
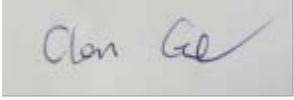


# RF TEST REPORT



Report No.: FCC\_RF\_SL16040101-AER-001\_UNII\_Rev. 1.0  
Supersede Report No.: None

|  |   |   |
|--|---|---|
| Applicant  | : | Aerohive Networks, Inc.   |
| Product Name   | : | Access Point  |
| Model No.  | : | AP245X  |
| Test Standard  | : | 47 CFR 15.407   |
| Test Method  | : | ANSI C63.4: 2014<br>789033 D02 General UNII Test Procedures New Rules v01 |
| FCC ID   | : | WBV-AP245   |
| IC ID  | : | 7774A-AP245   |
| Dates of test  | : | 05/12/2016 – 06/02/2016   |
| Issue Date   | : | 06/16/2016  |
| Test Result  | : | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail    |
| Equipment complied with the specification [X]<br>Equipment did not comply with the specification [ ] |   |   |

|  |  |
|--|--|
| This Test Report is Issued Under the Authority of:   |  |
|   |  |
| <b>Rachana Khanduri</b>  | <b>Chen Ge</b>   |
| Test Engineer  | Engineer Reviewer  |
| This test report may be reproduced in full only<br>Test result presented in this test report is applicable to the tested sample only |  |

Issued By:  
SIEMIC Laboratories  
775 Montague Expressway, Milpitas, 95035 CA



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## Laboratory Introduction

SIEMIC, headquartered in the heart of Silicon Valley, with superior facilities in US and Asia, is one of the leading independent testing and certification facilities providing customers with one-stop shop services for Compliance Testing and Global Certifications.



In addition to testing and certification, SIEMIC provides initial design reviews and compliance management throughout a project. Our extensive experience with China, Asia Pacific, North America, European, and International compliance requirements, assures the fastest, most cost effective way to attain regulatory compliance for the global markets.

### Accreditations for Conformity Assessment

| Country/Region | Accreditation Body     | Scope                             |
|----------------|------------------------|-----------------------------------|
| USA            | FCC, A2LA              | EMC, RF/Wireless, Telecom         |
| Canada         | IC, A2LA, NIST         | EMC, RF/Wireless, Telecom         |
| Taiwan         | BSMI, NCC, NIST        | EMC, RF, Telecom, Safety          |
| Hong Kong      | OFTA, NIST             | RF/Wireless, Telecom              |
| Australia      | NATA, NIST             | EMC, RF, Telecom, Safety          |
| Korea          | KCC/RRA, NIST          | EMI, EMS, RF, Telecom, Safety     |
| Japan          | VCCI, JATE, TELEC, RFT | EMI, RF/Wireless, Telecom         |
| Mexico         | NOM, COFETEL, Caniety  | Safety, EMC, RF/Wireless, Telecom |
| Europe         | A2LA, NIST             | EMC, RF, Telecom, Safety          |
| Israel         | MOC, NIST              | EMC, RF, Telecom, Safety          |

### Accreditations for Product Certifications

| Country   | Accreditation Body | Scope                 |
|-----------|--------------------|-----------------------|
| USA       | FCC TCB, NIST      | EMC, RF, Telecom      |
| Canada    | IC FCB, NIST       | EMC, RF, Telecom      |
| Singapore | iDA, NIST          | EMC, RF, Telecom      |
| EU        | NB                 | EMC & R&TTE Directive |
| Japan     | MIC (RCB 208)      | RF, Telecom           |
| Hong Kong | OFTA (US002)       | RF, Telecom           |

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## 1 Report Revision History

| Report No.                              | Report Version | Description  | Issue Date |
|---|----------------|--|------------|
| FCC_RF_SL16040101-AER-001_UNII          | None           | Original   | 06/10/2016 |
| FCC_RF_SL16040101-AER-001_UNII_Rev. 1.0 | Rev. 1.0       | Updated Internal Photos and Test Instruments information | 06/16/2016 |
|   |                |  |            |
|   |                |  |            |
|   |                |  |            |

## 2 Executive Summary

The purpose of this test program was to demonstrate compliance of following product

Company: Aerohive Networks, Inc.  
Product: Access Point  
Model: AP245X

against the current Stipulated Standards. The specified model product stated above has demonstrated compliance with the Stipulated Standard listed on 1<sup>st</sup> page.

## 3 Customer information

|                      |   |   |
|----------------------|---|---|
| Applicant Name       | : | Aerohive Networks, Inc.   |
| Applicant Address    | : | 1011 McCarthy Blvd, Milpitas, CA 95035, California, United States |
| Manufacturer Name    | : | Aerohive Networks, Inc.   |
| Manufacturer Address | : | 1011 McCarthy Blvd, Milpitas, CA 95035, California, United States |

## 4 Test site information

|                      |   |
|----------------------|---|
| Lab performing tests | SIEMIC Laboratories                         |
| Lab Address          | 775 Montague Expressway, Milpitas, CA 95035 |
| FCC Test Site No.    | 881796                                      |
| IC Test Site No.     | 4842D-2                                     |
| VCCI Test Site No.   | A0133                                       |

## 5 Modification

| Index | Item | Description | Note |
|-------|------|-------------|------|
| -     | -    | -           | -    |
|       |      |             |      |
|       |      |             |      |
|       |      |             |      |
|       |      |             |      |
|       |      |             |      |

## 6 EUT Information

### 6.1 EUT Description

|                           |                    |
|---------------------------|--------------------|
| Product Name              | Access Point       |
| Model No.                 | AP245X             |
| Trade Name                | Aerohive           |
| Serial No.                | N/A                |
| Host Model No.            | N/A                |
| Input Power               | 100-240V, 50/60Hz  |
| Power Adapter Manu/Model  | Microsemi 9001GR   |
| Power Adapter SN          | C15336594000002605 |
| Product Hardware version  | 1                  |
| Product Software version  | HIVEOS 7.0r1       |
| Radio Hardware version    | 1                  |
| Radio Software version    | HIVEOS 7.0r1       |
| Test Software version     | N/A                |
| Date of EUT received      | 05/07/2016         |
| Equipment Class/ Category | DTS, UNII          |
| Clock Frequencies         | N/A                |
| Port/Connectors           | PoE, Ethernet      |

### 6.2 Radio Description

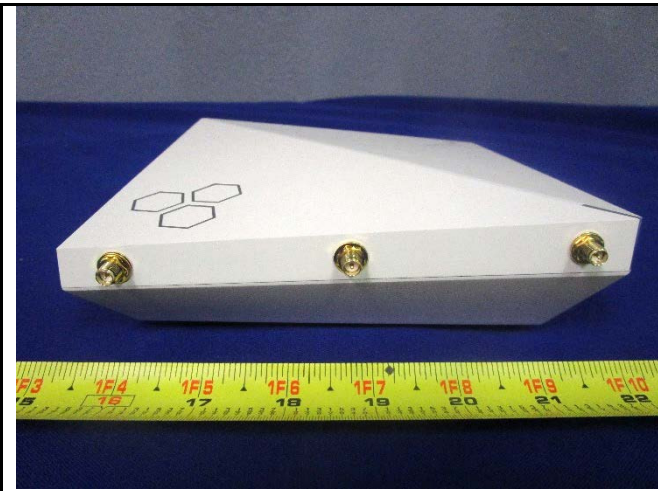
| Radio Type             | 802.11b                           | 802.11g                             | 802.11a                         | 802.11n-20M                                  | 802.11n-40M                     | 802.11ac-80M                    |
|------------------------|-----------------------------------|-------------------------------------|---------------------------------|--|---------------------------------|---------------------------------|
| Operating Frequency    | 2412-2462MHz                      | 2412-2462MHz                        | 5180-5240MHz<br>5745-5825MHz    | 2412-2462MHz<br>5180-5240MHz<br>5745-5825MHz | 5190-5230MHz<br>5755-5795MHz    | 5210MHz<br>5775MHz              |
| Modulation             | DSSS (CCK, DQPSK, DBPSK)          | OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM) | OFDM (BPSK, QPSK, 16QAM, 64QAM) | OFDM (BPSK, QPSK, 16QAM, 64QAM)              | OFDM (BPSK, QPSK, 16QAM, 64QAM) | OFDM (BPSK, QPSK, 16QAM, 64QAM) |
| Channel Spacing        | 5MHz                              | 5MHz                                | 20MHz                           | 5MHz(2.4GHz),<br>20MHz (5GHz)                | 40MHz                           | 80MHz                           |
| Number of Channels     | 11                                | 11                                  | 9                               | 11(2.4GHz)<br>9 (5GHz)                       | 9(2.4GH)<br>5(5GHz)             | 2                               |
| Antenna Type           | Omnidirectional Antenna           |                                     |                                 |  |                                 |                                 |
| Antenna Gain (Peak)    | 5.7 dBi (2.4GHz), 5.7 dBi (5 GHz) |                                     |                                 |  |                                 |                                 |
| Antenna Connector Type | U.FL                              |                                     |                                 |  |                                 |                                 |

**EUT Power level setting**

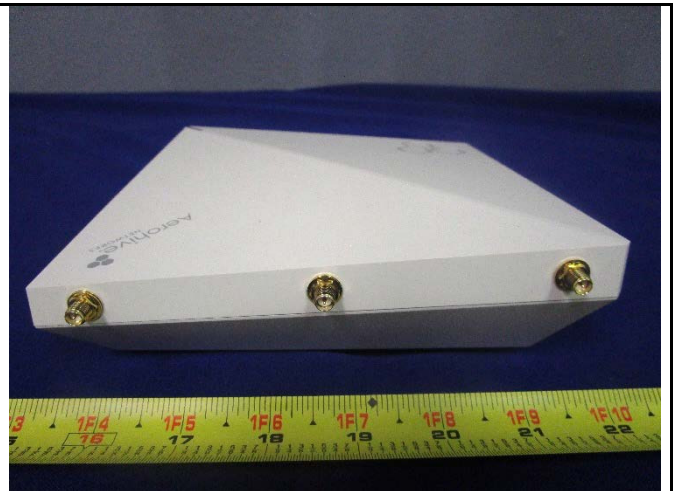
| Mode         | Frequency | Power Setting |
|--------------|-----------|---------------|
| 802.11-a     | 5180      | 88            |
| 802.11-a     | 5200      | 88            |
| 802.11-a     | 5240      | 88            |
| 802.11-n-20  | 5180      | 88            |
| 802.11-n-20  | 5200      | 88            |
| 802.11-n-20  | 5240      | 88            |
| 802.11-n-40  | 5190      | 88            |
| 802.11-n-40  | 5230      | 88            |
| 802.11-ac-80 | 5210      | 88            |
|              |           |               |
| 802.11-a     | 5745      | 88            |
| 802.11-a     | 5785      | 88            |
| 802.11-a     | 5825      | 88            |
| 802.11-n-20  | 5745      | 88            |
| 802.11-n-20  | 5785      | 88            |
| 802.11-n-20  | 5825      | 88            |
| 802.11-n-40  | 5755      | 88            |
| 802.11-n-40  | 5795      | 88            |
| 802.11-ac-80 | 5775      | 88            |



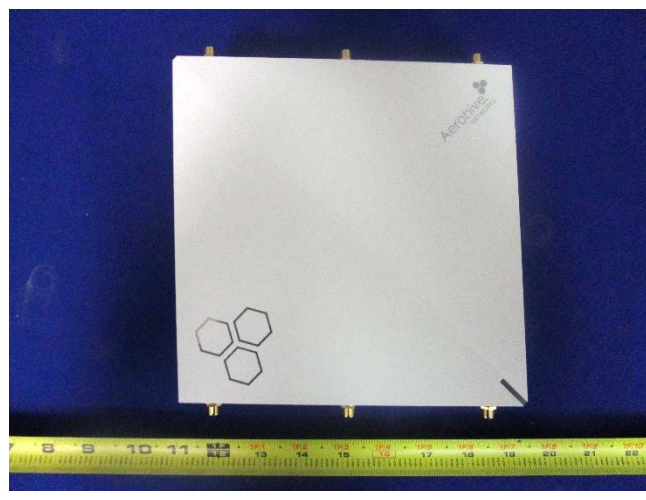
**6.3 EUT Photos-External**



**EUT - Front View**



**EUT - Rear View**



**EUT - Top View**



**EUT - Bottom View**



**EUT - Left Side View**



**EUT - Right Side View**





**Antenna- View 1**



**Antenna -View 2**



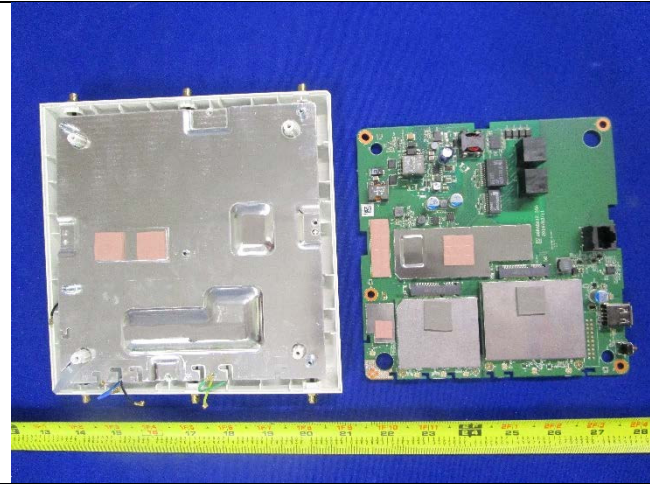
**Support Equipment Power Supply Top View**



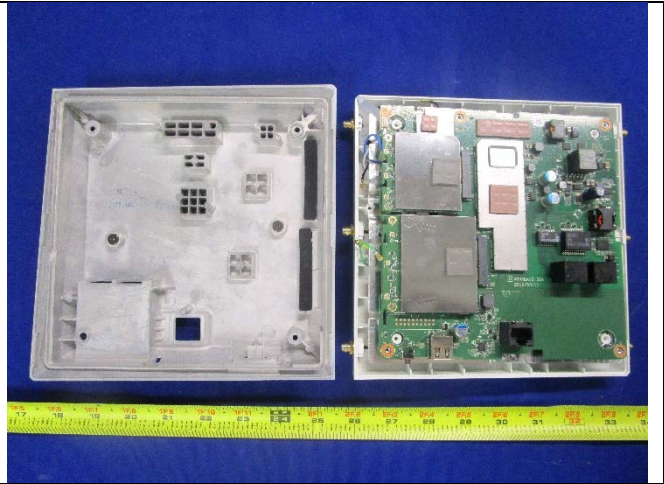
**Support Equipment Power Supply Bottom View**



