# FCC 47 CFR PART 15 SUBPART E

for

**Wireless Router**

**Model: AC40, AC50, AC60, AC70, A655W**

**Brand: UTT**

**Test Report Number:**

**C160415Z12-RP1-2**

**Issued Date: May 31, 2016**

Issued for

**SHANGHAI UTT TECHNOLOGIES CO., LTD.**

**Room 301, No.9 Building, No.518, Xinzhuan Rd., Songjiang District, Shanghai, China**

Issued by:

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ACCREDITED

TESTING CERT #2861.01

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# Revision History

| Rev. | Issue Date | Revisions | Effect Page | Revised By |
|---|---|---|---|---|
| 00 | May 31, 2016 | Initial Issue | ALL | Sabrina Wang |
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# 1. TEST CERTIFICATION

| | |
|---|---|
| **Product** | Wireless Router |
| **Model** | AC40, AC50, AC60, AC70, A655W |
| **Brand** | UTT |
| **Tested** | April 15~May 30, 2016 |
| **Applicant** | **SHANGHAI UTT TECHNOLOGIES CO., LTD.**<br>Room 301, No.9 Building, No.518, Xinzhuan Rd., Songjiang District, Shanghai, China |
| **Manufacturer** | **SHANGHAI UTT TECHNOLOGIES CO., LTD.**<br>Room 301, No.9 Building, No.518, Xinzhuan Rd., Songjiang District, Shanghai, China |

| **APPLICABLE STANDARDS** | |
|---|---|
| **STANDARD** | **TEST RESULT** |
| FCC 47 CFR Part 15 Subpart E | No non-compliance noted |

**We hereby certify that:**

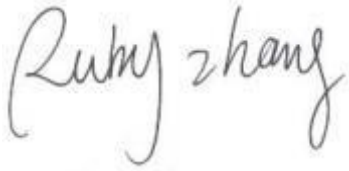
Compliance Certification Services (Shenzhen) Inc. tested the above equipment. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in **ANSI C63.10: 2013** and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.407、FCC 14-30.

The TEST RESULTS of this report relate only to the tested sample identified in this report.

***Approved by:***

**Sunday Hu**
**Supervisor of EMC Dept.**
**Compliance Certification Services (Shenzhen) Inc.**

***Reviewed by:***



**Ruby Zhang**
**Supervisor of Report Dept.**
**Compliance Certification Services (Shenzhen) Inc.**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# 2. EUT DESCRIPTION

| | |
|---|---|
| **Product** | Wireless Router |
| **Model Number** | AC40, AC50, AC60, AC70, A655W |
| **Brand** | UTT |
| **Model Discrepancy** | All models are identical to each other except the different model name. |
| **Serial Number** | C160415Z12-RP1-2 |
| **Received Date** | April 15, 2016 |
| **Power Supply** | DC12V supplied by the Adapter |
| **Adapter Manufacturer /Model No.** | SHENZHEN FUJIA APPLIANCE CO., LTD. / FJ-SW1202000N<br>I/P: 100-240Vac, 50/60Hz, 0.6A max<br>O/P: 12Vdc, 2000mA<br>DC Output Cable: Unshielded 1.50m |
| **Frequency Range** | UNII Band IV:<br>IEEE 802.11a, 802.11n HT20 : 5745MHz ~ 5825MHz<br>IEEE 802.11n HT40: 5755MHz ~ 5795MHz<br>IEEE 802.11ac 80: 5775MHz |
| **Transmit Power** | UNII Band IV:<br>IEEE 802.11a: 17.26dBm (Antenna 1)<br>15.55dBm (Antenna 2)<br>IEEE 802.11n HT 20 MHz mode: 18.61dBm (Combine with Antenna 1 and Antenna 2)<br>IEEE 802.11n HT 40 MHz mode: 18.95dBm (Combine with Antenna 1 and Antenna 2)<br>IEEE 802.11ac 80: 19.02dBm (Combine with Antenna 1 and Antenna 2) |
| **Modulation Technique** | OFDM (QPSK, BPSK, 16-QAM, 64-QAM) |
| **Transmit Data Rate** | IEEE 802.11a mode: 48, 36, 24, 18, 12, 9, 6Mbps<br>IEEE802.11n HT20MHz mode: 13,26,39,52,78,104,117,130Mbps<br>IEEE802.11n HT40MHz mode: 27,54,81,108,162,216,243,270Mbps<br>IEEE802.11ac VHT80MHz mode: 58.6,117,175.6,234,351,468,526.6, 585,702,780Mbps |
| **Number of Channels** | UNII Band IV<br>IEEE 802.11a, 802.11n HT20 : 5 Channels<br>IEEE 802.11n HT 40 MHz mode: 2 Channels<br>IEEE 802.11ac 80: 1 Channel |
| **Antenna Specification** | External Antenna with 5dBi gain (Max) |
| **Channels Spacing** | IEEE 802.11a, 802.11n HT20 : 20MHz<br>IEEE 802.11n HT40: 40MHz<br>IEEE 802.11ac 80: 80MHz |
| **Temperature Range** | -10°C ~ +50°C |
| **Hardware Version** | MT7620-K |
| **Software Version** | nvAC60v1.8.11-160330.bin |

***Note:*** *1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.*


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**Operation Frequency:**

| UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) | |
|---|---|
| **CHANNEL** | **MHz** |
| 149 | 5745 |
| 151 | 5755 |
| 153 | 5765 |
| 155 | 5775 |
| 157 | 5785 |
| 159 | 5795 |
| 161 | 5805 |
| 165 | 5825 |

*Remark:*

1. The sample selected for test was engineering sample that approximated to production product and was provided by manufacturer.
2. This submittal(s) (test report) is intended for FCC ID: **XPF-REG10-UTT** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules and FCC 14-30.


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# 3. TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 Radiated testing was performed at an antenna to EUT distance 3 meters. The tests documented in this report were performed in accordance with ANSI C63.10: 2013 and FCC CFR 47 Part 15.207, 15.209, 15.407 and FCC 14-30.
Radio testing was performed according to KDB DA 02-2138、KDB 789033 D02、KDB 905462 D06；

## 3.1 EUT CONFIGURATION

The EUT configuration for testing is installed for RF field strength measurement to meet the Commissions requirement, and is operated in a manner intended to generate the maximum emission in a continuous normal application.

## 3.2 EUT EXERCISE

The EUT is operated in the engineering mode to fix the TX frequency for the purposes of measurement.
According to its specifications, the EUT must comply with the requirements of Section 15.407 under the FCC Rules Part 15 Subpart E.

## 3.3 GENERAL TEST PROCEDURES

**Conducted Emissions**

The EUT is placed on the turntable, which is positioned at 0.8 m above the ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10, the conducted emission from the EUT is measured in the frequency range between 0.15 MHz and 30MHz, using the CISPR Quasi-Peak detector mode.

**Radiated Emissions**

The EUT is placed on the turntable, which is 0.8 m above the ground plane. The turntable is then rotated for 360 degrees to determine the proper orientation for the maximum emission level. The EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission level. And, each emission is to be maximized by changing the horizontal and vertical polarization of the receiving antenna. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.10.


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## 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| [1]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 - | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.52525 | 2655 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 156.7 - 156.9 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 162.0125 - 167.17 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 167.72 - 173.2 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 240 - 285 | 3600 - 4400 | ([2]) |
| 13.36 - 13.41 | 322 - 335.4 | | |

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.


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## 3.5 DESCRIPTION OF TEST MODES

The EUT is a 2x2 configuration spatial MIMO (2TX & 2RX) without beam forming function.

Software used to control the EUT for staying in continuous transmitting mode was programmed.

| Test Item | Test mode | Worse mode |
|---|---|---|
| Conducted Emission | **Mode 1:** TX | ☒ |
| Radiated Emission | **Mode 1:** TX | ☒ |

After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in normal link mode only.

The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X axis). The worst emission was found in lie-down position (Z axis) and the worst case was recorded.

**UNII Band IV:**

**IEEE 802.11a for 5745 ~ 5825MHz:**
Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6Mbps data rate were chosen for full testing.

**IEEE 802.11n HT 20 MHz for 5745 ~ 5825MHz:**
Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 27Mbps data rate were chosen for full testing.

**IEEE 802.11n HT 40 MHz Channel for 5755~ 5795MHz:**
Channel Low (5755MHz) and Channel High (5795MHz) with 27Mbps data rate were chosen for full testing.

**IEEE 802.11ac 80 Channel for 5775MHz:**
Channel Low (5775MHz) with 27Mbps data rate were chosen for full testing.


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# 4. SETUP OF EQUIPMENT UNDER TEST

## 4.1 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| No. | Equipment | Model No. | Serial No. | FCC ID | Brand | Data Cable | Power Cord |
|---|---|---|---|---|---|---|---|
| 1 | Notebook | E335 | N/A | DOC | Thinkpad | Shielded 1.50m | Unshielded 2.00m |

**Note:**

Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 4.2 CONFIGURATION OF SYSTEM UNDER TEST

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.


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# 5. FACILITIES AND ACCREDITATIONS

## 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at
**No.10-1 Mingkeda Logistics park, No.18, Huanguan South Rd., Guan Lan Town, Baoan District, Shenzhen, China**

The sites are constructed in conformance with the requirements of ANSI C63.10, ANSI C63.7 and CISPR Publication 22.

## 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.
Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.
Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.
All receiving equipment conforms to CISPR Publication 16-1, “Radio Interference Measuring Apparatus and Measurement Methods.”

## 5.3 ACCREDITATIONS

Our laboratories are accredited and approved by the following accreditation body according to ISO/IEC 17025.

| | |
|---|---|
| **USA** | **A2LA** |
| **China** | **CNAS** |

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

| | |
|---|---|
| **USA** | **FCC** |
| **Japan** | **VCCI (C-4815,R-4320,T-2317, G-10624)** |
| **Canada** | **INDUSTRY CANADA** |

Copies of granted accreditation certificates are available for downloading from our web site, http://www.ccssz.com


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## 5.4 MEASUREMENT UNCERTAINTY

| Parameter | Uncertainty |
|---|---|
| RF frequency | +/-1 * 10-5 |
| RF power conducted | +/- 1,5 dB |
| RF power radiated | +/- 6 dB |
| Spurious emissions, conducted | +/- 3 dB |
| Spurious emissions, radiated | +/- 6 dB |
| Humidity | +/- 5 % |
| Temperature | +/- 1°C |
| Time | +/-10 % |

***Remark:*** *This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.*


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# 6. FCC PART 15 REQUIREMENTS

## 6.1 26dB EMISSION BANDWIDTH

### 6.1.1LIMIT

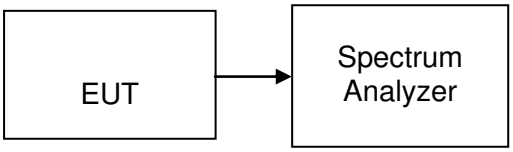
According to §15.303(c), for purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the emissions limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

### 6.1.2MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | N9010A | MY52221469 | 02/21/2016 | 02/20/2017 |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

### 6.1.3TEST CONFIGURATION




### 6.1.4TEST PROCEDURE

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low-loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW > 1%EBW, VBW > RBW, Span >26dB bandwidth, Detector = Peak, and Sweep = auto.
4. Mark the peak frequency and –26dB (upper and lower) frequency.
5. Repeat until all the rest channels were investigated.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### 6.1.5TEST RESULTS

*No non-compliance noted*

**Test Data**

**Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz**

| Channel | Frequency (MHz) | Bandwidth(B) (MHz) | |
|---|---|---|---|
| | | Antenna 1 | Antenna 2 |
| Low | 5745 | 20.11 | 19.90 |
| Mid | 5785 | 19.93 | 19.65 |
| High | 5825 | 19.85 | 19.79 |

**Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz**

| Channel | Frequency (MHz) | Bandwidth(B) (MHz) | |
|---|---|---|---|
| | | Antenna 1 | Antenna 2 |
| Low | 5745 | 20.23 | 20.13 |
| Mid | 5785 | 19.87 | 20.13 |
| High | 5825 | 20.13 | 19.95 |

**Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

| Channel | Frequency (MHz) | Bandwidth(B) (MHz) | |
|---|---|---|---|
| | | Antenna 1 | Antenna 2 |
| Low | 5755 | 40.16 | 39.65 |
| High | 5795 | 39.88 | 39.65 |

**Test mode: IEEE 802.11ac 80 mode / 5775MHz**

| Channel | Frequency (MHz) | Bandwidth(B) (MHz) | |
|---|---|---|---|
| | | Antenna 1 | Antenna 2 |
| | 5775 | 79.73 | 79.85 |


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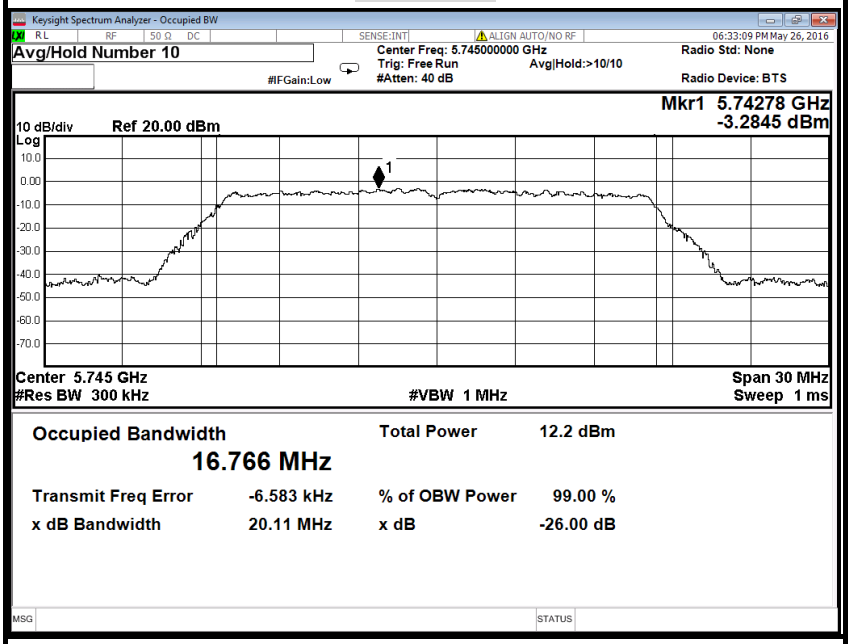
## Test Plot

**IEEE 802.11a mode / 5745 ~ 5825MHz**

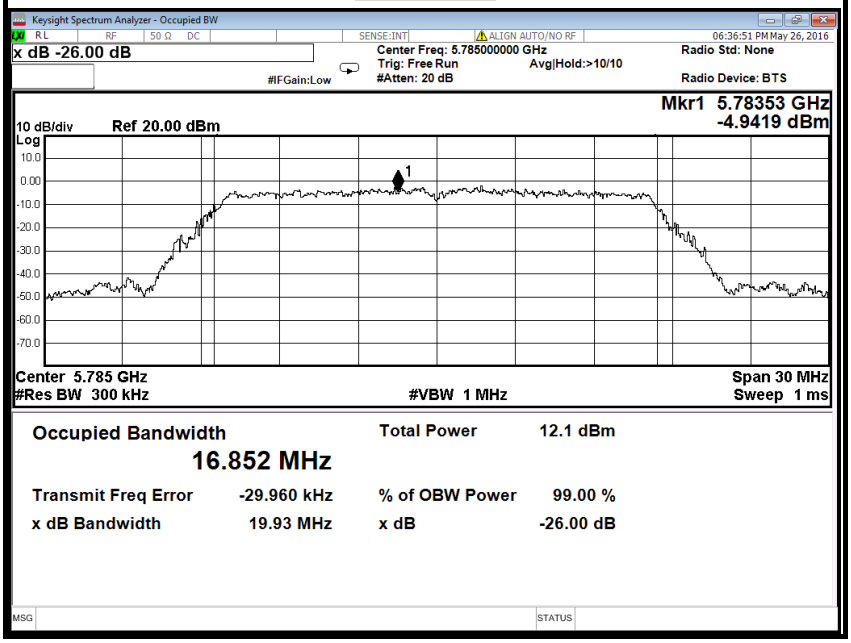
**26dB Bandwidth (CH Low)**

Antenna 1




**26dB Bandwidth (CH Mid)**

Antenna 1





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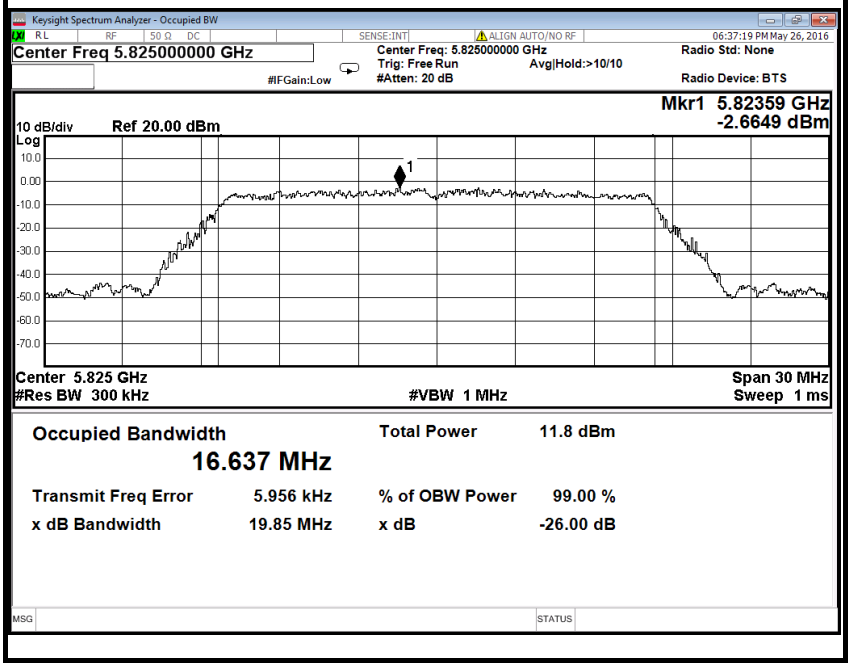
## 26dB Bandwidth (CH High)

Antenna 1





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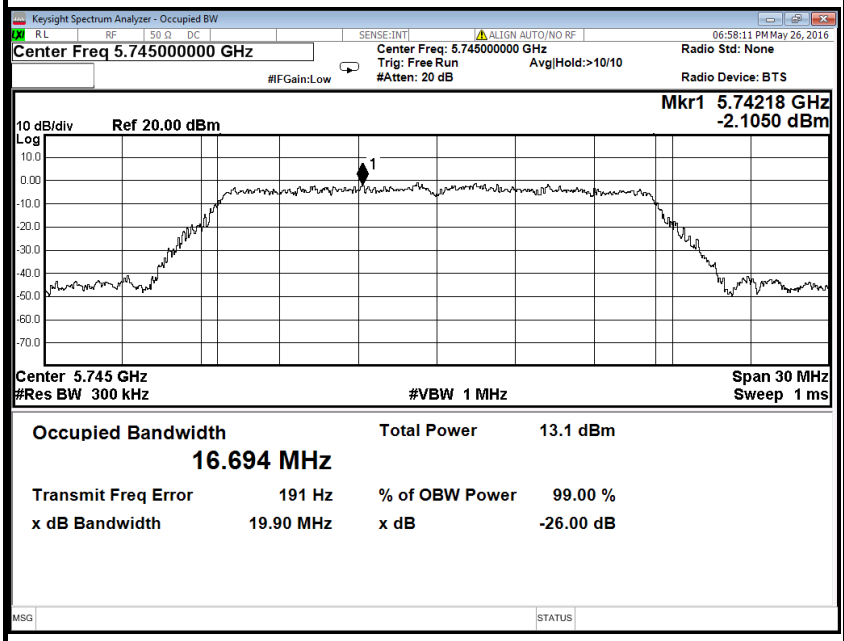
## IEEE 802.11a mode / 5745 ~ 5825MHz

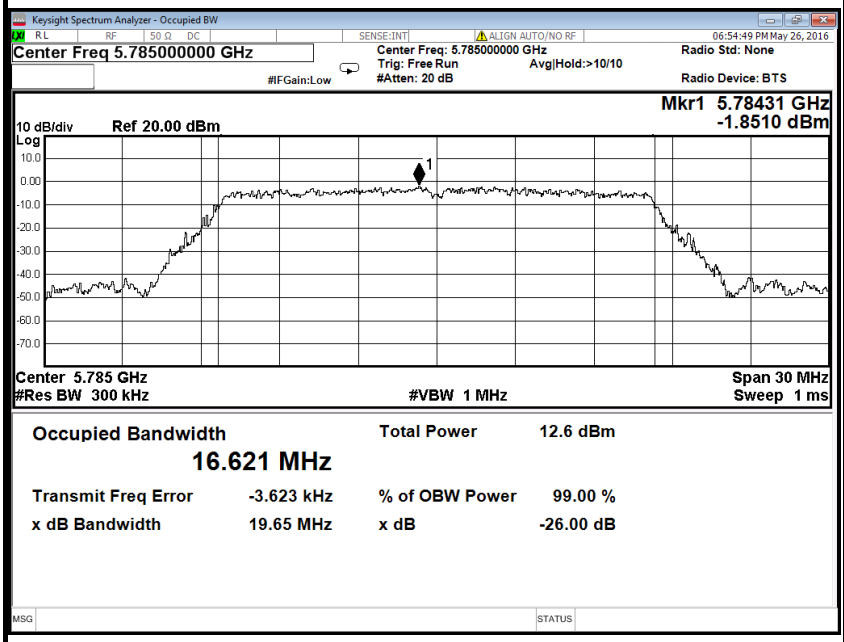
### 26dB Bandwidth (CH Low)

Antenna 2




### 26dB Bandwidth (CH Mid)

Antenna 2





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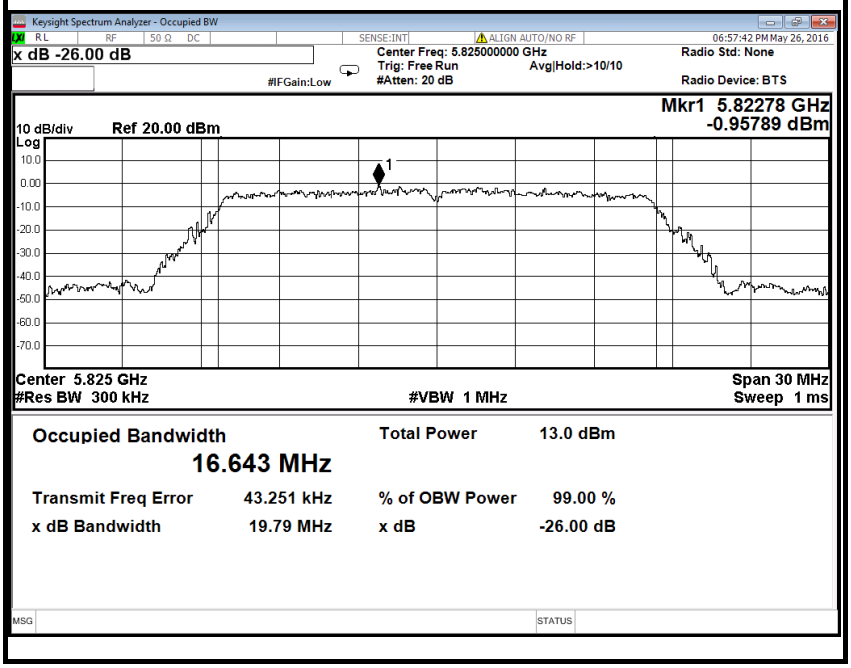
## 26dB Bandwidth (CH High)

Antenna 2





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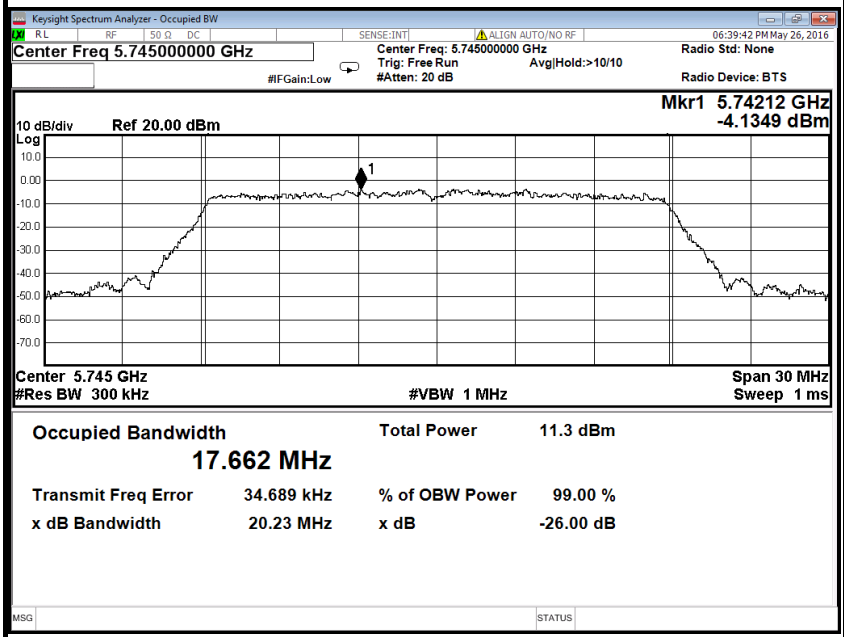
## IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

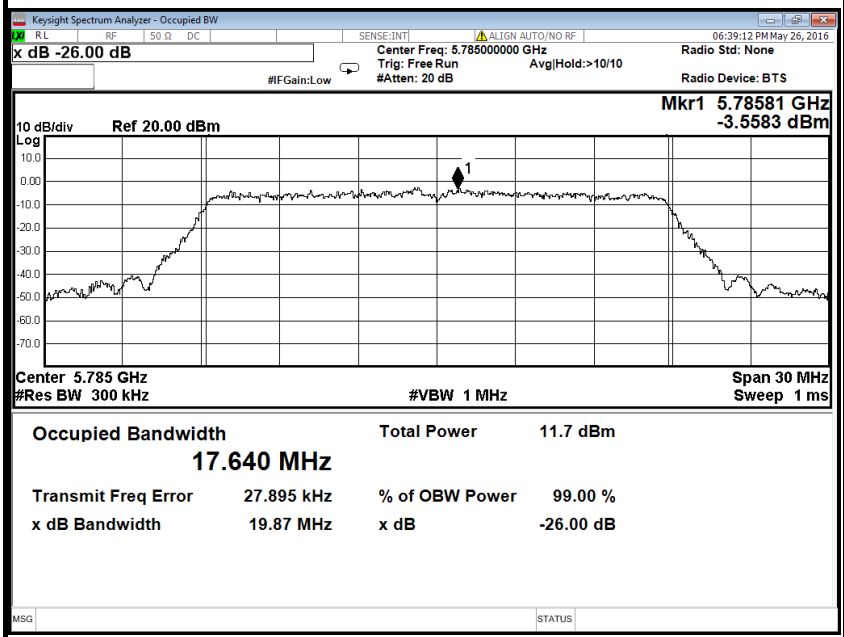
### 26dB Bandwidth (CH Low)

