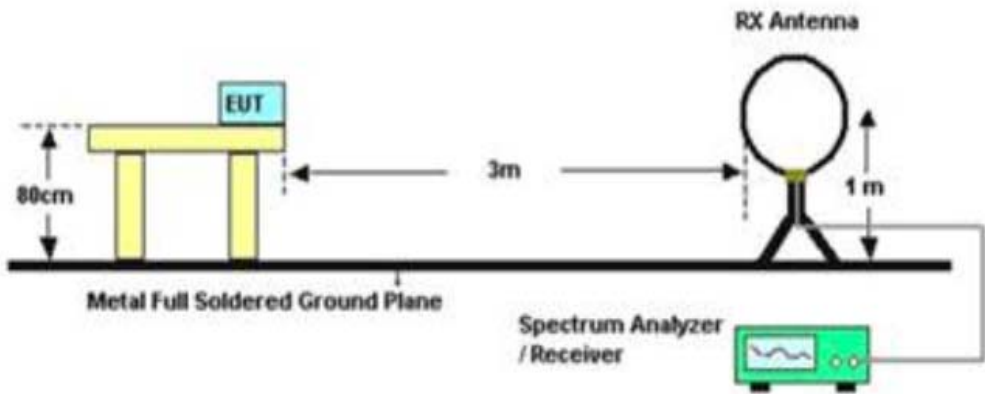
3. For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

4. For emissions below 1GHz, pretest for all mode, The test data of the worst case condition(s) was reported on the following pages.

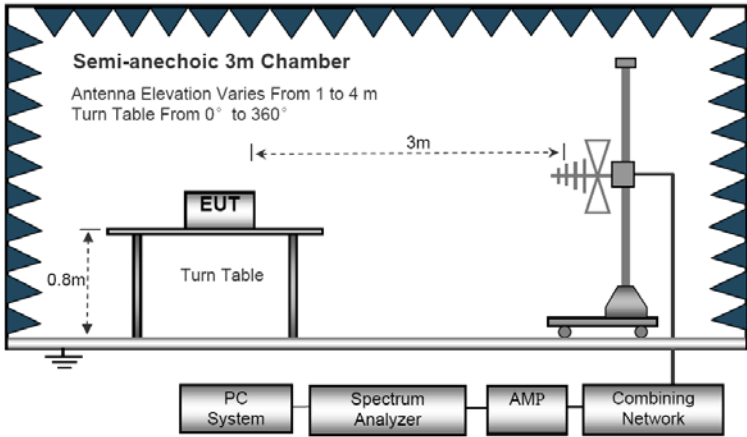
5. For Both PK and AV value above 1GHz, PK detector is used.

# Radiated Emission Test-Up

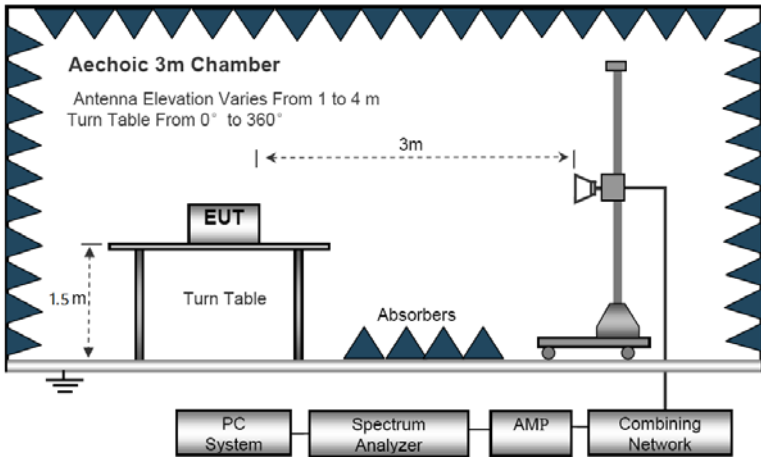
Below 30MHz



Below 1GHz



Above 1GHz



|                |                      |                     |             |
|----------------|----------------------|---------------------|-------------|
| EUT :          | Wi-Fi Range Extender | Model Name :        | JWA-AC2320M |
| Temperature :  | 20℃                  | Relative Humidity : | 48%         |
| Pressure :     | 1010hPa              | Test Mode :         | Link Mode   |
| Test Voltage : | AC 120V/60Hz         |                     |             |

**Below 30MHz**

| Freq. | Reading  | Limit    | Margin | State |
|-------|----------|----------|--------|-------|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB)   | P/F   |
| --    | --       | --       | --     | P     |
| --    | --       | --       | --     | P     |

**Note:**

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

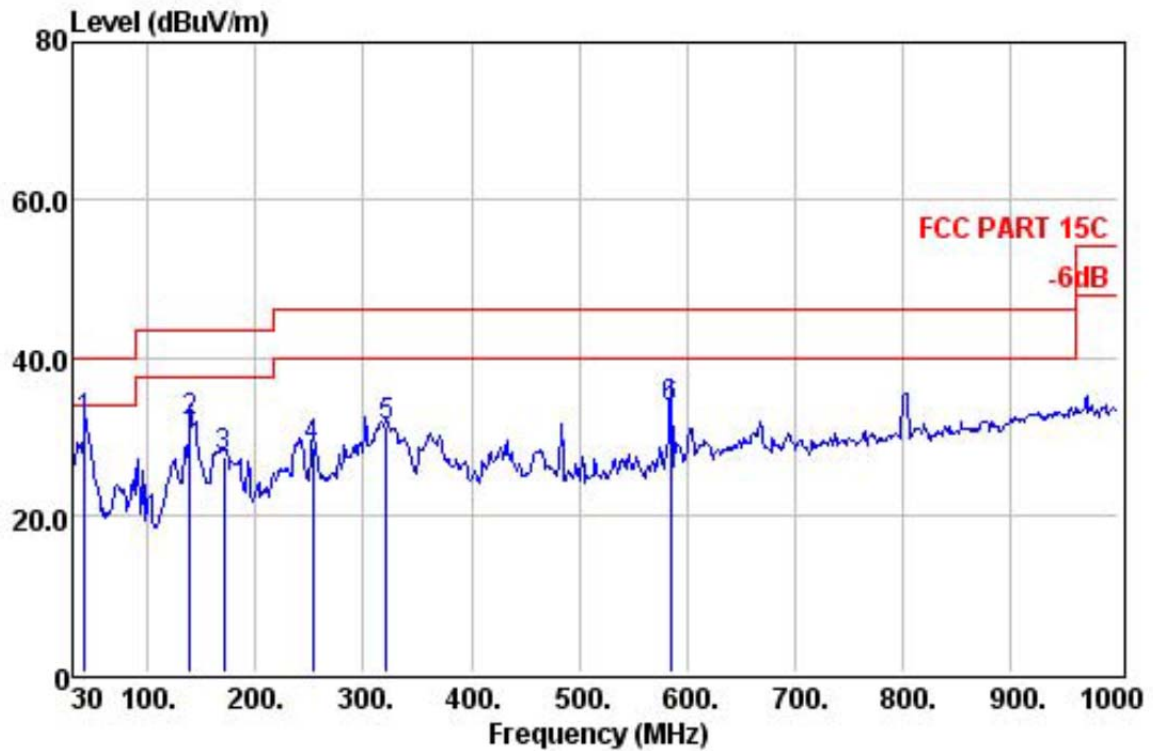
Distance extrapolation factor =  $40 \log (\text{specific distance}/\text{test distance})(\text{dB})$ ;

Limit line = specific limits(dBuv) + distance extrapolation factor.



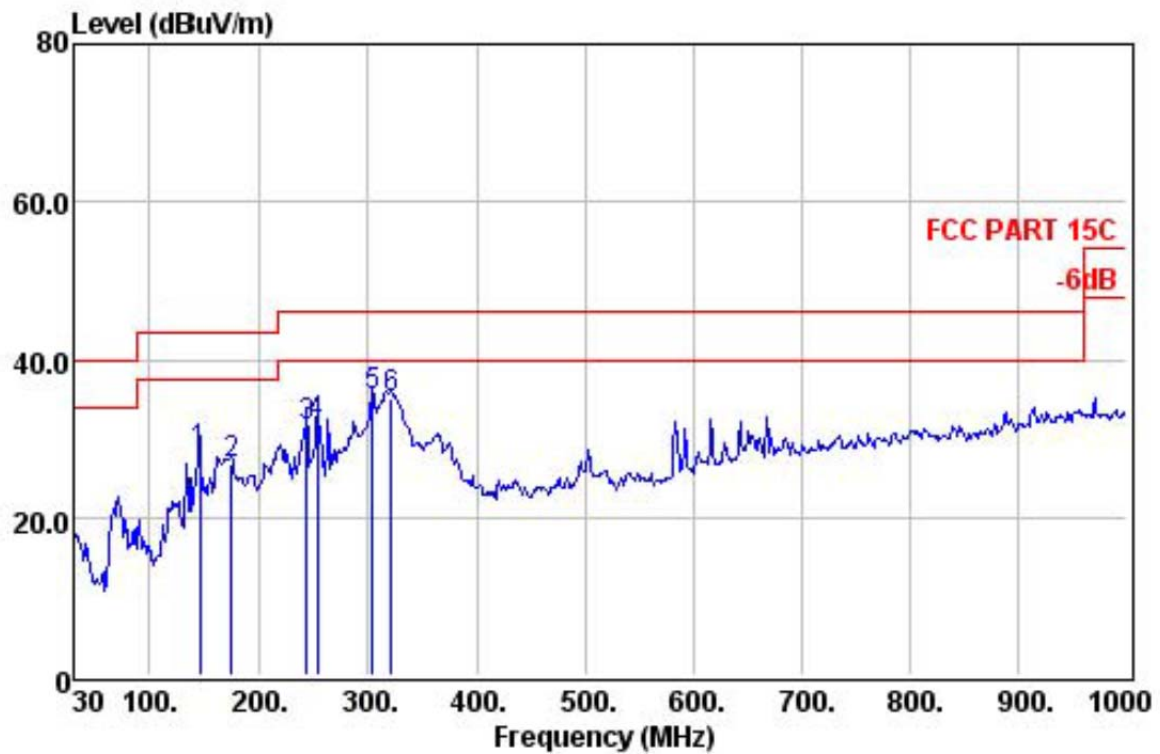
| Below 1GHz     |                      |                     |                  |
|----------------|----------------------|---------------------|------------------|
| EUT :          | Wi-Fi Range Extender | Model Name :        | JWA-AC2320M      |
| Temperature :  | 20℃                  | Relative Humidity : | 48%              |
| Pressure :     | 1010hPa              | Test Mode :         | TX-5180(802.11a) |
| Test Voltage : | AC 120V/60Hz         |                     |                  |