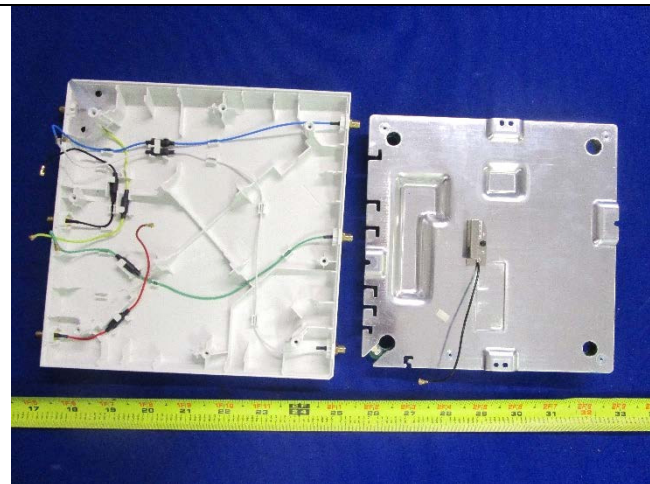
**6.4 EUT Photos – Internal**



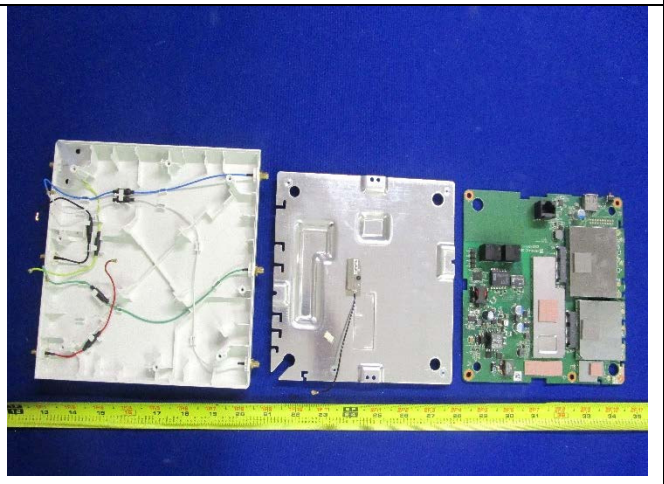
**EUT: Cover Off View 1**



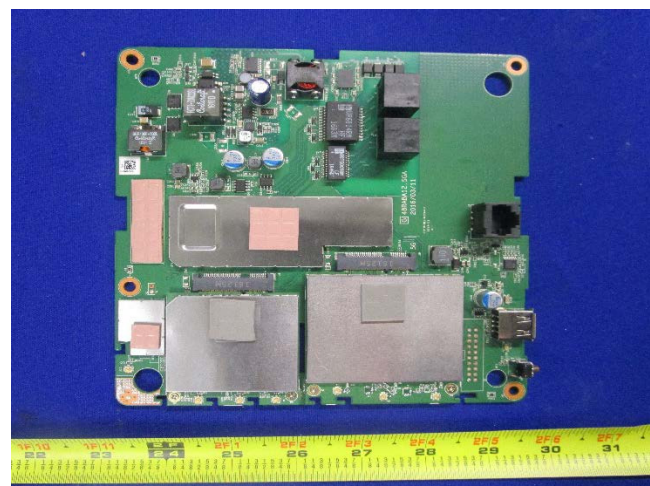
**EUT: Cover Off View 2**



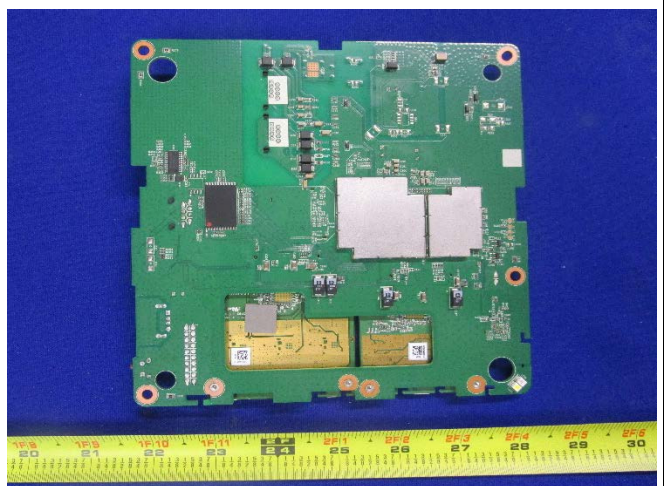
**EUT: Cover Off View 3**



**EUT: Cover Off View 4**

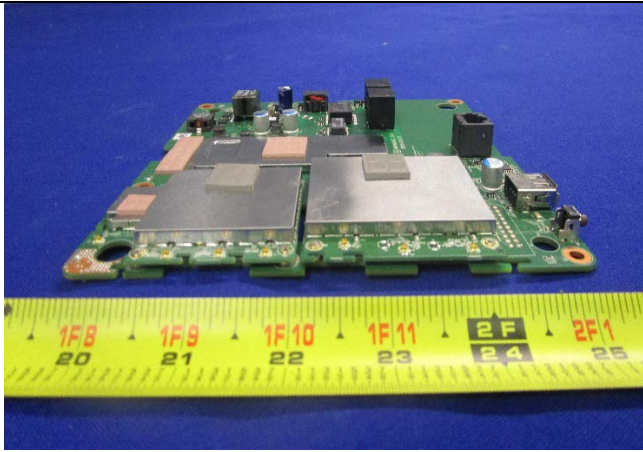


**PCBA Top View**

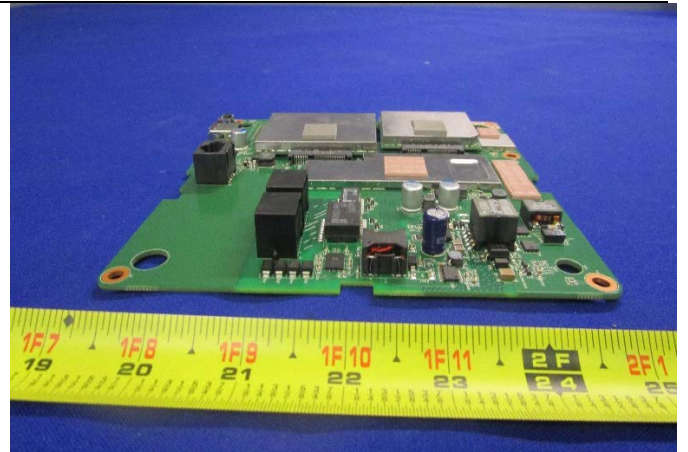


**PCBA Bottom View**

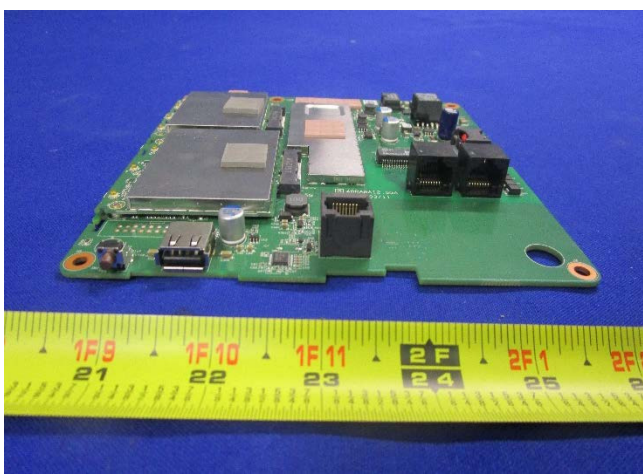




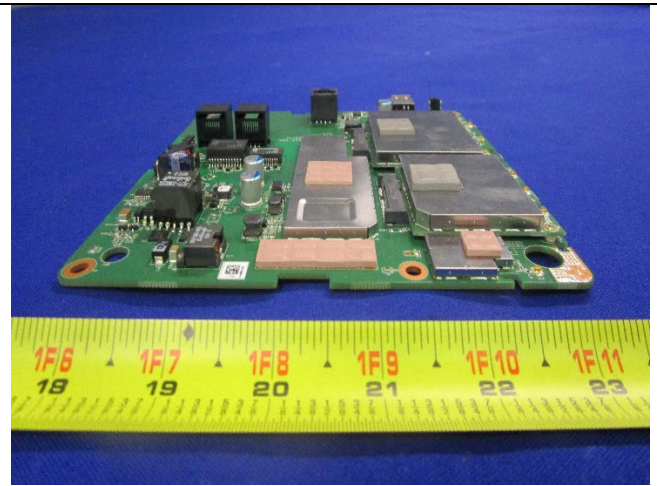
**PCBA Front View**



**PCBA Rear View**



**PCBA Left-Side View**



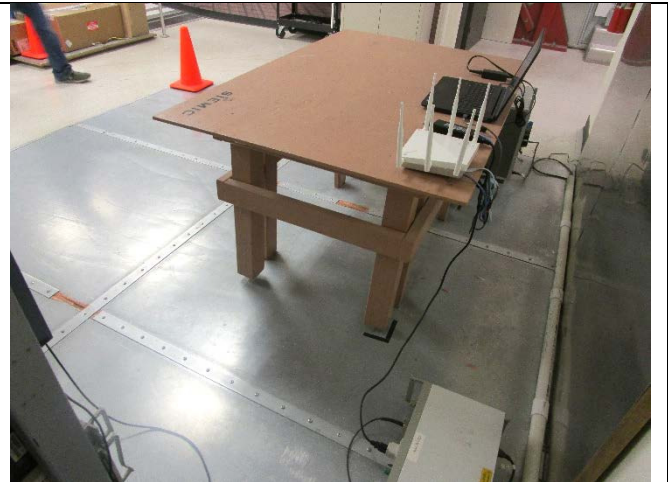
**PCBA Right-Side View**



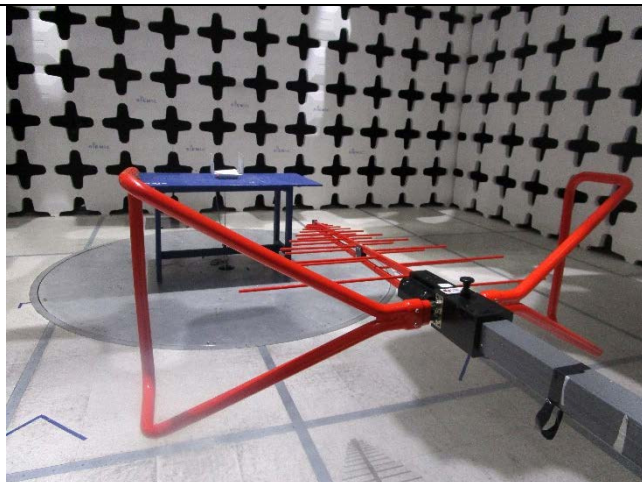
**6.5 EUT Test Setup Photos**



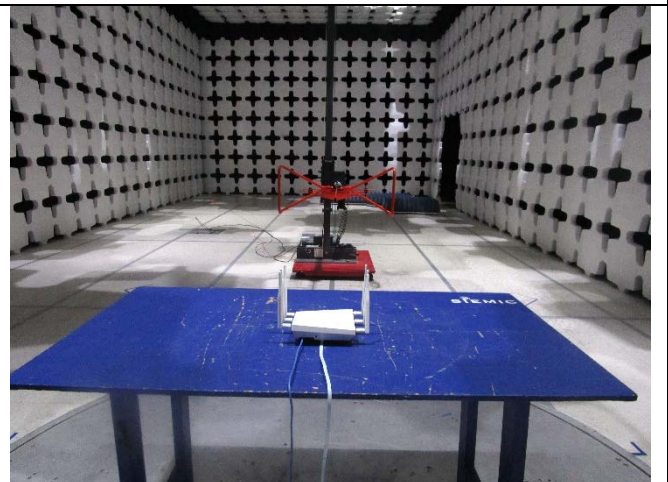
**AC Line Conducted Emissions – Front View**



**AC Line Conducted Emissions – Rear View**



**Radiated Emissions (<1GHz) – Front View**



**Radiated Emissions (<1GHz) – Rear View**



**Radiated Emissions (>1GHz) – Front View**



**Radiated Emissions (>1GHz) – Rear View**

## 7 Supporting Equipment/Software and cabling Description

### 7.1 Supporting Equipment

| Item | Supporting Equipment Description | Model         | Serial Number | Manufacturer | Note |
|------|----------------------------------|---------------|---------------|--------------|------|
| 1    | Laptop                           | Latitude 3550 | N/A           | Dell         | -    |
|      |                                  |               |               |              |      |
|      |                                  |               |               |              |      |

### 7.2 Cabling Description

| Name | Connection Start |          | Connection Stop |          | Length / shielding Info |            | Note |
|------|------------------|----------|-----------------|----------|-------------------------|------------|------|
|      | From             | I/O Port | To              | I/O Port | Length (m)              | Shielding  |      |
| RJ45 | EUT              | RJ45     | POE             | RJ45     | 2                       | Unshielded | -    |
| RJ45 | EUT              | RJ45     | Laptop          | USB      | 3                       | Unshielded | -    |

### 7.3 Test Software Description

| Test Item  | Software  | Description  |
|------------|-----------|--|
| RF Testing | Tera Term | Set the EUT to transmit continuously in diferent test modes and channels |
|            |           |  |
|            |           |  |

## 8 Test Summary

| Test Item                      | Test standard |           | Test Method/Procedure  | Pass / Fail  |
|--------------------------------|---------------|-----------|--|--|
| Restricted Band of Operation   | FCC           | 15.205    | ANSI C63.4 – 2014<br>789033 D02 General UNII Test Procedures New Rules v01 | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |
| AC Conducted Emissions Voltage | FCC           | 15.207(a) | ANSI C63.4 – 2014  | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |

| Test Item                                 | Test standard |                               | Test Method/Procedure  | Pass / Fail  |
|---|---------------|-------------------------------|--|--|
| 26 & 6 dB Emission Bandwidth              | FCC           | 15.407 (a) (2)                | 789033 D02 General UNII Test Procedures New Rules v01                      | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |
| Maximum conducted Output Power            | FCC           | 15.407 (a) (2)                | 789033 D02 General UNII Test Procedures New Rules v01                      | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |
| Power reduction (Antenna Gain > 6 dBi)    | FCC           | 15.407 (a) (2)                | -  | <input type="checkbox"/> Pass<br><input checked="" type="checkbox"/> N/A |
| Band Edge and Radiated Spurious Emissions | FCC           | 15.407(b)(2),<br>15.407(b)(6) | ANSI C63.4 – 2014<br>789033 D02 General UNII Test Procedures New Rules v01 | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |
| Power Spectral Density                    | FCC           | 15.407 (a) (2)                | 789033 D02 General UNII Test Procedures New Rules v01                      | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |
| Frequency Stability                       | FCC           | 15.407 (g)                    | -  | <input type="checkbox"/> Pass<br><input checked="" type="checkbox"/> N/A |
| Transmit Power Control (TPC)              | FCC           | 15.407 (h)(1)                 | -  | <input type="checkbox"/> Pass<br><input checked="" type="checkbox"/> N/A |
| User Manual                               | FCC           | -                             | -  | <input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> N/A |

|        |  |
|--------|--|
| Remark | <ol style="list-style-type: none"> <li>All measurement uncertainties are not taken into consideration for all presented test result.</li> <li>The applicant shall ensure frequency stability by showing that an emission is maintained within the band of operation under all normal operating conditions as specified in the user's manual.</li> <li>The device is operating at near 98% duty cycle.</li> </ol> |
|--------|--|