Antenna 1




### 26dB Bandwidth (CH Mid)

Antenna 1





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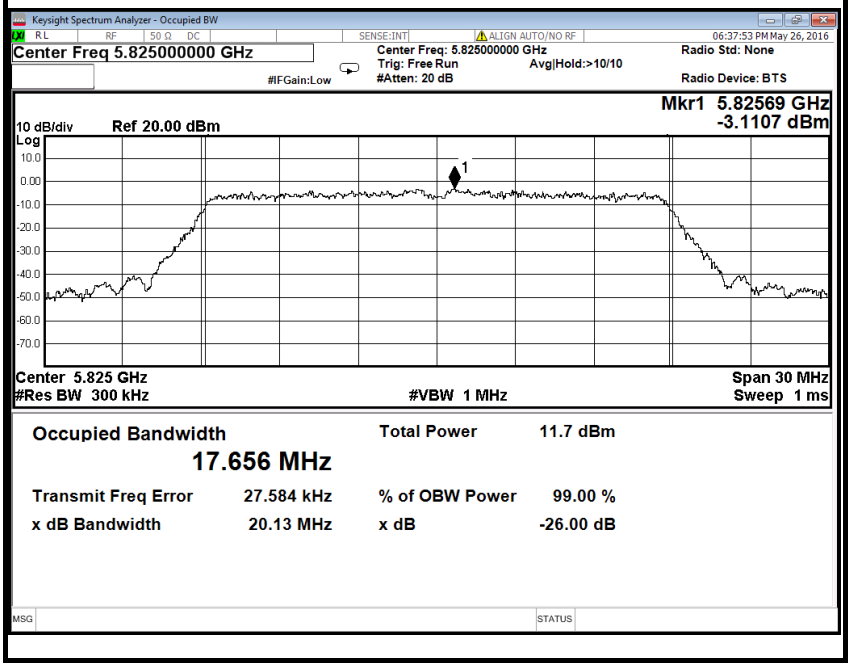
## 26dB Bandwidth (CH High)

Antenna 1





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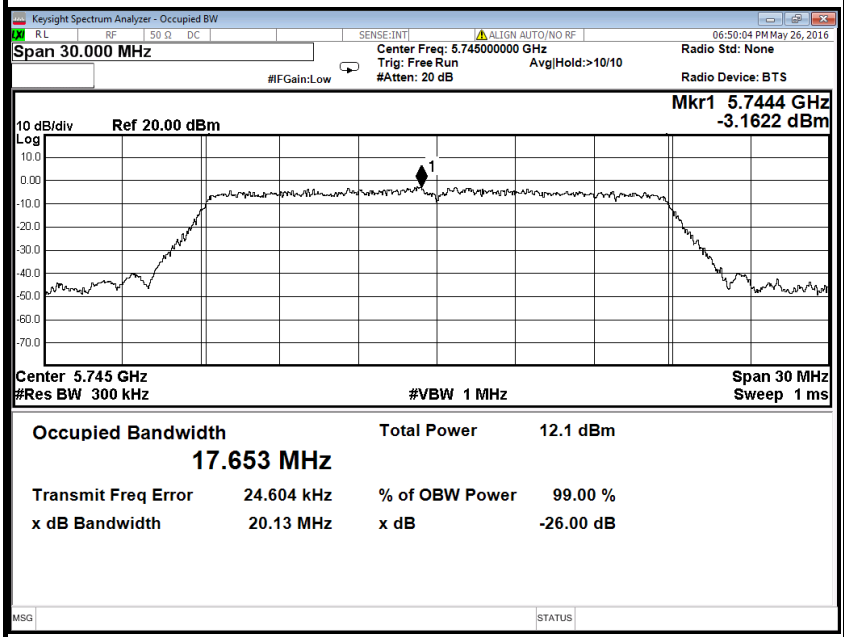
## IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

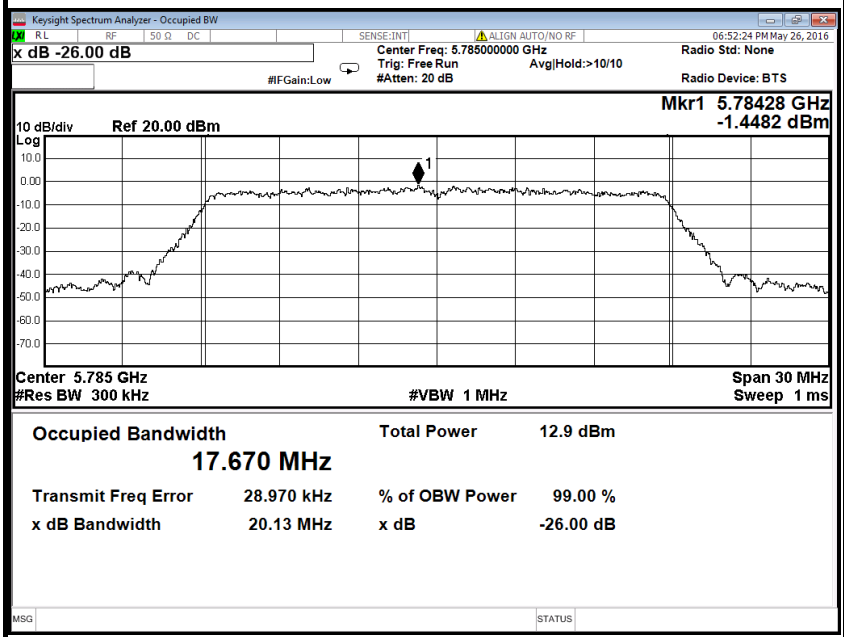
### 26dB Bandwidth (CH Low)

Antenna 2




### 26dB Bandwidth (CH Mid)

Antenna 2





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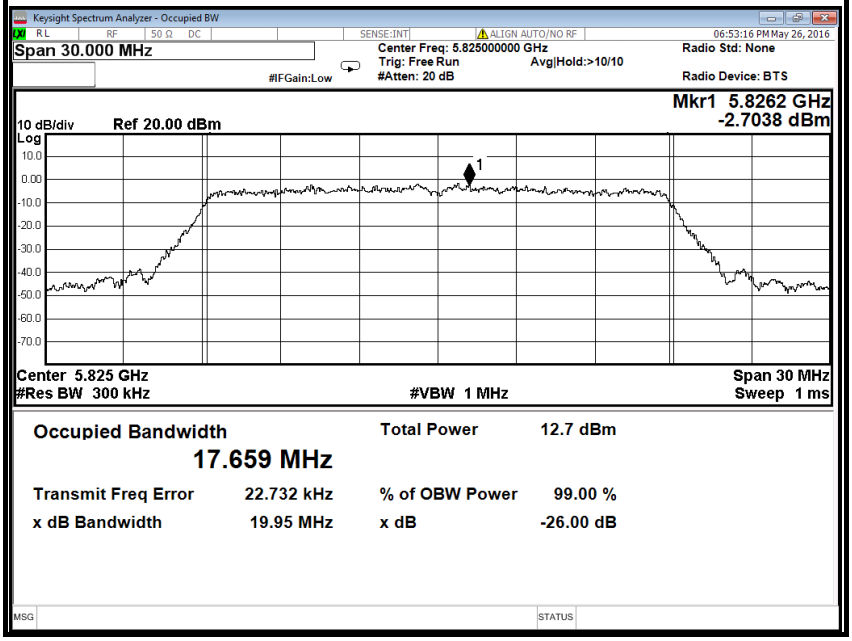
**26dB Bandwidth (CH High)**

Antenna 2





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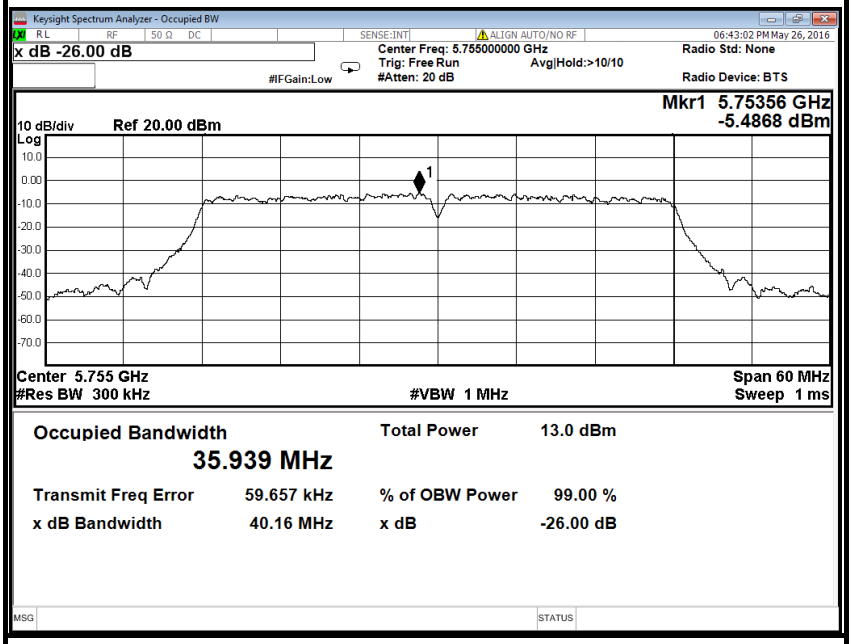
**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

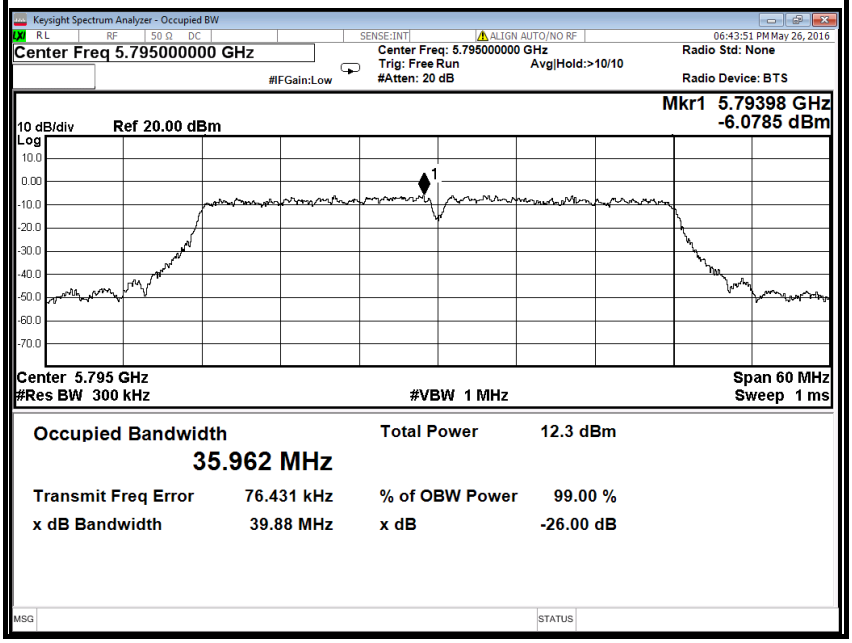
**26dB Bandwidth (CH Low)**

Antenna 1




**26dB Bandwidth (CH High)**

Antenna 1





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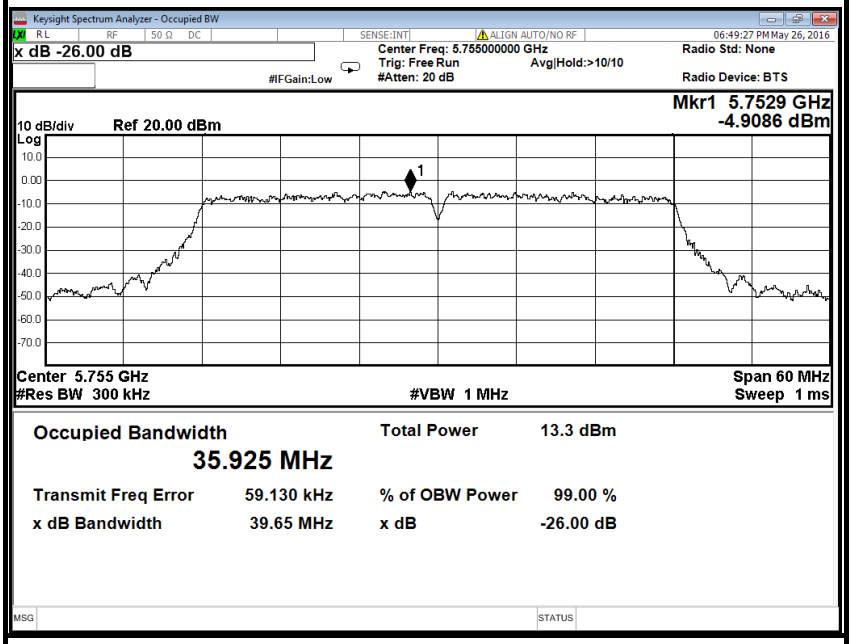
**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

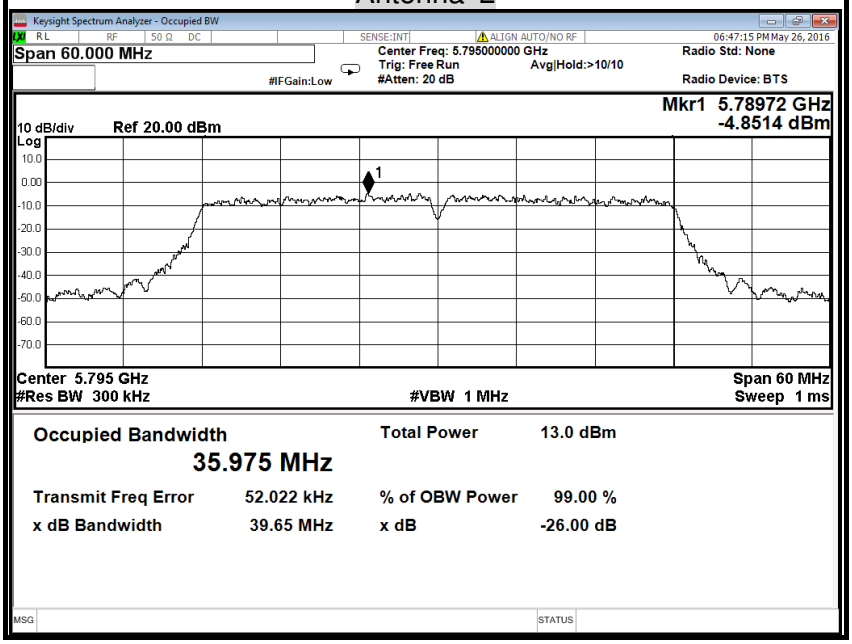
**26dB Bandwidth (CH Low)**

Antenna 2




**26dB Bandwidth (CH High)**

Antenna 2





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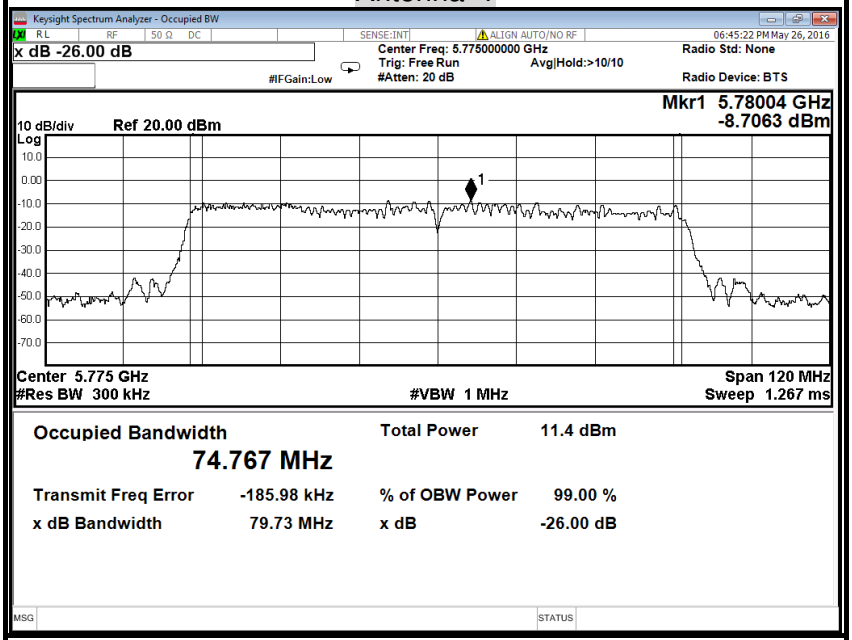
**IEEE 802.11ac 80 mode / 5775MHz**

**26dB Bandwidth**

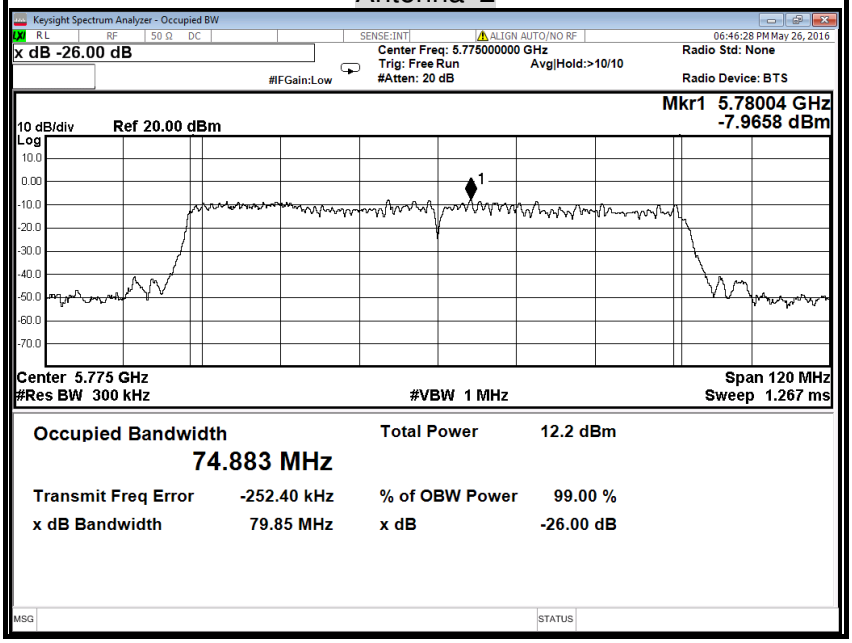
Antenna 1




**IEEE 802.11ac 80 mode / 5775MHz**

**26dB Bandwidth**

Antenna 2





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## 6.2 6dB BANDWIDTH MEASUREMENT

### 6.2.1 LIMITS

According to §15.407(e), Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

### 6.2.2 TEST INSTRUMENTS

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Calibration Due |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | N9010A | MY52221469 | 02/21/2016 | 02/20/2017 |

### 6.2.3 TEST PROCEDURES (please refer to measurement standard)

8.1 Option 1:

a) Set RBW = 100 kHz.

b) Set the video bandwidth (VBW) ≥ 3 x RBW.

c) Detector = Peak.

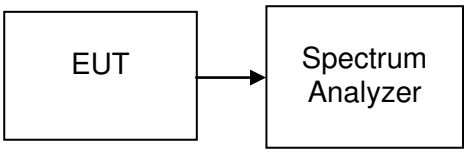
d) Trace mode = max hold.

e) Sweep = auto couple.

f) Allow the trace to stabilize.

g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 6.2.4 TEST SETUP





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### 6.2.5 TEST RESULTS

*No non-compliance noted*

## Test Data

**Test mode: IEEE 802.11a mode / 5745 ~ 5825MHz**

| Channel | Frequency (MHz) | Bandwidth(B) (MHz) | |
|---|---|---|---|
| | | Antenna 1 | Antenna 2 |
| Low | 5745 | 16.39 | 16.33 |
| Mid | 5785 | 16.29 | 16.37 |
| High | 5825 | 16.34 | 16.33 |

**Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz**

| Channel | Frequency (MHz) | Bandwidth(B) (MHz) | |
|---|---|---|---|
| | | Antenna 1 | Antenna 2 |
| Low | 5745 | 17.54 | 17.48 |
| Mid | 5785 | 17.60 | 17.52 |
| High | 5825 | 17.51 | 17.52 |

**Test mode: IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

| Channel | Frequency (MHz) | Bandwidth(B) (MHz) | |
|---|---|---|---|
| | | Antenna 1 | Antenna 2 |
| Low | 5755 | 36.13 | 36.15 |
| High | 5795 | 35.85 | 36.02 |

**Test mode: IEEE 802.11ac 80 mode / 5775MHz**

| Channel | Frequency (MHz) | Bandwidth(B) (MHz) | |
|---|---|---|---|
| | | Antenna 1 | Antenna 2 |
| | 5775 | 74.69 | 74.33 |


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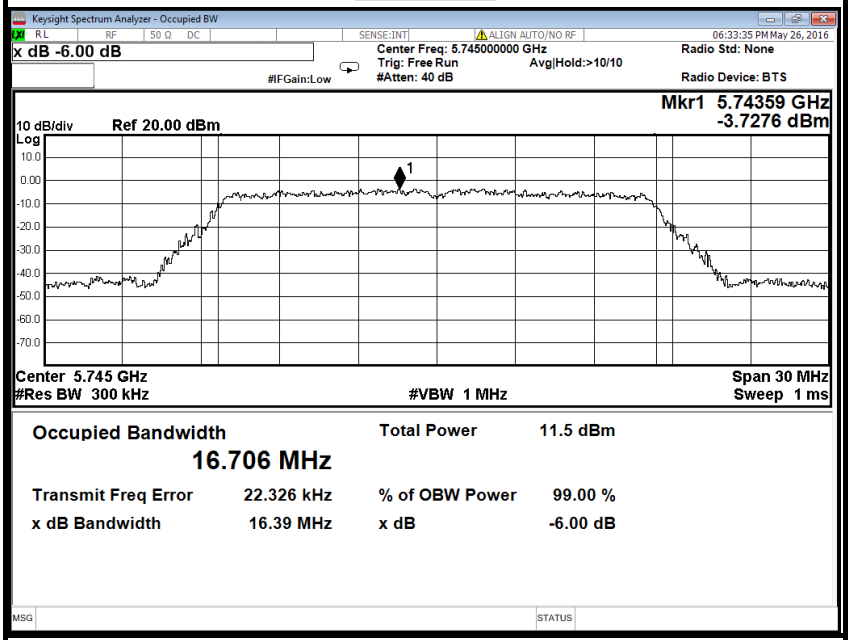
## Test Plot

**IEEE 802.11a mode / 5745 ~ 5825MHz**

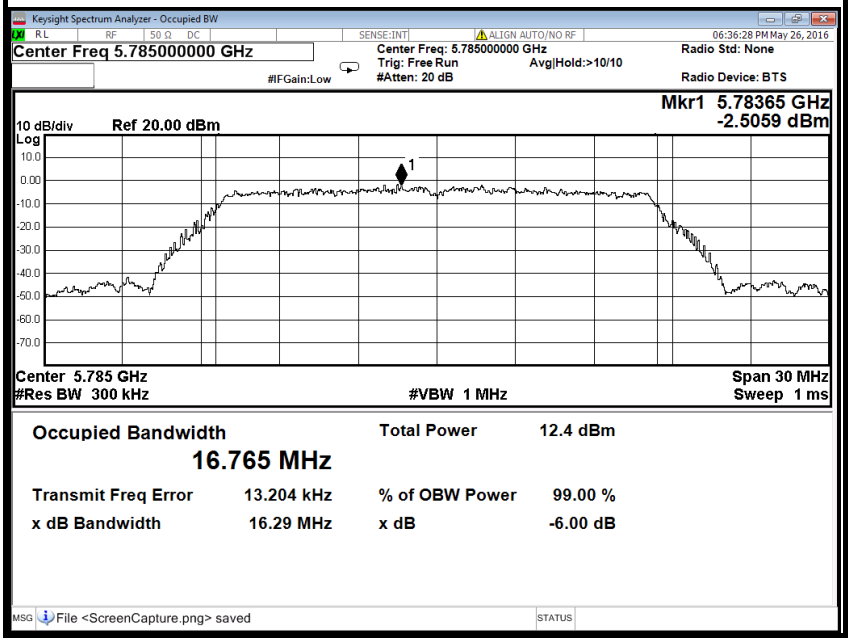
**6dB Bandwidth (CH Low)**

Antenna 1




**6dB Bandwidth (CH Mid)**

Antenna 1





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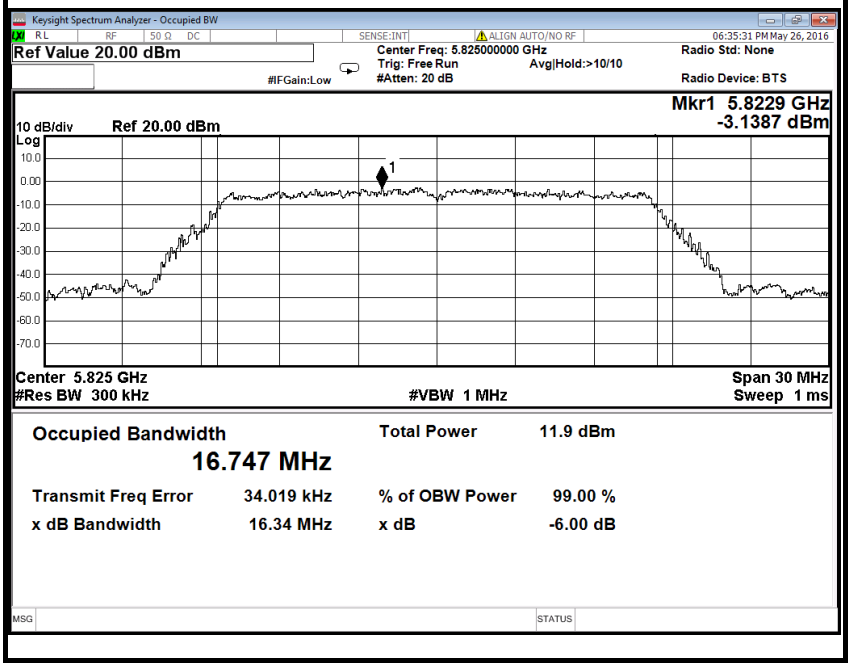
## 6dB Bandwidth (CH High)