## Vertical



|   | Freq   | Preamp Factor | Antenna Factor | Read Level | Cable Loss | Level  | Limit  | Over Limit | Remark |
|---|--------|---------------|----------------|------------|------------|--------|--------|------------|--------|
|   | MHz    |               | dB/m           | dBuV       | dB         | dBuV/m | dBuV/m | dB         |        |
| 1 | 41.64  | 31.38         | 12.23          | 50.56      | 0.56       | 31.97  | 40.00  | -8.03      | QP     |
| 2 | 138.64 | 31.21         | 8.39           | 53.38      | 1.22       | 31.78  | 43.50  | -11.72     | QP     |
| 3 | 170.65 | 31.19         | 10.12          | 47.14      | 1.30       | 27.37  | 43.50  | -16.13     | QP     |
| 4 | 253.10 | 30.97         | 12.91          | 44.96      | 1.70       | 28.60  | 46.00  | -17.40     | QP     |
| 5 | 321.00 | 30.84         | 14.39          | 45.53      | 2.02       | 31.10  | 46.00  | -14.90     | QP     |
| 6 | 584.84 | 30.73         | 20.11          | 41.17      | 3.20       | 33.75  | 46.00  | -12.25     | QP     |

## Horizontal



|      | Preamp | Antenna | Read  | Cable |        | Limit  | Over  |           |
|------|--------|---------|-------|-------|--------|--------|-------|-----------|
| Freq | Factor | Factor  | Level | Loss  | Level  | Line   | Limit | Remark    |
| MHz  | dB     | dB/m    | dBuV  | dB    | dBuV/m | dBuV/m | dB    |           |
| 1    | 144.46 | 31.23   | 8.67  | 49.53 | 1.22   | 28.19  | 43.50 | -15.31 QP |
| 2    | 173.56 | 31.18   | 10.21 | 46.40 | 1.39   | 26.82  | 43.50 | -16.68 QP |
| 3    | 243.40 | 30.95   | 12.72 | 48.26 | 1.61   | 31.64  | 46.00 | -14.36 QP |
| 4    | 253.10 | 30.97   | 12.91 | 48.32 | 1.70   | 31.96  | 46.00 | -14.04 QP |
| 5    | 303.54 | 30.92   | 13.90 | 50.32 | 1.94   | 35.24  | 46.00 | -10.76 QP |
| 6    | 321.00 | 30.84   | 14.39 | 49.45 | 2.02   | 35.02  | 46.00 | -10.98 QP |

Note: 1. Absolute Level= Reading Level+ antenna Factor + cable loss - Preamp factor,  
 2. Over Limit= Absolute Level – Limit;  
 3. Only the worst case is presented in the report .

| Above 1GHz     |                      |                     |             |
|----------------|----------------------|---------------------|-------------|
| EUT :          | Wi-Fi Range Extender | Model Name :        | JWA-AC2320M |
| Temperature :  | 20°C                 | Relative Humidity : | 48%         |
| Pressure :     | 1010hPa              | Test Mode :         | TX-802.11a  |
| Test Voltage : | AC 120V/60HZ         |                     |             |

| Polar<br>(H/V) | Frequency | Meter<br>Reading | Antenna<br>Factor | Cable<br>loss | Preamp<br>factor | Emission<br>Level | Limits   | Margin | Remark  |
|----------------|-----------|------------------|-------------------|---------------|------------------|-------------------|----------|--------|---------|
|                | (MHz)     | (dBuV)           | (dB)              | (dB)          | (dB)             | (dBuV/m)          | (dBuV/m) | (dB)   |         |
| 802.11a-5180   |           |                  |                   |               |                  |                   |          |        |         |
| V              | 10360     | 32.63            | 23.99             | 17.04         | 28.84            | 44.82             | 54       | -9.18  | Average |
| V              | 10360     | 45.33            | 23.99             | 17.04         | 28.84            | 57.52             | 74       | -16.48 | Peak    |
| V              | 15540     | 29.65            | 23.53             | 20.34         | 29.63            | 43.89             | 54       | -10.11 | Average |
| V              | 15540     | 39.85            | 23.53             | 20.34         | 29.63            | 54.09             | 74       | -19.91 | Peak    |
| H              | 10360     | 31.41            | 23.99             | 17.04         | 28.84            | 43.6              | 54       | -10.4  | Average |
| H              | 10360     | 42.67            | 23.99             | 17.04         | 28.84            | 54.86             | 74       | -19.14 | Peak    |
| H              | 15540     | 26.85            | 23.53             | 20.34         | 29.63            | 41.09             | 54       | -12.91 | Average |
| H              | 15540     | 36.24            | 23.53             | 20.34         | 29.63            | 50.48             | 74       | -23.52 | Peak    |
| 802.11a-5200   |           |                  |                   |               |                  |                   |          |        |         |
| V              | 10400     | 31.53            | 24.04             | 17.04         | 28.84            | 43.77             | 54       | -10.23 | Average |
| V              | 10400     | 42.85            | 24.04             | 17.04         | 28.84            | 55.09             | 74       | -18.91 | Peak    |
| V              | 15600     | 30.35            | 23.79             | 20.39         | 29.64            | 44.89             | 54       | -9.11  | Average |
| V              | 15600     | 39.86            | 23.79             | 20.39         | 29.64            | 54.4              | 74       | -19.6  | Peak    |
| H              | 10400     | 32.14            | 24.04             | 17.04         | 28.84            | 44.38             | 54       | -9.62  | Average |
| H              | 10400     | 43.65            | 24.04             | 17.04         | 28.84            | 55.89             | 74       | -18.11 | Peak    |
| H              | 15600     | 28.48            | 23.79             | 20.39         | 29.64            | 43.02             | 54       | -10.98 | Average |
| H              | 15600     | 38.52            | 23.79             | 20.39         | 29.64            | 53.06             | 74       | -20.94 | Peak    |
| 802.11a-5240   |           |                  |                   |               |                  |                   |          |        |         |
| V              | 10480     | 31.39            | 25.17             | 17.06         | 28.85            | 44.77             | 54       | -9.23  | Average |
| V              | 10480     | 43.46            | 25.17             | 17.06         | 28.85            | 56.84             | 74       | -17.16 | Peak    |
| V              | 15720     | 31.65            | 24.25             | 20.45         | 29.67            | 46.68             | 54       | -7.32  | Average |
| V              | 15720     | 38.71            | 24.25             | 20.45         | 29.67            | 53.74             | 74       | -20.26 | Peak    |
| H              | 10480     | 30.77            | 25.17             | 17.06         | 28.85            | 44.15             | 54       | -9.85  | Average |
| H              | 10480     | 43.98            | 25.17             | 17.06         | 28.85            | 57.36             | 74       | -16.64 | Peak    |
| H              | 15720     | 28.51            | 24.25             | 20.45         | 29.67            | 43.54             | 54       | -10.46 | Average |
| H              | 15720     | 38.53            | 24.25             | 20.45         | 29.67            | 53.56             | 74       | -20.44 | Peak    |

**Note:**

Absolute Level= Reading Level+antenna Factor+cable loss-preamp factor,

Over Limit= Absolute Level – Limit

“802.11a” mode is the worst mode and show in the report. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has not to be reported.

## 5. BAND EDGE COMPLIANCE TEST

### 5.1.Limits

All emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

### 5.2.Test setup

Test method: FCC KDB 789033 G)& Parts 15.407(b)(4) & 15.209(a)

Same as Clause 4.2.