## 9 Measurement Uncertainty

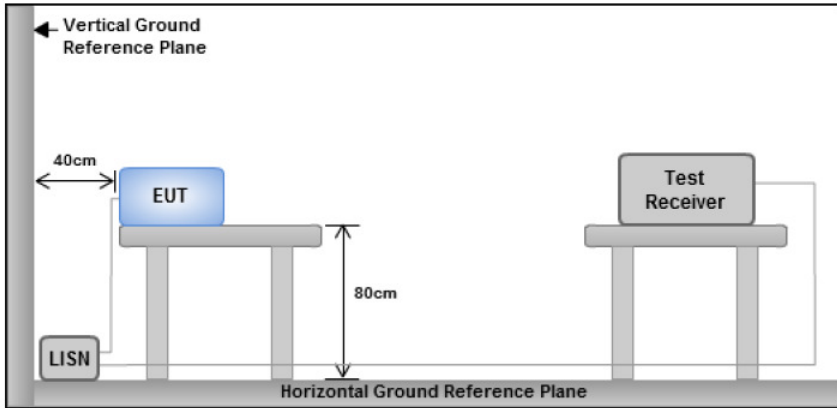
| Emissions                                 |                 |   |               |
|---|-----------------|---|---------------|
| Test Item                                 | Frequency Range | Description   | Uncertainty   |
| AC Conducted Emissions                    | 150KHz – 30MHz  | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2                                 | ±3.5dB        |
| Band Edge and Radiated Spurious Emissions | 30MHz – 1GHz    | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | +5.6dB/-4.5dB |
| Band Edge and Radiated Spurious Emissions | 1GHz – 40GHz    | Confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2 (for EUTs < 0.5m X 0.5m X 0.5m) | +4.3dB/-4.1dB |

## 10 Measurements, Examination and Derived Results

### 10.1 Conducted Emissions

#### Conducted Emission Limit

| Frequency ranges (MHz) | Limit (dBuV) |         |
|------------------------|--------------|---------|
|                        | QP           | Average |
| 0.15 ~ 0.5             | 66 – 56      | 56 – 46 |
| 0.5 ~ 5                | 56           | 46      |
| 5 ~ 30                 | 60           | 50      |

| Spec         | Item | Requirement   | Applicable                          |
|--------------|------|---|-------------------------------------|
| 47CFR§15.207 | a)   | For Low-power radio-frequency devices that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 $\mu$ H/50 ohms line impedance stabilization network (LISN). The lower limit applies at the boundary between the frequency ranges.   | <input checked="" type="checkbox"/> |
| Test Setup   |      |  <p style="text-align: center;">Note: 1. Support units were connected to second LISN.<br/>2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes</p>   |                                     |
| Procedure    |      | <ul style="list-style-type: none"> <li>- The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table, as shown in Annex B.</li> <li>- The power supply for the EUT was fed through a 50<math>\Omega</math>/50<math>\mu</math>H EUT LISN, connected to filtered mains.</li> <li>- The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.</li> <li>- All other supporting equipment was powered separately from another main supply.</li> </ul> |                                     |
| Remark       |      | EUT was tested at 120VAC, 60Hz  |                                     |
| Result       |      | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail  |                                     |

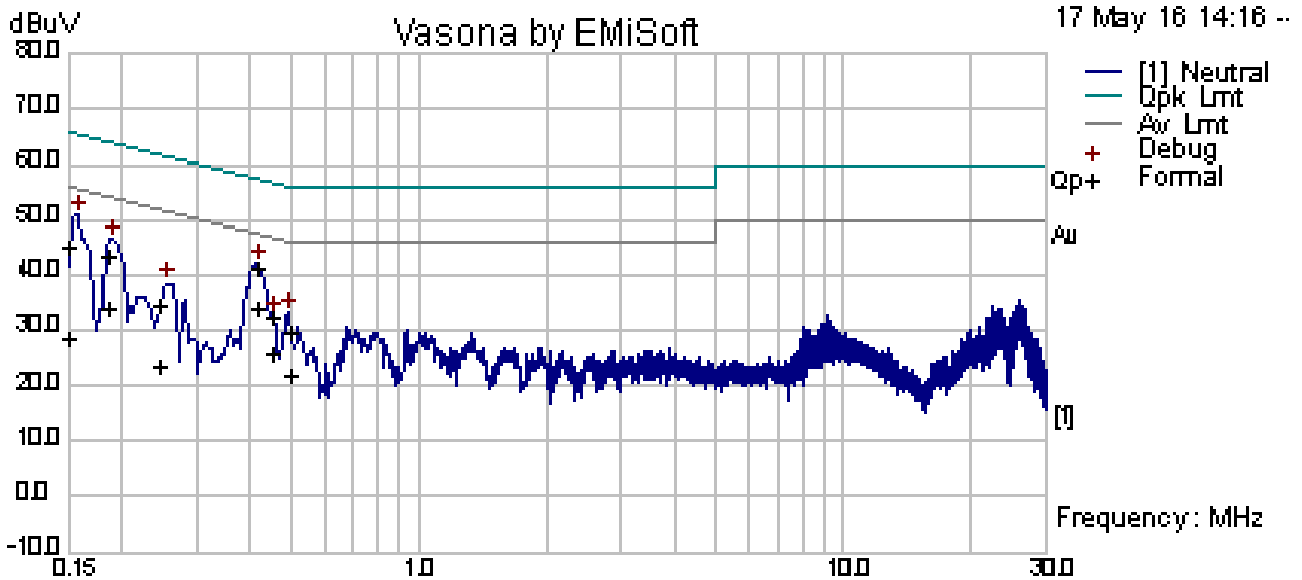
Test Data     Yes                       N/A

Test Plot     Yes (See below)               N/A

Test was done by **Rachana Khanduri** at **Conducted Emission Test Site**.

### Conducted Emission Test Results

|                           |                     |      |  |         |   |
|---------------------------|---------------------|------|--|---------|---|
| Test specification:       | Conducted Emissions |      |  | Result: | <input checked="" type="checkbox"/> Pass<br><br><input type="checkbox"/> Fail |
| Environmental Conditions: | Temp(°C):           | 21   |  |         |   |
|                           | Humidity (%):       | 42   |  |         |   |
|                           | Atmospheric(mbar):  | 1021 |  |         |   |
| Mains Power:              | 120Vac, 60Hz        |      |  |         |   |
| Tested by:                | Rachana Khanduri    |      |  |         |   |
| Test Date:                | 05/17/2016          |      |  |         |   |
| Remarks                   | AC Line @ Neutral   |      |  |         |   |

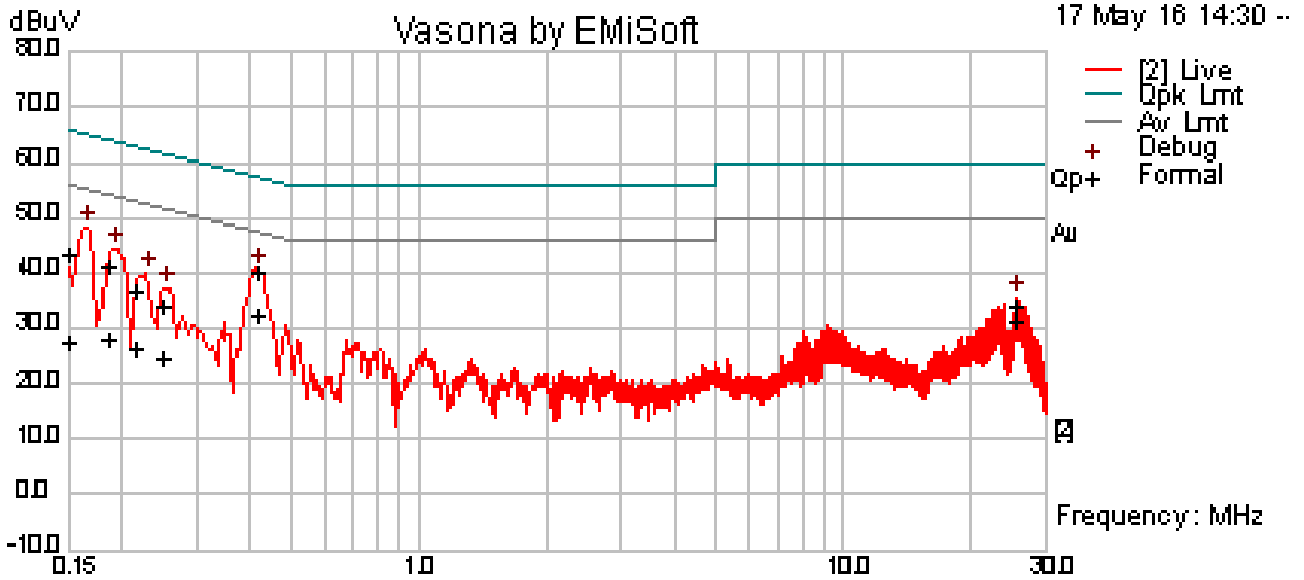


Neutral Plot at 120Vac, 60Hz

| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | Factors (dB) | Level (dBuV) | Measurement Type | Line    | Limit (dBuV) | Margin (dB) | Pass /Fail |
|-----------------|------------|-----------------|--------------|--------------|------------------|---------|--------------|-------------|------------|
| 0.15            | 33.20      | 10.00           | 1.80         | 45.00        | Quasi Peak       | Neutral | 66.00        | -21.00      | Pass       |
| 0.42            | 30.83      | 10.01           | 0.74         | 41.58        | Quasi Peak       | Neutral | 57.54        | -15.96      | Pass       |
| 0.19            | 32.20      | 10.00           | 1.42         | 43.62        | Quasi Peak       | Neutral | 64.21        | -20.59      | Pass       |
| 0.50            | 18.82      | 10.01           | 0.68         | 29.51        | Quasi Peak       | Neutral | 56.04        | -26.53      | Pass       |
| 0.25            | 23.35      | 10.00           | 1.08         | 34.43        | Quasi Peak       | Neutral | 61.91        | -27.47      | Pass       |
| 0.45            | 22.03      | 10.01           | 0.71         | 32.75        | Quasi Peak       | Neutral | 56.85        | -24.10      | Pass       |
| 0.15            | 16.60      | 10.00           | 1.80         | 28.41        | Average          | Neutral | 56.00        | -27.59      | Pass       |
| 0.42            | 23.29      | 10.01           | 0.74         | 34.03        | Average          | Neutral | 47.54        | -13.51      | Pass       |
| 0.19            | 22.59      | 10.00           | 1.42         | 34.01        | Average          | Neutral | 54.21        | -20.21      | Pass       |
| 0.50            | 11.38      | 10.01           | 0.68         | 22.07        | Average          | Neutral | 46.04        | -23.97      | Pass       |
| 0.25            | 12.49      | 10.00           | 1.08         | 23.57        | Average          | Neutral | 51.91        | -28.33      | Pass       |
| 0.45            | 15.2       | 10.01           | 0.71         | 25.92        | Average          | Neutral | 46.85        | -20.93      | Pass       |

### Conducted Emission Test Results

|                           |                     |      |  |  |
|---------------------------|---------------------|------|--|--|
| Test specification:       | Conducted Emissions |      |  | Result:<br><input checked="" type="checkbox"/> Pass<br><input type="checkbox"/> Fail |
| Environmental Conditions: | Temp(°C):           | 21   |  |  |
|                           | Humidity (%):       | 42   |  |  |
|                           | Atmospheric(mbar):  | 1021 |  |  |
| Mains Power:              | 120Vac, 60Hz        |      |  |  |
| Tested by:                | Rachana Khanduri    |      |  |  |
| Test Date:                | 05/17/2016          |      |  |  |
| Remarks                   | AC Line @ Line      |      |  |  |



Line Plot at 120Vac, 60Hz

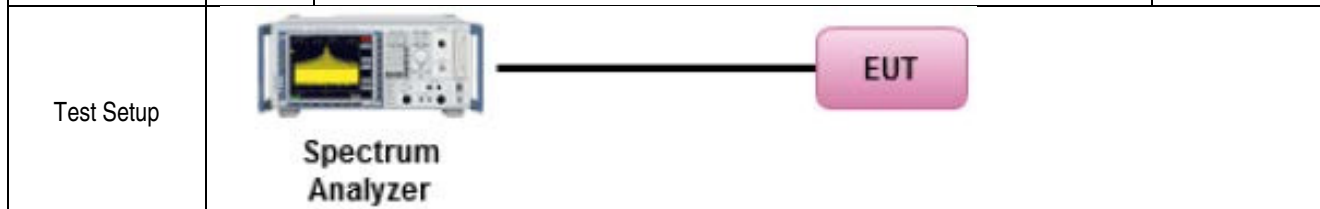
| Frequency (MHz) | Raw (dBuV) | Cable Loss (dB) | Factors (dB) | Level (dBuV) | Measurement Type | Line | Limit (dBuV) | Margin (dB) | Pass /Fail |
|-----------------|------------|-----------------|--------------|--------------|------------------|------|--------------|-------------|------------|
| 0.41            | 29.36      | 10.01           | 0.74         | 40.11        | Quasi Peak       | Live | 57.55        | -17.44      | Pass       |
| 0.15            | 31.48      | 10.00           | 1.80         | 43.28        | Quasi Peak       | Live | 66.00        | -22.72      | Pass       |
| 0.18            | 29.71      | 10.00           | 1.43         | 41.15        | Quasi Peak       | Live | 64.29        | -23.14      | Pass       |
| 0.21            | 25.52      | 10.00           | 1.23         | 36.75        | Quasi Peak       | Live | 63.02        | -26.27      | Pass       |
| 0.25            | 23.32      | 10.00           | 1.06         | 34.38        | Quasi Peak       | Live | 61.77        | -27.39      | Pass       |
| 25.49           | 23.16      | 10.08           | 0.78         | 34.01        | Quasi Peak       | Live | 60.00        | -25.99      | Pass       |
| 0.41            | 21.97      | 10.01           | 0.74         | 32.72        | Average          | Live | 47.55        | -14.83      | Pass       |
| 0.15            | 15.49      | 10.00           | 1.80         | 27.30        | Average          | Live | 56.00        | -28.70      | Pass       |
| 0.18            | 16.43      | 10.00           | 1.43         | 27.86        | Average          | Live | 54.29        | -26.43      | Pass       |
| 0.21            | 15.37      | 10.00           | 1.23         | 26.60        | Average          | Live | 53.02        | -26.42      | Pass       |
| 0.25            | 13.55      | 10.00           | 1.06         | 24.61        | Average          | Live | 51.77        | -27.16      | Pass       |
| 25.49           | 20.47      | 10.08           | 0.78         | 31.33        | Average          | Live | 50           | -18.67      | Pass       |

Note: The results above show only the worst case.