Antenna 1





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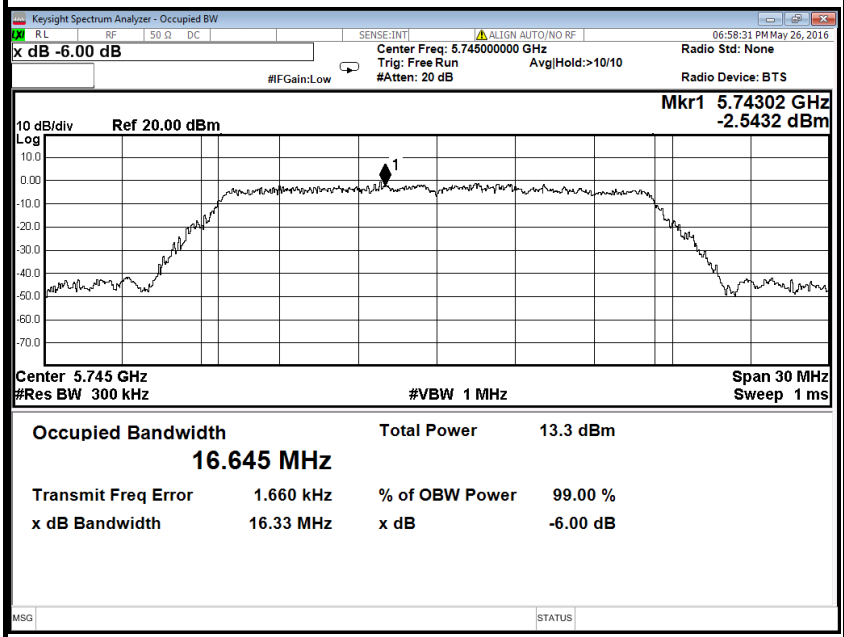
## IEEE 802.11a mode / 5745 ~ 5825MHz

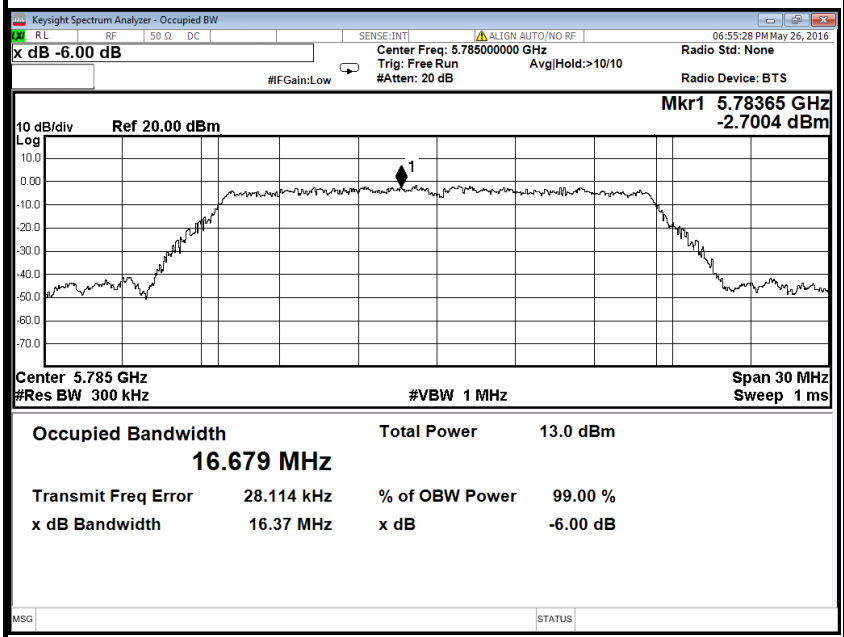
### 6dB Bandwidth (CH Low)

Antenna 2




### 6dB Bandwidth (CH Mid)

Antenna 2





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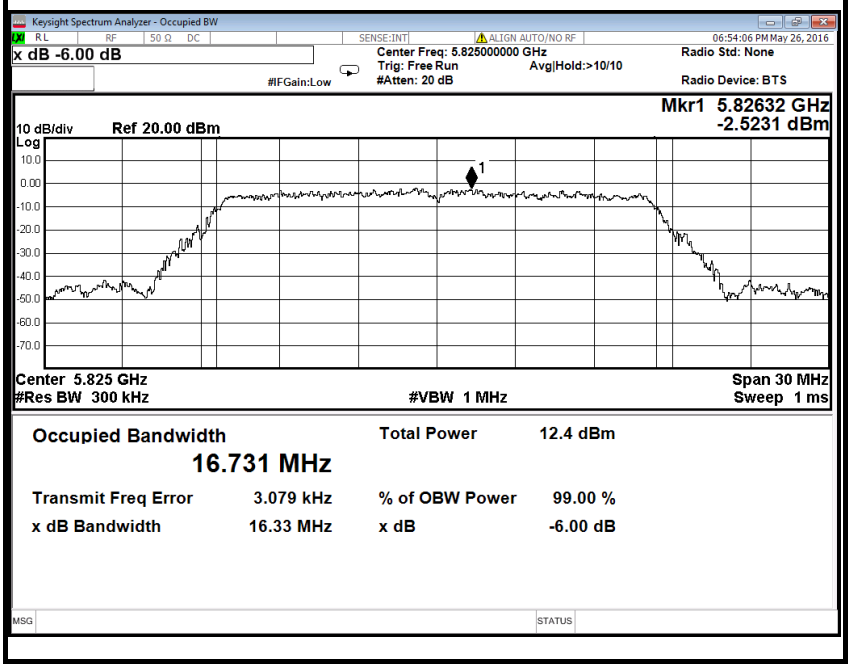
## 6dB Bandwidth (CH High)

Antenna 2





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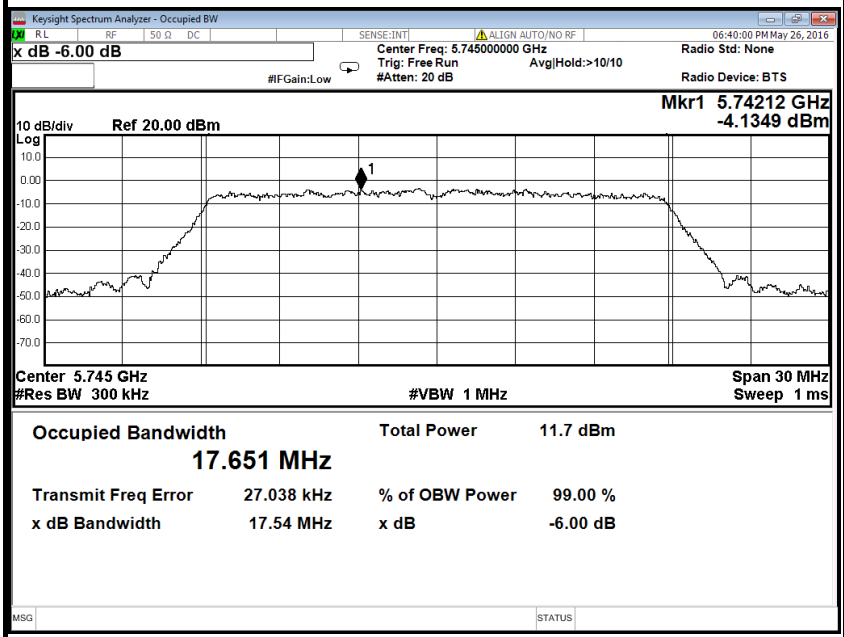
## IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

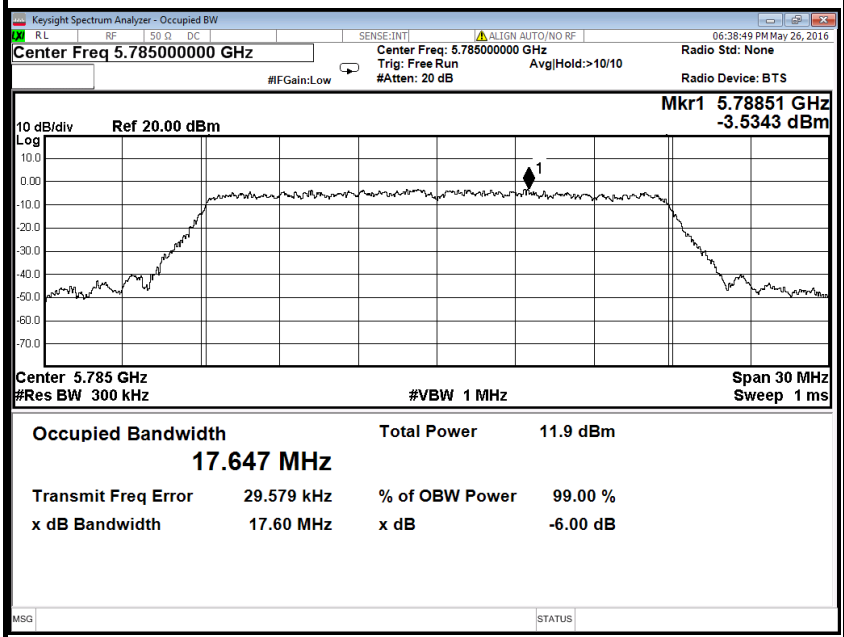
### 6dB Bandwidth (CH Low)

Antenna 1




### 6dB Bandwidth (CH Mid)

Antenna 1





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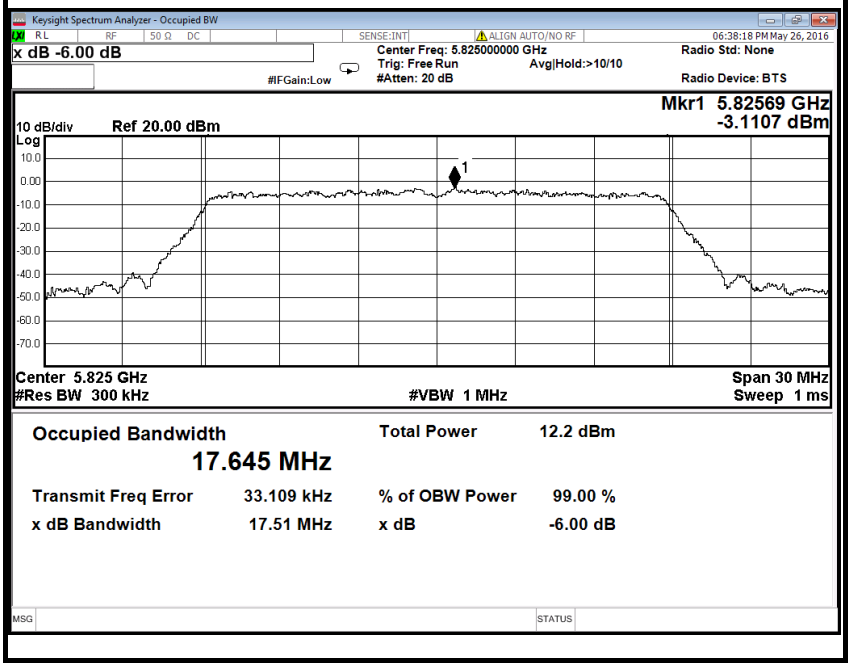
## 6dB Bandwidth (CH High)

Antenna 1





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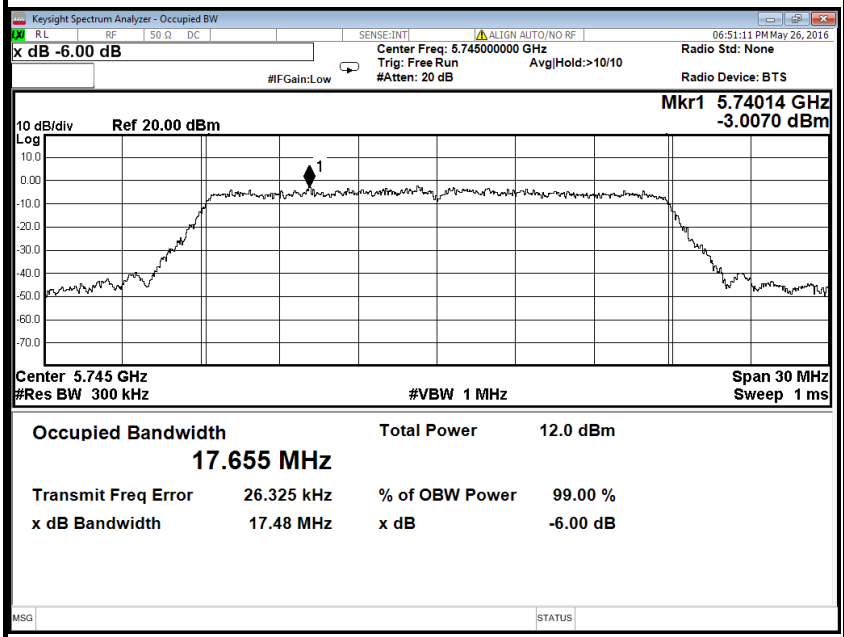
## IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz

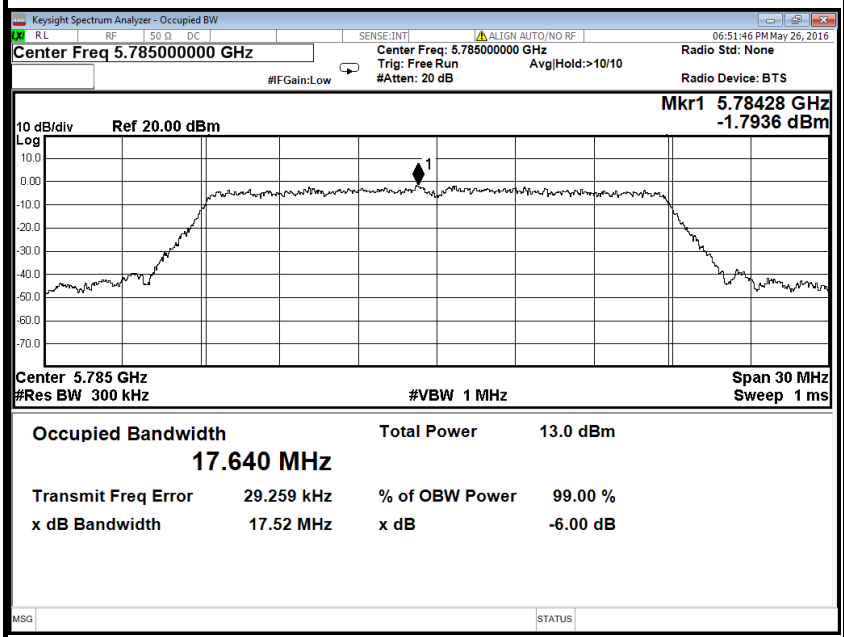
### 6dB Bandwidth (CH Low)

Antenna 2




### 6dB Bandwidth (CH Mid)

Antenna 2





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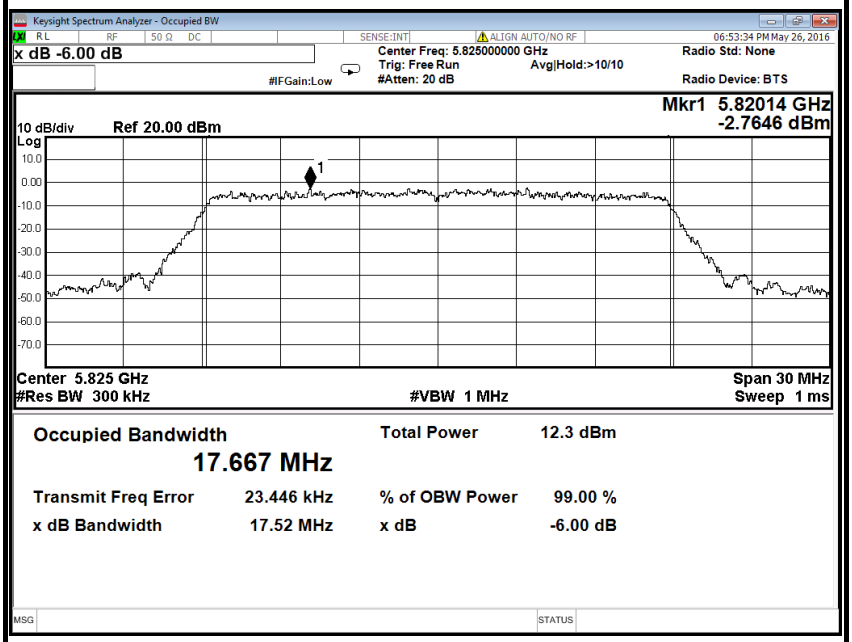
## 6dB Bandwidth (CH High)

Antenna 2





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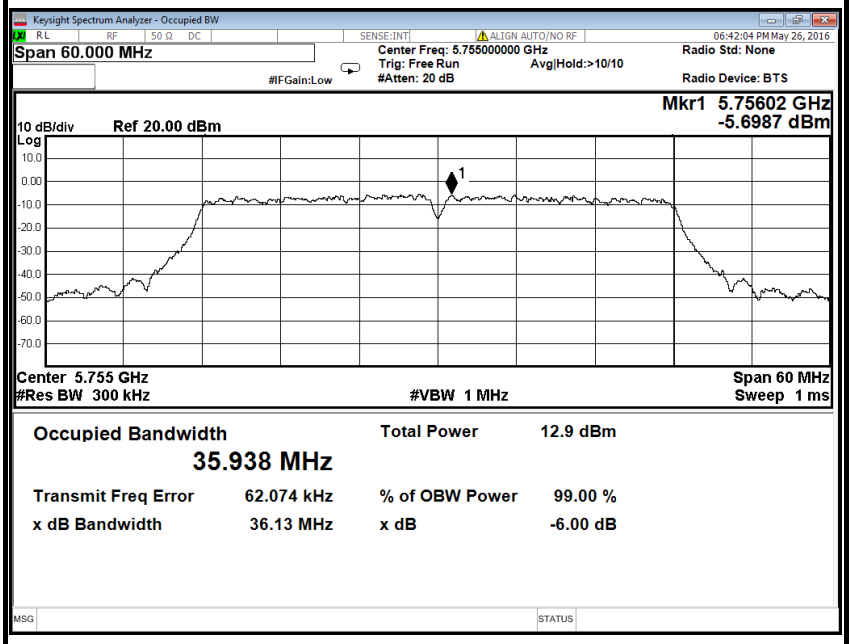
## IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

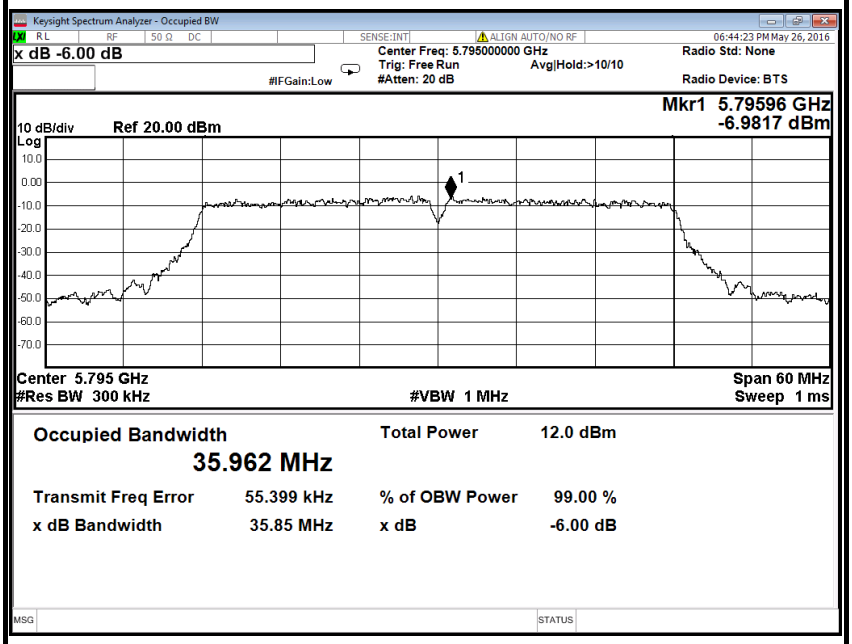
### 6dB Bandwidth (CH Low)

Antenna 1




### 6dB Bandwidth (CH High)

Antenna 1





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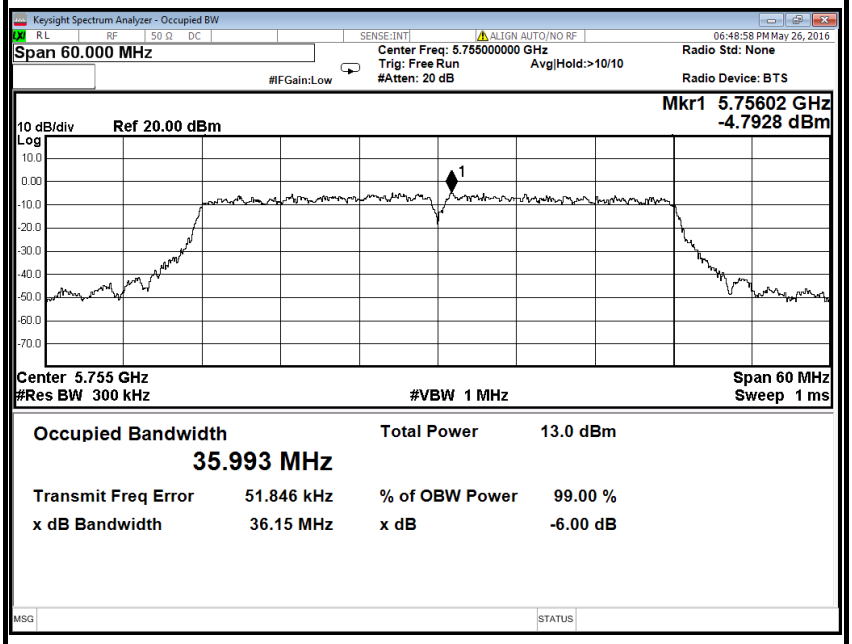
## IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz

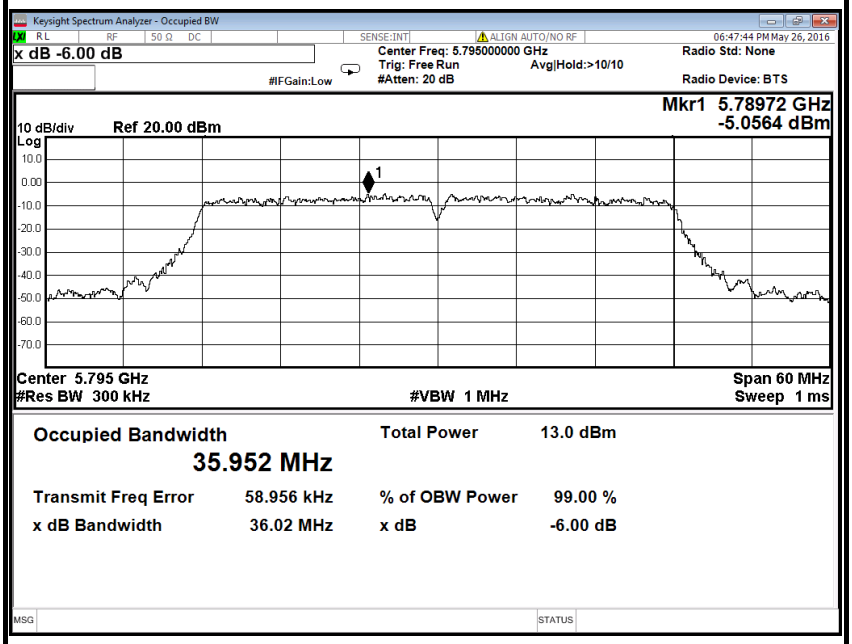
### 6dB Bandwidth (CH Low)

Antenna 2




### 6dB Bandwidth (CH High)

Antenna 2





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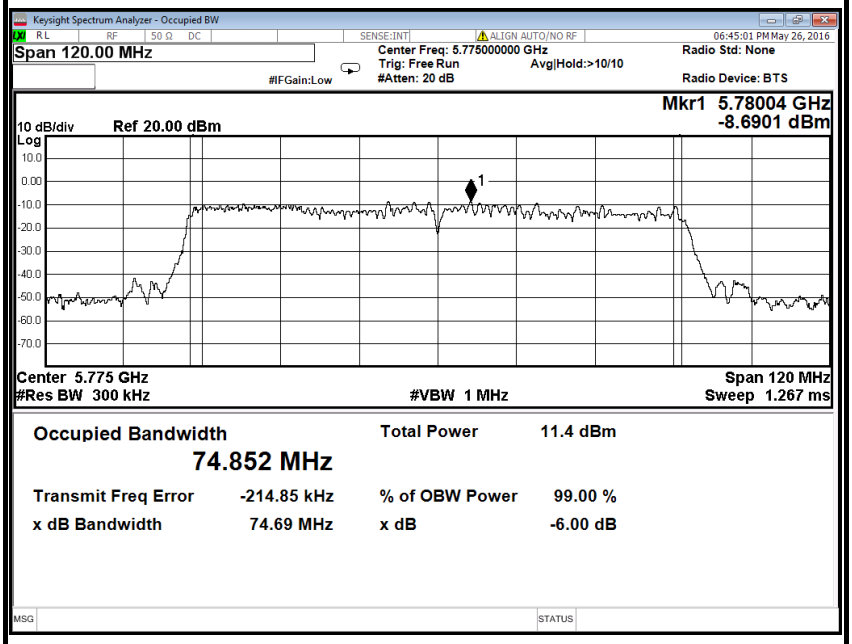
## IEEE 802.11ac 80 mode / 5775MHz

## 6dB Bandwidth

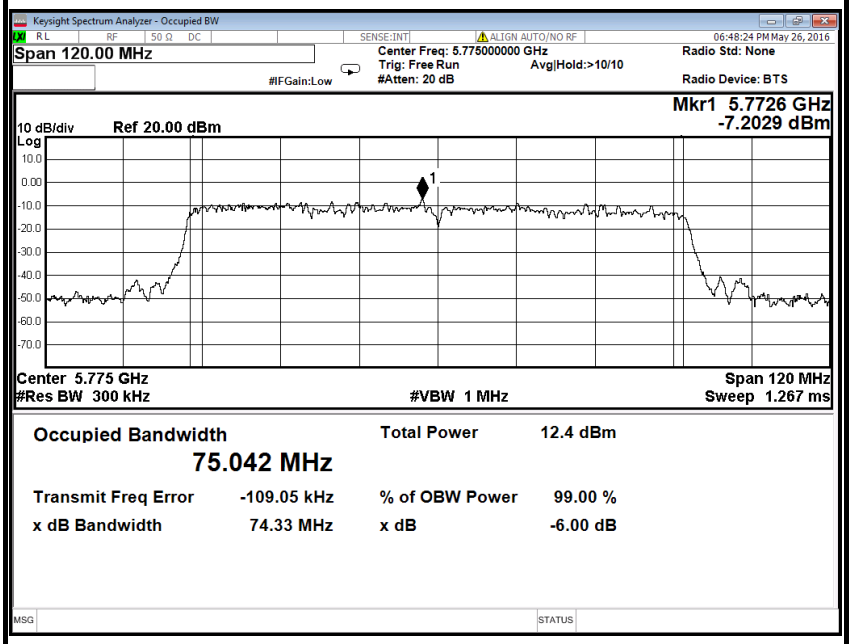
Antenna 1




## IEEE 802.11ac 80 mode / 5775MHz

## 6dB Bandwidth

Antenna 2





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## 6.3 ANTENNA GAIN

### MEASUREMENT

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal WLAN devices, the OFDM mode is used.