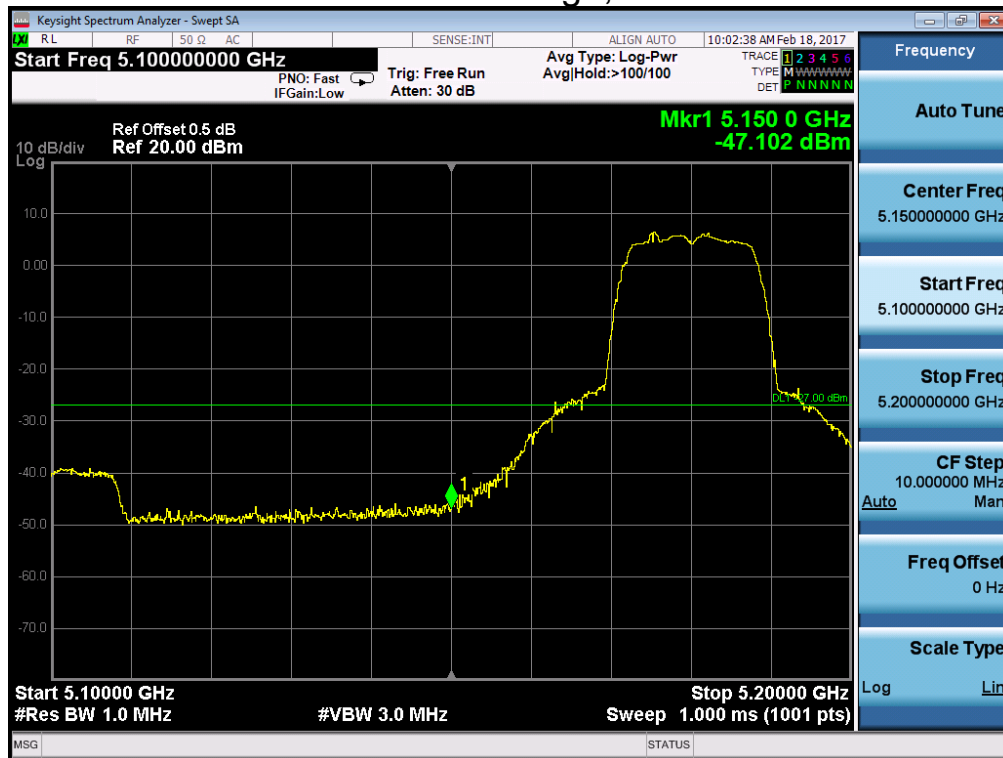
### 5.3.Test Data

| Frequency<br>(MHz) | Meter<br>Reading<br>(dBμV) | antenna<br>Factor<br>(dB) | cable<br>loss<br>(dB) | preamp<br>factor<br>(dB) | Emission<br>Level<br>(dBμV/m) | EIRP<br>[dBm] | Limit<br>[dBm] | Result | Comment    |
|--------------------|----------------------------|---------------------------|-----------------------|--------------------------|-------------------------------|---------------|----------------|--------|------------|
| 802.11a            |                            |                           |                       |                          |                               |               |                |        |            |
| 5150               | 35.12                      | 28.66                     | 12.93                 | 27.62                    | 49.09                         | -46.11        | -27.00         | Pass   | Vertical   |
| 5350               | 35.55                      | 28.73                     | 13.09                 | 27.62                    | 49.75                         | -45.45        | -27.00         | Pass   | Vertical   |
| 5150               | 31.75                      | 27.63                     | 15.16                 | 27.67                    | 46.87                         | -48.33        | -27.00         | Pass   | Horizontal |
| 5350               | 32.98                      | 27.82                     | 15.66                 | 27.68                    | 48.78                         | -46.42        | -27.00         | Pass   | Horizontal |
| 802.11n(HT20)      |                            |                           |                       |                          |                               |               |                |        |            |
| 5150               | 34.84                      | 28.66                     | 12.93                 | 27.62                    | 48.81                         | -46.39        | -27.00         | Pass   | Vertical   |
| 5350               | 34.12                      | 28.73                     | 13.09                 | 27.62                    | 48.32                         | -46.88        | -27.00         | Pass   | Vertical   |
| 5150               | 30.34                      | 27.63                     | 15.16                 | 27.67                    | 45.46                         | -49.74        | -27.00         | Pass   | Horizontal |
| 5350               | 31.65                      | 27.82                     | 15.66                 | 27.68                    | 47.45                         | -47.75        | -27.00         | Pass   | Horizontal |
| 802.11n(HT40)      |                            |                           |                       |                          |                               |               |                |        |            |
| 5150               | 34.12                      | 28.66                     | 12.93                 | 27.62                    | 48.09                         | -47.11        | -27.00         | Pass   | Vertical   |
| 5350               | 34.35                      | 28.73                     | 13.09                 | 27.62                    | 48.55                         | -46.65        | -27.00         | Pass   | Vertical   |
| 5150               | 30.74                      | 27.63                     | 15.16                 | 27.67                    | 45.86                         | -49.34        | -27.00         | Pass   | Horizontal |
| 5350               | 31.43                      | 27.82                     | 15.66                 | 27.68                    | 47.23                         | -47.97        | -27.00         | Pass   | Horizontal |

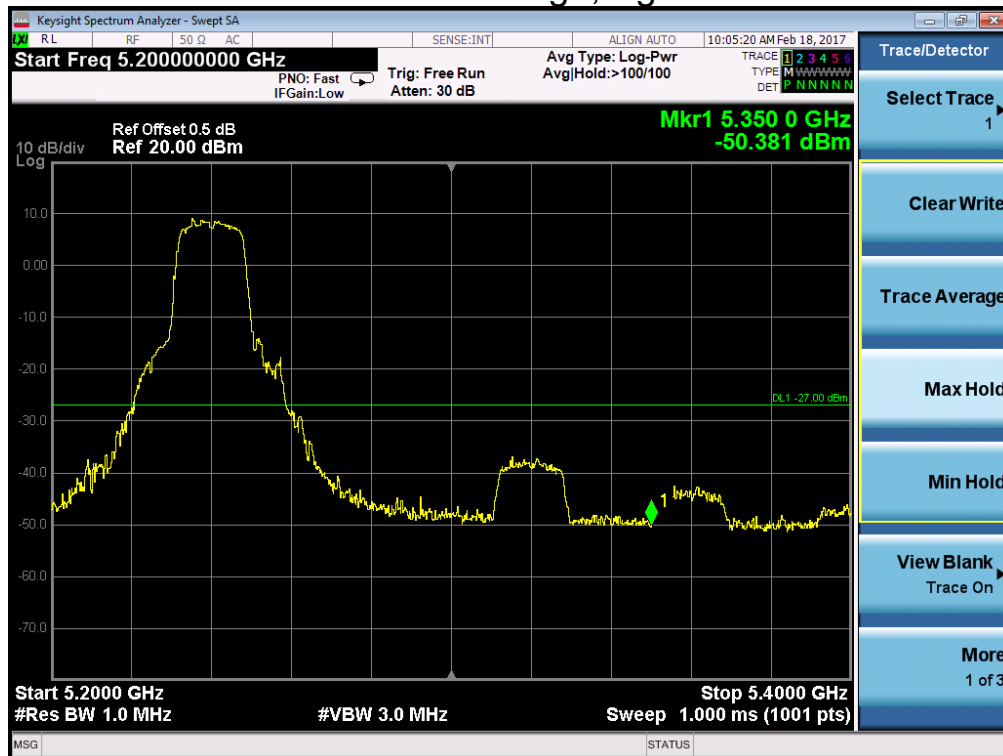
Remark: 1. According to KDB 789033 D02section H) d) (iii), for measurement above 1000MHz@3m distance, the limit of EIRP is calculated as follows:  $EIRP[dBm] = E[dBμV/m] - 95.2$

For conducted test:

### 802.11a: Band Edge, Left Side

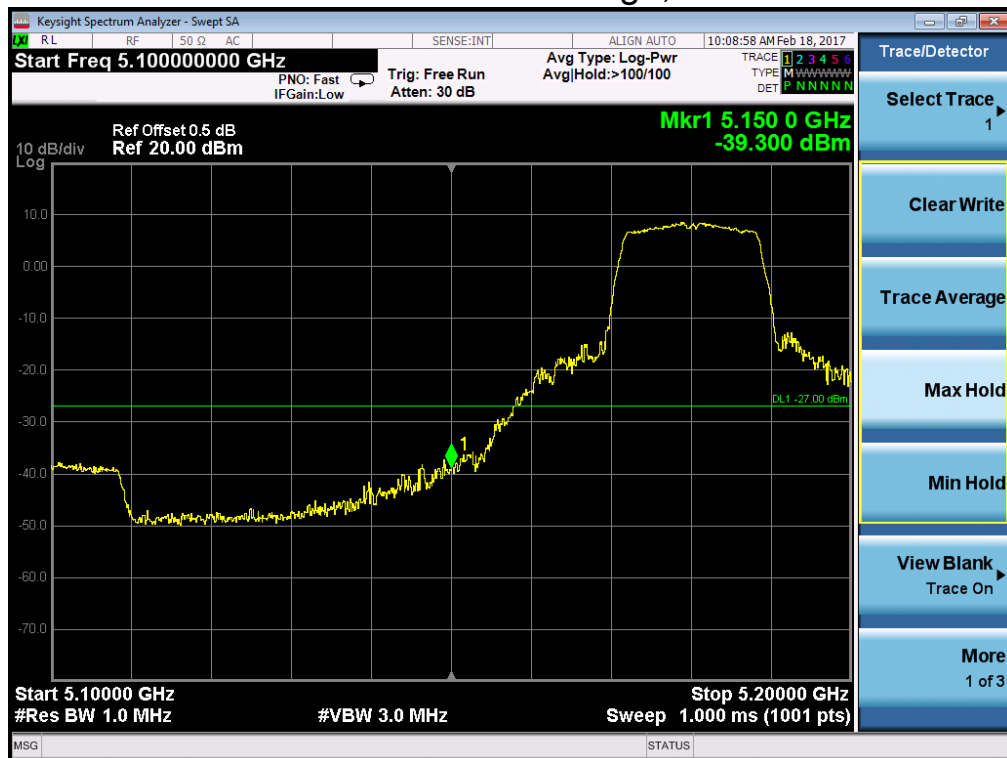


### 802.11a: Band Edge, Right Side

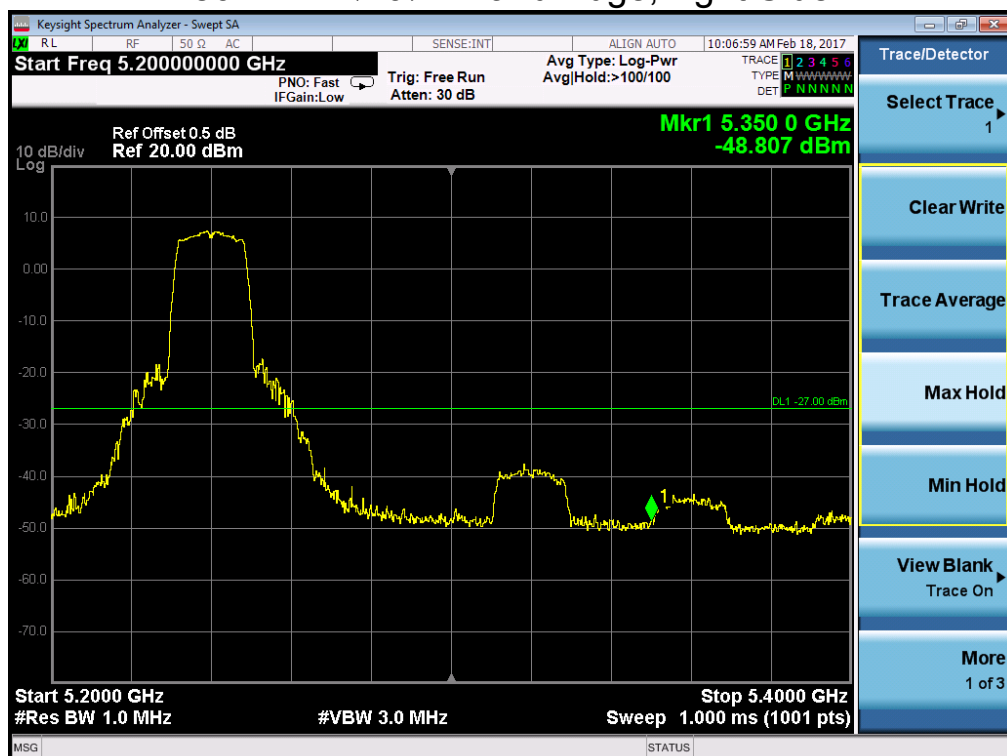


Note: EIRP BAND EDGE=Reading Level+antenna gain

## 802.11n (20) : Band Edge, Left Side



## 802.11n (20) : Band Edge, Right Side



Note: EIRP BAND EDGE=Reading Level+antenna gain

## 802.11n (40) : Band Edge, Left Side



## 802.11n (40) : Band Edge, Right Side



Note: EIRP BAND EDGE=Reading Level+antenna gain

## 6. 26DB AND 6DB BANDWIDTH TEST

### 6.1.Applicable Standard

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033, at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth.

The 26 dB bandwidth is used to determine the conducted power limits.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

### 6.2.Test Procedure

#### 1. Emission Bandwidth (EBW)

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

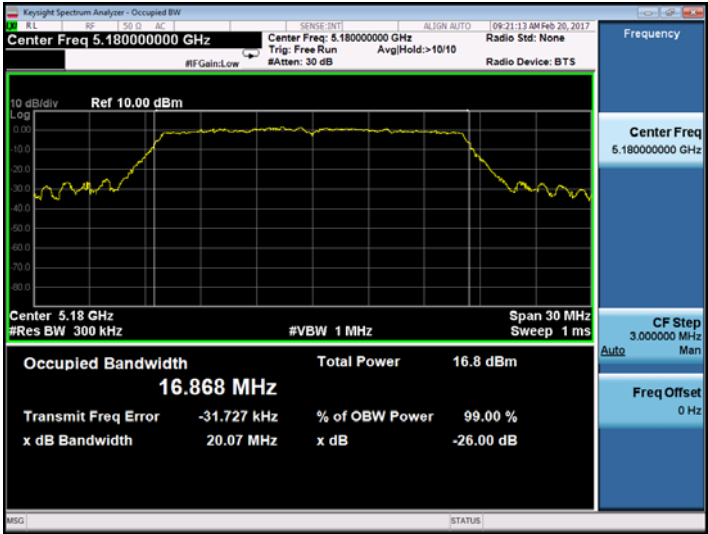
### 6.3.Test setup





| Mode           | Channel number | Frequency (MHz) | 26dB Bandwidth (MHz) |
|----------------|----------------|-----------------|----------------------|
| 802.11a        | 36             | 5180            | 20.07                |
|                | 40             | 5200            | 26.80                |
|                | 48             | 5240            | 23.39                |
| 802.11n (HT20) | 36             | 5180            | 27.00                |
|                | 40             | 5200            | 25.79                |
|                | 48             | 5240            | 21.06                |
| 802.11n (HT40) | 38             | 5190            | 40.18                |
|                | 46             | 5230            | 40.26                |