## 10.2 26 dB Bandwidth & 6 dB Bandwidth

### Requirement(s):

| Spec     | Item   | Requirement  | Applicable                          |
|----------|--------|--|-------------------------------------|
| § 15.407 | -      | 26 dB Emission BW: Report only for reference.  | <input checked="" type="checkbox"/> |
|          | a) (2) | 26 dB Emission BW: Report only for power limit calculation.  | <input type="checkbox"/>            |
|          | e)     | Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz. | <input checked="" type="checkbox"/> |



|                |  |
|----------------|--|
| Test Procedure | <p>789033 D02 General UNII Test Procedures New Rules v01</p> <p><u>26dB Emission bandwidth measurement procedure (Other than 5.725-5.85 GHz)</u></p> <ul style="list-style-type: none"> <li>- Allow the trace to stabilize.</li> <li>- Use the spectrum analyzer built-in measurement function to determine the 26dB BW. <ul style="list-style-type: none"> <li>o Set RBW = around 1% of emission bandwidth</li> <li>o Set VBW &gt; RBW</li> <li>o Detector = Peak</li> <li>o Trace mode = max hold</li> </ul> </li> <li>- Capture the plot.</li> <li>- Repeat above steps for different test channel and other modulation type.</li> </ul> <p><u>6 dB Minimum emission bandwidth measurement procedure (for 5.725-5.85 GHz)</u></p> <ul style="list-style-type: none"> <li>- Allow the trace to stabilize.</li> <li>- Use the spectrum analyzer built-in measurement function to determine the 6dB BW. <ul style="list-style-type: none"> <li>o Set RBW = 100 KHz</li> <li>o Set VBW ≥ 3 x RBW</li> <li>o Detector = Peak</li> <li>o Trace mode = max hold</li> <li>o Sweep = auto couple</li> </ul> </li> <li>- Capture the plot.</li> <li>- Repeat above steps for different test channel and other modulation type.</li> </ul> |
|----------------|--|

|           |  |                         |  |
|-----------|--|-------------------------|--|
| Test Date | 05/17/2016   | Environmental condition | Temperature 22°C<br>Relative Humidity 38%<br>Atmospheric Pressure 1020mbar |
| Remark    | -  |                         |  |
| Result    | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail |                         |  |

Test Data     Yes       N/A  
Test Plot     Yes       N/A

Test was done by **Rachana Khanduri** at **RF Test Site**.

**26dB Bandwidth measurement result for 5.2GHz**

| Type    | Test mode   | Freq (MHz) | CH   | Result (MHz) | Limit (MHz) |
|---------|-------------|------------|------|--------------|-------------|
| 26dB BW | 802.11a     | 5180       | Low  | 21.22        | -           |
| 26dB BW | 802.11a     | 5200       | Mid  | 21.43        | -           |
| 26dB BW | 802.11a     | 5240       | High | 21.69        | -           |
| 26dB BW | 802.11n-20  | 5180       | Low  | 21.83        | -           |
| 26dB BW | 802.11n-20  | 5200       | Mid  | 21.42        | -           |
| 26dB BW | 802.11n-20  | 5240       | High | 22.04        | -           |
| 26dB BW | 802.11n-40  | 5190       | Low  | 45.64        | -           |
| 26dB BW | 802.11n-40  | 5230       | High | 40.50        | -           |
| 26dB BW | 802.11ac-80 | 5210       | Mid  | 80.13        | -           |

**6dB Bandwidth measurement result for 5.8GHz**

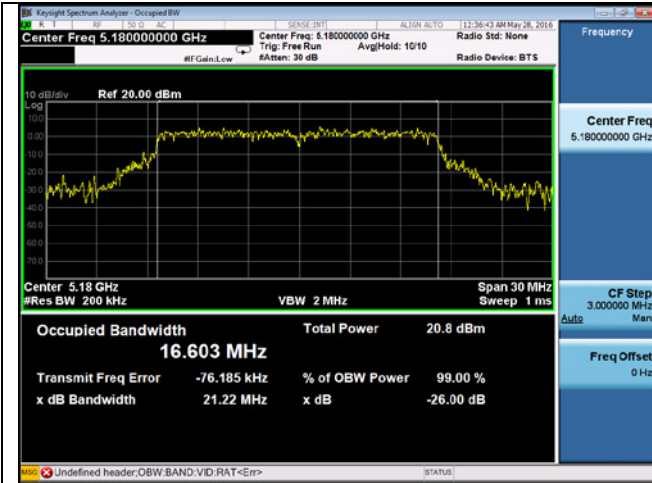
| Type   | Test mode   | Freq (MHz) | CH   | Result (MHz) | Limit (MHz) | Result |
|--------|-------------|------------|------|--------------|-------------|--------|
| 6dB BW | 802.11a     | 5745       | Low  | 16.50        | ≥0.5        | Pass   |
| 6dB BW | 802.11a     | 5785       | Mid  | 16.39        | ≥0.5        | Pass   |
| 6dB BW | 802.11a     | 5825       | High | 16.52        | ≥0.5        | Pass   |
| 6dB BW | 802.11n-20  | 5745       | Low  | 17.29        | ≥0.5        | Pass   |
| 6dB BW | 802.11n-20  | 5785       | Mid  | 17.56        | ≥0.5        | Pass   |
| 6dB BW | 802.11n-20  | 5825       | High | 17.39        | ≥0.5        | Pass   |
| 6dB BW | 802.11n-40  | 5755       | Low  | 36.34        | ≥0.5        | Pass   |
| 6dB BW | 802.11n-40  | 5795       | High | 35.69        | ≥0.5        | Pass   |
| 6dB BW | 802.11ac-80 | 5775       | Mid  | 76.36        | ≥0.5        | Pass   |

**99% Occupied Bandwidth measurement result for 5.2GHz**

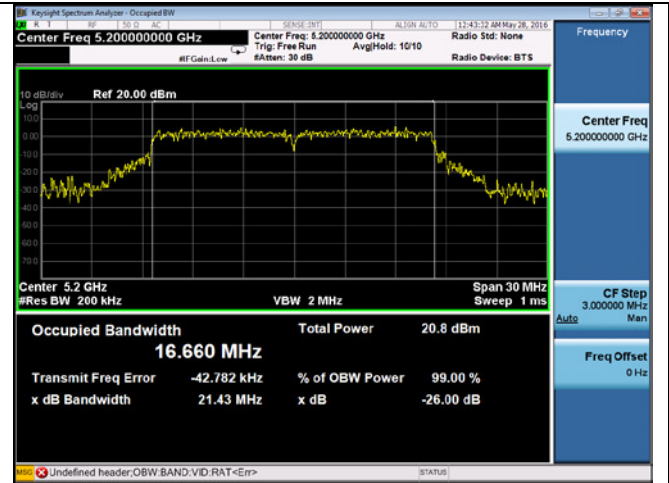
| Type    | Test mode   | Freq (MHz) | CH   | Result (MHz) | Limit (MHz) |
|---------|-------------|------------|------|--------------|-------------|
| 99% OBW | 802.11a     | 5180       | Low  | 16.60        | -           |
| 99% OBW | 802.11a     | 5200       | Mid  | 16.66        | -           |
| 99% OBW | 802.11a     | 5240       | High | 16.61        | -           |
| 99% OBW | 802.11n-20  | 5180       | Low  | 17.83        | -           |
| 99% OBW | 802.11n-20  | 5200       | Mid  | 17.80        | -           |
| 99% OBW | 802.11n-20  | 5240       | High | 17.56        | -           |
| 99% OBW | 802.11n-40  | 5190       | Low  | 45.64        | -           |
| 99% OBW | 802.11n-40  | 5230       | High | 40.50        | -           |
| 99% OBW | 802.11ac-80 | 5210       | -    | 80.13        | -           |