### MEASUREMENT PARAMETERS

| Measurement parameter | |
|---|---|
| Detector | Peak |
| Sweep time | Auto |
| Resolution bandwidth | 3 MHz |
| Video bandwidth | 3 MHz |
| Trace-Mode | Max hold |

### LIMITS

| FCC | IC |
|---|---|
| Antenna Gain | |
| 6 dBi | |


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# TEST RESULTS

## IEEE 802.11a mode (Antenna 1)

| $T_{nom}$ | $V_{nom}$ | Lowest channel 5745MHz | Highest channel 5825MHz |
|---|---|---|---|
| Conducted power [dBm] Measured with OFDM modulation | | 5.02 | 4.37 |
| Radiated power [dBm] Measured with OFDM modulation | | 8.31 | 8.65 |
| Gain [dBi] Calculated | | 3.29 | 4.28 |
| Measurement uncertainty | | ± 1.5 dB (cond.) / ± 3 dB (rad.) | |

## IEEE 802.11a mode (Antenna 2)

| $T_{nom}$ | $V_{nom}$ | Lowest channel 5745MHz | Highest channel 5825MHz |
|---|---|---|---|
| Conducted power [dBm] Measured with OFDM modulation | | 3.32 | 1.20 |
| Radiated power [dBm] Measured with OFDM modulation | | 7.65 | 5.83 |
| Gain [dBi] Calculated | | 4.33 | 4.63 |
| Measurement uncertainty | | ± 1.5 dB (cond.) / ± 3 dB (rad.) | |


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## 6.4 OUTPUT POWER

### 6.4.1 LIMIT

**According to §15.407(a)& FCC R&O FCC 14 - 30,**

(1) For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(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 + 10log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or 17 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

*NOTE: The Commission strongly recommends that parties employing U-NII devices to provide critical communications services should determine if there are any nearby Government radar systems that could affect their operation.*

**Specified Limit of the Peak Power**

Not applicable, since the EUT only used band IV.


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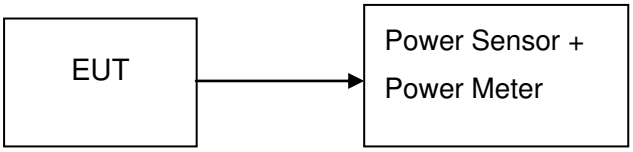
### 6.4.2 MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Calibration Due |
|---|---|---|---|---|---|
| Power Meter | Anritsu | ML2495A | 1204003 | 02/21/2016 | 02/20/2017 |
| Power Sensor | Anritsu | MA2411B | 1126150 | 02/21/2016 | 02/20/2017 |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

### 6.4.3 TEST CONFIGURATIONS

*The EUT was connected to a spectrum analyzer through a 50Ω RF cable.*




### 6.4.4 TEST PROCEDURE

Set span to encompass the entire emission bandwidth (EBW) of the signal.

Set RBW = 1 MHz / Set VBW = 3 MHz.

Use sample detector mode if bin width (i.e., span/number of points in spectrum display) < 0.5 RBW. Otherwise use peak detector mode. Use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at full control power for entire sweep of every sweep. If the device transmits continuously, with no off intervals or reduced power intervals, the trigger may be set to “free run”.·Trace average 100 traces in power averaging mode. Compute power by integrating the spectrum across the 26 dB EBW of the signal. The integration can be performed using the spectrum analyzer’s band power measurement function with band limits set equal to the EBW band edges or by summing power levels in each 1 MHz band in linear power terms. The 1 MHz band power levels to be summed can be obtained by averaging, in linear power terms, power levels in each frequency bin across the 1 MHz.

### 6.4.5 TEST RESULTS

*No non-compliance noted*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## 6.4.6 TEST DATA

**IEEE 802.11a mode / 5745 ~ 5825MHz**

| Channel | Frequency (MHz) | Output Power (dBm) | | Output Power (W) | | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|
| | | Antenna 1 | Antenna 2 | Antenna 1 | Antenna 2 | | |
| Low | 5745 | 17.26 | 15.55 | 0.05321 | 0.03589 | 30.00 | PASS |
| Mid | 5785 | 16.94 | 13.98 | 0.04943 | 0.02500 | | PASS |
| High | 5825 | 16.58 | 13.41 | 0.04550 | 0.02193 | | PASS |

**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz**

| Channel | Frequency (MHz) | Output Power (dBm) | | | Output Power (W) | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|
| | | Antenna 1 | Antenna 2 | Total | | | |
| Low | 5745 | 16.09 | 14.37 | 18.32 | 0.06800 | 30.00 | PASS |
| Mid | 5785 | 16.87 | 13.80 | 18.61 | 0.07263 | | PASS |
| High | 5825 | 16.41 | 13.31 | 18.14 | 0.06518 | | PASS |

**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHzs**

| Channel | Frequency (MHz) | Output Power (dBm) | | | Output Power (W) | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|
| | | Antenna 1 | Antenna 2 | Total | | | |
| Low | 5755 | 17.15 | 14.26 | 18.95 | 0.07855 | 30.00 | PASS |
| High | 5795 | 16.82 | 13.71 | 18.55 | 0.07158 | | PASS |

**IEEE 802.11ac 80 mode / 5775MHz**

| Channel | Frequency (MHz) | Output Power (dBm) | | | Output Power (W) | Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|
| | | Antenna 1 | Antenna 2 | Total | | | |
| | 5775 | 17.20 | 14.37 | 19.02 | 0.07983 | 30.00 | PASS |


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## 6.5 BAND EDGES MEASUREMENT

### 6.5.1 LIMIT

According to §15.407(b)

(1) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

(2) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency block edges as the design of the equipment permits.

### 6.5.2 MEASUREMENT EQUIPMENT USED

| Radiated Emission Test Site 966(2) | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model Number** | **Serial Number** | **Last Calibration** | **Due Calibration** |
| PSA Series Spectrum Analyzer | Agilent | E4446A | US44300399 | 02/21/2016 | 02/20/2017 |
| EMI TEST RECEIVER | ROHDE&SCHWARZ | ESCI | 100783 | 02/21/2016 | 02/20/2017 |
| Amplifier | EMEC | EM330 | 060661 | 03/18/2016 | 03/17/2017 |
| High Noise Amplifier | Agilent | 8449B | 3008A01838 | 02/21/2016 | 02/20/2017 |
| Loop Antenna | COM-POWER | AL-130 | 121044 | 09/25/2015 | 09/24/2016 |
| Bilog Antenna | SCHAFFNER | CBL6143 | 5082 | 02/21/2016 | 02/20/2017 |
| Horn Antenna | SCHWARZBECK | BBHA9120 | D286 | 02/28/2016 | 02/27/2017 |
| Board-Band Horn Antenna | Schwarzbeck | BBHA 9170 | 9170-497 | 02/28/2016 | 02/27/2017 |
| Turn Table | N/A | N/A | N/A | N.C.R | N.C.R |
| Antenna Tower | SUNOL | TLT2 | N/A | N.C.R | N.C.R |
| Controller | Sunol Sciences | SC104V | 022310-1 | N.C.R | N.C.R |
| Controller | CT | N/A | N/A | N.C.R | N.C.R |
| Temp. / Humidity Meter | Anymetre | JR913 | N/A | 02/21/2016 | 02/20/2017 |
| Test S/W | FARAD | LZ-RF / CCS-SZ-3A2 | | | |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The FCC Site Registration number is 101879.

3. N.C.R = No Calibration Required.


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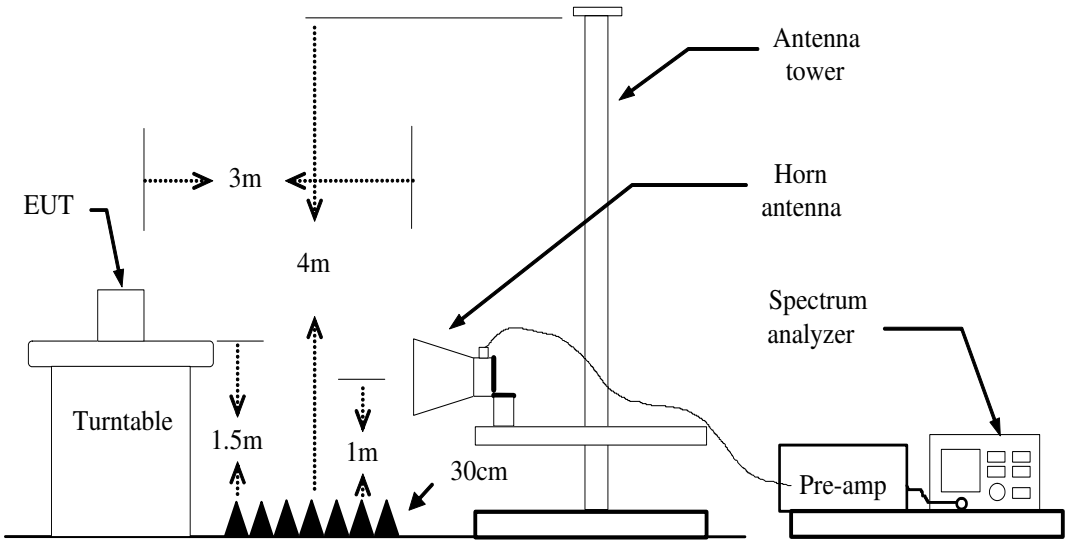
### 6.5.3TEST CONFIGURATION




### 6.5.4TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   (a) PEAK: RBW=1 / VBW=3MHz / Sweep=AUTO
   (b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO / Detector=RMS
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.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### 6.5.5TEST RESULT

**IEEE 802.11a mode / 5745 ~ 5825MHz**

**Antenna 1:**

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 20.11MHz, CH High: 19.85MHz
4. Frequency Range: 5734.945MHz, 5834.925MHz

**Antenna 2:**

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 19.90MHz, CH High: 19.79MHz
4. Frequency Range: 5735.050MHz, 5834.895MHz

**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz**

**Antenna 1:**

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 20.23MHz, CH High: 20.13MHz
4. Frequency Range: 5734.885MHz, 5835.065MHz

**Antenna 2:**

1. Operating Frequency: 5745-5825MHz
2. CH Low: 5745MHz, CH High: 5825MHz
3. 26dB bandwidth: CH Low: 20.13MHz, CH High: 19.95MHz
4. Frequency Range: 5734.935MHz, 5834.975MHz


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**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

**Antenna 1:**

1. Operating Frequency: 5755-5795MHz
2. CH Low: 5755MHz, CH High: 5795MHz
3. 26dB bandwidth: CH Low: 40.16MHz, CH High: 39.88MHz
4. Frequency Range: 5734.920MHz, 5814.940MHz

**Antenna 2:**

1. Operating Frequency: 5755-5795MHz
2. CH Low: 5755MHz, CH High: 5795MHz
3. 26dB bandwidth: CH Low: 39.65MHz, CH High: 39.65MHz
4. Frequency Range: 5735.175MHz, 5814.825MHz

**IEEE 802.11ac 80 mode / 5755 ~ 5795MHz**

**Antenna 1:**

1. Operating Frequency: 5775MHz
2. CH: 5775MHz
3. 26dB bandwidth: CH: 79.73MHz
4. Frequency Range: 5735.135MHz, 5814.865MHz

**Antenna 2:**

1. Operating Frequency: 5775MHz
2. CH: 5775MHz
3. 26dB bandwidth: CH: 79.85MHz
4. Frequency Range: 5735.075MHz, 5184.925MHz

Because the mentioned conditions, the test is not applicable.


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## 6.6 PEAK POWER SPECTAL DENSITY

### 6.6.1 LIMIT

**According to §15.407(a) & FCC R&O FCC 14-30**

(1) For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(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 + 10log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 1 W or 17 dBm + 10log B, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in peak transmitter power and peak power spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

*NOTE: The Commission strongly recommends that parties employing U-NII devices to provide critical communications services should determine if there are any nearby Government radar systems that could affect their operation.*


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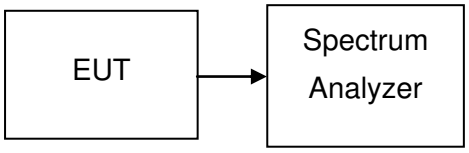
### 6.6.2 MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | N9010A | MY52221469 | 02/21/2016 | 02/20/2017 |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

### 6.6.3 TEST CONFIGURATION




### 6.6.4 TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
   Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. For devices operating in the bands 5.15-5.25 GHz,Set the spectrum analyzer as RBW = 1MHz, VBW = 3MHz, Span = 30MHz, Sweep=1.2ms
3. For devices operating in the bands 5.725-5.85 GHz,Set the spectrum analyzer as RBW = 500kHz, VBW = 1.5MHz, Span = 30MHz, Sweep=1.2ms
4. Record the max. reading.
5. Repeat the above procedure until the measurements for all frequencies are completed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## 6.6.5 TEST RESULTS

### Test Data

**IEEE 802.11a mode / 5745 ~ 5825MHz**

| Channel | Frequency (MHz) | PPSD (dBm) | | factor | Limit (dBm) | Margain | | Result |
|---|---|---|---|---|---|---|---|---|
| | | Antenna 1 | Antenna 2 | | | Antenna 1 | Antenna 2 | |
| Low | 5745 | 3.356 | 3.227 | -3.01 | 30 | -29.654 | -29.783 | PASS |
| Mid | 5785 | 2.358 | 3.269 | -3.01 | | -30.652 | -29.741 | PASS |
| High | 5825 | 2.590 | 2.626 | -3.01 | | -30.420 | -27.374 | PASS |

**Test mode: IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz**

| Channel | Frequency (MHz) | PPSD (dBm) | | factor | Total (dBm) | Limit (dBm) | Margain | Result |
|---|---|---|---|---|---|---|---|---|
| | | Antenna 1 | Antenna 2 | | | | | |
| Low | 5745 | 1.852 | 1.159 | -3.01 | 1.520 | 30 | -28.480 | PASS |
| Mid | 5785 | 3.000 | 2.599 | -3.01 | 2.804 | | -27.196 | PASS |
| High | 5825 | 2.232 | 1.858 | -3.01 | 2.049 | | -27.951 | PASS |

**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

| Channel | Frequency (MHz) | PPSD (dBm) | | factor | Total (dBm) | Limit (dBm) | Margain | Result |
|---|---|---|---|---|---|---|---|---|
| | | Antenna 1 | Antenna 2 | | | | | |
| Low | 5755 | 0.310 | -1.134 | -3.01 | -0.352 | 30 | -30.352 | PASS |
| High | 5795 | -0.521 | 0.256 | -3.01 | -0.115 | | -30.115 | PASS |

**IEEE 802.11ac 80 mode / 5775MHz**

| Channel | Frequency (MHz) | PPSD (dBm) | | factor | Total (dBm) | Limit (dBm) | Margain | Result |
|---|---|---|---|---|---|---|---|---|
| | | Antenna 1 | Antenna 2 | | | | | |
| | 5775 | -1.193 | -1.196 | -3.01 | -1.194 | 30 | -31.194 | PASS |

**Remark: factor =10*log10(500/RBW)**


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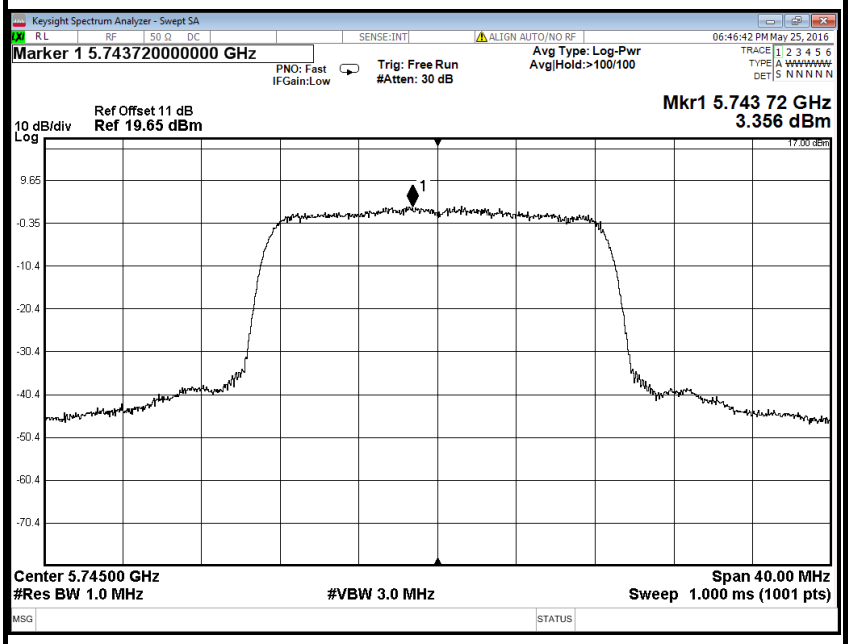
## Test Plot

**IEEE 802.11a mode / 5745 ~ 5825MHz**

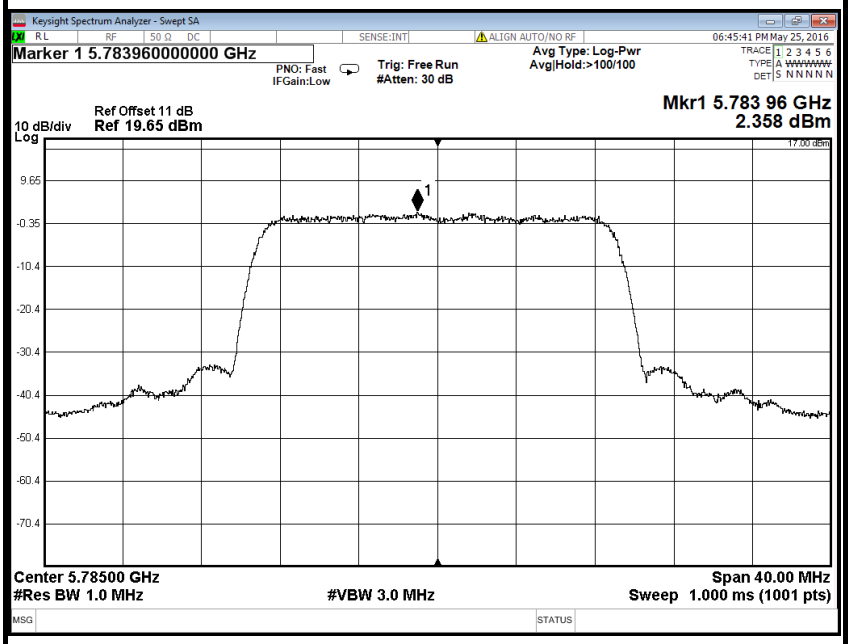
**PPSD (CH Low)**

Antenna 1




**PPSD (CH Mid)**

Antenna 1





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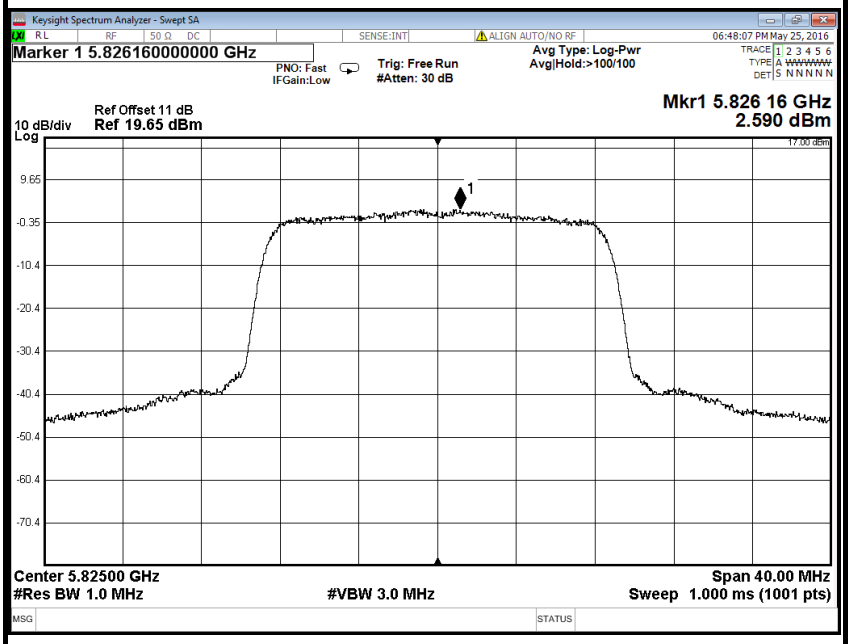
**PPSD (CH High)**

Antenna 1





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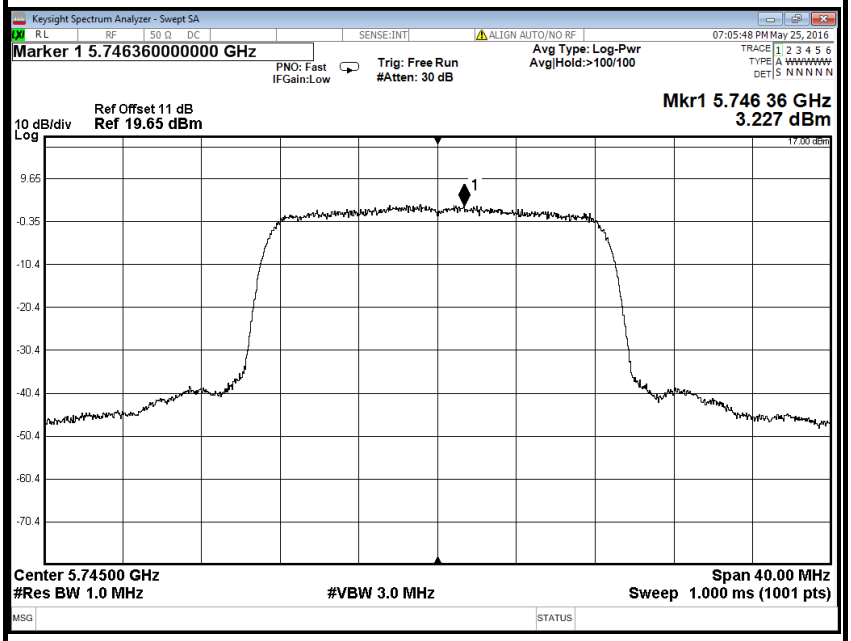
**IEEE 802.11a mode / 5745 ~ 5825MHz**

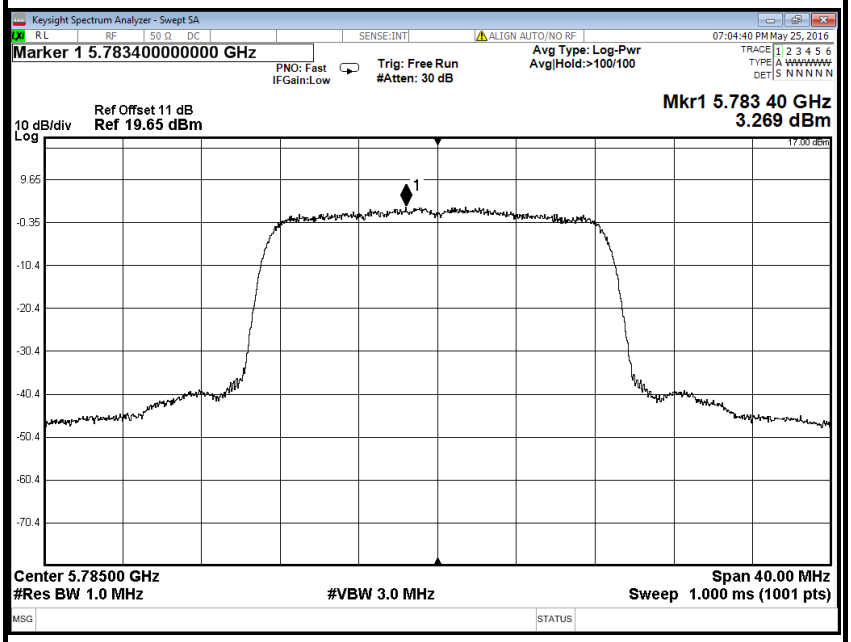
**PPSD (CH Low)**

Antenna 2




**PPSD (CH Mid)**

Antenna 2





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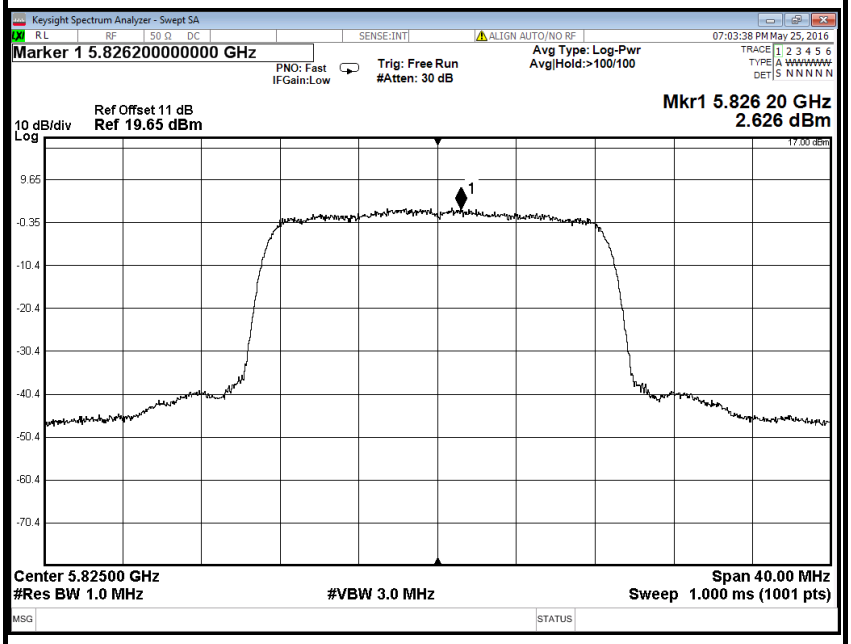
**PPSD (CH High)**