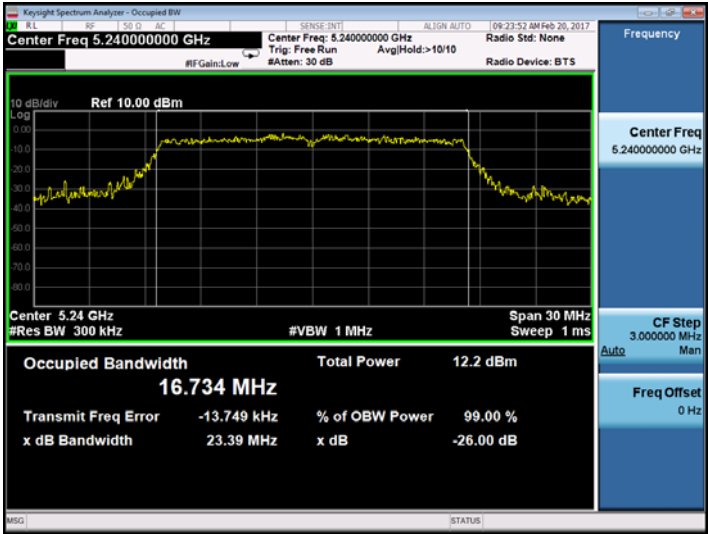
802.11a mode-ch36



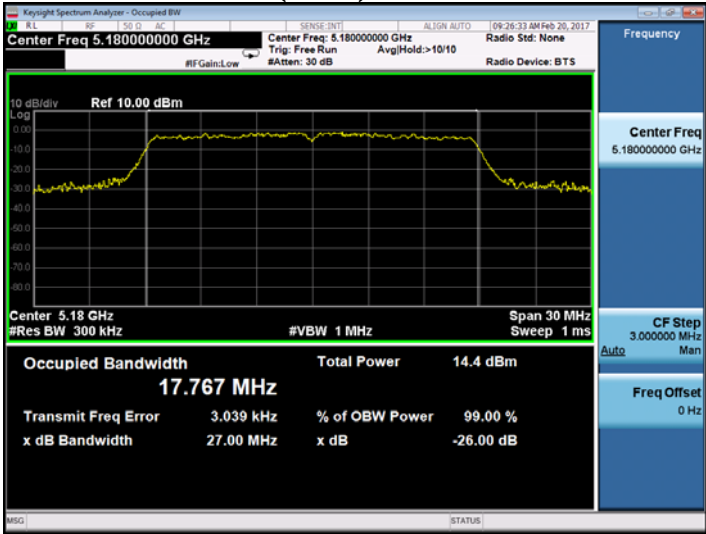
802.11a mode-ch40



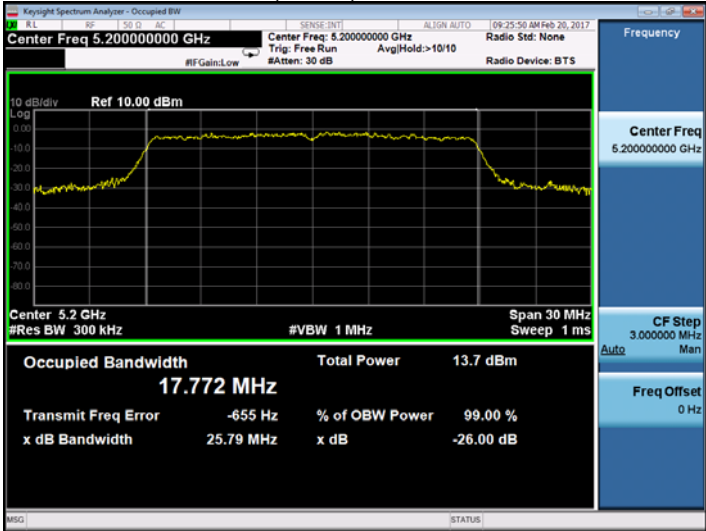
802.11a mode-ch48



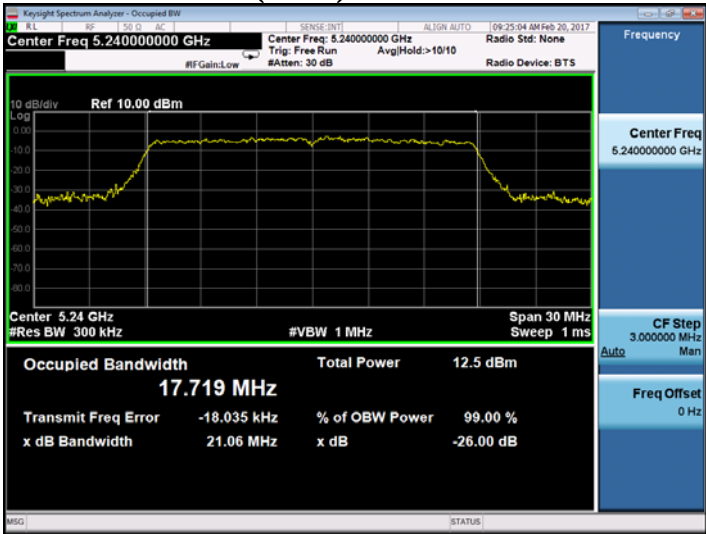
802.11n(HT20) mode-ch36



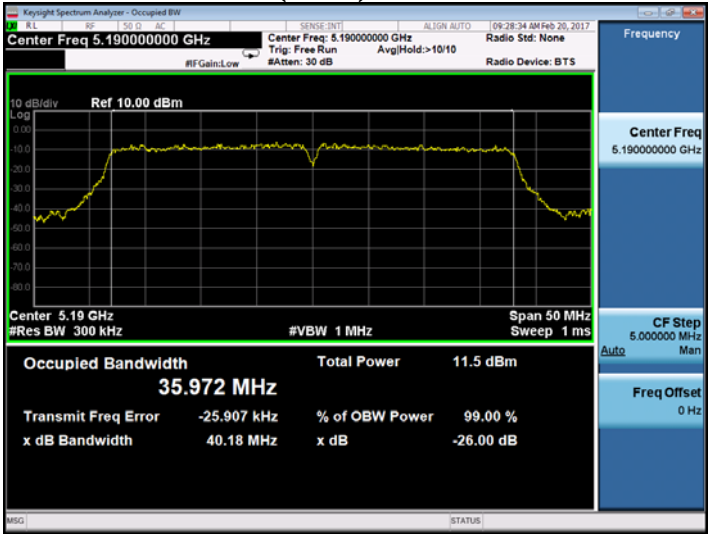
802.11 n(HT20) mode-ch40



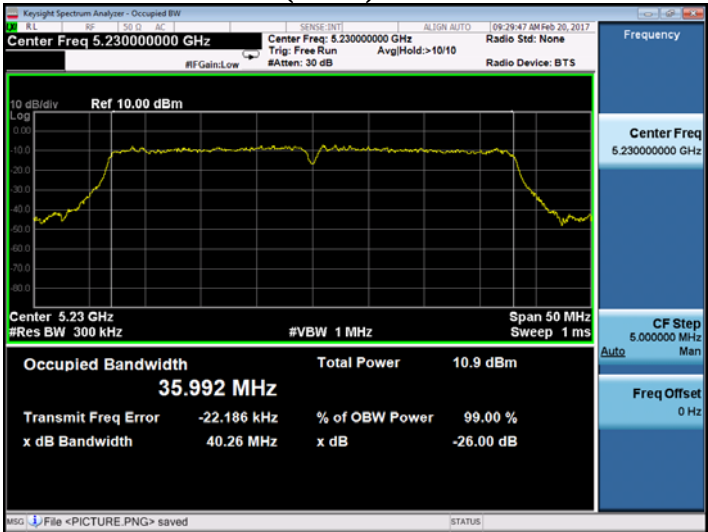
802.11 n(HT20) mode-ch48



802.11n(HT40) mode-ch38



802.11 n(HT40) mode-ch46



## 7. OUTPUT POWER TEST

### 7.1.Limits

Band 5.15-5.25GHz:

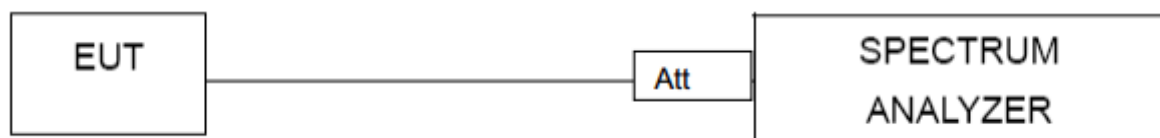
FCC: For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

### 7.2.Test setup

1. The maximum average conducted output power can be measured using Method PM-G (Measurement using a gated RF average power meter):
2. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
  - a. The Transmitter output (antenna port) was connected to the power meter.
  - b. Turn on the EUT and power meter and then record the power value.
  - c. Repeat above procedures on all channels needed to be tested.



Duty cycle



### 7.3.Test result

|                   | Frequency<br>(MHz) | Average Output<br>Power<br>(dBm) | FCC Limit<br>(dBm) | Result |
|-------------------|--------------------|----------------------------------|--------------------|--------|
| 802.11a           | 5180               | 11.17                            | 24                 | Pass   |
|                   | 5200               | 10.62                            | 24                 | Pass   |
|                   | 5240               | 11.14                            | 24                 | Pass   |
| 802.11n<br>(HT20) | 5180               | 11.39                            | 24                 | Pass   |
|                   | 5200               | 11.14                            | 24                 | Pass   |
|                   | 5240               | 10.57                            | 24                 | Pass   |
| 802.11n<br>(HT40) | 5190               | 10.21                            | 24                 | Pass   |
|                   | 5230               | 11.32                            | 24                 | Pass   |

NOTE: During the test the EUT is in 100% duty cycle transmitting.

## 8. DUTY CYCLE

### 8.1. Test Procedure

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set  $RBW \geq OBW$  if possible; otherwise, set RBW to the largest available value. Set  $VBW \geq RBW$ . Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are  $> 50/T$  and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if  $T \leq 16.7$  microseconds.)

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

Span = Zero Span

RBW = 8MHz

VBW = 50MHz

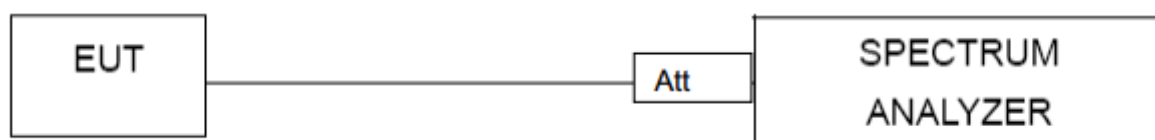
Number of points in Sweep  $> 100$

Detector function = peak

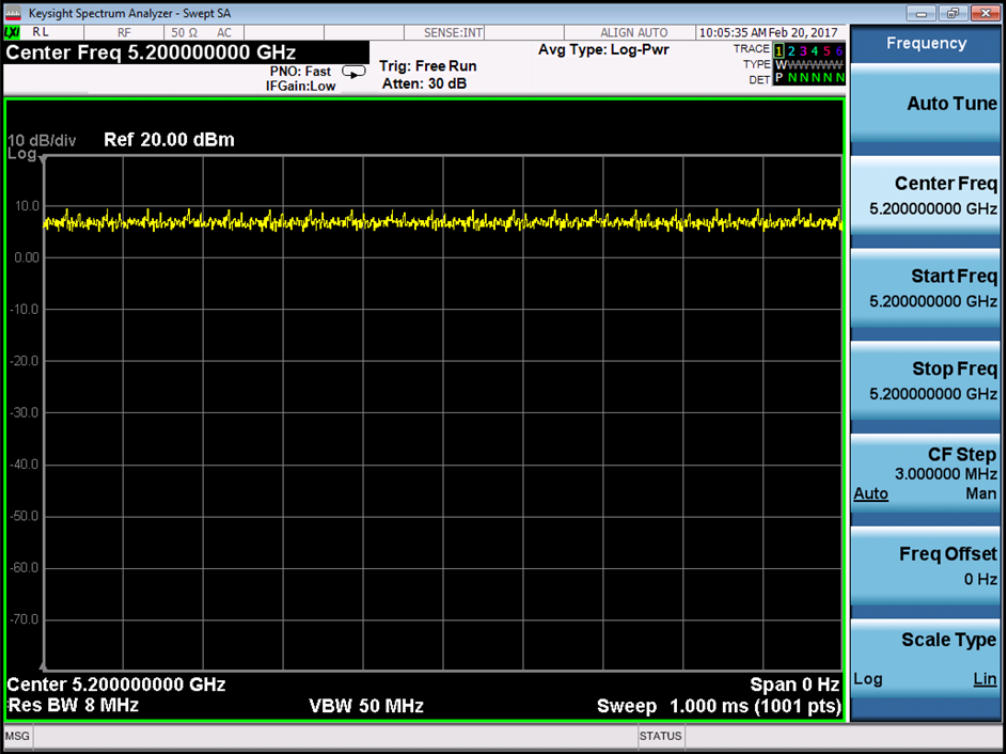
Trace = Clear write Measure Ttotal and Ton

Calculate Duty Cycle =  $T_{on} / T_{total}$  and Duty Cycle Factor =  $10 \cdot \log(1/\text{Duty Cycle})$