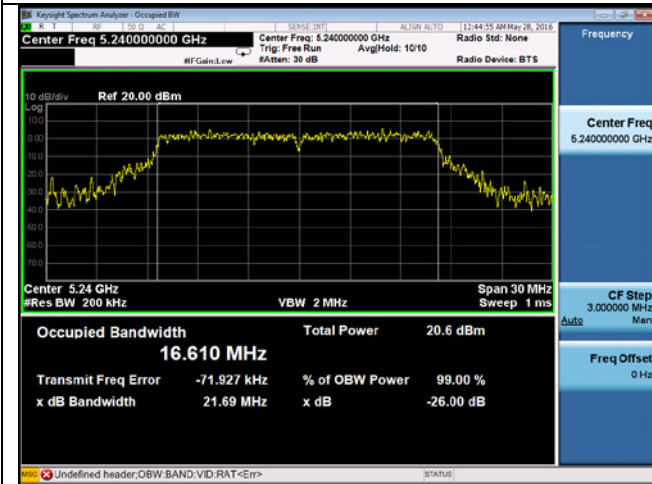
**26dB Bandwidth Test Plots**



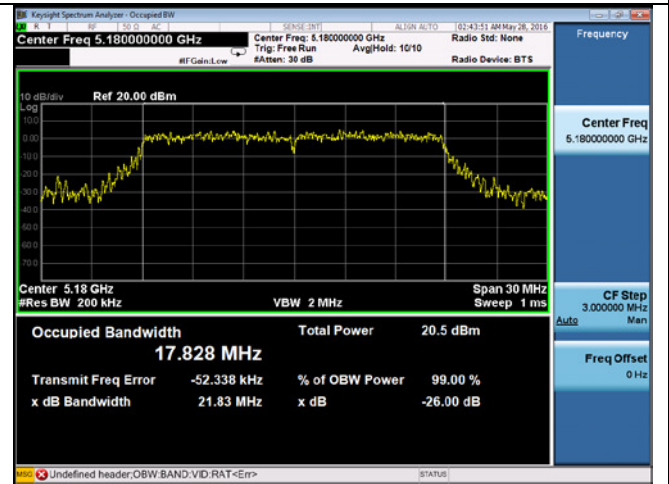
**26dB BW - 802.11a 5180MHz**



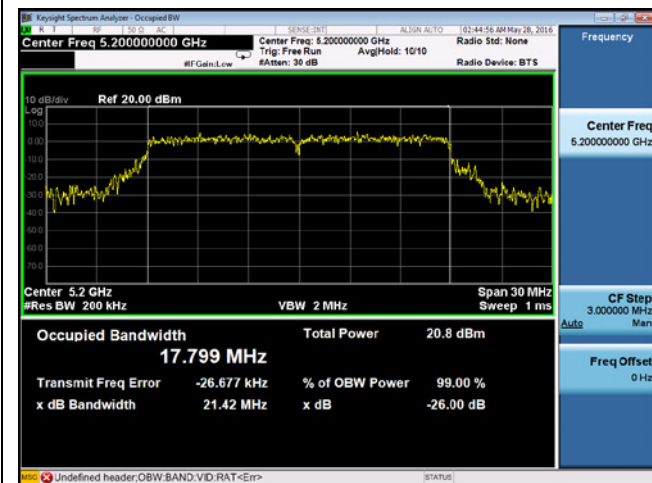
**26dB BW - 802.11a 5200MHz**



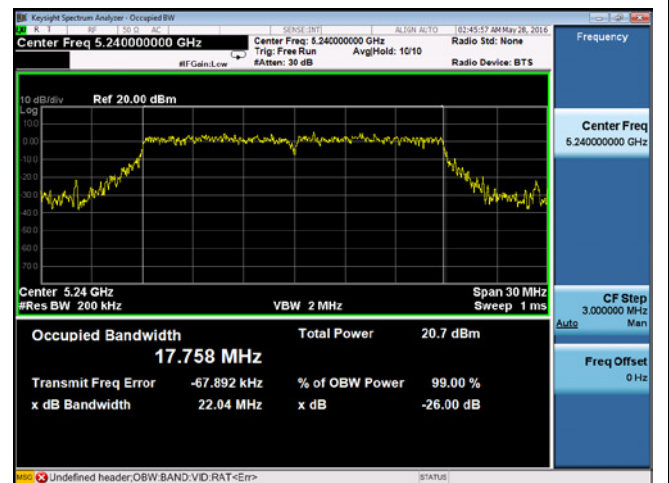
**26dB BW - 802.11a 5240MHz**



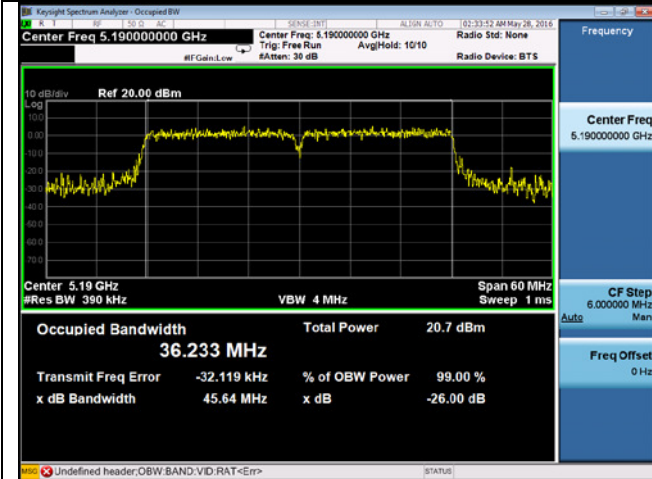
**26dB BW - 802.11n-20M 5180MHz**



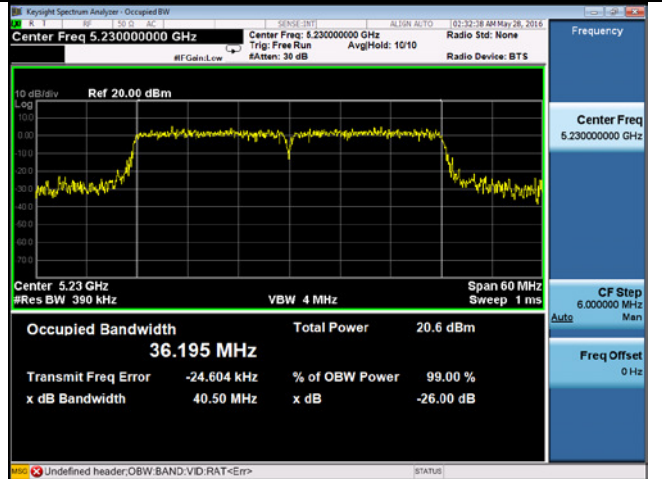
**26dB BW - 802.11n-20M 5200MHz**



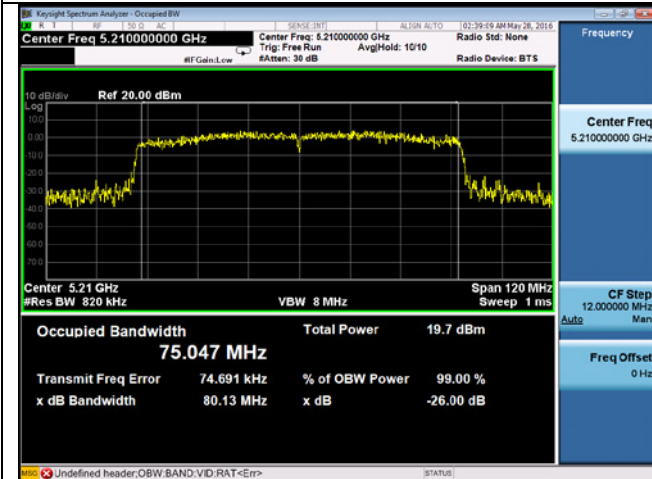
**26dB BW - 802.11n-20M 5240MHz**



26dB BW - 802.11n-40M 5190MHz

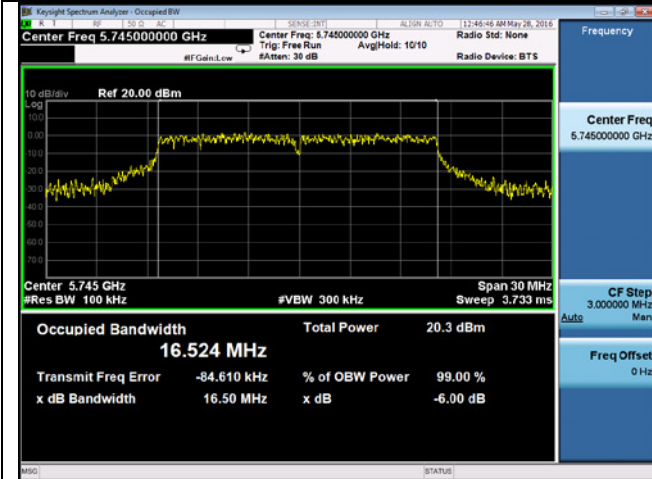


26dB BW - 802.11n-40M 5230MHz

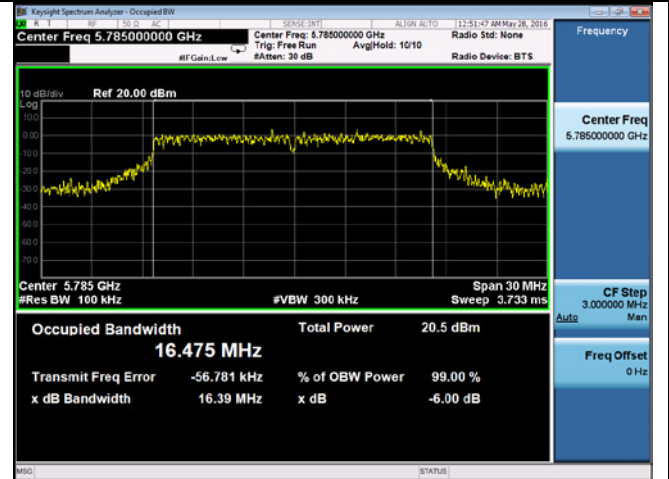


26dB BW - 802.11ac-80M 5210MHz

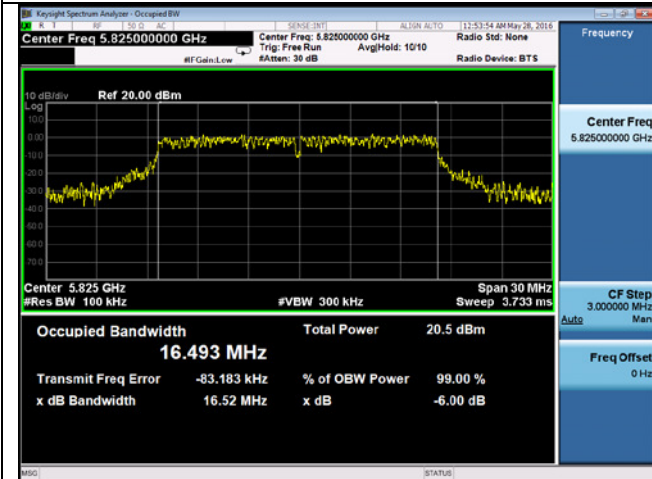
**6dB Bandwidth Test Plots**



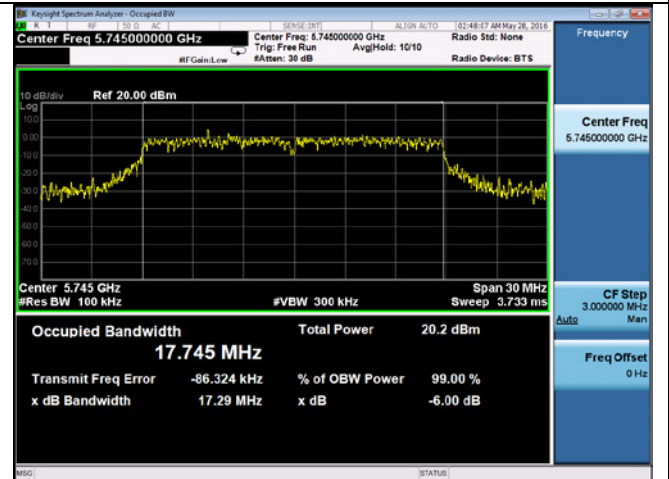
**6dB BW 802.11a 5745MHz**



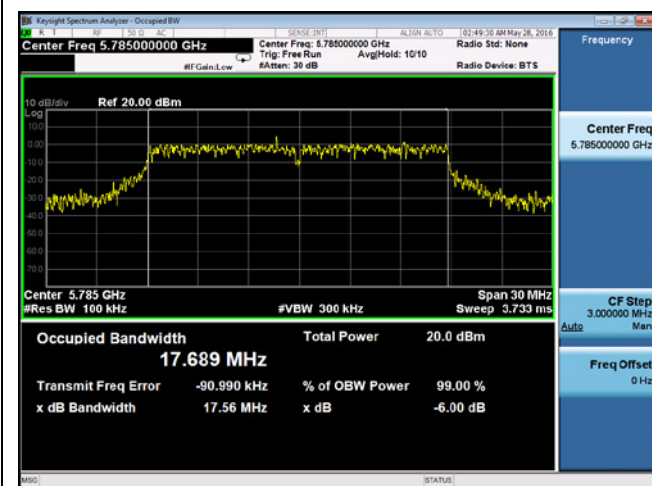
**6dB BW 802.11a 5785MHz**



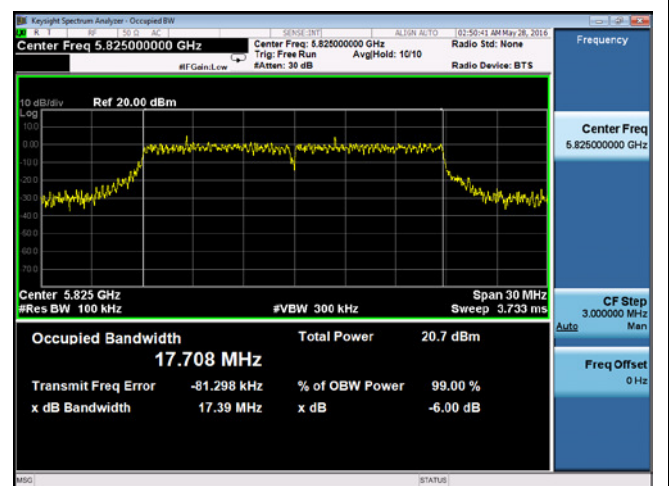
**6dB BW 802.11a 5825MHz**



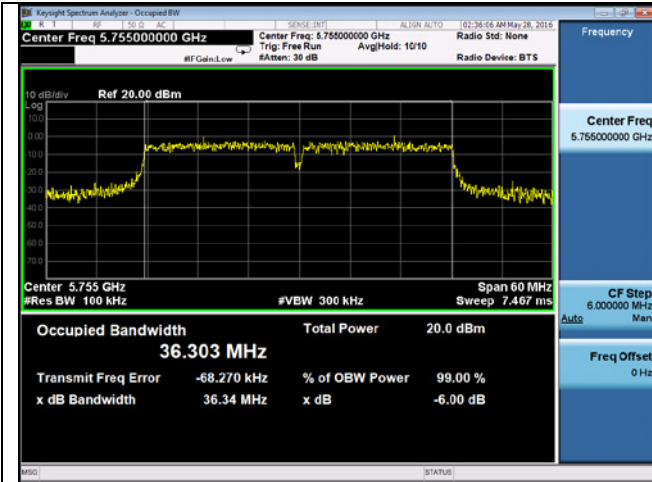
**6dB BW 802.11n-20M 5745MHz**



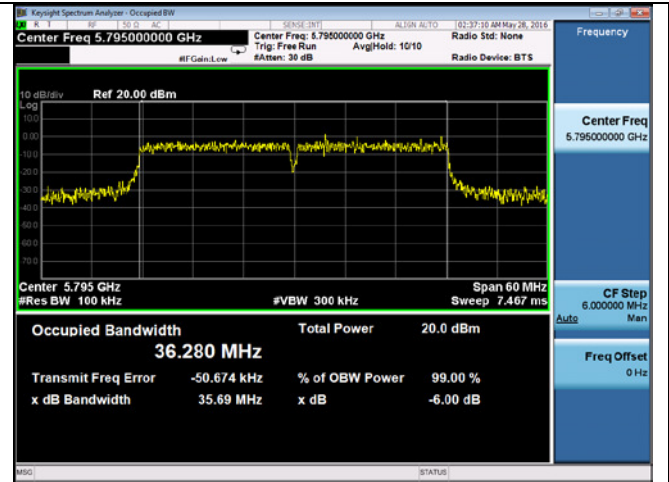
**6dB BW 802.11n-20M 5785MHz**



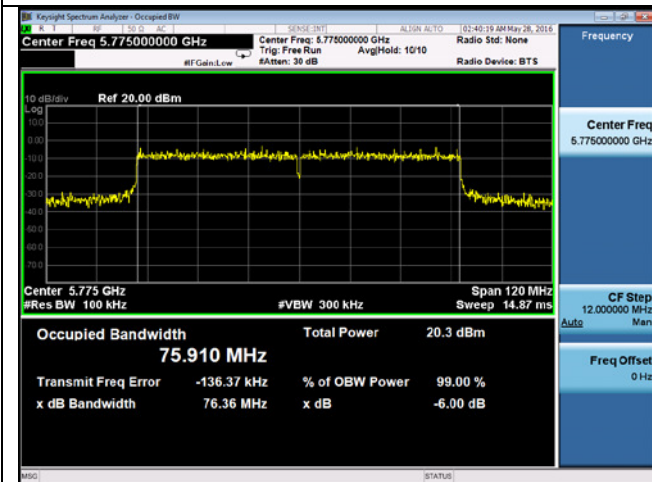
**6dB BW 802.11n-20M 5825MHz**



6dB BW 802.11n-40M 5755MHz



6dB BW 802.11n-40M 5795MHz



6dB BW 802.11ac-80M 5775MHz

### 10.3 Output Power

#### Requirement(s):

| Spec     | Item       | Requirement   | Applicable                          |
|----------|------------|---|-------------------------------------|
| § 15.407 | a)(1)(i)   | For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).   | <input type="checkbox"/>            |
|          | a)(1)(ii)  | For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi.   | <input checked="" type="checkbox"/> |
|          | a)(1)(iii) | For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. | <input type="checkbox"/>            |
|          | a)(1)(iv)  | For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.  | <input type="checkbox"/>            |
|          | a)(2)      | For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.  | <input type="checkbox"/>            |
|          | a)(3)      | For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.  | <input checked="" type="checkbox"/> |

Test Setup



Test Procedure

789033 D02 General UNII Test Procedures New Rules v01  
Measurement using a Power Meter (PM)  
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.

- Connect EUT's RF output power to power meter
- Set EUT to be continuous transmission mode
- Measurement the average output power using power meter and record the result
- Repeat above steps for different test channel and other modulation type.

Test Date

05/26/2016

Environmental condition

Temperature 21°C  
Relative Humidity 40%  
Atmospheric Pressure 1019mbar

Remark

Directional Gain =  $G_{ANT} + 10 \cdot \log(N_{ANT})$  dBi  
Antenna Gain ( $G_{ANT}$ ) = 5.7dBi  
 $N_{ANT} = 3$

Result

Pass  Fail

Test Data  Yes  N/A

Test Plot  Yes (See below)  N/A

Test was done by **Rachana Khanduri** at **RF Test Site**.



## Output Power measurement result for 5.2GHz

### For Non-Beamforming

| Type         | Test mode    | Freq (MHz) | CH   | Conducted Power (dBm) |         |         |                | Limit (dBm) | Result |
|--------------|--------------|------------|------|-----------------------|---------|---------|----------------|-------------|--------|
|              |              |            |      | Chain 1               | Chain 2 | Chain 3 | Combined Power |             |        |
| Output power | 802.11a      | 5180       | Low  | 18.31                 | 18.02   | 18.09   | 22.91          | 30          | Pass   |
| Output power | 802.11a      | 5200       | Mid  | 18.49                 | 17.95   | 18.05   | 22.94          | 30          | Pass   |
| Output power | 802.11a      | 5240       | High | 18.32                 | 17.92   | 17.90   | 22.82          | 30          | Pass   |
| Output power | 802.11n-20M  | 5180       | Low  | 18.44                 | 18.22   | 18.11   | 23.03          | 30          | Pass   |
| Output power | 802.11n-20M  | 5200       | Mid  | 18.36                 | 18.09   | 18.07   | 22.95          | 30          | Pass   |
| Output power | 802.11n-20M  | 5240       | High | 18.32                 | 17.85   | 17.85   | 22.78          | 30          | Pass   |
| Output power | 802.11n-40M  | 5190       | Low  | 18.51                 | 17.49   | 18.14   | 22.84          | 30          | Pass   |
| Output power | 802.11n-40M  | 5230       | High | 18.37                 | 17.30   | 18.15   | 22.74          | 30          | Pass   |
| Output power | 802.11ac-80M | 5210       | -    | 17.76                 | 19.04   | 21.40   | 24.44          | 30          | Pass   |

### For Beamforming

| Type         | Test mode  | Freq (MHz) | CH   | Conducted Power (dBm) |         |         |                | Limit (dBm) | Result |
|--------------|--|------------|------|-----------------------|---------|---------|----------------|-------------|--------|
|              |  |            |      | Chain 1               | Chain 2 | Chain 3 | Combined Power |             |        |
| Output power | 802.11a  | 5180       | Low  | 18.31                 | 18.02   | 18.09   | 22.91          | 25.53       | Pass   |
| Output power | 802.11a  | 5200       | Mid  | 18.49                 | 17.95   | 18.05   | 22.94          | 25.53       | Pass   |
| Output power | 802.11a  | 5240       | High | 18.32                 | 17.92   | 17.90   | 22.82          | 25.53       | Pass   |
| Output power | 802.11n-20M  | 5180       | Low  | 18.44                 | 18.22   | 18.11   | 23.03          | 25.53       | Pass   |
| Output power | 802.11n-20M  | 5200       | Mid  | 18.36                 | 18.09   | 18.07   | 22.95          | 25.53       | Pass   |
| Output power | 802.11n-20M  | 5240       | High | 18.32                 | 17.85   | 17.85   | 22.78          | 25.53       | Pass   |
| Output power | 802.11n-40M  | 5190       | Low  | 18.51                 | 17.49   | 18.14   | 22.84          | 25.53       | Pass   |
| Output power | 802.11n-40M  | 5230       | High | 18.37                 | 17.30   | 18.15   | 22.74          | 25.53       | Pass   |
| Output power | 802.11ac-80M   | 5210       | -    | 17.76                 | 19.04   | 21.40   | 24.44          | 25.53       | Pass   |
| Note         | Directional Gain = $5.7 + 10 * \log(3) = 10.47\text{dBi}$<br>Directional Gain is greater than 6dBi.<br>So, Limit = $30 - 4.47 = 25.53\text{dBm}$ |            |      |                       |         |         |                |             |        |