Antenna 2





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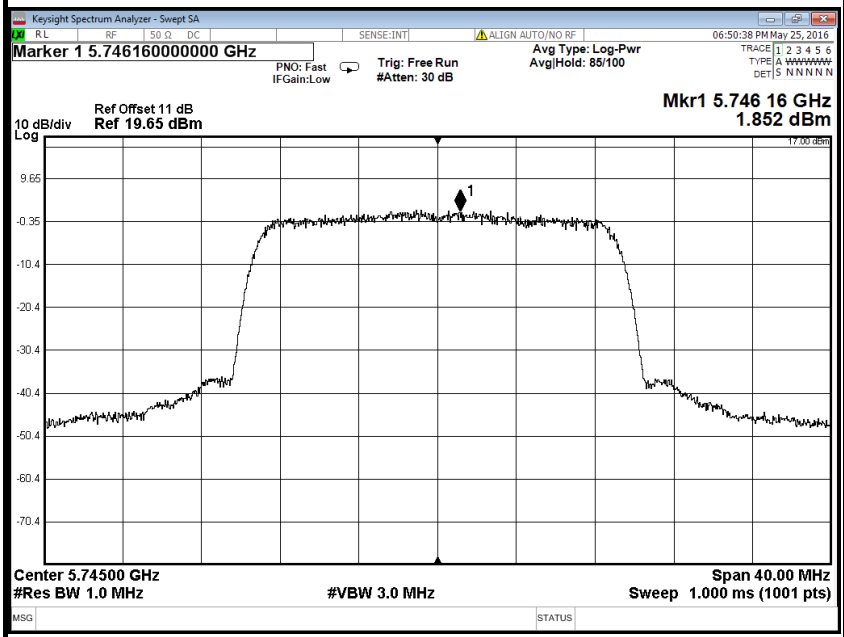
**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz**

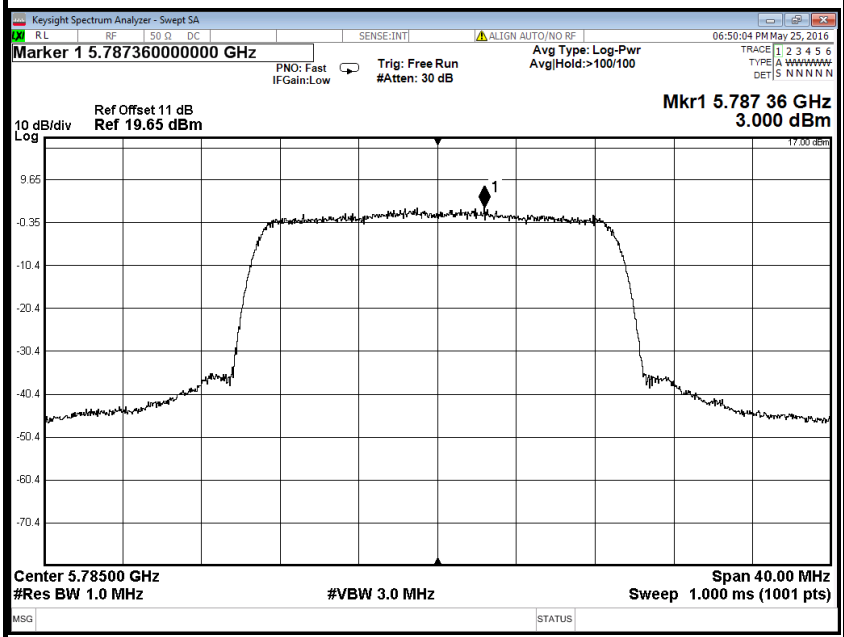
**PPSD (CH Low)**

Antenna 1




**PPSD (CH Mid)**

Antenna 1





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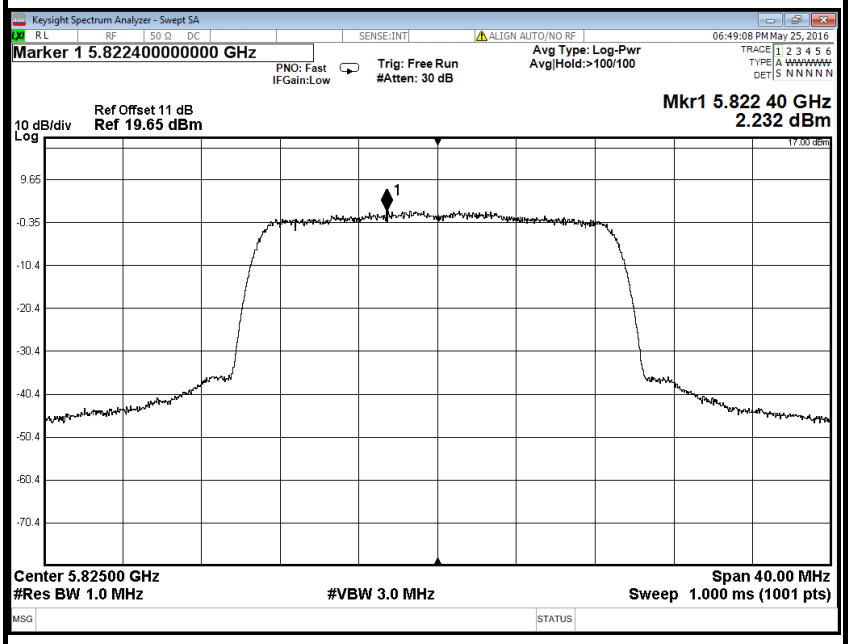
**PPSD (CH High)**

Antenna 1





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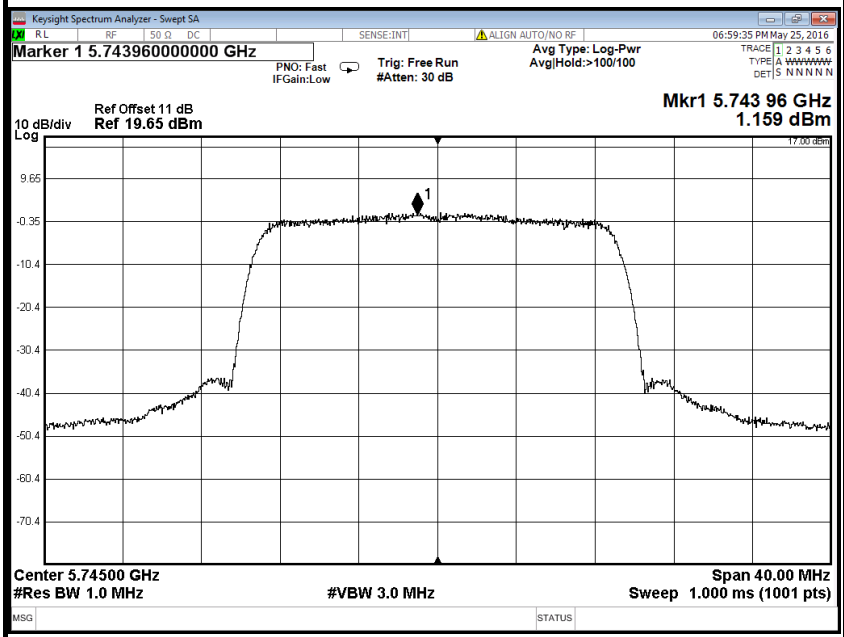
**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz**

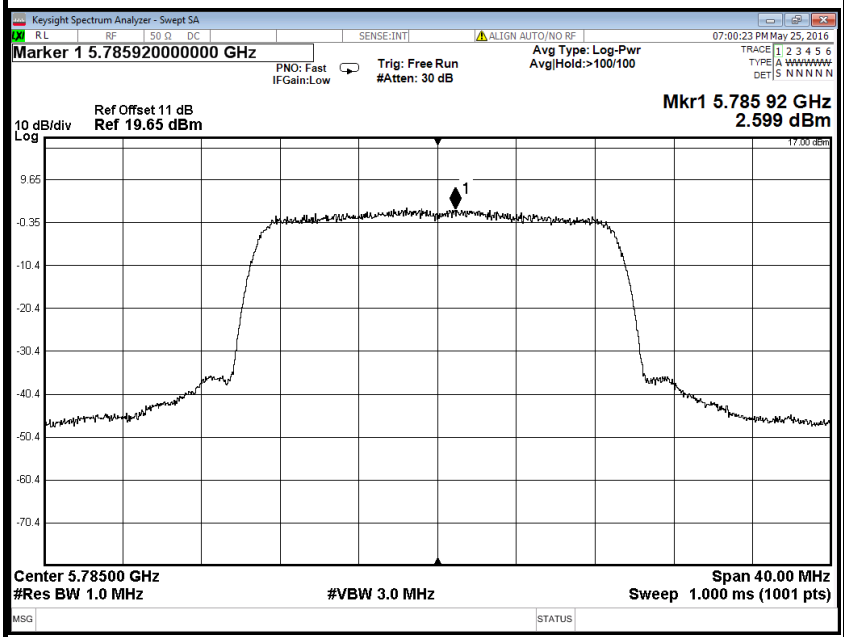
**PPSD (CH Low)**

Antenna 2




**PPSD (CH Mid)**

Antenna 2





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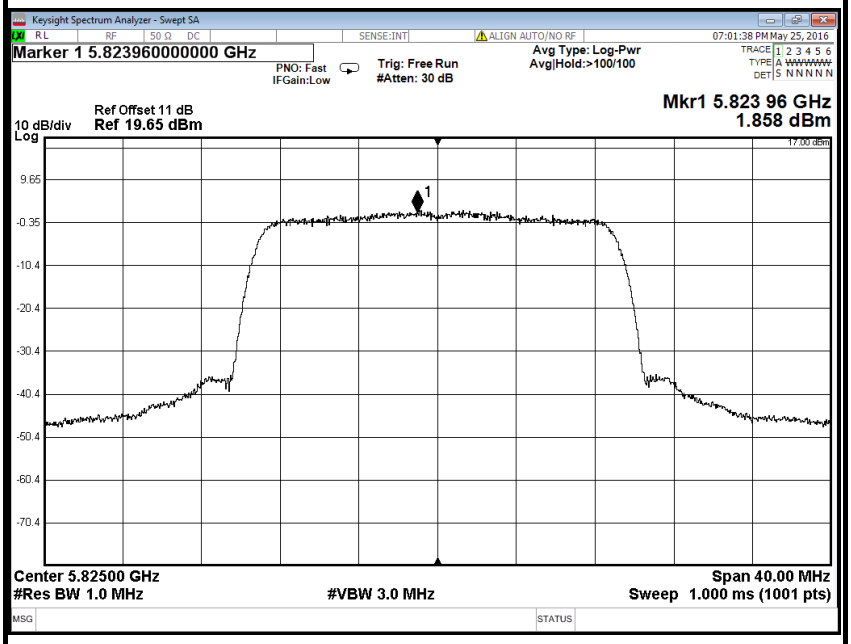
**PPSD (CH High)**

Antenna 2





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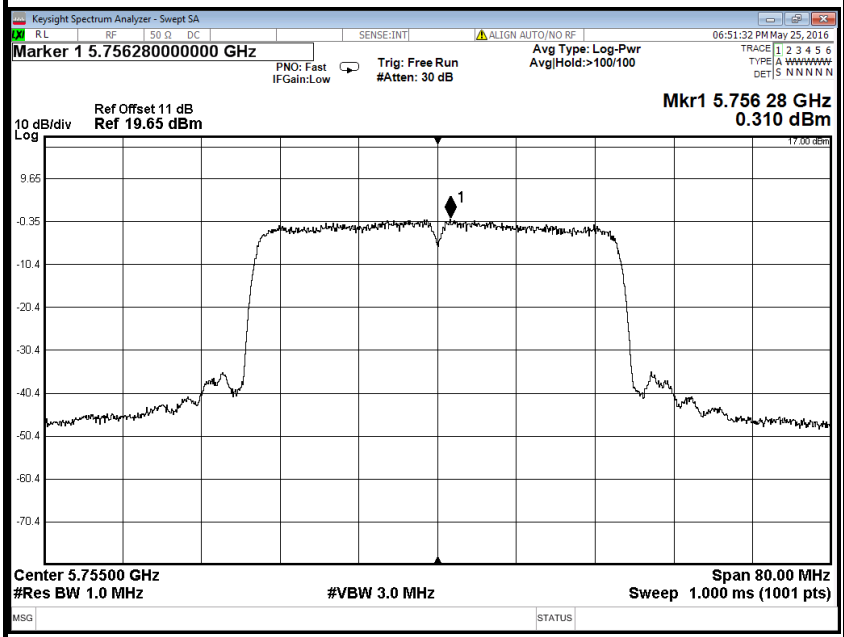
**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

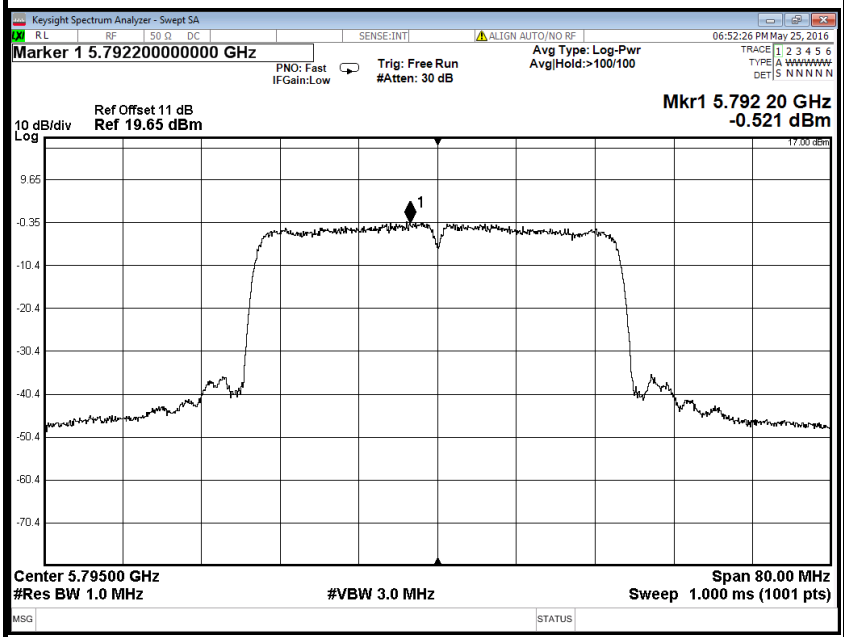
**PPSD (CH Low)**

Antenna 1




**PPSD (CH High)**

Antenna 1





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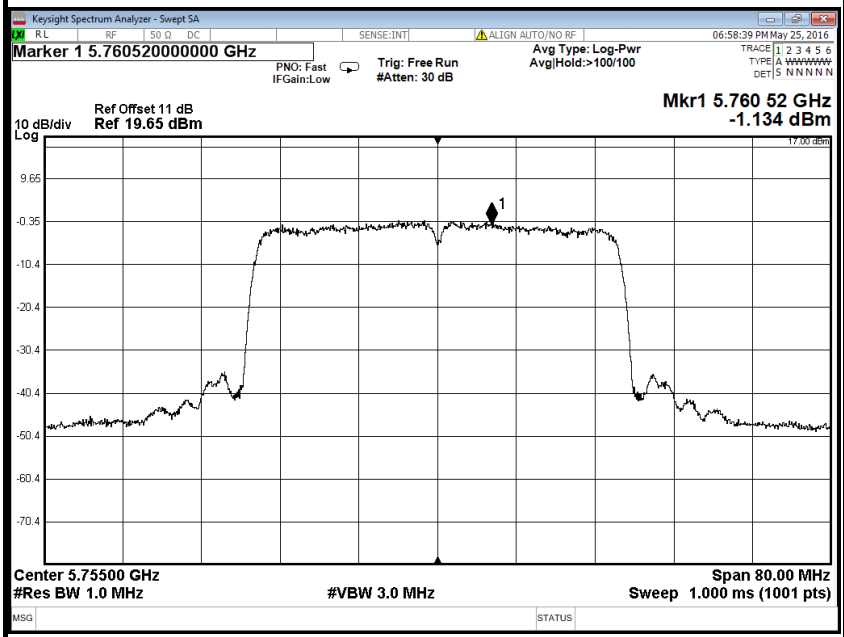
**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

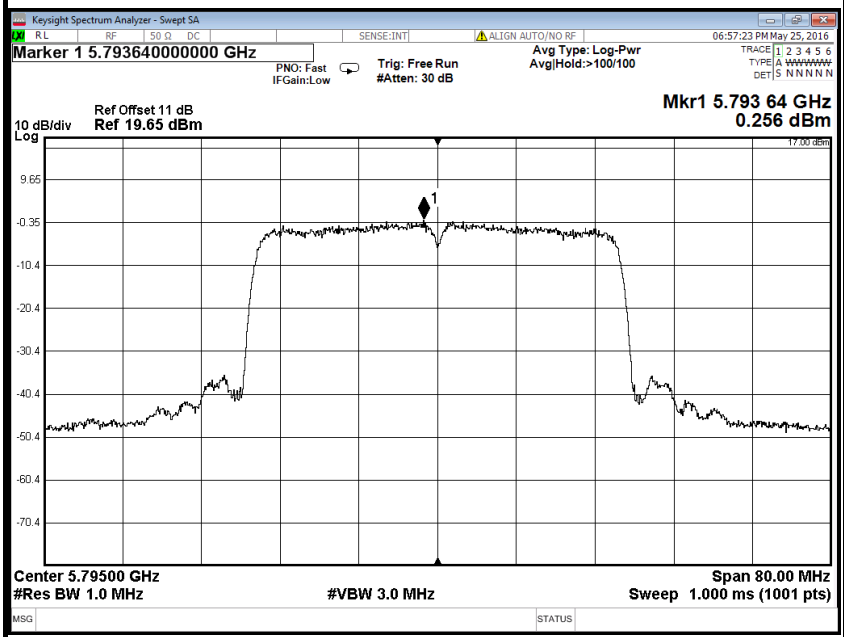
**PPSD (CH Low)**

Antenna 2




**26dB Bandwidth (CH High)**

Antenna 2





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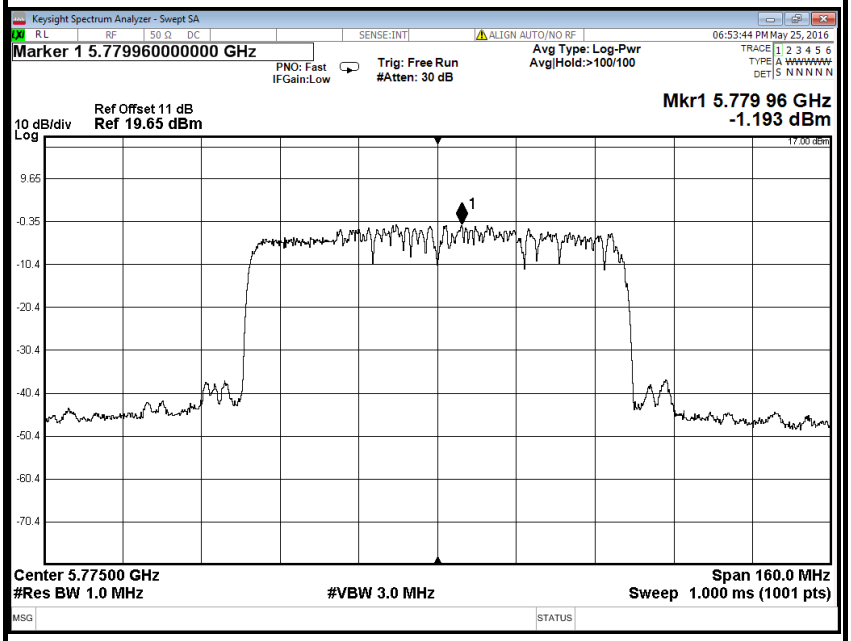
**IEEE 802.11ac 80 mode / 5775MHz**

**PPSD**

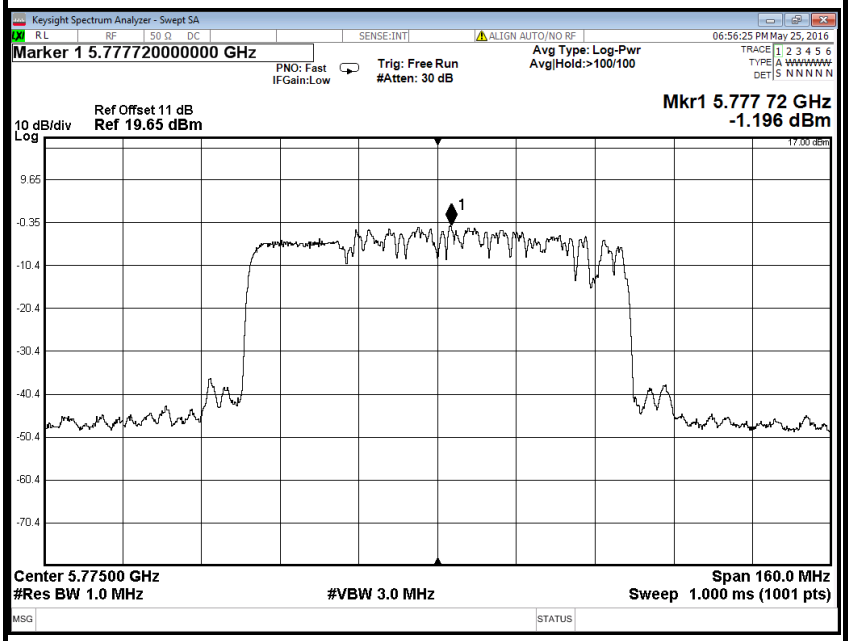
Antenna 1




**IEEE 802.11ac 80 mode / 5775MHz**

**PPSD**

Antenna 2





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## 6.7 RADIATED UNDESIABLE EMISSION

### 6.7.1 LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (μV/m) | Measurement Distance (m) |
|---|---|---|
| 30-88 | 100* | 3 |
| 88-216 | 150* | 3 |
| 216-960 | 200* | 3 |
| Above 960 | 500 | 3 |

***Remark:*** *Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.*

2. In the emission table above, the tighter limit applies at the band edges.

| Frequency (MHz) | Field Strength (μV/m at 3-meter) | Field Strength (dBμV/m at 3-meter) |
|---|---|---|
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |


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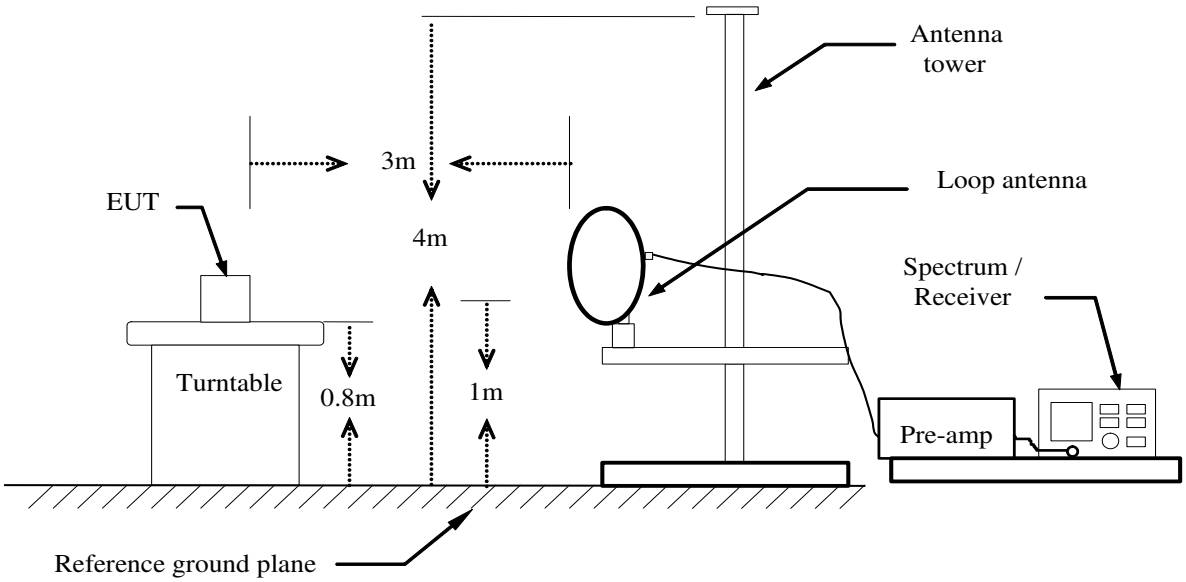
### 6.7.2 TEST INSTRUMENTS

| Radiated Emission Test Site 966(2) | | | | | |
|---|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model Number** | **Serial Number** | **Last Calibration** | **Due Calibration** |
| PSA Series Spectrum Analyzer | Agilent | E4446A | US44300399 | 02/21/2016 | 02/20/2017 |
| EMI TEST RECEIVER | ROHDE&SCHWARZ | ESCI | 100783 | 02/21/2016 | 02/20/2017 |
| Amplifier | EMEC | EM330 | 060661 | 03/18/2016 | 03/17/2017 |
| High Noise Amplifier | Agilent | 8449B | 3008A01838 | 02/21/2016 | 02/20/2017 |
| Loop Antenna | COM-POWER | AL-130 | 121044 | 09/25/2015 | 09/24/2016 |
| Bilog Antenna | SCHAFFNER | CBL6143 | 5082 | 02/21/2016 | 02/20/2017 |
| Horn Antenna | SCHWARZBECK | BBHA9120 | D286 | 02/28/2016 | 02/27/2017 |
| Board-Band Horn Antenna | Schwarzbeck | BBHA 9170 | 9170-497 | 02/28/2016 | 02/27/2017 |
| Turn Table | N/A | N/A | N/A | N.C.R | N.C.R |
| Antenna Tower | SUNOL | TLT2 | N/A | N.C.R | N.C.R |
| Controller | Sunol Sciences | SC104V | 022310-1 | N.C.R | N.C.R |
| Controller | CT | N/A | N/A | N.C.R | N.C.R |
| Temp. / Humidity Meter | Anymetre | JR913 | N/A | 02/21/2016 | 02/20/2017 |
| Test S/W | FARAD | LZ-RF / CCS-SZ-3A2 | | | |