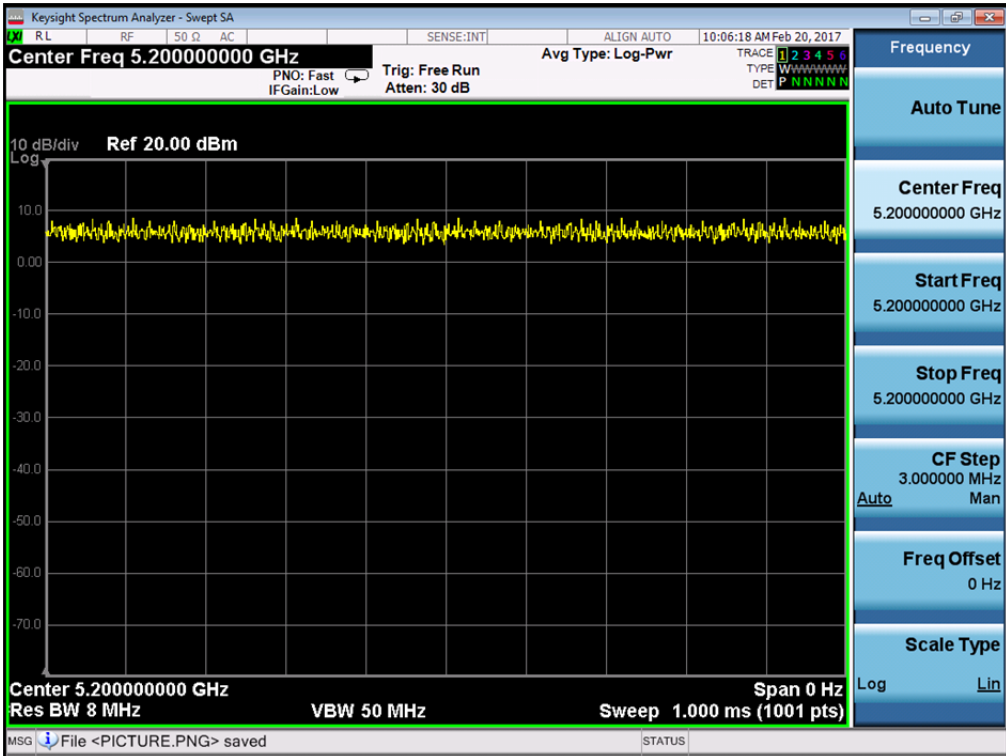
### 8.2. Test Setup



Test plot of Duty Cycle for 802.11a

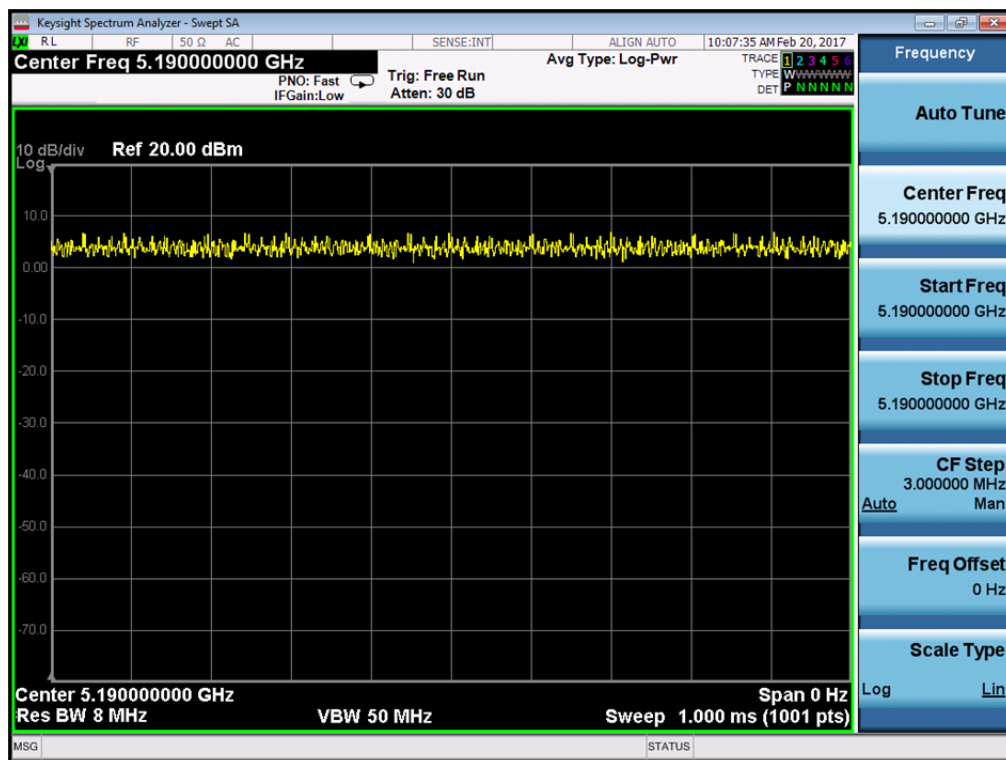


Test plot of Duty Cycle for 802.11n(HT20)





## Test plot of Duty Cycle for 802.11n(HT40)



## 9. PEAK POWER SPECTRAL DENSITY TEST

### 9.1.Limits

Band 5.15-5.25GHz:

FCC: In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

### 9.2.Test setup

Methods refer to FCC KDB 789033

- 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-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...".
- 2) Use the peak search function on the instrument to find the peak of the spectrum.
- 3) The result is the PPSD.
- 4) The above procedures make use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified in the 15.407(a)(5). That rule section also permits use of resolution bandwidths less than 1 MHz "provided that the measured power is integrated to show the total power over the measurement bandwidth" (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth



### 9.3. Test data

Test data as below

| Mode              | Frequency<br>(MHz) | Power Density. | FCC Limit<br>(dBm) |
|-------------------|--------------------|----------------|--------------------|
| 802.11a           | 5180               | 0.504          | 11                 |
|                   | 5200               | 3.241          | 11                 |
|                   | 5240               | 2.350          | 11                 |
| 802.11n<br>(HT20) | 5180               | 2.012          | 11                 |
|                   | 5200               | 1.498          | 11                 |
|                   | 5240               | 0.574          | 11                 |
| 802.11n<br>(HT40) | 5190               | 3.865          | 11                 |
|                   | 5230               | 2.487          | 11                 |

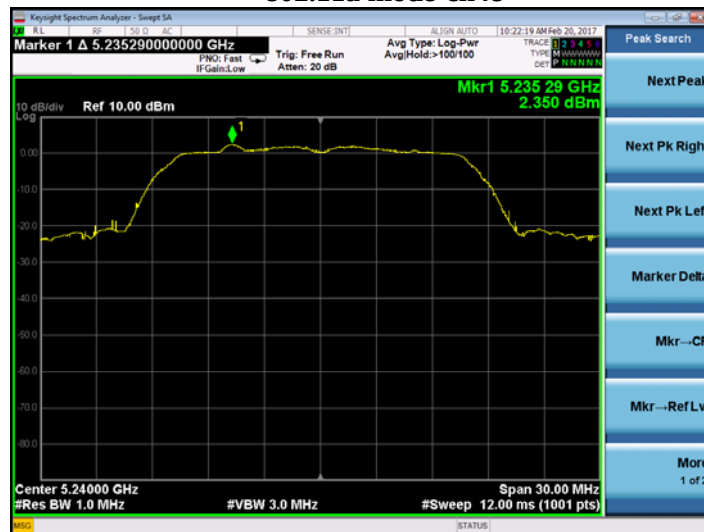
## 802.11a mode-ch36



## 802.11a mode-ch40



## 802.11a mode-ch48



802.11n(HT20) mode-ch36



802.11 n(HT20) mode-ch40



802.11 n(HT20) mode-ch48



802.11n(HT40) mode-ch38



802.11 n(HT40) mode-ch46

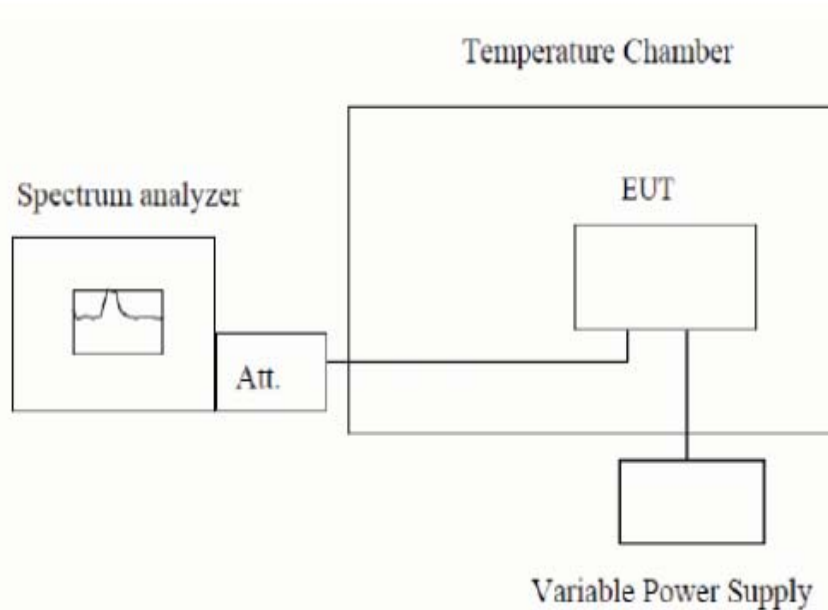


## 10. FREQUENCY STABILITY TEST

### 10.1.Limit

According to §15.407(g), 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.

### 10.2.Test Configuration



### 10.3.Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and max hold settings.
5.  $f_c$  is declaring of channel frequency. Then the frequency error formula is  $(f_c - f)/f_c \times 10^6$  ppm and the limit is less than  $\pm 20$  ppm (IEEE 802.11 specification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature rule is  $-30^\circ\text{C} \sim 50^\circ\text{C}$ .