## Output Power Measurement Results for 5.8GHz

### For Non-Beamforming

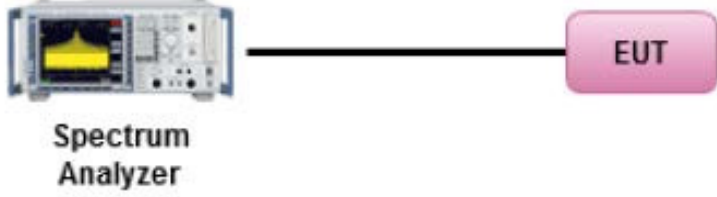
| Type         | Test mode    | Freq (MHz) | CH   | Conducted Power (dBm) |         |         |                | Limit (dBm) | Result |
|--------------|--------------|------------|------|-----------------------|---------|---------|----------------|-------------|--------|
|              |              |            |      | Chain 1               | Chain 2 | Chain 3 | Combined Power |             |        |
| Output power | 802.11a      | 5745       | Low  | 18.25                 | 17.70   | 18.46   | 22.92          | 30          | Pass   |
| Output power | 802.11a      | 5785       | Mid  | 18.20                 | 17.64   | 18.50   | 22.90          | 30          | Pass   |
| Output power | 802.11a      | 5825       | High | 18.35                 | 17.56   | 18.48   | 22.92          | 30          | Pass   |
| Output power | 802.11n-20M  | 5745       | Low  | 18.39                 | 17.68   | 18.46   | 22.96          | 30          | Pass   |
| Output power | 802.11n-20M  | 5785       | Mid  | 18.34                 | 17.61   | 18.51   | 22.94          | 30          | Pass   |
| Output power | 802.11n-20M  | 5825       | High | 18.25                 | 17.6    | 18.40   | 22.87          | 30          | Pass   |
| Output power | 802.11n-40M  | 5755       | Low  | 18.34                 | 17.81   | 18.62   | 23.04          | 30          | Pass   |
| Output power | 802.11n-40M  | 5795       | High | 18.29                 | 17.82   | 18.67   | 23.05          | 30          | Pass   |
| Output power | 802.11ac-80M | 5775       | -    | 18.50                 | 17.61   | 19.09   | 23.21          | 30          | Pass   |

### For Beamforming

| Type         | Test mode  | Freq (MHz) | CH   | Conducted Power (dBm) |         |         |                | Limit (dBm) | Result |
|--------------|--|------------|------|-----------------------|---------|---------|----------------|-------------|--------|
|              |  |            |      | Chain 1               | Chain 2 | Chain 3 | Combined Power |             |        |
| Output power | 802.11a  | 5745       | Low  | 18.25                 | 17.70   | 18.46   | 22.92          | 25.53       | Pass   |
| Output power | 802.11a  | 5785       | Mid  | 18.20                 | 17.64   | 18.50   | 22.90          | 25.53       | Pass   |
| Output power | 802.11a  | 5825       | High | 18.35                 | 17.56   | 18.48   | 22.92          | 25.53       | Pass   |
| Output power | 802.11n-20M  | 5745       | Low  | 18.39                 | 17.68   | 18.46   | 22.96          | 25.53       | Pass   |
| Output power | 802.11n-20M  | 5785       | Mid  | 18.34                 | 17.61   | 18.51   | 22.94          | 25.53       | Pass   |
| Output power | 802.11n-20M  | 5825       | High | 18.25                 | 17.60   | 18.40   | 22.87          | 25.53       | Pass   |
| Output power | 802.11n-40M  | 5755       | Low  | 18.34                 | 17.81   | 18.62   | 23.04          | 25.53       | Pass   |
| Output power | 802.11n-40M  | 5795       | High | 18.29                 | 17.82   | 18.67   | 23.05          | 25.53       | Pass   |
| Output power | 802.11ac-80M   | 5775       | -    | 18.50                 | 17.61   | 19.09   | 23.21          | 25.53       | Pass   |
| Note         | Directional Gain = $5.7 + 10 \cdot \log(3) = 10.47\text{dBi}$<br>Directional Gain is greater than 6dBi.<br>So, Limit = $30 - 4.47 = 25.53\text{dBm}$ |            |      |                       |         |         |                |             |        |

### 10.4 Peak Spectral Density

**Requirement(s):**

| Spec           | Item  | Requirement  | Applicable   |
|----------------|---|--|--|
| § 15.407       | a)(1)(i)  | For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. | <input checked="" type="checkbox"/>  |
|                | a)(1)(ii)   | For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band.  | <input type="checkbox"/>   |
|                | a)(2)   | For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.                  | <input type="checkbox"/>   |
|                | a)(3)   | For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.   | <input checked="" type="checkbox"/>  |
| Test Setup     |   |  |  |
| Test Procedure | <p>789033 D02 General UNII Test Procedures New Rules v01, II.F. Method SA-1</p> <p><u>Maximum spectral density measurement procedure</u></p> <ul style="list-style-type: none"> <li>- Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.</li> <li>- Set RBW = 1 MHz</li> <li>- Set VBW ≥ 3 MHz</li> <li>- Detector = RMS.</li> <li>- Sweep time = auto couple.</li> <li>- Trace mode = max hold.</li> <li>- Trace average at least 100 traces in power averaging</li> <li>- Use the peak marker function to determine the maximum amplitude level within the RBW.</li> </ul> <p>Apply correction to the result if different RBW is used.</p> |  |  |
| Test Date      | 05/26/2016  | Environmental condition  | Temperature 22°C<br>Relative Humidity 42%<br>Atmospheric Pressure 1020mbar |
| Remark         | Directional Gain = $G_{ANT} + 10 \cdot \log(N_{ANT})$ dBi<br>Antenna Gain ( $G_{ANT}$ ) = 5.7dBi<br>$N_{ANT} = 3$   |  |  |
| Result         | <input checked="" type="checkbox"/> Pass <input type="checkbox"/> Fail  |  |  |

**Test Data**     Yes                       N/A

**Test Plot**     Yes (See below)               N/A

**Test was done by *Rachana Khanduri* at *RF Test Site*.**

## PSD Measurement Results for 5.2GHz

### For Non-Beamforming

| Type | Test mode   | Freq (MHz) | CH   | Conducted PSD (dBm/MHz) |         |         |              | Limit (dBm) | Result |
|------|-------------|------------|------|-------------------------|---------|---------|--------------|-------------|--------|
|      |             |            |      | Chain 1                 | Chain 2 | Chain 3 | Combined PSD |             |        |
| PSD  | 802.11a     | 5180       | Low  | 6.95                    | 6.24    | 6.26    | 11.27        | 17          | Pass   |
| PSD  | 802.11a     | 5200       | Mid  | 6.63                    | 6.12    | 6.34    | 11.14        | 17          | Pass   |
| PSD  | 802.11a     | 5240       | High | 6.38                    | 6.11    | 6.20    | 11.00        | 17          | Pass   |
| PSD  | 802.11n-20  | 5180       | Low  | 6.53                    | 5.95    | 6.18    | 11.00        | 17          | Pass   |
| PSD  | 802.11n-20  | 5200       | Mid  | 6.22                    | 5.78    | 6.01    | 10.78        | 17          | Pass   |
| PSD  | 802.11n-20  | 5240       | High | 6.03                    | 5.54    | 5.82    | 10.57        | 17          | Pass   |
| PSD  | 802.11n-40  | 5190       | Low  | 3.34                    | 2.15    | 3.24    | 7.72         | 17          | Pass   |
| PSD  | 802.11n-40  | 5230       | High | 3.49                    | 1.99    | 2.84    | 7.59         | 17          | Pass   |
| PSD  | 802.11ac-80 | 5210       | -    | 0.58                    | 1.68    | 3.79    | 7.00         | 17          | Pass   |

### For Beamforming

| Type | Test mode  | Freq (MHz) | CH   | Conducted PSD (dBm/MHz) |         |         |              | Limit (dBm/MHz) | Result |
|------|--|------------|------|-------------------------|---------|---------|--------------|-----------------|--------|
|      |  |            |      | Chain 1                 | Chain 2 | Chain 3 | Combined PSD |                 |        |
| PSD  | 802.11a  | 5180       | Low  | 6.95                    | 6.24    | 6.26    | 11.27        | 12.53           | Pass   |
| PSD  | 802.11a  | 5200       | Mid  | 6.63                    | 6.12    | 6.34    | 11.14        | 12.53           | Pass   |
| PSD  | 802.11a  | 5240       | High | 6.38                    | 6.11    | 6.20    | 11.00        | 12.53           | Pass   |
| PSD  | 802.11n-20   | 5180       | Low  | 6.53                    | 5.95    | 6.18    | 11.00        | 12.53           | Pass   |
| PSD  | 802.11n-20   | 5200       | Mid  | 6.22                    | 5.78    | 6.01    | 10.78        | 12.53           | Pass   |
| PSD  | 802.11n-20   | 5240       | High | 6.03                    | 5.54    | 5.82    | 10.57        | 12.53           | Pass   |
| PSD  | 802.11n-40   | 5190       | Low  | 3.34                    | 2.15    | 3.24    | 7.72         | 12.53           | Pass   |
| PSD  | 802.11n-40   | 5230       | High | 3.49                    | 1.99    | 2.84    | 7.59         | 12.53           | Pass   |
| PSD  | 802.11ac-80  | 5210       | -    | 0.58                    | 1.68    | 3.79    | 7.00         | 12.53           | Pass   |
| Note | Directional Gain = $5.7 + 10 \cdot \log(3) = 10.47\text{dBi}$<br>Directional Gain is greater than 6dBi.<br>So, Limit = $17 - 4.47 = 12.53\text{dBm/MHz}$ |            |      |                         |         |         |              |                 |        |

### PSD Measurement Results for 5.8GHz

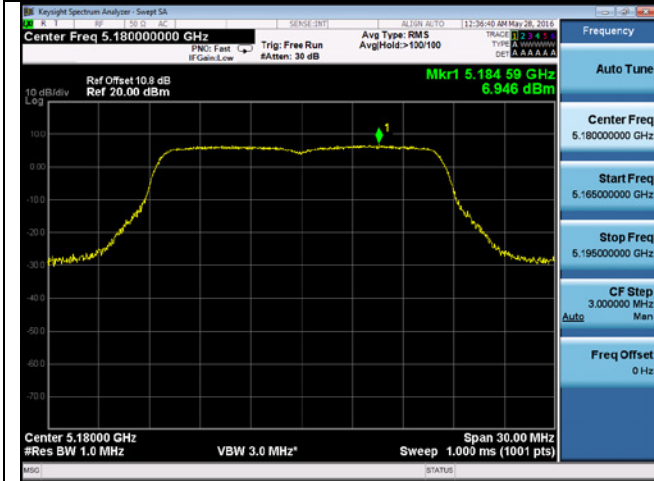
#### For Non-Beamforming

| Type | Test mode  | Freq (MHz) | CH   | Conducted PSD (dBm/100kHz) |         |         |          | Correction Factor (dB) | Combined PSD (dBm/500 kHz) | Limit (dBm/500kHz) | Result |
|------|--|------------|------|----------------------------|---------|---------|----------|------------------------|----------------------------|--------------------|--------|
|      |  |            |      | Chain 1                    | Chain 2 | Chain 3 | Combined |                        |                            |                    |        |
| PSD  | 802.11a  | 5745       | Low  | -3.28                      | -3.45   | -3.07   | 1.51     | 6.99                   | 8.50                       | 30                 | Pass   |
| PSD  | 802.11a  | 5785       | Mid  | -2.84                      | -3.44   | -2.92   | 1.71     | 6.99                   | 8.70                       | 30                 | Pass   |
| PSD  | 802.11a  | 5825       | High | -2.83                      | -3.75   | -2.69   | 1.71     | 6.99                   | 8.70                       | 30                 | Pass   |
| PSD  | 802.11n-20   | 5745       | Low  | -3.82                      | -4.03   | -3.05   | 1.56     | 6.99                   | 8.55                       | 30                 | Pass   |
| PSD  | 802.11n-20   | 5785       | Mid  | -3.30                      | -3.70   | -3.11   | 1.41     | 6.99                   | 8.40                       | 30                 | Pass   |
| PSD  | 802.11n-20   | 5825       | High | -3.18                      | -3.71   | -2.78   | 1.56     | 6.99                   | 8.55                       | 30                 | Pass   |
| PSD  | 802.11n-40   | 5755       | Low  | -6.63                      | -6.82   | -5.88   | -1.65    | 6.99                   | 5.34                       | 30                 | Pass   |
| PSD  | 802.11n-40   | 5795       | High | -6.71                      | -6.90   | -5.58   | -1.58    | 6.99                   | 5.41                       | 30                 | Pass   |
| PSD  | 802.11ac-80  | 5775       | Mid  | -9.25                      | -10.03  | -8.66   | -4.51    | 6.99                   | 2.48                       | 30                 | Pass   |
| Note | BW correction factor = $10\log(500\text{kHz}/\text{RBW})$ , RBW was set to 100kHz during test. |            |      |                            |         |         |          |                        |                            |                    |        |

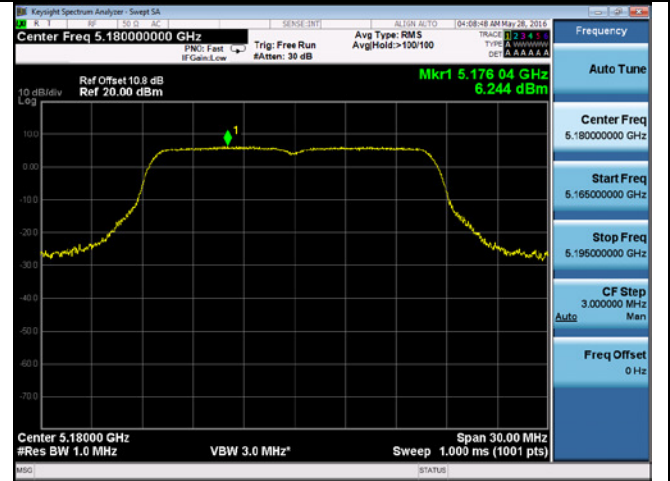
#### For Beamforming

| Type   | Test mode  | Freq (MHz) | CH   | Conducted PSD (dBm/100kHz) |         |         |          | Correction Factor (dB) | Combined PSD (dBm/500 kHz) | Limit (dBm/500kHz) | Result |
|--------|--|------------|------|----------------------------|---------|---------|----------|------------------------|----------------------------|--------------------|--------|
|        |  |            |      | Chain 1                    | Chain 2 | Chain 3 | Combined |                        |                            |                    |        |
| PSD    | 802.11a  | 5745       | Low  | -3.28                      | -3.45   | -3.07   | 1.51     | 6.99                   | 8.50                       | 25.53              | Pass   |
| PSD    | 802.11a  | 5785       | Mid  | -2.84                      | -3.44   | -2.92   | 1.71     | 6.99                   | 8.70                       | 25.53              | Pass   |
| PSD    | 802.11a  | 5825       | High | -2.83                      | -3.75   | -2.69   | 1.71     | 6.99                   | 8.70                       | 25.53              | Pass   |
| PSD    | 802.11n-20   | 5745       | Low  | -3.82                      | -4.03   | -3.05   | 1.56     | 6.99                   | 8.55                       | 25.53              | Pass   |
| PSD    | 802.11n-20   | 5785       | Mid  | -3.30                      | -3.70   | -3.11   | 1.41     | 6.99                   | 8.40                       | 25.53              | Pass   |
| PSD    | 802.11n-20   | 5825       | High | -3.18                      | -3.71   | -2.78   | 1.56     | 6.99                   | 8.55                       | 25.53              | Pass   |
| PSD    | 802.11n-40   | 5755       | Low  | -6.63                      | -6.82   | -5.88   | -1.65    | 6.99                   | 5.34                       | 25.53              | Pass   |
| PSD    | 802.11n-40   | 5795       | High | -6.71                      | -6.90   | -5.58   | -1.58    | 6.99                   | 5.41                       | 25.53              | Pass   |
| PSD    | 802.11ac-80  | 5775       | Mid  | -9.25                      | -10.03  | -8.66   | -4.51    | 6.99                   | 2.48                       | 25.53              | Pass   |
| Note   | BW correction factor = $10\log(500\text{kHz}/\text{RBW})$ , RBW was set to 100kHz during test.   |            |      |                            |         |         |          |                        |                            |                    |        |
| Remark | Directional Gain = $5.7 + 10^* \log(3) = 10.47\text{dBi}$<br>Directional Gain is greater than 6dBi.<br>So, Limit = $30 - 4.47 = 25.53\text{dBm}/500\text{kHz}$ |            |      |                            |         |         |          |                        |                            |                    |        |