### 6.7.3 TEST CONFIGURATION

**Below 30MHz**





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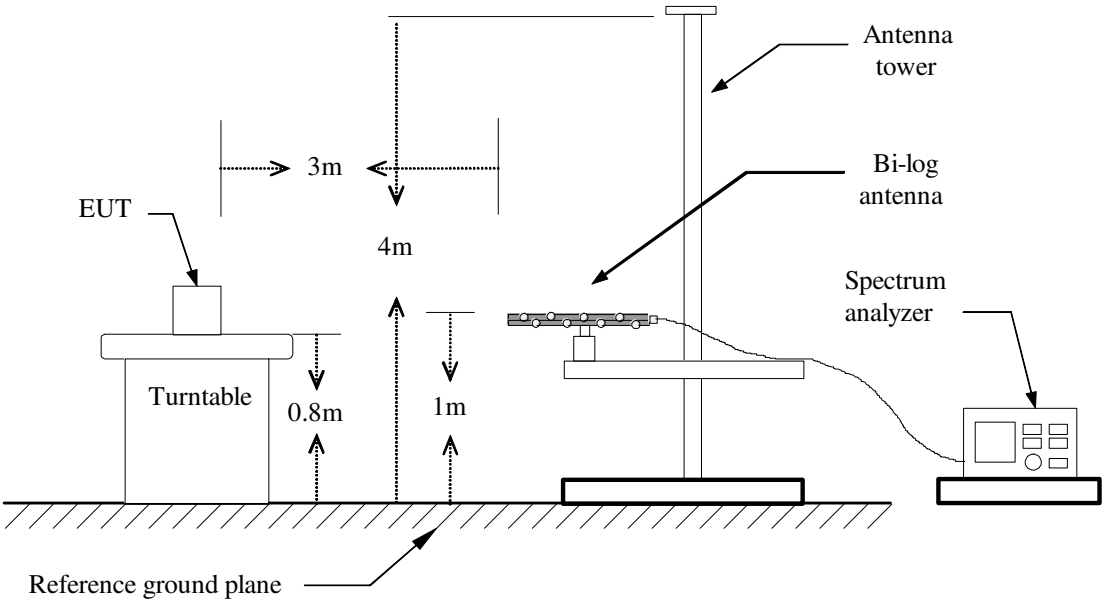
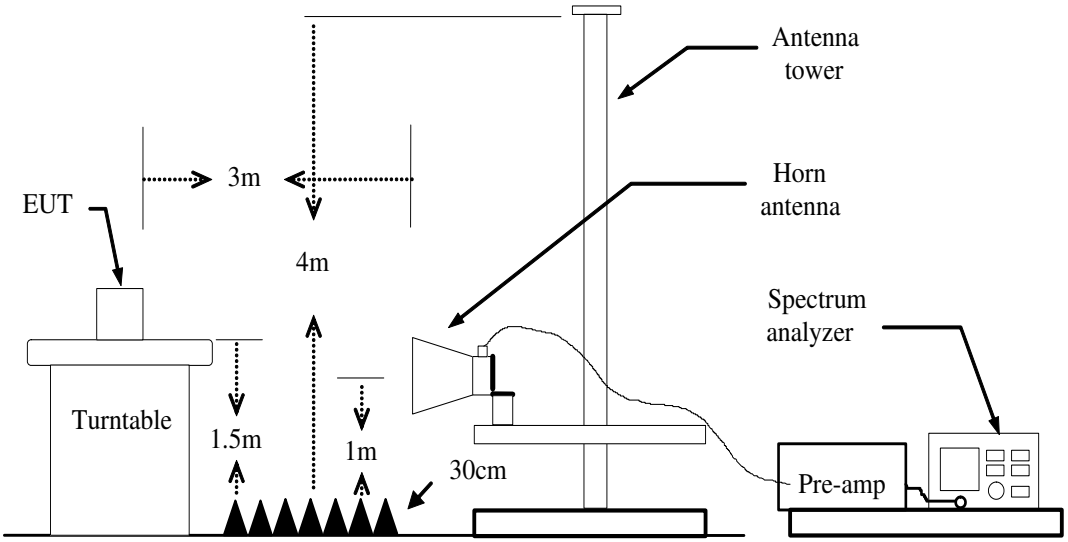
**Below 1 GHz**




**Above 1 GHz**




For the actual test configuration, please refer to the related item – Photographs of the TEST CONFIGURATION.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### 6.7.4 TEST PROCEDURE

1. The EUT is placed on a turntable, which is 0.8m or 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

   Below 1GHz:

   RBW=100kHz / VBW=300kHz / Sweep=AUTO

   Above 1GHz:

   (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

   (b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO / Detector=RMS
7. Repeat above procedures until the measurements for all frequencies are complete.


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### 6.7.5 DATA SAPLE

**Below 1GHz**

| Frequency (MHz) | Reading (dBuV) | Correct Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| XXX.XXXX | 36.37 | -12.20 | 24.17 | 40.00 | -15.83 | V | QP |

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correct Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Q.P. = Quasi-peak Reading

**Above 1GHz**

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| XXXX.XXXX | 62.09 | -11.42 | 50.67 | 74.00 | -23.33 | V | Peak |
| XXXX.XXXX | 49.78 | -11.42 | 38.36 | 54.00 | -15.64 | V | AVG |

Frequency (MHz) = Emission frequency in MHz
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
Peak = Peak Reading
AVG = Average Reading

**Calculation Formula**

Margin (dB) = Result (dBuV/m) – Limits (dBuV/m)
Result (dBuV/m) = Reading (dBuV) + Correction Factor


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### 6.7.6 TEST RESULTS

**Below 1 GHz**

**Test Mode:** TX **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 100.8100 | 55.13 | -23.53 | 31.60 | 43.50 | -11.90 | V | QP |
| 326.8200 | 50.88 | -18.57 | 32.31 | 46.00 | -13.69 | V | QP |
| 344.2800 | 53.73 | -17.94 | 35.79 | 46.00 | -10.21 | V | QP |
| 377.2600 | 51.16 | -16.67 | 34.49 | 46.00 | -11.51 | V | QP |
| 600.3600 | 49.55 | -12.86 | 36.69 | 46.00 | -9.31 | V | QP |
| 903.0000 | 44.49 | -9.76 | 34.73 | 46.00 | -11.27 | V | QP |
| | | | | | | | |
| 75.5900 | 61.51 | -26.25 | 35.26 | 40.00 | -4.74 | H | QP |
| 312.2700 | 50.97 | -19.12 | 31.85 | 46.00 | -14.15 | H | QP |
| 398.6000 | 50.46 | -16.14 | 34.32 | 46.00 | -11.68 | H | QP |
| 429.6400 | 50.85 | -15.58 | 35.27 | 46.00 | -10.73 | H | QP |
| 647.8900 | 42.24 | -12.51 | 29.73 | 46.00 | -16.27 | H | QP |
| 696.3900 | 44.41 | -12.03 | 32.38 | 46.00 | -13.62 | H | QP |

***Remark:***

1. *No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)*
2. *Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.*
3. *Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).*


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**Above 1 GHz**

**1GHz~6GHz**

**Test Mode:** TX / IEEE 802.11a / 5745MHz /(CH Low) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 2885.000 | 45.13 | -1.57 | 43.56 | 74.00 | -30.44 | V | peak |
| 3260.000 | 44.24 | -0.92 | 43.32 | 74.00 | -30.68 | V | peak |
| 4145.000 | 43.91 | 2.10 | 46.01 | 74.00 | -27.99 | V | peak |
| 4750.000 | 42.27 | 4.17 | 46.44 | 74.00 | -27.56 | V | peak |
| 5225.000 | 41.77 | 5.38 | 47.15 | 74.00 | -26.85 | V | peak |
| 5440.000 | 41.45 | 5.76 | 47.21 | 74.00 | -26.79 | V | peak |
| | | | | | | | |
| 9804.000 | 30.55 | 11.42 | 41.97 | 74.00 | -32.03 | H | Peak |
| 10620.000 | 30.56 | 13.90 | 44.46 | 74.00 | -29.54 | H | Peak |
| 11316.000 | 30.16 | 14.94 | 45.10 | 74.00 | -28.90 | H | Peak |
| 12492.000 | 29.64 | 16.27 | 45.91 | 74.00 | -28.09 | H | peak |
| 14244.000 | 28.76 | 20.72 | 49.48 | 74.00 | -24.52 | H | peak |
| 14988.000 | 29.14 | 21.15 | 50.29 | 74.00 | -23.71 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Antenna 1**

**Test Mode:** TX / IEEE 802.11a / 5745MHz /(CH Low) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 9960.000 | 30.77 | 11.86 | 42.63 | 74.00 | -31.37 | V | peak |
| 10824.000 | 29.76 | 14.53 | 44.29 | 74.00 | -29.71 | V | peak |
| 12360.000 | 30.16 | 15.83 | 45.99 | 74.00 | -28.01 | V | peak |
| 13548.000 | 28.18 | 19.39 | 47.57 | 74.00 | -26.43 | V | peak |
| 14316.000 | 28.71 | 20.76 | 49.47 | 74.00 | -24.53 | V | peak |
| 15000.000 | 28.73 | 21.16 | 49.89 | 74.00 | -24.11 | V | peak |
| | | | | | | | |
| 1765.000 | 49.33 | -6.35 | 42.98 | 74.00 | -31.02 | H | Peak |
| 2885.000 | 45.77 | -1.57 | 44.20 | 74.00 | -29.80 | H | Peak |
| 3925.000 | 43.36 | 1.27 | 44.63 | 74.00 | -29.37 | H | Peak |
| 4135.000 | 42.93 | 2.07 | 45.00 | 74.00 | -29.00 | H | peak |
| 4795.000 | 42.49 | 4.31 | 46.80 | 74.00 | -27.20 | H | peak |
| 5610.000 | 42.41 | 5.92 | 48.33 | 74.00 | -25.67 | H | peak |

***Remark:***

7. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
8. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
9. *Average test would be performed if the peak result were greater than the average limit.*
10. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
11. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
12. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Test Mode:** TX / IEEE 802.11a / 5785MHz /(CH Mid) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 10104.000 | 31.13 | 12.30 | 43.43 | 74.00 | -30.57 | V | peak |
| 10620.000 | 29.95 | 13.90 | 43.85 | 74.00 | -30.15 | V | peak |
| 12276.000 | 30.04 | 15.55 | 45.59 | 74.00 | -28.41 | V | peak |
| 12768.000 | 29.92 | 17.18 | 47.10 | 74.00 | -26.90 | V | peak |
| 14352.000 | 28.63 | 20.78 | 49.41 | 74.00 | -24.59 | V | peak |
| 14952.000 | 29.04 | 21.13 | 50.17 | 74.00 | -23.83 | V | peak |
| | | | | | | | |
| 11016.000 | 29.85 | 15.07 | 44.92 | 74.00 | -29.08 | H | Peak |
| 11820.000 | 30.69 | 14.72 | 45.41 | 74.00 | -28.59 | H | Peak |
| 12348.000 | 29.92 | 15.79 | 45.71 | 74.00 | -28.29 | H | Peak |
| 13596.000 | 28.35 | 19.52 | 47.87 | 74.00 | -26.13 | H | peak |
| 14244.000 | 28.62 | 20.72 | 49.34 | 74.00 | -24.66 | H | peak |
| 14952.000 | 28.94 | 21.13 | 50.07 | 74.00 | -23.93 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Test Mode:** TX / IEEE 802.11a / 5825MHz /(CH High) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 10296.000 | 30.78 | 12.90 | 43.68 | 74.00 | -30.32 | V | peak |
| 11292.000 | 30.18 | 14.95 | 45.13 | 74.00 | -28.87 | V | peak |
| 12228.000 | 30.48 | 15.39 | 45.87 | 74.00 | -28.13 | V | peak |
| 12984.000 | 29.33 | 17.90 | 47.23 | 74.00 | -26.77 | V | peak |
| 14256.000 | 28.67 | 20.73 | 49.40 | 74.00 | -24.60 | V | peak |
| 14928.000 | 28.86 | 21.12 | 49.98 | 74.00 | -24.02 | V | peak |
| | | | | | | | |
| 10152.000 | 30.76 | 12.45 | 43.21 | 74.00 | -30.79 | H | Peak |
| 11220.000 | 29.98 | 14.98 | 44.96 | 74.00 | -29.04 | H | Peak |
| 12912.000 | 29.19 | 17.66 | 46.85 | 74.00 | -27.15 | H | Peak |
| 14052.000 | 27.75 | 20.61 | 48.36 | 74.00 | -25.64 | H | peak |
| 14940.000 | 29.20 | 21.13 | 50.33 | 74.00 | -23.67 | H | peak |
| 16980.000 | 27.47 | 23.25 | 50.72 | 74.00 | -23.28 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Antenna 2**

**Test Mode:** TX / IEEE 802.11a / 5745MHz /(CH Low) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 7752.000 | 32.11 | 9.17 | 41.28 | 74.00 | -32.72 | V | peak |
| 8424.000 | 32.51 | 9.42 | 41.93 | 74.00 | -32.07 | V | peak |
| 9612.000 | 31.13 | 10.86 | 41.99 | 74.00 | -32.01 | V | peak |
| 11196.000 | 30.10 | 14.99 | 45.09 | 74.00 | -28.91 | V | peak |
| 12912.000 | 29.33 | 17.66 | 46.99 | 74.00 | -27.01 | V | peak |
| 14436.000 | 28.73 | 20.83 | 49.56 | 74.00 | -24.44 | V | peak |
| | | | | | | | |
| 8376.000 | 32.06 | 9.44 | 41.50 | 74.00 | -32.50 | H | Peak |
| 10032.000 | 30.91 | 12.08 | 42.99 | 74.00 | -31.01 | H | Peak |
| 11040.000 | 30.22 | 15.06 | 45.28 | 74.00 | -28.72 | H | Peak |
| 11844.000 | 30.53 | 14.71 | 45.24 | 74.00 | -28.76 | H | peak |
| 12672.000 | 29.16 | 16.86 | 46.02 | 74.00 | -27.98 | H | peak |
| 14964.000 | 29.03 | 21.14 | 50.17 | 74.00 | -23.83 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Test Mode:** TX / IEEE 802.11a / 5785MHz /(CH Mid) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 6948.000 | 32.16 | 7.62 | 39.78 | 74.00 | -34.22 | V | peak |
| 7752.000 | 32.04 | 9.17 | 41.21 | 74.00 | -32.79 | V | peak |
| 8364.000 | 31.88 | 9.45 | 41.33 | 74.00 | -32.67 | V | peak |
| 10392.000 | 30.13 | 13.20 | 43.33 | 74.00 | -30.67 | V | peak |
| 11340.000 | 29.78 | 14.93 | 44.71 | 74.00 | -29.29 | V | peak |
| 15024.000 | 28.84 | 21.05 | 49.89 | 74.00 | -24.11 | V | peak |
| | | | | | | | |
| 6924.000 | 32.14 | 7.58 | 39.72 | 74.00 | -34.28 | H | Peak |
| 7752.000 | 31.85 | 9.17 | 41.02 | 74.00 | -32.98 | H | Peak |
| 8376.000 | 31.81 | 9.44 | 41.25 | 74.00 | -32.75 | H | Peak |
| 10620.000 | 30.13 | 13.90 | 44.03 | 74.00 | -29.97 | H | peak |
| 11316.000 | 29.78 | 14.94 | 44.72 | 74.00 | -29.28 | H | peak |
| 14964.000 | 28.92 | 21.14 | 50.06 | 74.00 | -23.94 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Test Mode:** TX / IEEE 802.11a / 5825MHz /(CH High) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 6924.000 | 32.41 | 7.58 | 39.99 | 74.00 | -34.01 | V | peak |
| 7608.000 | 31.26 | 8.89 | 40.15 | 74.00 | -33.85 | V | peak |
| 8352.000 | 32.12 | 9.46 | 41.58 | 74.00 | -32.42 | V | peak |
| 10068.000 | 30.94 | 12.19 | 43.13 | 74.00 | -30.87 | V | peak |
| 13008.000 | 28.75 | 17.97 | 46.72 | 74.00 | -27.28 | V | peak |
| 14880.000 | 28.72 | 21.09 | 49.81 | 74.00 | -24.19 | V | peak |
| | | | | | | | |
| 6948.000 | 32.66 | 7.62 | 40.28 | 74.00 | -33.72 | H | Peak |
| 7752.000 | 31.96 | 9.17 | 41.13 | 74.00 | -32.87 | H | Peak |
| 8352.000 | 31.82 | 9.46 | 41.28 | 74.00 | -32.72 | H | Peak |
| 11196.000 | 29.94 | 14.99 | 44.93 | 74.00 | -29.07 | H | peak |
| 12984.000 | 29.29 | 17.90 | 47.19 | 74.00 | -26.81 | H | peak |
| 15036.000 | 28.96 | 21.00 | 49.96 | 74.00 | -24.04 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Combine with Antenna 1 and Antenna 2**

**Test Mode:** TX / IEEE 802.11n HT 20 MHz / 5745MHz /(CH Low) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 9876.000 | 30.73 | 11.62 | 42.35 | 74.00 | -31.65 | V | peak |
| 11040.000 | 29.83 | 15.06 | 44.89 | 74.00 | -29.11 | V | peak |
| 12792.000 | 29.09 | 17.26 | 46.35 | 74.00 | -27.65 | V | peak |
| 13548.000 | 28.19 | 19.39 | 47.58 | 74.00 | -26.42 | V | peak |
| 14244.000 | 28.40 | 20.72 | 49.12 | 74.00 | -24.88 | V | peak |
| 14928.000 | 28.90 | 21.12 | 50.02 | 74.00 | -23.98 | V | peak |
| | | | | | | | |
| 10248.000 | 30.85 | 12.75 | 43.60 | 74.00 | -30.40 | H | Peak |
| 10848.000 | 29.87 | 14.61 | 44.48 | 74.00 | -29.52 | H | Peak |
| 12960.000 | 29.01 | 17.82 | 46.83 | 74.00 | -27.17 | H | Peak |
| 13512.000 | 27.94 | 19.30 | 47.24 | 74.00 | -26.76 | H | peak |
| 14244.000 | 28.68 | 20.72 | 49.40 | 74.00 | -24.60 | H | peak |
| 15000.000 | 28.96 | 21.16 | 50.12 | 74.00 | -23.88 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Test Mode:** TX / IEEE 802.11n HT 20 MHz / 5785MHz /(CH Mid) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 10680.000 | 29.65 | 14.09 | 43.74 | 74.00 | -30.26 | V | peak |
| 11040.000 | 30.39 | 15.06 | 45.45 | 74.00 | -28.55 | V | peak |
| 12936.000 | 29.23 | 17.74 | 46.97 | 74.00 | -27.03 | V | peak |
| 13896.000 | 27.75 | 20.31 | 48.06 | 74.00 | -25.94 | V | peak |
| 14388.000 | 28.59 | 20.81 | 49.40 | 74.00 | -24.60 | V | peak |
| 15096.000 | 29.10 | 20.72 | 49.82 | 74.00 | -24.18 | V | peak |
| | | | | | | | |
| 8328.000 | 32.00 | 9.47 | 41.47 | 74.00 | -32.53 | H | Peak |
| 10140.000 | 31.30 | 12.41 | 43.71 | 74.00 | -30.29 | H | Peak |
| 11364.000 | 30.29 | 14.92 | 45.21 | 74.00 | -28.79 | H | Peak |
| 12228.000 | 30.42 | 15.39 | 45.81 | 74.00 | -28.19 | H | peak |
| 14316.000 | 29.05 | 20.76 | 49.81 | 74.00 | -24.19 | H | peak |
| 15024.000 | 28.90 | 21.05 | 49.95 | 74.00 | -24.05 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Test Mode:** TX / IEEE 802.11n HT 20 MHz / 5825MHz /(CH High) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 8328.000 | 32.00 | 9.47 | 41.47 | 74.00 | -32.53 | V | peak |
| 9288.000 | 31.36 | 9.93 | 41.29 | 74.00 | -32.71 | V | peak |
| 10512.000 | 30.26 | 13.57 | 43.83 | 74.00 | -30.17 | V | peak |
| 11844.000 | 30.53 | 14.71 | 45.24 | 74.00 | -28.76 | V | peak |
| 14016.000 | 27.73 | 20.59 | 48.32 | 74.00 | -25.68 | V | peak |
| 14316.000 | 29.05 | 20.76 | 49.81 | 74.00 | -24.19 | V | peak |
| | | | | | | | |
| 10800.000 | 29.52 | 14.46 | 43.98 | 74.00 | -30.02 | H | Peak |
| 10980.000 | 29.88 | 15.02 | 44.90 | 74.00 | -29.10 | H | Peak |
| 11832.000 | 30.75 | 14.71 | 45.46 | 74.00 | -28.54 | H | Peak |
| 12612.000 | 29.34 | 16.67 | 46.01 | 74.00 | -27.99 | H | peak |
| 14124.000 | 27.95 | 20.65 | 48.60 | 74.00 | -25.40 | H | peak |
| 15000.000 | 28.78 | 21.16 | 49.94 | 74.00 | -24.06 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Combine with Antenna 1 and Antenna 2**

**Test Mode:** TX / IEEE 802.11n HT 40 MHz / 5755MHz /(CH Low) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 7752.000 | 32.51 | 9.17 | 41.68 | 74.00 | -32.32 | V | peak |
| 10032.000 | 31.15 | 12.08 | 43.23 | 74.00 | -30.77 | V | peak |
| 11040.000 | 29.93 | 15.06 | 44.99 | 74.00 | -29.01 | V | peak |
| 12972.000 | 29.26 | 17.86 | 47.12 | 74.00 | -26.88 | V | peak |
| 14388.000 | 28.80 | 20.81 | 49.61 | 74.00 | -24.39 | V | peak |
| 14880.000 | 29.11 | 21.09 | 50.20 | 74.00 | -23.80 | V | peak |
| | | | | | | | |
| 10104.000 | 30.90 | 12.30 | 43.20 | 74.00 | -30.80 | H | Peak |
| 11340.000 | 29.94 | 14.93 | 44.87 | 74.00 | -29.13 | H | Peak |
| 12984.000 | 29.24 | 17.90 | 47.14 | 74.00 | -26.86 | H | Peak |
| 14244.000 | 28.93 | 20.72 | 49.65 | 74.00 | -24.35 | H | peak |
| 14988.000 | 28.59 | 21.15 | 49.74 | 74.00 | -24.26 | H | peak |
| 17376.000 | 28.48 | 23.32 | 51.80 | 74.00 | -22.20 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Test Mode:** TX / IEEE 802.11n HT 40 MHz / 5795MHz /(CH High) **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 10080.000 | 31.06 | 12.23 | 43.29 | 74.00 | -30.71 | V | peak |
| 11016.000 | 29.92 | 15.07 | 44.99 | 74.00 | -29.01 | V | peak |
| 12348.000 | 30.27 | 15.79 | 46.06 | 74.00 | -27.94 | V | peak |
| 12684.000 | 29.17 | 16.90 | 46.07 | 74.00 | -27.93 | V | peak |
| 14244.000 | 28.66 | 20.72 | 49.38 | 74.00 | -24.62 | V | peak |
| 15000.000 | 29.19 | 21.16 | 50.35 | 74.00 | -23.65 | V | peak |
| | | | | | | | |
| 10884.000 | 29.79 | 14.72 | 44.51 | 74.00 | -29.49 | H | Peak |
| 11208.000 | 30.16 | 14.99 | 45.15 | 74.00 | -28.85 | H | Peak |
| 12444.000 | 29.80 | 16.11 | 45.91 | 74.00 | -28.09 | H | Peak |
| 12636.000 | 29.48 | 16.75 | 46.23 | 74.00 | -27.77 | H | peak |
| 14244.000 | 28.70 | 20.72 | 49.42 | 74.00 | -24.58 | H | peak |
| 15012.000 | 28.69 | 21.11 | 49.80 | 74.00 | -24.20 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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**Combine with antenna 1 and antenna 2**

**Test Mode:** TX / IEEE 802.11ac 80 / 5775MHz **Tested by:** Jack Chen

**Ambient temperature:** 24°C **Relative humidity:** 52% RH **Date:** May 18, 2016

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|---|---|---|---|---|---|---|---|
| 9936.000 | 30.64 | 11.80 | 42.44 | 74.00 | -31.56 | V | peak |
| 10800.000 | 29.78 | 14.46 | 44.24 | 74.00 | -29.76 | V | peak |
| 11844.000 | 30.51 | 14.71 | 45.22 | 74.00 | -28.78 | V | peak |
| 12396.000 | 29.93 | 15.95 | 45.88 | 74.00 | -28.12 | V | peak |
| 13008.000 | 29.39 | 17.97 | 47.36 | 74.00 | -26.64 | V | peak |
| 14940.000 | 28.79 | 21.13 | 49.92 | 74.00 | -24.08 | V | peak |
| | | | | | | | |
| 9744.000 | 30.67 | 11.24 | 41.91 | 74.00 | -32.09 | H | Peak |
| 10296.000 | 30.55 | 12.90 | 43.45 | 74.00 | -30.55 | H | Peak |
| 10932.000 | 30.35 | 14.87 | 45.22 | 74.00 | -28.78 | H | Peak |
| 12648.000 | 29.24 | 16.78 | 46.02 | 74.00 | -27.98 | H | peak |
| 14196.000 | 28.76 | 20.69 | 49.45 | 74.00 | -24.55 | H | peak |
| 14856.000 | 28.49 | 21.08 | 49.57 | 74.00 | -24.43 | H | peak |

***Remark:***

1. *Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.*
2. *Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.*
3. *Average test would be performed if the peak result were greater than the average limit.*
4. *Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
5. *Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.*
6. *Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).*


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## 6.8 CONDUCTED UNDESIRABLE EMISSION

### 6.8.1 LIMIT

According to 15.407(b) ,

(1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

(2) For transmitters operating in the 5.725–5.850 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of –17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of –27 dBm/MHz.

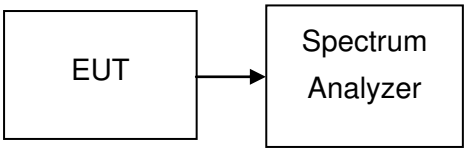
(3) The provisions of §15.205 apply to intentional radiators operating under this section.