## 10.4.Test result

Measurement Data (the worst model was 802.11a):

Frequency Stability under Temperature

| Operating Frequency: 5180 MHz |            |                         |                   |                      |
|-------------------------------|------------|-------------------------|-------------------|----------------------|
| Environment Temperature(oC)   | Voltage(V) | Measured Frequency(MHz) | Test Result (MHz) | Max. Deviation (ppm) |
| 50                            | 120        | 5180                    | 5180.0141         | 2.722                |
| 40                            | 120        | 5180                    | 5180.0201         | 3.880                |
| 30                            | 120        | 5180                    | 5180.0135         | 2.606                |
| 20                            | 120        | 5180                    | 5180.0137         | 2.645                |
| 10                            | 120        | 5180                    | 5180.0122         | 2.355                |
| 0                             | 120        | 5180                    | 5180.0153         | 2.954                |
| -10                           | 120        | 5180                    | 5180.0114         | 2.201                |
| -20                           | 120        | 5180                    | 5180.0146         | 2.819                |
| -30                           | 120        | 5180                    | 5180.0127         | 2.452                |

Frequency Stability under Voltage

| Operating Frequency: 5180 MHz |                         |                  |                     |
|-------------------------------|-------------------------|------------------|---------------------|
| DC Voltage(V)                 | Measured Frequency(MHz) | Test Result(MHz) | Max. Deviation(ppm) |
| 108                           | 5180                    | 5180.0153        | 2.954               |
| 120                           | 5180                    | 5180.0241        | 4.653               |
| 132                           | 5180                    | 5180.0152        | 2.934               |



## Frequency Stability under Temperature

| Operating Frequency: 5200 MHz |            |                         |                   |                      |
|-------------------------------|------------|-------------------------|-------------------|----------------------|
| Environment Temperature(oC)   | Voltage(V) | Measured Frequency(MHz) | Test Result (MHz) | Max. Deviation (ppm) |
| 50                            | 120        | 5200                    | 5200.0336         | 6.462                |
| 40                            | 120        | 5200                    | 5200.0274         | 5.269                |
| 30                            | 120        | 5200                    | 5200.0327         | 6.288                |
| 20                            | 120        | 5200                    | 5200.0283         | 5.442                |
| 10                            | 120        | 5200                    | 5200.0239         | 4.596                |
| 0                             | 120        | 5200                    | 5200.0247         | 4.750                |
| -10                           | 120        | 5200                    | 5200.0313         | 6.019                |
| -20                           | 120        | 5200                    | 5200.0239         | 4.596                |
| -30                           | 120        | 5200                    | 5200.0374         | 7.192                |

## Frequency Stability under Voltage

| Operating Frequency: 5200 MHz |                         |                  |                     |
|-------------------------------|-------------------------|------------------|---------------------|
| DC Voltage(V)                 | Measured Frequency(MHz) | Test Result(MHz) | Max. Deviation(ppm) |
| 108                           | 5200                    | 5200.0289        | 5.558               |
| 120                           | 5200                    | 5200.0342        | 6.577               |
| 132                           | 5200                    | 5200.0351        | 6.750               |

## Frequency Stability under Temperature

| Operating Frequency: 5240 MHz |            |                         |                   |                      |
|-------------------------------|------------|-------------------------|-------------------|----------------------|
| Environment Temperature(oC)   | Voltage(V) | Measured Frequency(MHz) | Test Result (MHz) | Max. Deviation (ppm) |
| 50                            | 120        | 5240                    | 5240.0315         | 6.011                |
| 40                            | 120        | 5240                    | 5240.0368         | 7.023                |
| 30                            | 120        | 5240                    | 5240.0327         | 6.240                |
| 20                            | 120        | 5240                    | 5240.0341         | 6.508                |
| 10                            | 120        | 5240                    | 5240.0295         | 5.630                |
| 0                             | 120        | 5240                    | 5240.0313         | 5.973                |
| -10                           | 120        | 5240                    | 5240.0323         | 6.164                |
| -20                           | 120        | 5240                    | 5240.0305         | 5.821                |
| -30                           | 120        | 5240                    | 5240.0297         | 5.668                |

## Frequency Stability under Voltage

| Operating Frequency: 5240 MHz |                         |                  |                     |
|-------------------------------|-------------------------|------------------|---------------------|
| DC Voltage(V)                 | Measured Frequency(MHz) | Test Result(MHz) | Max. Deviation(ppm) |
| 108                           | 5240                    | 5240.0342        | 6.527               |
| 120                           | 5240                    | 5240.0297        | 5.668               |
| 132                           | 5240                    | 5240.0341        | 6.508               |

## **11.ANTENNA REQUIREMENTS**

### **11.1.Limits**

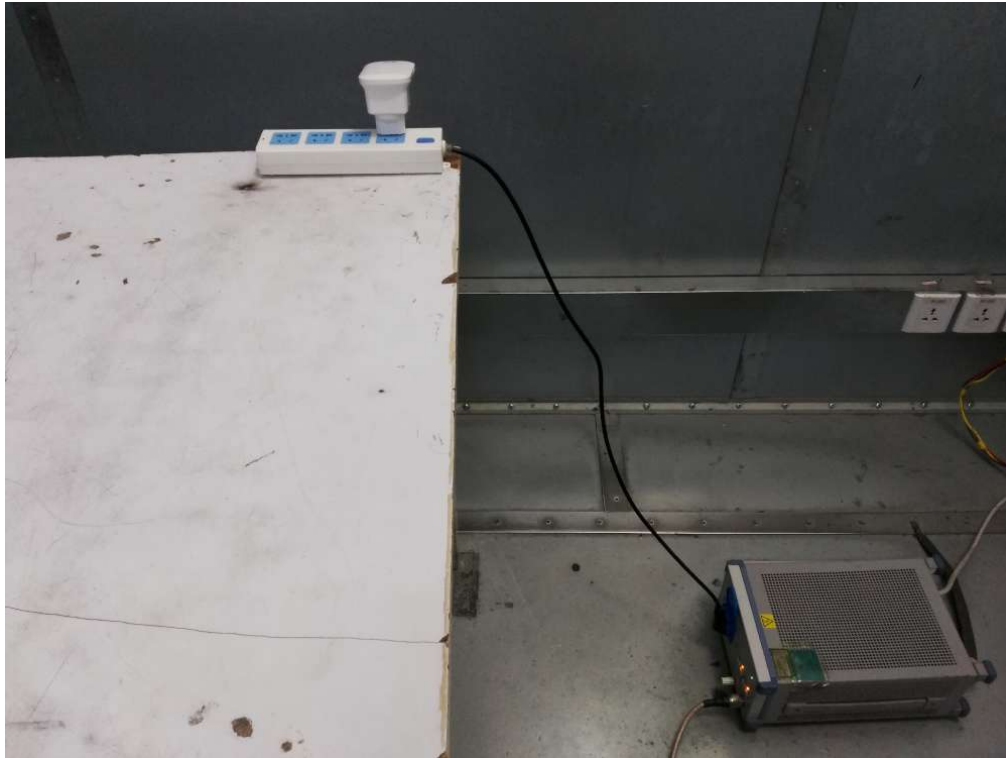
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **11.2.Result**

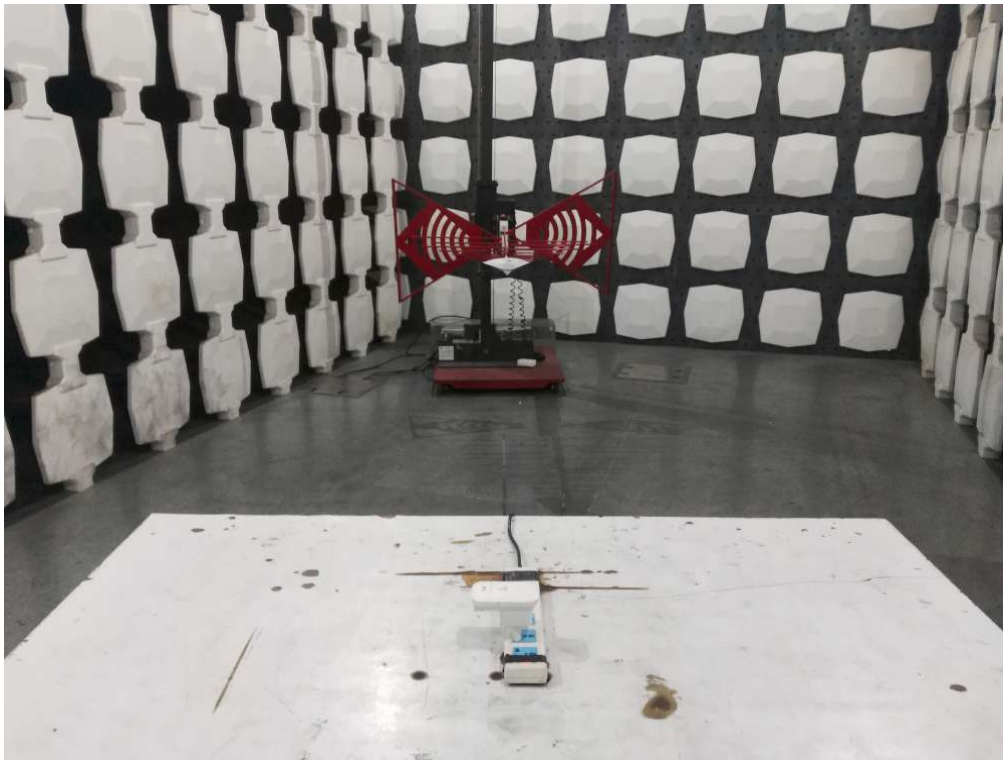
The antenna used for this product is PIFA Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 2.29dBi.