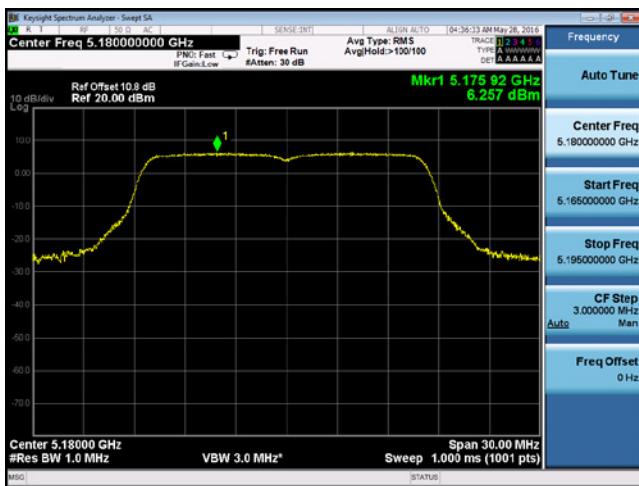
**Test Plots**



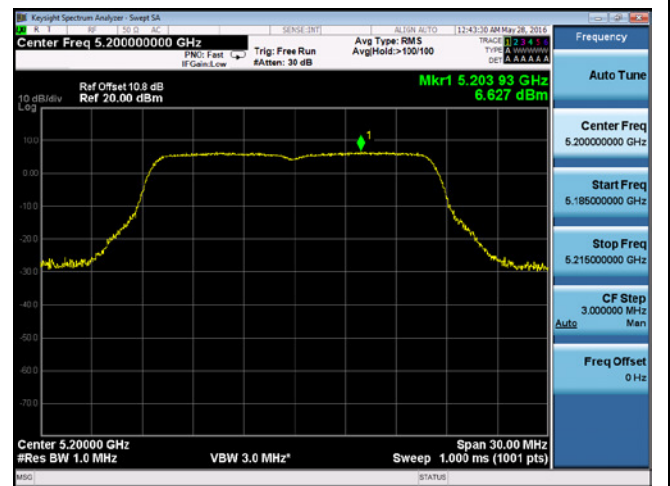
**PSD-802.11a-5180M-chain1**



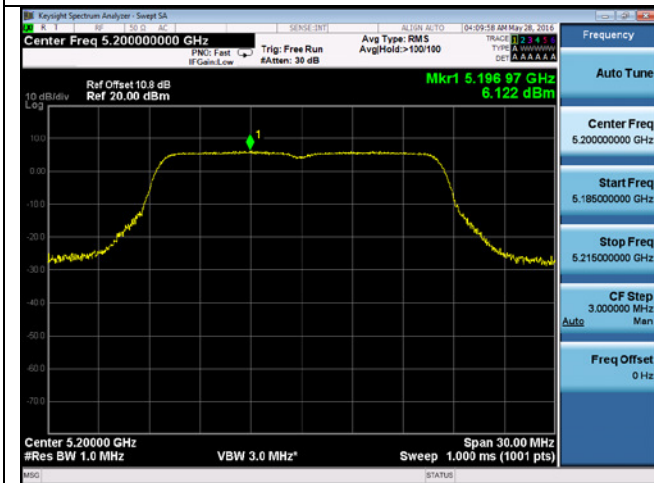
**PSD-802.11a-5180M-chain2**



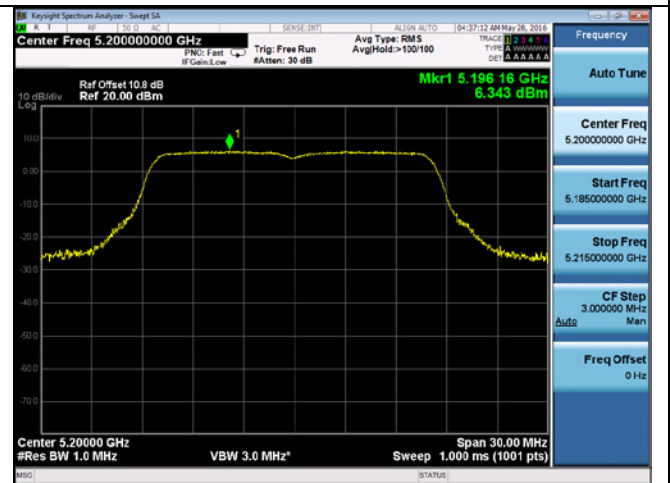
**PSD-802.11a-5180M-chain3**



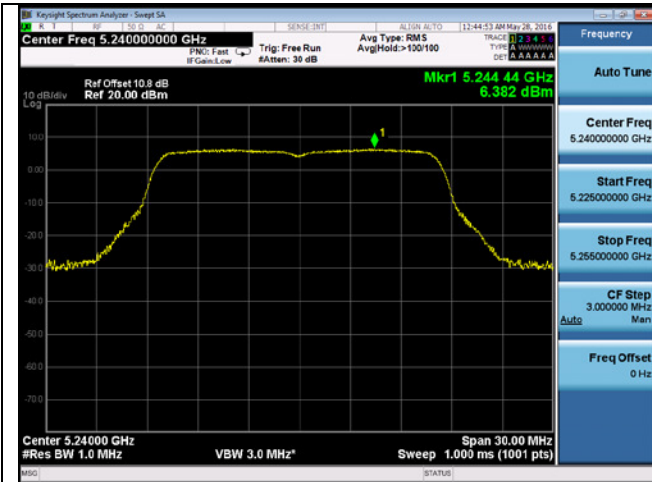
**PSD-802.11a-5200M-chain1**



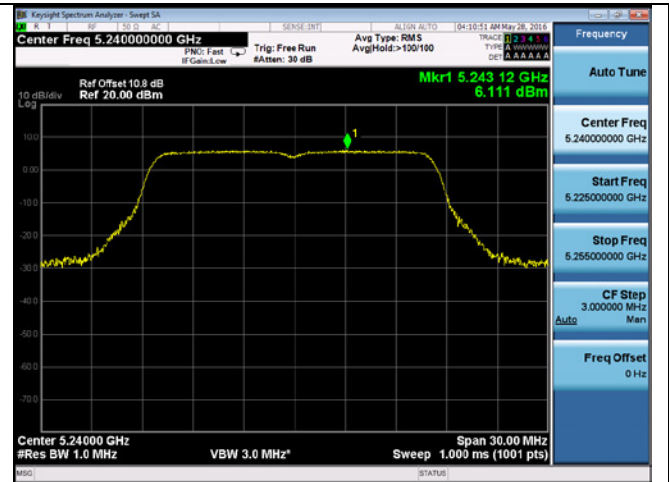
**PSD-802.11a-5200M-chain2**



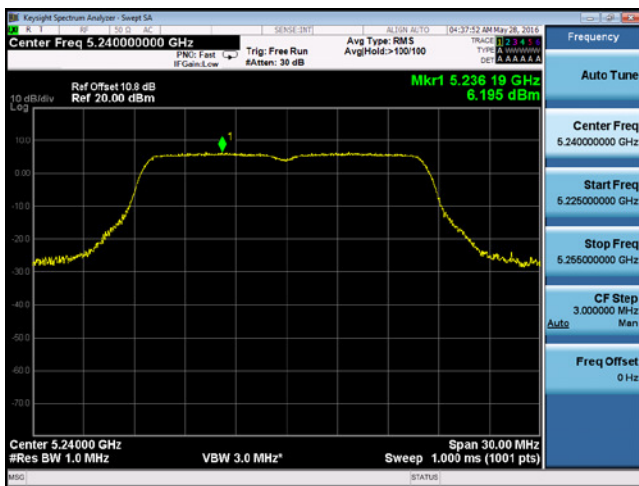
**PSD-802.11a-5200M-chain3**



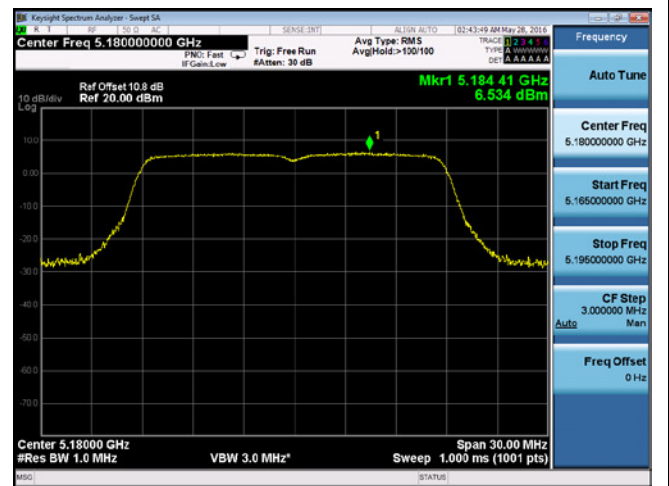
PSD-802.11a-5240M-chain1



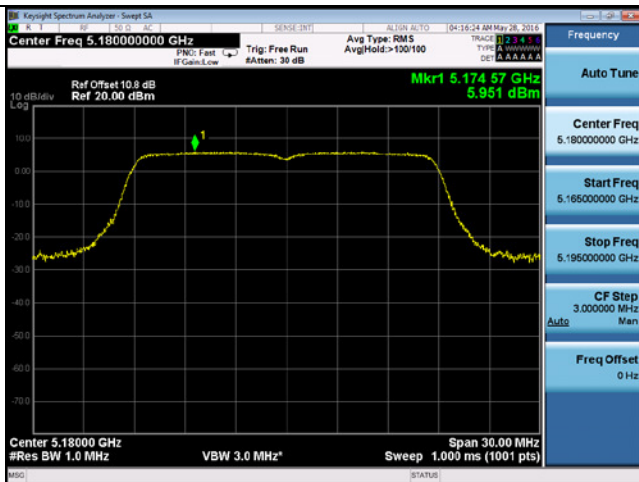
PSD-802.11a-5240M-chain2



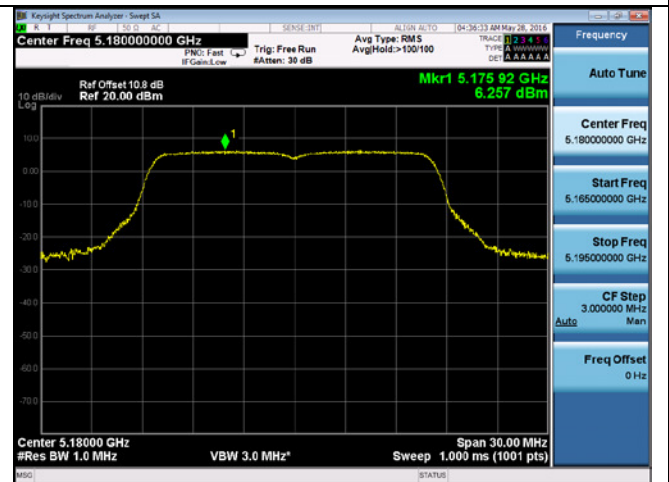
PSD-802.11a-5240M-chain3



PSD-802.11n-20M -5180M-chain1

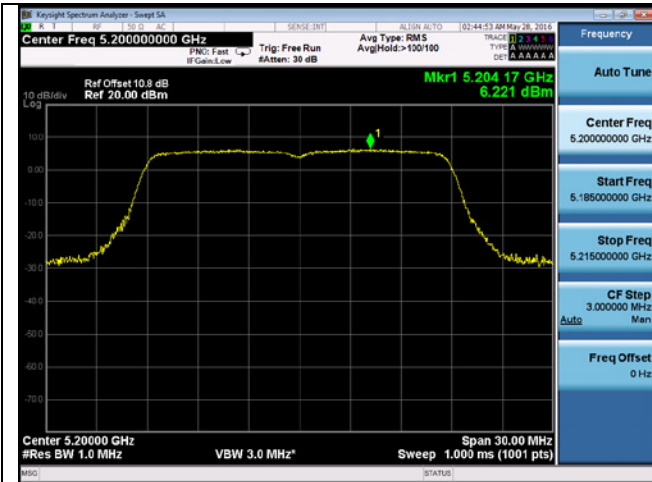


PSD-802.11n-20M -5180M-chain2

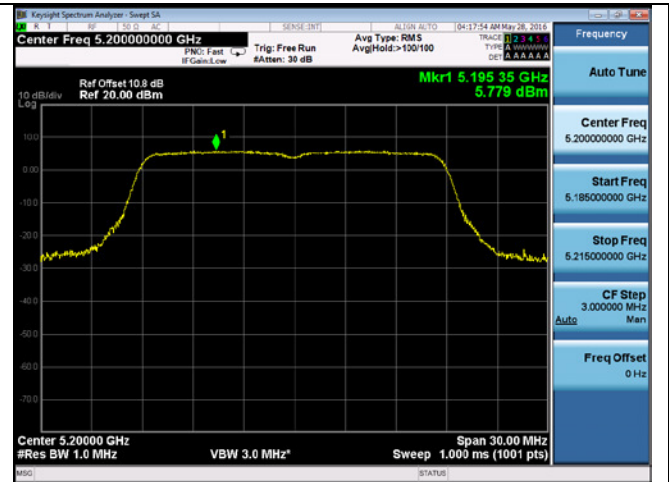


PSD-802.11n-20M -5180M-chain3

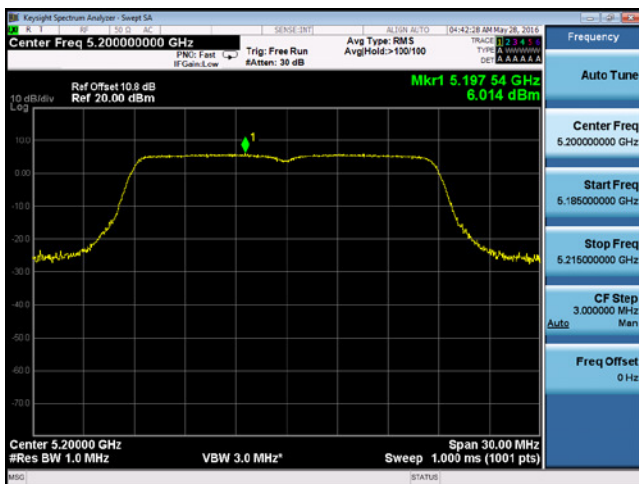




PSD-802.11n-20M-5200M-chain1



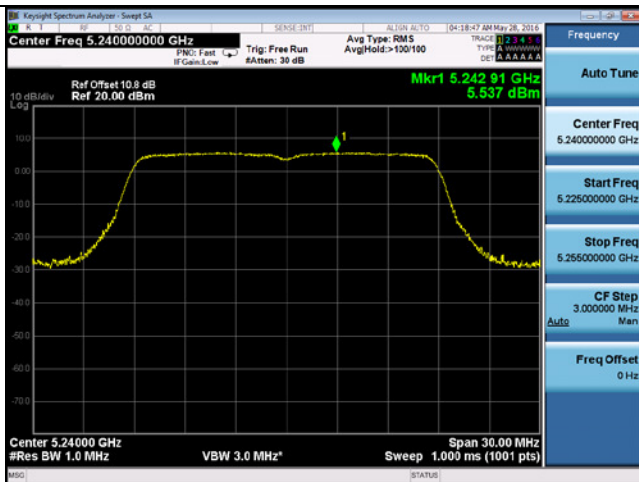