### 6.8.2 MEASUREMENT EQUIPMENT USED

| Name of Equipment | Manufacturer | Model | Serial Number | Last Calibration | Due Calibration |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4446A | US44300399 | 02/21/2016 | 02/20/2017 |

***Remark:*** *Each piece of equipment is scheduled for calibration once a year.*

### 6.8.3 TEST CONFIGURATION




### 6.8.4 TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements are made.

Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

### 6.8.5 TEST RESULTS

*No non-compliance noted*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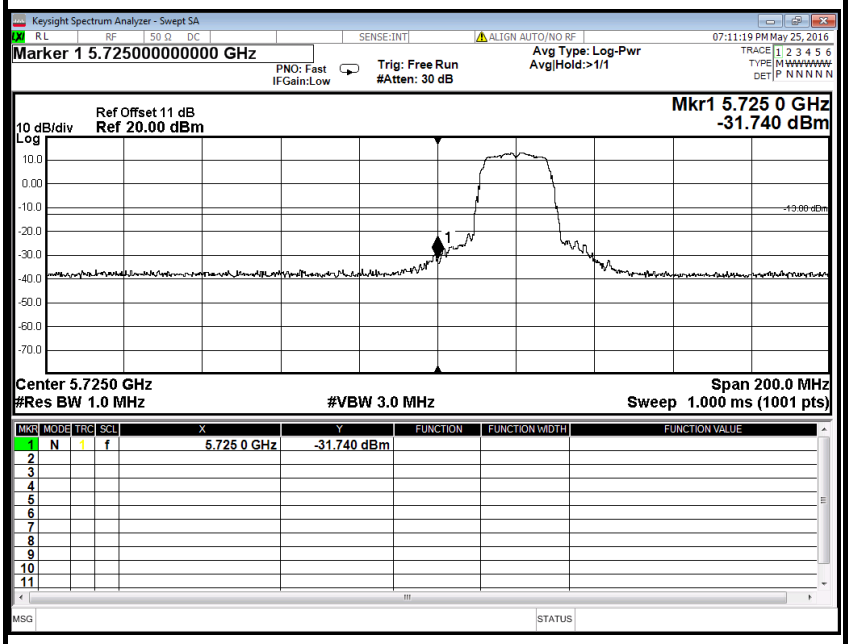
## Test Plot

**IEEE 802.11a mode / 5745 ~ 5825MHz**

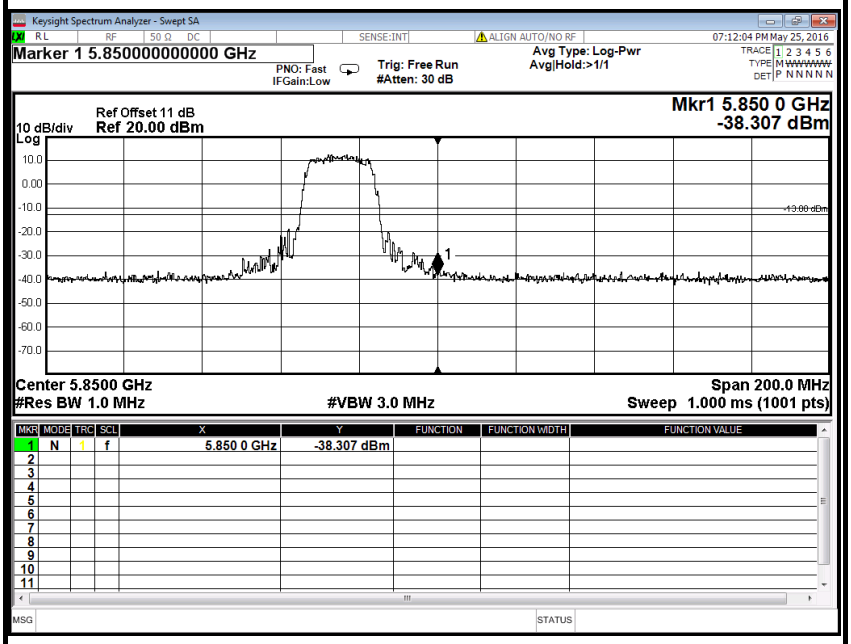
**CH Low**

Antenna 1




**CH High**

Antenna 1





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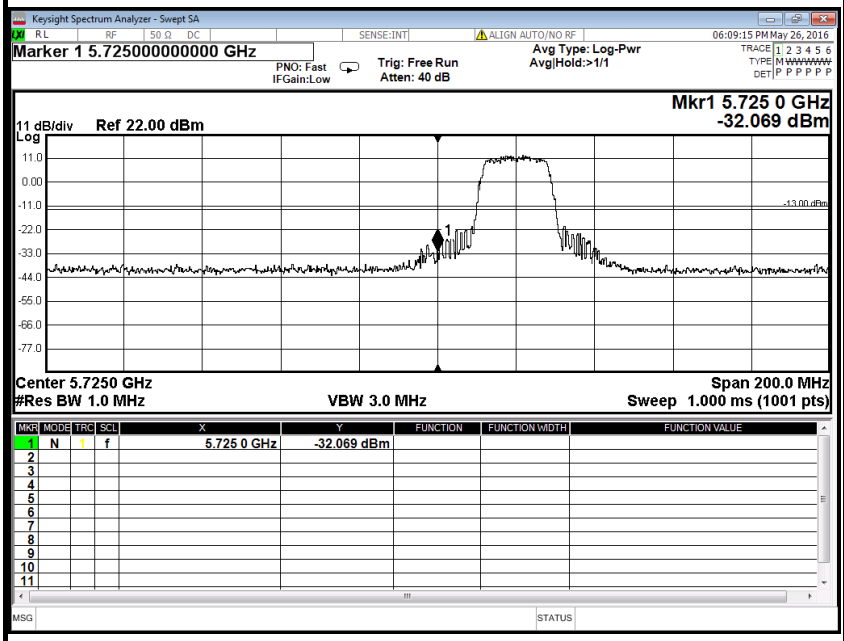
**IEEE 802.11a mode / 5745 ~ 5825MHz**

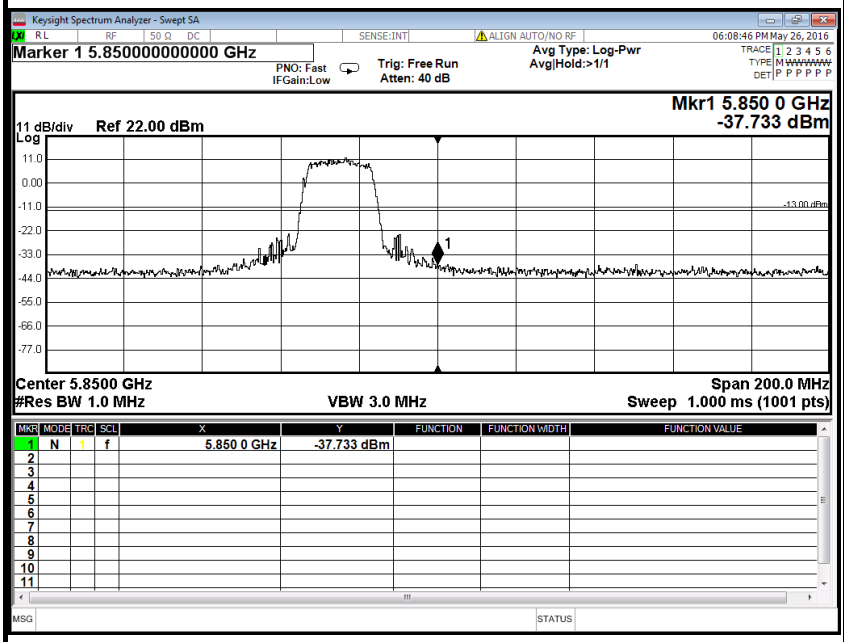
**CH Low**

Antenna 2




**CH High**

Antenna 2





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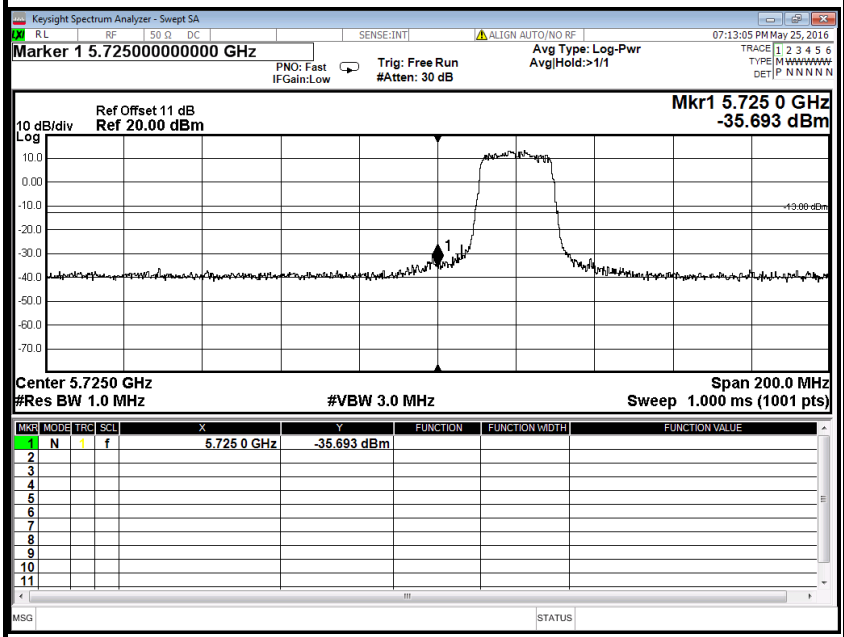
**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz**

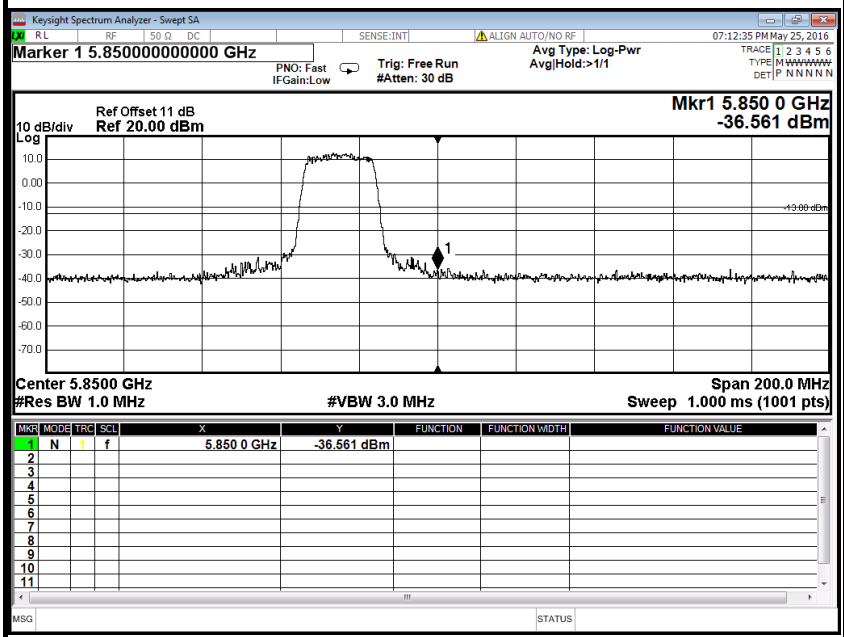
**CH Low**

Antenna 1




**CH High**

Antenna 1





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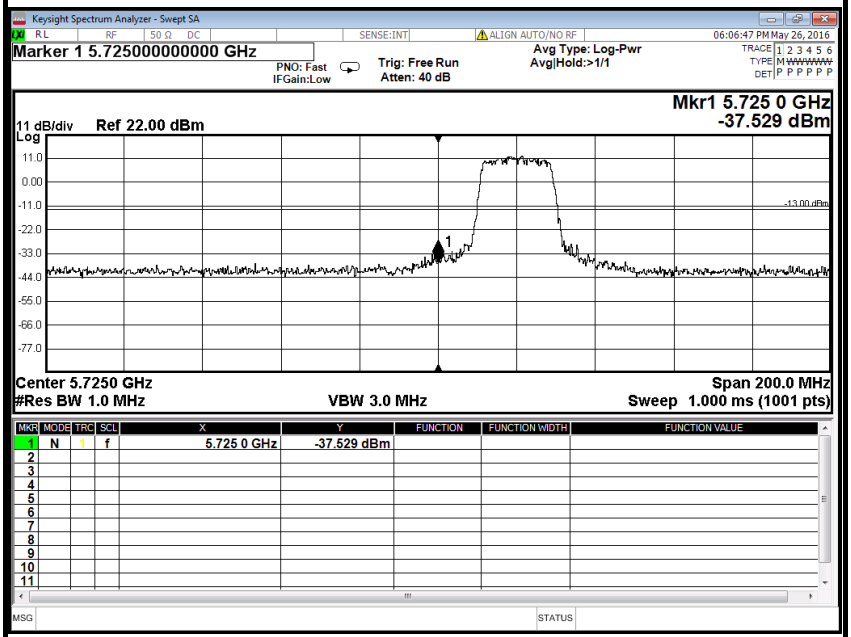
**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz**

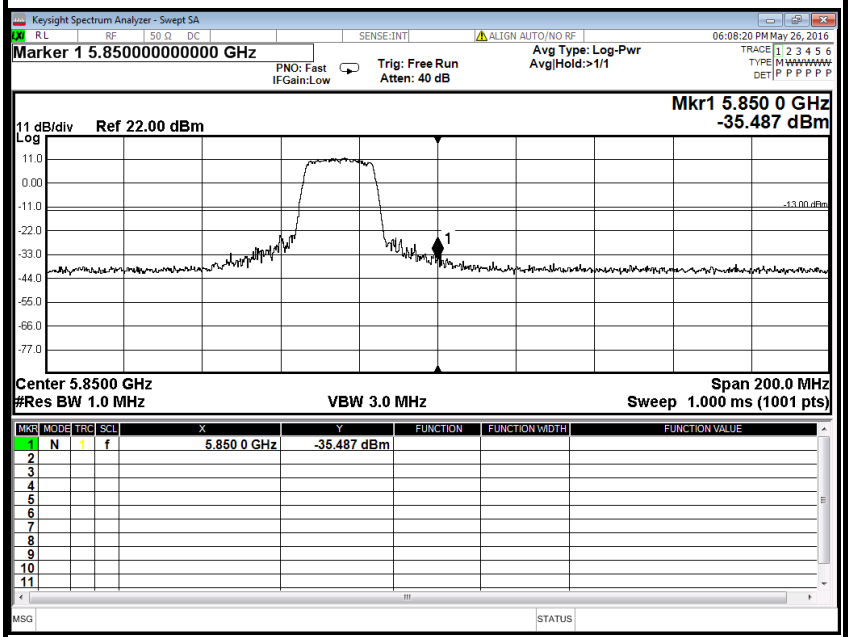
**CH Low**

**Antenna 2**




**CH High**

Antenna 2





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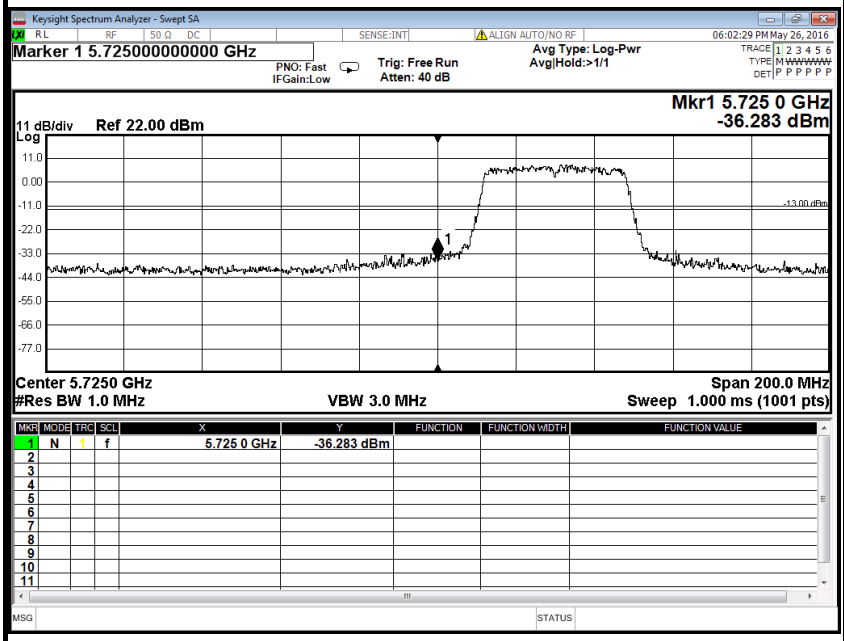
**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

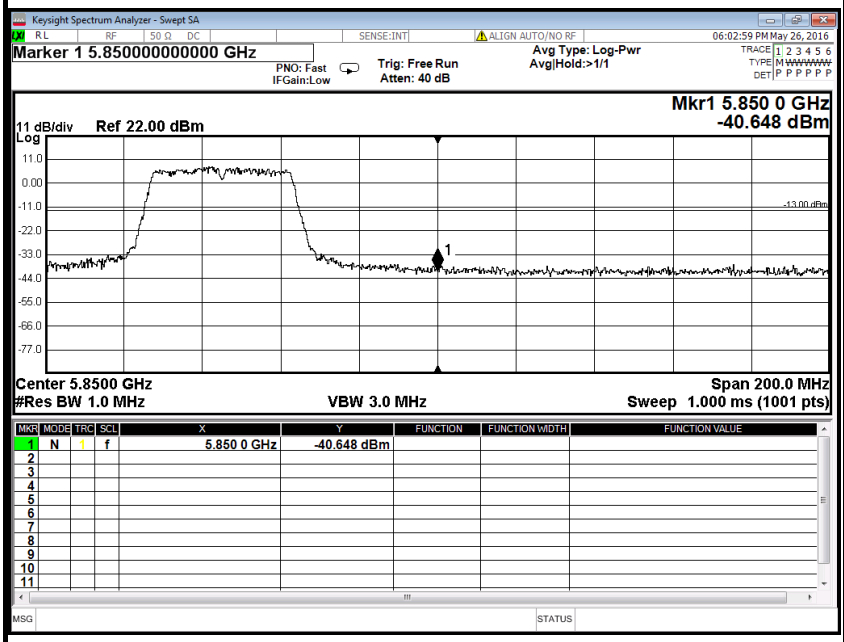
**CH Low**

Antenna 1




**CH High**

Antenna 1





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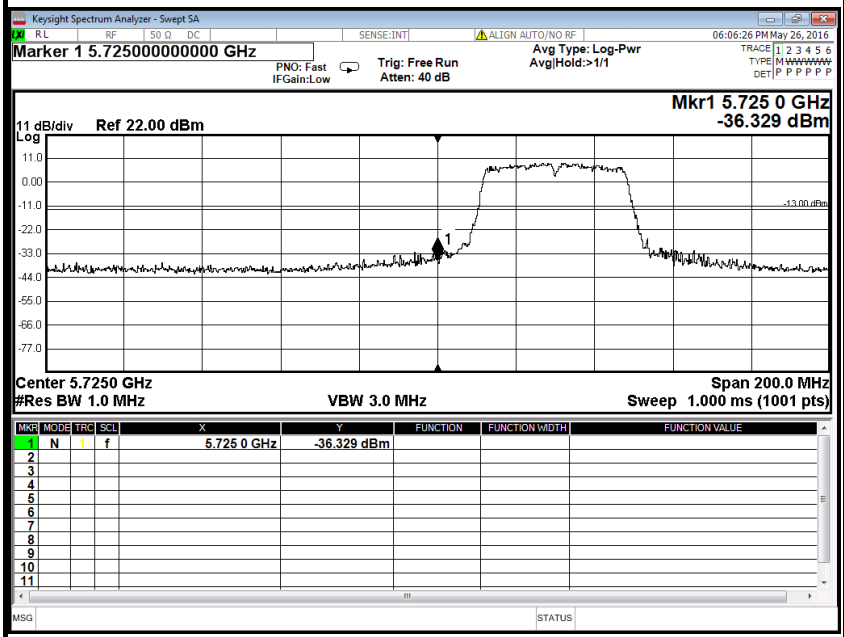
**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz**

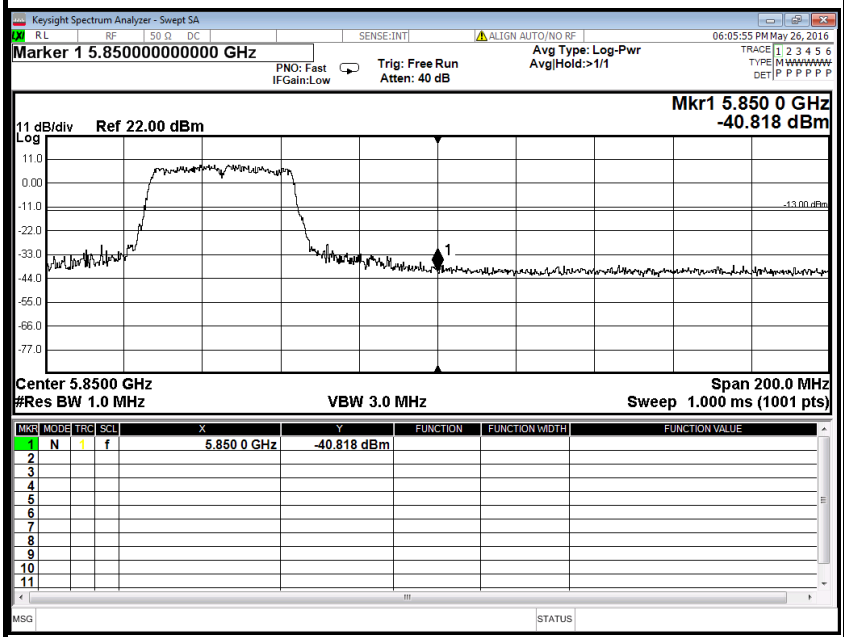
**CH Low**

Antenna 2




**CH High**

Antenna 2





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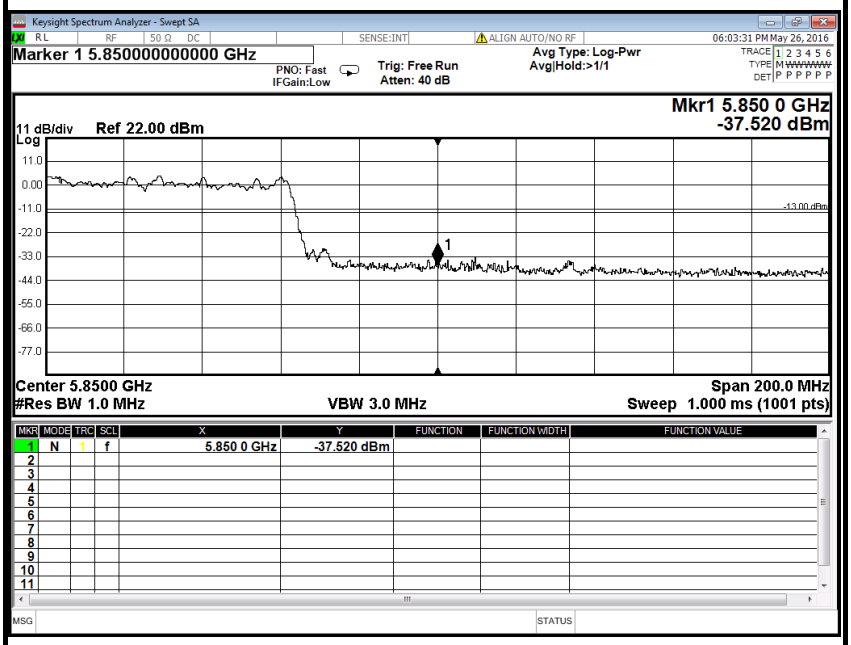
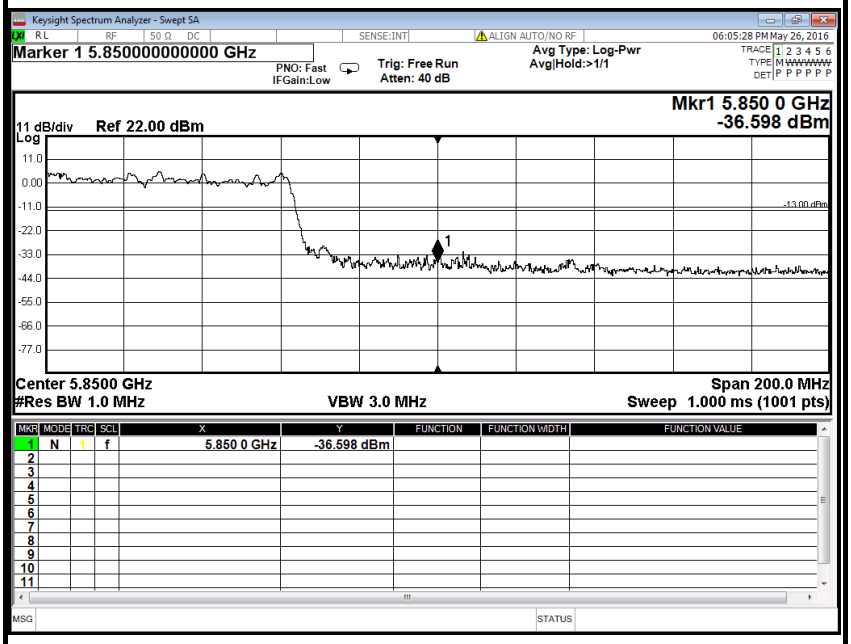
**IEEE 802.11ac 80 mode / 5775MHz**

Antenna 1




**IEEE 802.11ac 80 mode / 5775MHz**

Antenna 2





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## 6.9 POWERLINE CONDUCTED EMISSIONS

### 6.9.1 LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator 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 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

| Frequency Range (MHz) | Limits (dBµV) | |
|---|---|---|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56* | 56 to 46* |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

** Decreases with the logarithm of the frequency.*

### 6.9.2 TEST INSTRUMENTS

| Conducted Emission Test Site | | | | | |
|---|---|---|---|---|---|
| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
| EMI TEST RECEIVER | ROHDE&SCHWARZ | ESCI | 100783 | 02/21/2016 | 02/20/2017 |
| LISN(EUT) | ROHDE&SCHWARZ | ENV216 | 101543-WX | 02/21/2016 | 02/20/2017 |
| LISN | EMCO | 3825/2 | 8901-1459 | 02/21/2016 | 02/20/2017 |
| Temp. / Humidity Meter | VICTOR | HTC-1 | N/A | 02/21/2016 | 02/20/2017 |
| Test S/W | FARAD | EZ-EMC/ CCS-3A1-CE | | | |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. N.C.R = No Calibration Request.