## 12.PHOTOGRAPHS OF TEST SET-UP

### Conducted Emission



## Radiated Emission Test



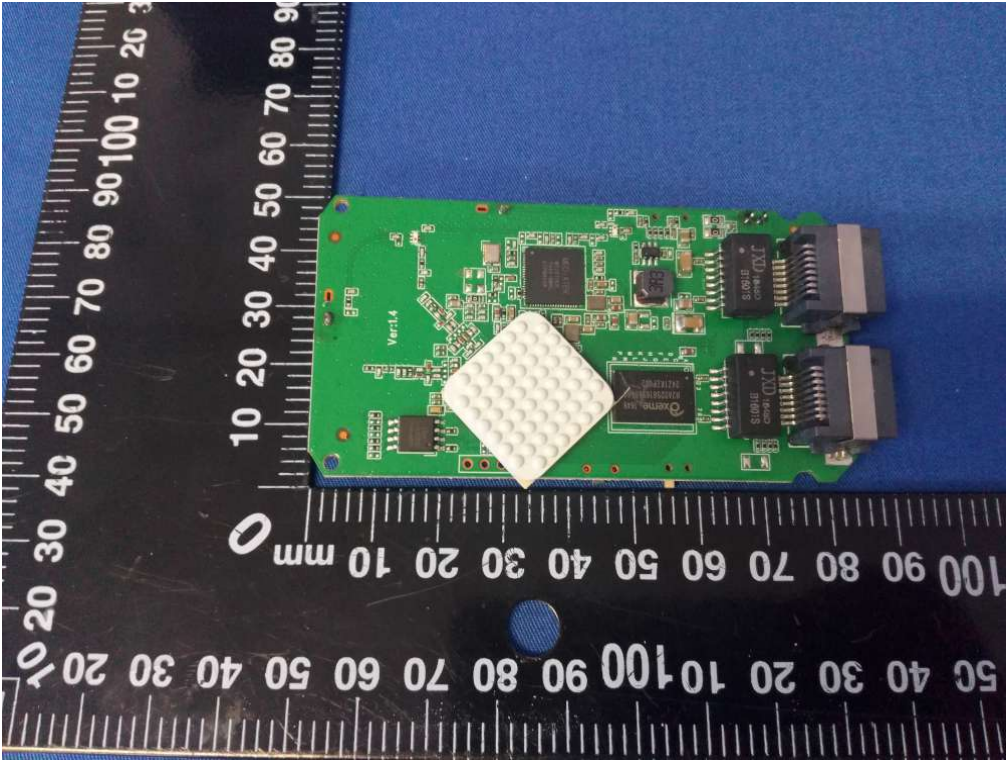
### 13. PHOTOGRAPHS OF THE EUT



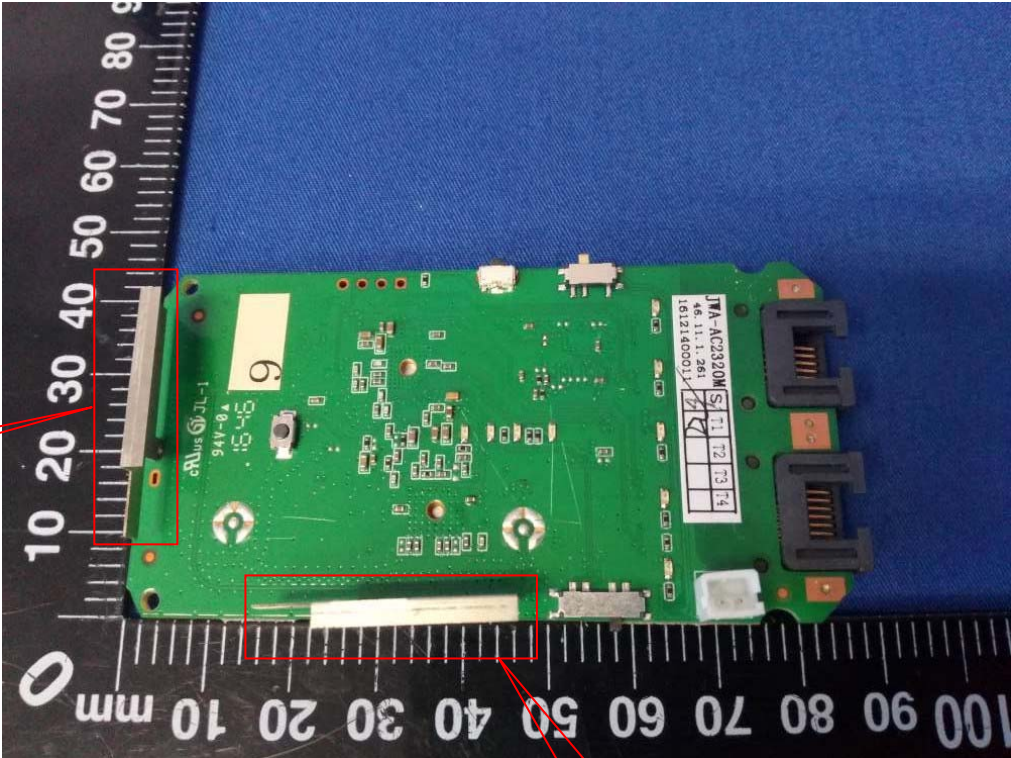


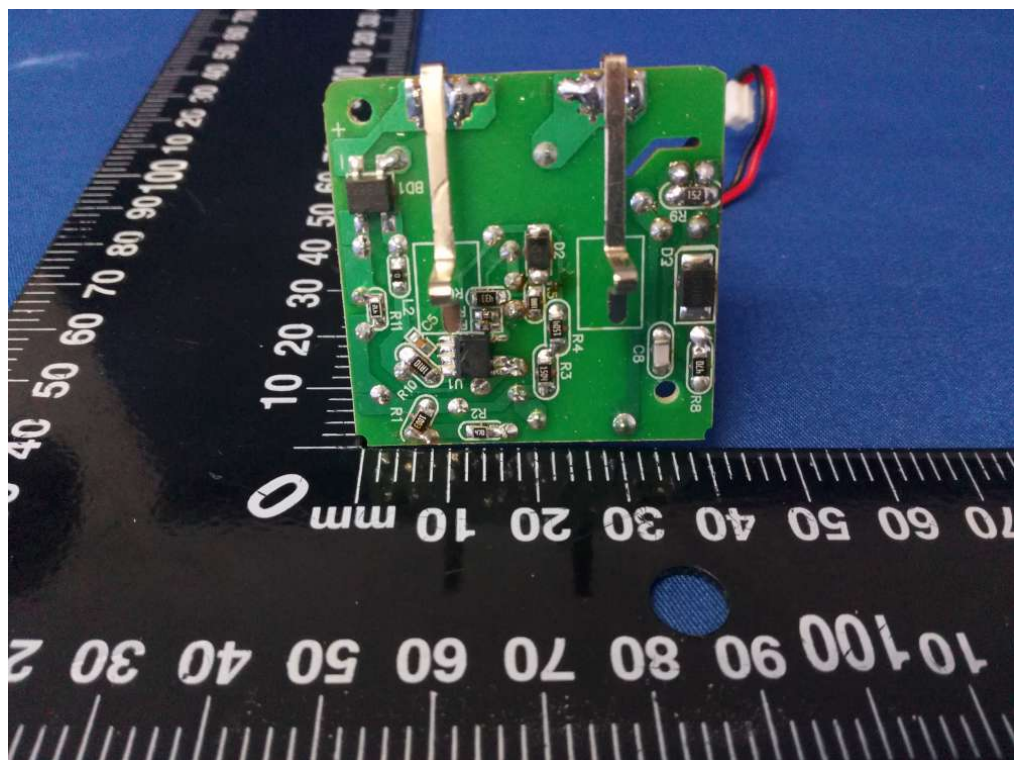
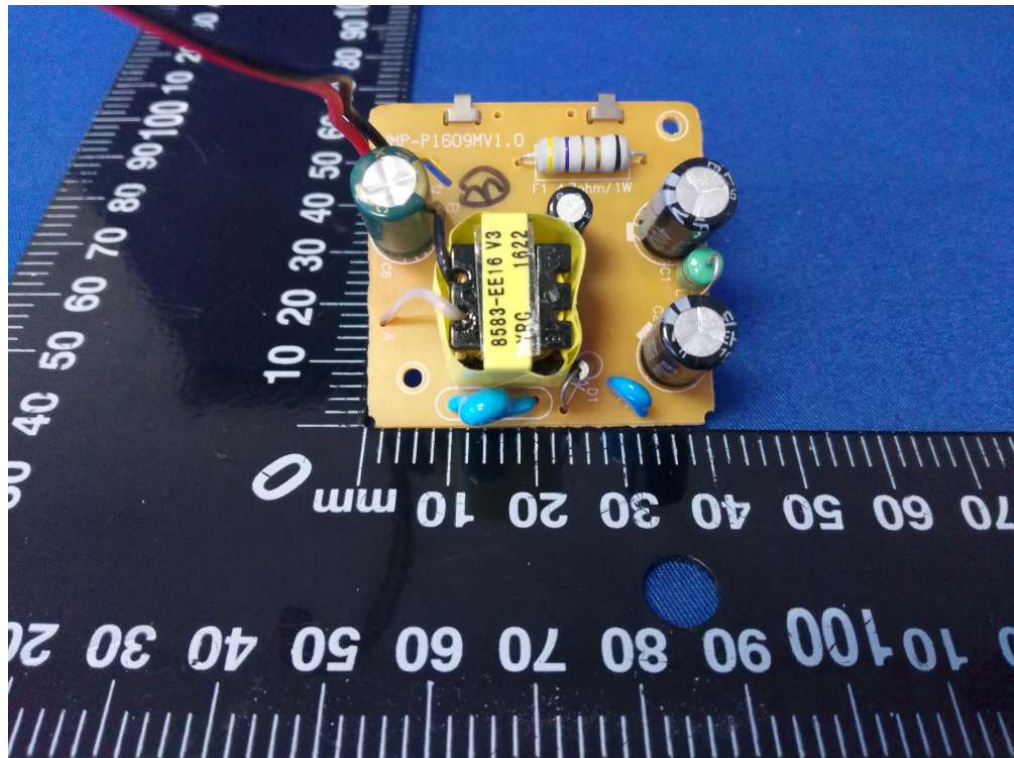












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