PSD-802.11n-20M-5200M-chain2



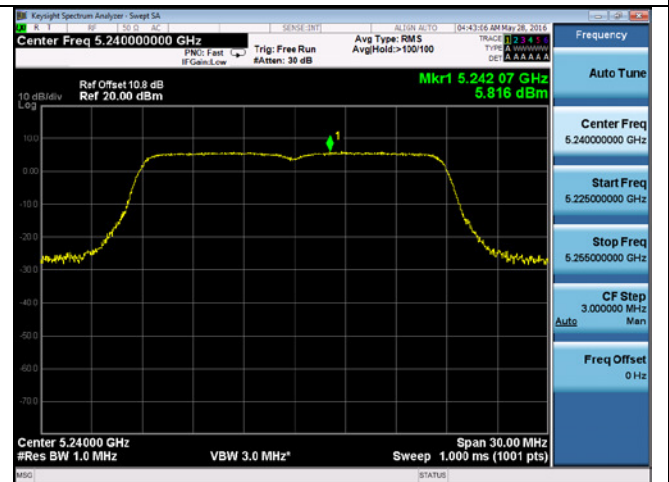
PSD-802.11n-20M-5200M-chain3



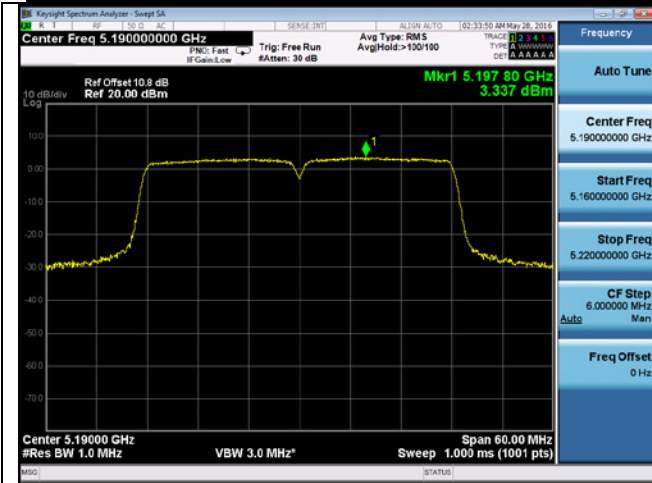
PSD-802.11n-20M-5240M-chain1



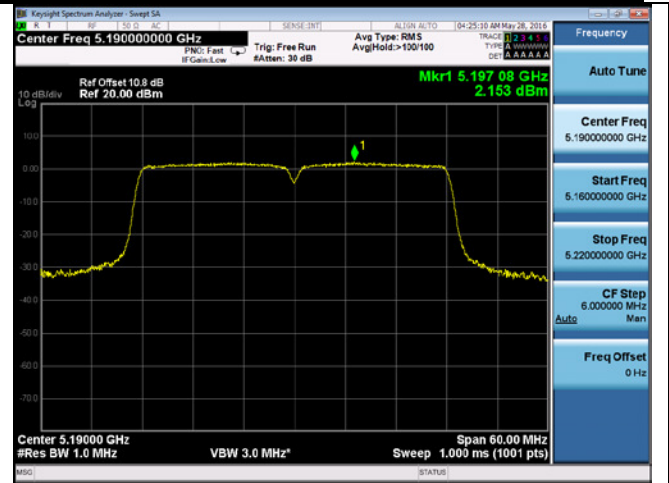
PSD-802.11n-20M-5240M-chain2



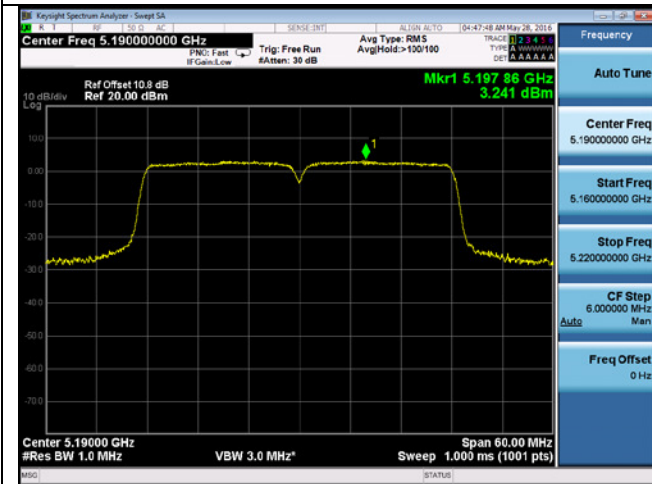
PSD-802.11n-20M-5240M-chain3



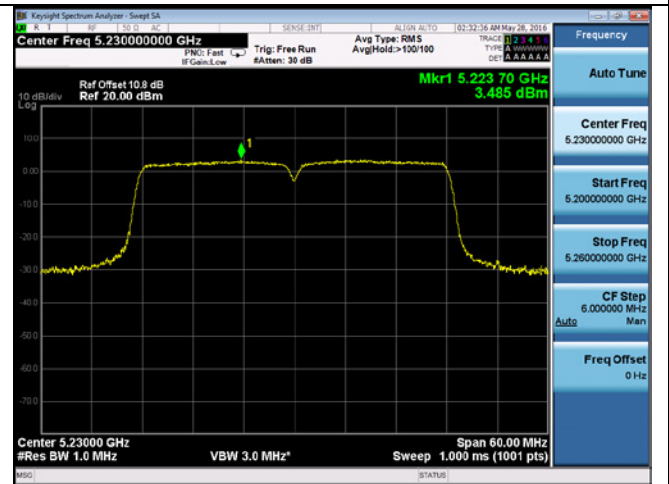
PSD-802.11n-40M-5190M-chain1



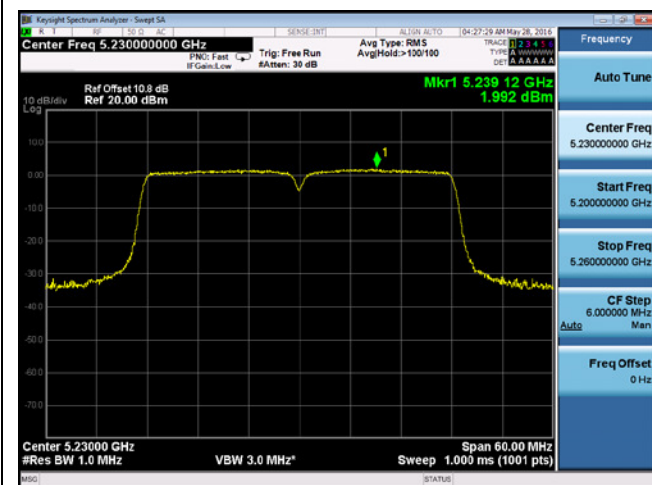
PSD-802.11n-40M-5190M-chain2



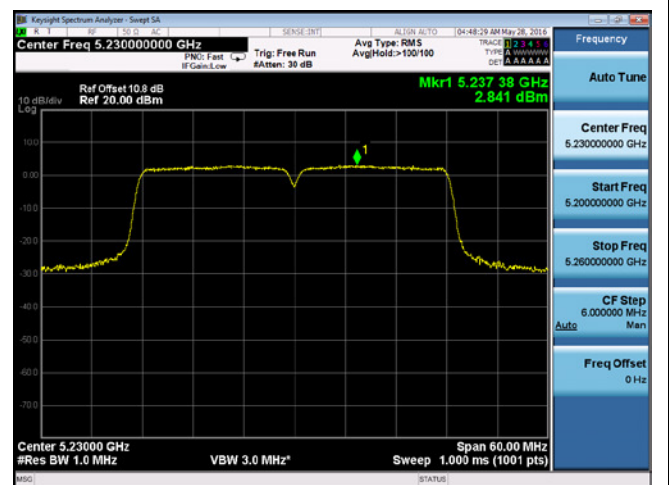
PSD-802.11n-40M-5190M-chain3



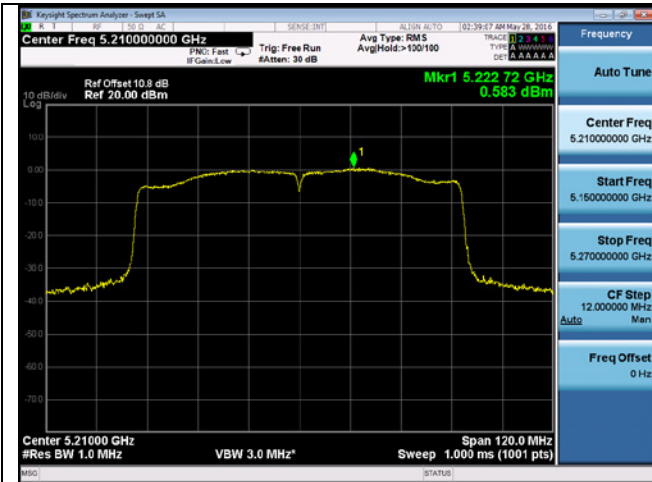
PSD-802.11n-40M-5230M-chain1



PSD-802.11n-40M-5230M-chain2



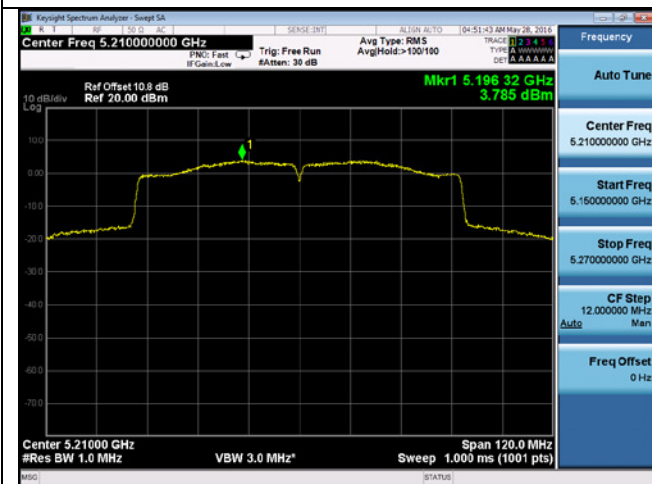
PSD-802.11n-40M-5230M-chain3



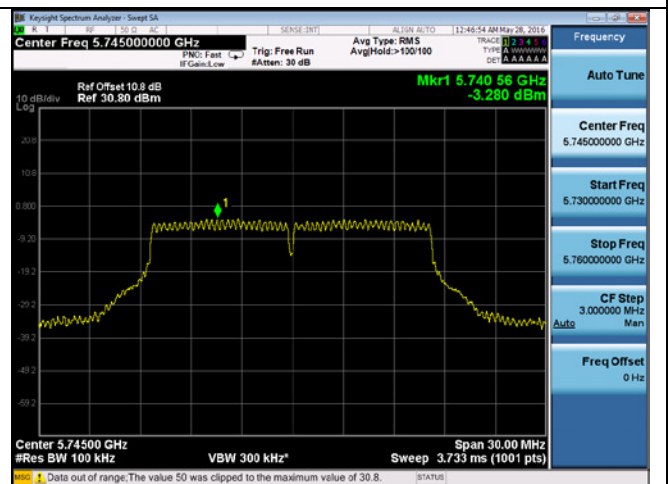
PSD-802.11ac-80M-5210M-chain1



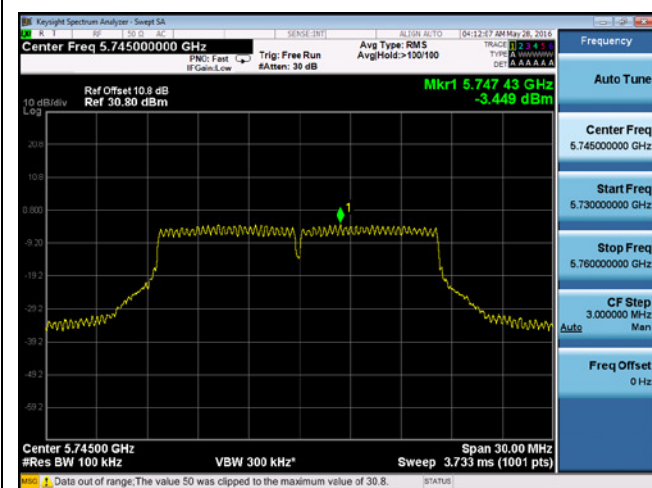
PSD-802.11ac-80M-5210M-chain2



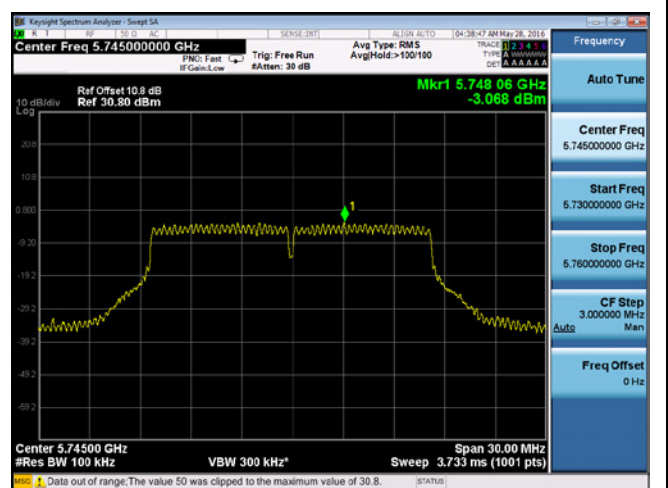
PSD-802.11ac-80M-5210M-chain3



PSD-802.11a-5745M-chain1



PSD-802.11a-5745M-chain2



PSD-802.11a-5745M-chain3