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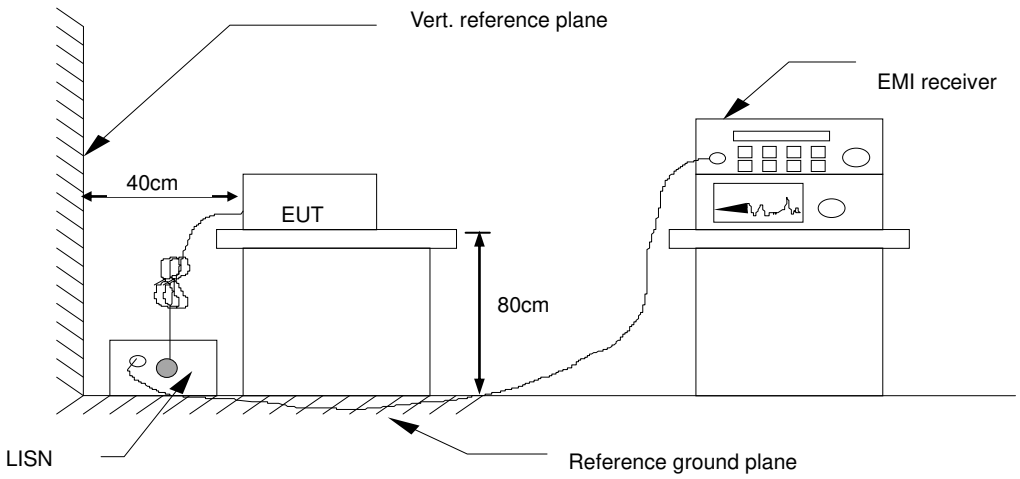
### 6.9.3 TEST CONFIGURATION




### 6.9.4 TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### 6.9.5 DATA SAMPLE

| Frequency (MHz) | QuasiPeak Reading (dBuV) | Average Reading (dBuV) | Correction Factor (dB) | QuasiPeak Result (dBuV) | Average Result (dBuV) | QuasiPeak Limit (dBuV) | Average Limit (dBuV) | QuasiPeak Margin (dB) | Average Margin (dB) | Remark (Pass/Fail) |
|---|---|---|---|---|---|---|---|---|---|---|
| X.XXXX | 32.69 | 25.65 | 11.52 | 44.21 | 37.17 | 65.78 | 55.79 | -21.57 | -18.62 | Pass |

Factor = Insertion loss of LISN + Cable Loss
Result = Quasi-peak Reading/ Average Reading + Factor
Limit = Limit stated in standard
Margin = Result (dBuV) – Limit (dBuV)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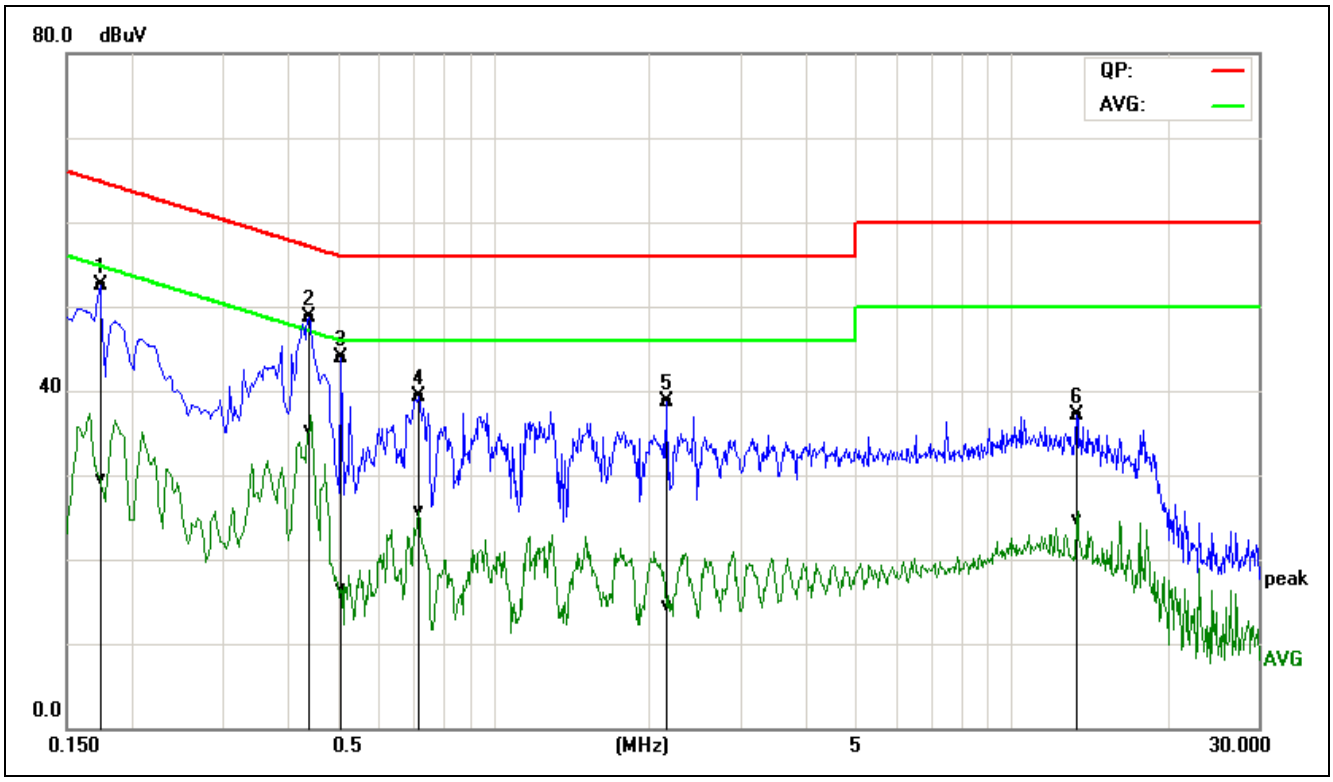
### 6.9.6 TEST RESULTS

| | | | |
|---|---|---|---|
| **Model No.** | AC60 | **RBW,VBW** | 9 kHz |
| **Environmental Conditions** | 22°C, 45% RH | **Test Mode** | Mode 1 |
| **Tested by** | Jack Chen | **Line** | L1 |
| **Test Date** | April 20, 2016 | | |




| Frequency (MHz) | QuasiPeak Reading (dBuV) | Average Reading (dBuV) | Correction Factor (dB) | QuasiPeak Result (dBuV) | Average Result (dBuV) | QuasiPeak Limit (dBuV) | Average Limit (dBuV) | QuasiPeak Margin (dB) | Average Margin (dB) | Remark (Pass/Fail) | **Line (L1/L2)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.1740 | 42.70 | 19.75 | 9.78 | 52.48 | 29.53 | 64.76 | 54.77 | -12.28 | -25.24 | Pass | L1 |
| 0.4420 | 38.82 | 25.46 | 9.86 | 48.68 | 35.32 | 57.02 | 47.02 | -8.34 | -11.70 | Pass | L1 |
| 0.5100 | 34.05 | 6.59 | 9.88 | 43.93 | 16.47 | 56.00 | 46.00 | -12.07 | -29.53 | Pass | L1 |
| 0.7180 | 29.46 | 15.85 | 9.89 | 39.35 | 25.74 | 56.00 | 46.00 | -16.65 | -20.26 | Pass | L1 |
| 2.1660 | 28.76 | 4.54 | 9.94 | 38.70 | 14.48 | 56.00 | 46.00 | -17.30 | -31.52 | Pass | L1 |
| 13.3580 | 26.97 | 14.52 | 10.10 | 37.07 | 24.62 | 60.00 | 50.00 | -22.93 | -25.38 | Pass | L1 |

*REMARKS: L1 = Line One (Live Line)*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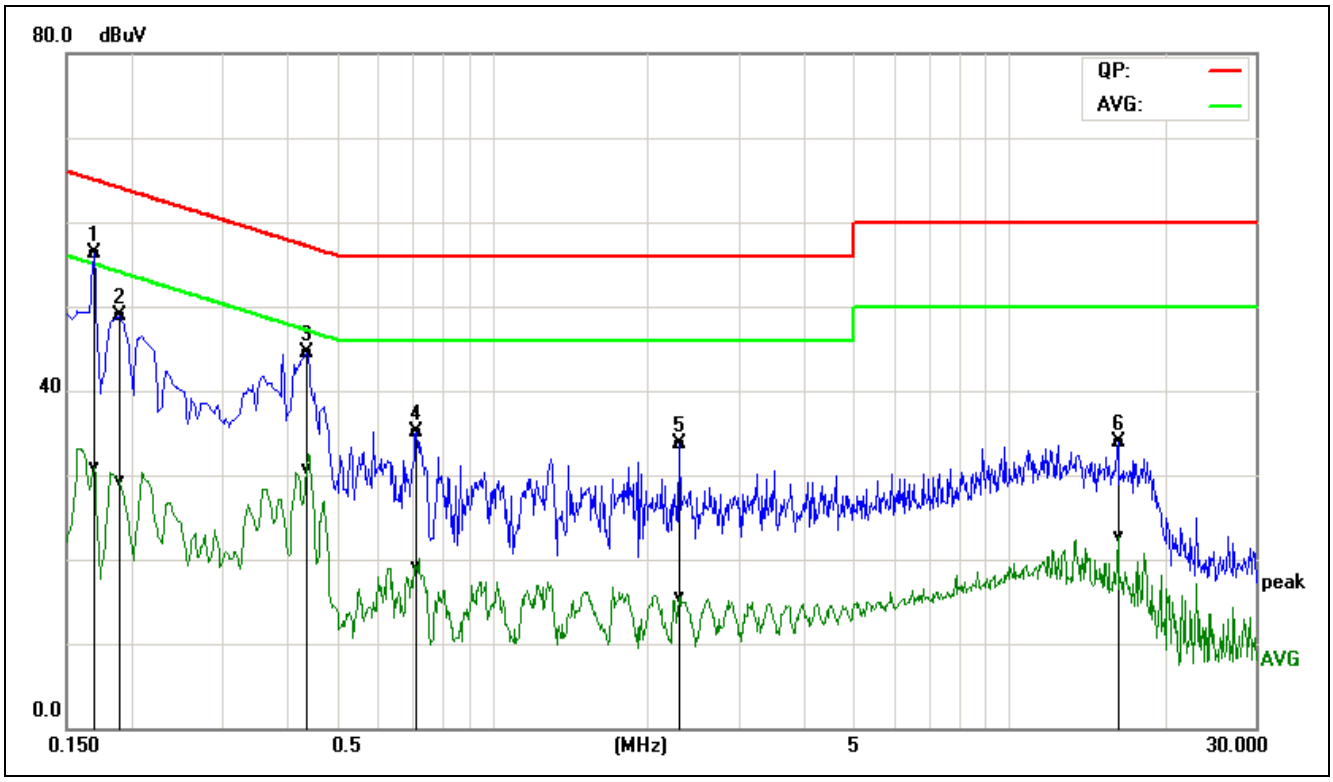
| | | | |
|---|---|---|---|
| **Model No.** | AC60 | **RBW,VBW** | 9 kHz |
| **Environmental Conditions** | 22°C, 45% RH | **Test Mode** | Mode 1 |
| **Tested by** | Jack Chen | **Line** | L2 |
| **Test Date** | April 20, 2016 | | |




| Frequency (MHz) | QuasiPeak Reading (dBuV) | Average Reading (dBuV) | Correction Factor (dB) | QuasiPeak Result (dBuV) | Average Result (dBuV) | QuasiPeak Limit (dBuV) | Average Limit (dBuV) | QuasiPeak Margin (dB) | Average Margin (dB) | Remark (Pass/Fail) | **Line (L1/L2)** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.1700 | 46.36 | 21.06 | 9.88 | 56.24 | 30.94 | 64.96 | 54.96 | -8.72 | -24.02 | Pass | L2 |
| 0.1900 | 39.00 | 19.37 | 9.89 | 48.89 | 29.26 | 64.03 | 54.04 | -15.14 | -24.78 | Pass | L2 |
| 0.4380 | 34.58 | 20.86 | 9.88 | 44.46 | 30.74 | 57.10 | 47.10 | -12.64 | -16.36 | Pass | L2 |
| 0.7140 | 25.26 | 9.17 | 9.89 | 35.15 | 19.06 | 56.00 | 46.00 | -20.85 | -26.94 | Pass | L2 |
| 2.3020 | 23.71 | 5.47 | 9.95 | 33.66 | 15.42 | 56.00 | 46.00 | -22.34 | -30.58 | Pass | L2 |
| 16.2260 | 23.85 | 12.54 | 10.13 | 33.98 | 22.67 | 60.00 | 50.00 | -26.02 | -27.33 | Pass | L2 |

REMARKS: L2 = Line Two (Neutral Line)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## 6.10 FREQUENCY STABILITY

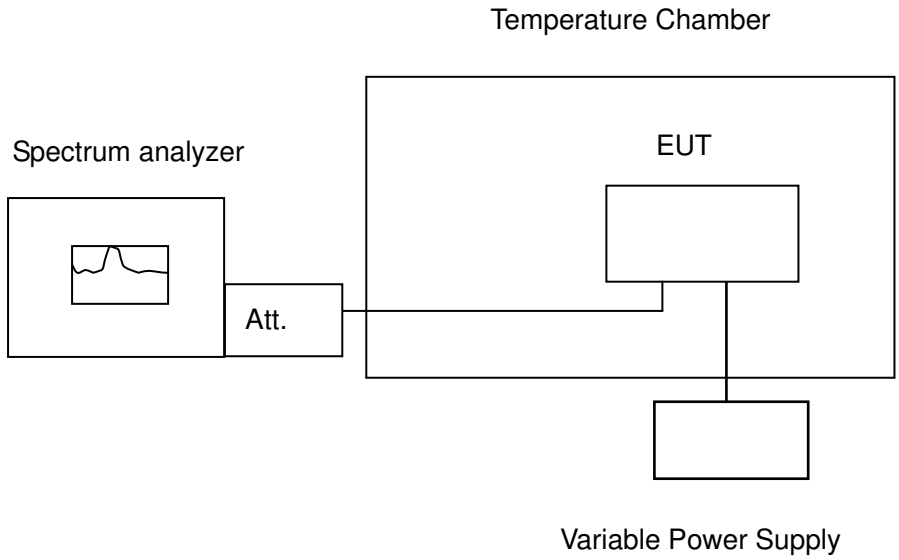
### 6.10.1 LIMIT

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 operational description.

### 6.10.2 TEST INSTRUMENTS

| Name of Equipment | Manufacturer | Model Number | Serial Number | Last Calibration | Due Calibration |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | N9010A | MY52221469 | 02/21/2016 | 02/20/2017 |
| DC Power Supply | DAZHENG | PS-605D | 20018978 | N.C.R | N.C.R |
| AC POWER SOUCE | UMART | HPA1010 | N/A | N.C.R | N.C.R |
| Power Meter | Anritsu | ML2495A | 1204003 | 02/21/2016 | 02/20/2017 |
| Power Sensor | Anritsu | MA2411B | 1126150 | 02/21/2016 | 02/20/2017 |
| Temperature Chamber | TERCHY | MHG-800N | E21104 | 11/18/2015 | 11/17/2016 |
| Temp. / Humidity Meter | Anymetre | JR913 | N/A | 02/21/2016 | 02/20/2017 |

### 6.10.3 TEST CONFIGURATION




***Remark:*** *Measurement setup for testing on Antenna connector*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### 6.10.4 TEST PROCEDURE

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to –20°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

### 6.10.5 TEST RESULTS

*No non-compliance noted.*


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**Test Data**
**Antenna 1**

**IEEE 802.11a mode / 5745 ~ 5825MHz (Low)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5744.989396 | 5725-5850 | PASS |
| 40 | 120 | 5744.958932 | 5725-5850 | PASS |
| 30 | 120 | 5744.992946 | 5725-5850 | PASS |
| 20 | 120 | 5745.046500 | 5725-5850 | PASS |
| 10 | 120 | 5744.983821 | 5725-5850 | PASS |
| 0 | 120 | 5744.992575 | 5725-5850 | PASS |
| -10 | 120 | 5744.954193 | 5725-5850 | PASS |
| -20 | 120 | 5744.965642 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5744.986059 | 5725-5850 | PASS |
| | 120 | 5745.046500 | 5725-5850 | PASS |
| | 132 | 5744.965630 | 5725-5850 | PASS |

**IEEE 802.11a mode / 5745 ~ 5825MHz (High)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5824.957410 | 5725-5850 | PASS |
| 40 | 120 | 5824.991564 | 5725-5850 | PASS |
| 30 | 120 | 5824.953195 | 5725-5850 | PASS |
| 20 | 120 | 5825.016500 | 5725-5850 | PASS |
| 10 | 120 | 5824.981881 | 5725-5850 | PASS |
| 0 | 120 | 5824.957977 | 5725-5850 | PASS |
| -10 | 120 | 5824.978433 | 5725-5850 | PASS |
| -20 | 120 | 5824.982298 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5824.999478 | 5725-5850 | PASS |
| | 120 | 5825.016500 | 5725-5850 | PASS |
| | 132 | 5824.984305 | 5725-5850 | PASS |


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**Antenna 2**

**IEEE 802.11a mode / 5745 ~ 5825MHz (Low)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5744.955513 | 5725-5850 | PASS |
| 40 | 120 | 5744.966041 | 5725-5850 | PASS |
| 30 | 120 | 5744.961645 | 5725-5850 | PASS |
| 20 | 120 | 5745.017000 | 5725-5850 | PASS |
| 10 | 120 | 5744.990997 | 5725-5850 | PASS |
| 0 | 120 | 5744.964883 | 5725-5850 | PASS |
| -10 | 120 | 5744.990977 | 5725-5850 | PASS |
| -20 | 120 | 5744.961728 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5744.970550 | 5725-5850 | PASS |
| | 120 | 5745.017000 | 5725-5850 | PASS |
| | 132 | 5744.991713 | 5725-5850 | PASS |

**IEEE 802.11a mode / 5745 ~ 5825MHz (High)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5824.973279 | 5725-5850 | PASS |
| 40 | 120 | 5824.963506 | 5725-5850 | PASS |
| 30 | 120 | 5824.967354 | 5725-5850 | PASS |
| 20 | 120 | 5825.017000 | 5725-5850 | PASS |
| 10 | 120 | 5824.957152 | 5725-5850 | PASS |
| 0 | 120 | 5824.951842 | 5725-5850 | PASS |
| -10 | 120 | 5824.960506 | 5725-5850 | PASS |
| -20 | 120 | 5824.987006 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5824.994259 | 5725-5850 | PASS |
| | 120 | 5825.017000 | 5725-5850 | PASS |
| | 132 | 5824.968607 | 5725-5850 | PASS |


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**Antenna 1**

**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz (Low)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5744.990608 | 5725-5850 | PASS |
| 40 | 120 | 5744.997828 | 5725-5850 | PASS |
| 30 | 120 | 5744.993015 | 5725-5850 | PASS |
| 20 | 120 | 5745.016000 | 5725-5850 | PASS |
| 10 | 120 | 5744.999721 | 5725-5850 | PASS |
| 0 | 120 | 5744.957647 | 5725-5850 | PASS |
| -10 | 120 | 5744.981450 | 5725-5850 | PASS |
| -20 | 120 | 5744.983218 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5744.999436 | 5725-5850 | PASS |
| | 120 | 5745.016000 | 5725-5850 | PASS |
| | 132 | 5744.963186 | 5725-5850 | PASS |

**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz (High)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5824.977988 | 5725-5850 | PASS |
| 40 | 120 | 5824.979818 | 5725-5850 | PASS |
| 30 | 120 | 5824.951485 | 5725-5850 | PASS |
| 20 | 120 | 5824.997830 | 5725-5850 | PASS |
| 10 | 120 | 5824.997600 | 5725-5850 | PASS |
| 0 | 120 | 5824.970390 | 5725-5850 | PASS |
| -10 | 120 | 5824.974025 | 5725-5850 | PASS |
| -20 | 120 | 5824.952096 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5824.995765 | 5725-5850 | PASS |
| | 120 | 5825.016000 | 5725-5850 | PASS |
| | 132 | 5824.987564 | 5725-5850 | PASS |


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**Antenna 2**

**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz (Low)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5744.952998 | 5725-5850 | PASS |
| 40 | 120 | 5744.973392 | 5725-5850 | PASS |
| 30 | 120 | 5744.977707 | 5725-5850 | PASS |
| 20 | 120 | 5745.017000 | 5725-5850 | PASS |
| 10 | 120 | 5744.989491 | 5725-5850 | PASS |
| 0 | 120 | 5744.987114 | 5725-5850 | PASS |
| -10 | 120 | 5744.983671 | 5725-5850 | PASS |
| -20 | 120 | 5744.957818 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5744.980673 | 5725-5850 | PASS |
| | 120 | 5745.017000 | 5725-5850 | PASS |
| | 132 | 5744.987372 | 5725-5850 | PASS |

**IEEE 802.11n HT 20 MHz mode / 5745 ~ 5825MHz (High)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5824.995887 | 5725-5850 | PASS |
| 40 | 120 | 5824.956206 | 5725-5850 | PASS |
| 30 | 120 | 5824.997688 | 5725-5850 | PASS |
| 20 | 120 | 5825.017000 | 5725-5850 | PASS |
| 10 | 120 | 5824.971406 | 5725-5850 | PASS |
| 0 | 120 | 5824.953357 | 5725-5850 | PASS |
| -10 | 120 | 5824.970686 | 5725-5850 | PASS |
| -20 | 120 | 5824.957658 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5824.973564 | 5725-5850 | PASS |
| | 120 | 5825.017000 | 5725-5850 | PASS |
| | 132 | 5824.951977 | 5725-5850 | PASS |


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**Antenna 1**

**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz (Low)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5754.989876 | 5725-5850 | PASS |
| 40 | 120 | 5754.987040 | 5725-5850 | PASS |
| 30 | 120 | 5754.974761 | 5725-5850 | PASS |
| 20 | 120 | 5755.016000 | 5725-5850 | PASS |
| 10 | 120 | 5754.963339 | 5725-5850 | PASS |
| 0 | 120 | 5754.972887 | 5725-5850 | PASS |
| -10 | 120 | 5754.964932 | 5725-5850 | PASS |
| -20 | 120 | 5754.972265 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5754.960451 | 5725-5850 | PASS |
| | 120 | 5755.016000 | 5725-5850 | PASS |
| | 132 | 5754.961469 | 5725-5850 | PASS |

**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz (High)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5794.993126 | 5725-5850 | PASS |
| 40 | 120 | 5794.988357 | 5725-5850 | PASS |
| 30 | 120 | 5794.954822 | 5725-5850 | PASS |
| 20 | 120 | 5795.016500 | 5725-5850 | PASS |
| 10 | 120 | 5794.978741 | 5725-5850 | PASS |
| 0 | 120 | 5794.964729 | 5725-5850 | PASS |
| -10 | 120 | 5794.954911 | 5725-5850 | PASS |
| -20 | 120 | 5794.958346 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5794.985940 | 5725-5850 | PASS |
| | 120 | 5795.016500 | 5725-5850 | PASS |
| | 132 | 5794.986350 | 5725-5850 | PASS |


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**Antenna 2**

**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz (Low)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5754.957925 | 5725-5850 | PASS |
| 40 | 120 | 5754.968268 | 5725-5850 | PASS |
| 30 | 120 | 5754.954263 | 5725-5850 | PASS |
| 20 | 120 | 5755.017500 | 5725-5850 | PASS |
| 10 | 120 | 5754.959007 | 5725-5850 | PASS |
| 0 | 120 | 5754.984021 | 5725-5850 | PASS |
| -10 | 120 | 5754.986712 | 5725-5850 | PASS |
| -20 | 120 | 5754.994760 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5754.980187 | 5725-5850 | PASS |
| | 120 | 5755.017500 | 5725-5850 | PASS |
| | 132 | 5754.969518 | 5725-5850 | PASS |

**IEEE 802.11n HT 40 MHz mode / 5755 ~ 5795MHz (High)**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5794.985067 | 5725-5850 | PASS |
| 40 | 120 | 5794.983775 | 5725-5850 | PASS |
| 30 | 120 | 5794.968560 | 5725-5850 | PASS |
| 20 | 120 | 5795.017000 | 5725-5850 | PASS |
| 10 | 120 | 5794.960149 | 5725-5850 | PASS |
| 0 | 120 | 5794.961706 | 5725-5850 | PASS |
| -10 | 120 | 5794.986231 | 5725-5850 | PASS |
| -20 | 120 | 5794.954433 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5794.973527 | 5725-5850 | PASS |
| | 120 | 5795.017000 | 5725-5850 | PASS |
| | 132 | 5794.955880 | 5725-5850 | PASS |


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**Antenna 1**

**IEEE 802.11ac 80 mode / 5775MHz**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5774.967401 | 5725-5850 | PASS |
| 40 | 120 | 5774.990109 | 5725-5850 | PASS |
| 30 | 120 | 5774.965118 | 5725-5850 | PASS |
| 20 | 120 | 5775.018000 | 5725-5850 | PASS |
| 10 | 120 | 5774.980493 | 5725-5850 | PASS |
| 0 | 120 | 5774.967862 | 5725-5850 | PASS |
| -10 | 120 | 5774.993643 | 5725-5850 | PASS |
| -20 | 120 | 5774.966678 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5774.984222 | 5725-5850 | PASS |
| | 120 | 5775.018000 | 5725-5850 | PASS |
| | 132 | 5774.973396 | 5725-5850 | PASS |

**Antenna 2**

**IEEE 802.11ac 80 mode / 5775MHz**

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 50 | 120 | 5774.995084 | 5725-5850 | PASS |
| 40 | 120 | 5774.976485 | 5725-5850 | PASS |
| 30 | 120 | 5774.953557 | 5725-5850 | PASS |
| 20 | 120 | 5775.018000 | 5725-5850 | PASS |
| 10 | 120 | 5774.964791 | 5725-5850 | PASS |
| 0 | 120 | 5774.965510 | 5725-5850 | PASS |
| -10 | 120 | 5774.972526 | 5725-5850 | PASS |
| -20 | 120 | 5774.972264 | 5725-5850 | PASS |

| Environment Temperature ( °C ) | Volage (V) | Measured Frequency (MHz) | limit Range | Test Result |
|---|---|---|---|---|
| 20 | 108 | 5774.997253 | 5725-5850 | PASS |
| | 120 | 5775.018000 | 5725-5850 | PASS |
| | 132 | 5774.949792 | 5725-5850 | PASS |


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