# FCC TEST REPORT

| | |
|---|---|
| **Product Name:** | Promethean WIFI Module (Titanium) |
| **Trade Mark:** | Promethean |
| **Model No.:** | AP-WIFI-BC |
| **Add. Model No.:** | N/A |
| **Report Number:** | 181126027RFC-4 |
| **Test Standards:** | FCC 47 CFR Part 15 Subpart E |
| **FCC ID:** | QAM-AP-WIFI-BC |
| **Test Result:** | PASS |
| **Date of Issue:** | January 18, 2019 |

Prepared for:

**Promethean Ltd**
**Promethean House, Lower Philips Rd Whitebirk, Blackburn, BB1 5TH, United Kingdom**

Prepared by:

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**
**16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China**
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Tested by: Henry Lu, Project Engineer

Reviewed by: Kevin Liang, Assistant Manager

Approved by: Billy Li, Technical Director

Date: January 18, 2019

# Version

| Version No. | Date | Description |
|---|---|---|
| V1.0 | January 18, 2019 | Original |

# CONTENTS

# 1. GENERAL INFORMATION

## 1.1 CLIENT INFORMATION

| | |
|---|---|
| **Applicant:** | Promethean Ltd |
| **Address of Applicant:** | Promethean House, Lower Philips Rd Whitebirk, Blackburn, BB1 5TH, United Kingdom |
| **Manufacturer:** | Guangzhou Lango Electronics Technology Co., Ltd |
| **Address of Manufacturer:** | 4/f, NO.136, Gaopu Road, Tianhe District, Guangzhou, 510663, P.R. China |

## 1.2 EUT INFORMATION

### 1.2.1 General Description of EUT

| | | | |
|---|---|---|---|
| **Product Name:** | Promethean WIFI Module (Titanium) | | |
| **Model No.:** | AP-WIFI-BC | | |
| **Add. Model No.:** | N/A | | |
| **Trade Mark:** | Promethean | | |
| **DUT Stage:** | Identical Prototype | | |
| **EUT Supports Function:** | 2.4 GHz ISM Band: | IEEE 802.11b/g/n | |
| | | Bluetooth V4.2 | |
| | 5 GHz RLAN Bands: | 5 150 MHz to 5 250 MHz | IEEE 802.11a/n/ac |
| | 5.8 GHz Band: | 5 725 MHz to 5 875 MHz | IEEE 802.11a/n/ac |
| **Software Version:** | v5.2.21.1_27105.20180315_COEX20180112-5959 | | |
| **Hardware Version:** | XF.WIFI.E-4-V0 | | |
| **Sample Received Date:** | December 10, 2018 | | |
| **Sample Tested Date:** | December 20, 2018 to January 16, 2019 | | |

### 1.2.2 Description of Accessories

None

## 1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

| | |
|---|---|
| **Frequency Bands:** | 5150 MHz to 5250 MHz (U-NII-1) |
| | 5 725 MHz to 5 850 MHz (U-NII-3) |
| **Frequency Ranges:** | 5180 MHz to 5240 MHz |
| | 5 745 MHz to 5 825 MHz |
| **Support Standards:** | IEEE 802.11a/n/ac |
| **TPC Function:** | Not Support |
| **DFS Operational mode:** | Slave without radar Interference detection function |
| **Type of Modulation:** | IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK) |
| | IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK) |
| | IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK) |
| **Channel Spacing:** | IEEE 802.11a/n-HT20/ac-VHT20: 20 MHz |
| | IEEE 802.11n-HT40/ac-VHT40: 40 MHz |
| | IEEE 802.11ac-VHT80: 80 MHz |
| **Data Rate:** | IEEE 802.11a: Up to 54 Mbps |
| | IEEE 802.11n-HT20: Up to MCS15 |
| | IEEE 802.11n-HT40: Up to MCS15 |
| | IEEE 802.11ac-VHT20: Up to MCS8 |
| | IEEE 802.11ac-VHT40: Up to MCS9 |
| | IEEE 802.11ac-VHT80: Up to MCS9 |

| | | | | |
|---|---|---|---|---|
| **Number of Channels:** | 5150 MHz to 5250 MHz:<br>4 for IEEE 802.11a/n-HT20/ac-VHT20<br>2 for IEEE 802.11n-HT40)/ac-VHT40<br>1 for IEEE 802.11acVHT80 | | | |
| | 5725 MHz to 5850 MHz:<br>5 for IEEE 802.11a/n-HT20/ac-VHT20<br>2 for IEEE 802.11n-HT40/ac-VHT40<br>1 for IEEE 802.11ac-VHT80 | | | |
| **Antenna Type:** | Chain 0 | External Antenna | | |
| | Chain 1 | External Antenna | | |
| **Antenna Gain:** | Chain 0 | 5150 MHz to 5250 MHz: 4.95 dBi | | |
| | | 5725 MHz to 5850 MHz: 4.72 dBi | | |
| | Chain 1 | 5150 MHz to 5250 MHz: 4.95 dBi | | |
| | | 5725 MHz to 5850 MHz: 4.72 dBi | | |
| **Maximum Avg. Power (dBm):** | **SISO_Chain 0** | | **U-NII-1** | **U-NII-3** |
| | IEEE 802.11a: | | 13.49 | 12.74 |
| | **SISO_Chain 1** | | **U-NII-1** | **U-NII-3** |
| | IEEE 802.11a: | | 11.69 | 8.95 |
| | **MIMO_Chain 0+1** | | **U-NII-1** | **U-NII-3** |
| | IEEE 802.11n-HT20: | | 14.92 | 13.31 |
| | IEEE 802.11n-HT40: | | 12.78 | 11.10 |
| | IEEE 802.11ac-VHT20: | | 12.79 | 11.09 |
| | IEEE 802.11ac-VHT40: | | 12.92 | 11.32 |
| | IEEE 802.11ac-VHT80: | | 12.92 | 11.56 |
| **Normal Test Voltage:** | 120V~60Hz | | | |

## 1.4 OTHER INFORMATION

| **Operation Frequency Each of Channel** | | |
|---|---|---|
| | **U-NII-1** | **U-NII-3** |
| **IEEE 802.11a, IEEE 802.11n-HT20, IEEE 802.11ac-VHT20** | **f = 5000 + 5k, k = 32 + 4n** | **f = 5000 + 5k, k = 145 + 4n** |
| | **n = 1,…, 4** | **n = 1,…, 5** |
| **IEEE 802.11n-HT40, IEEE 802.11ac-VHT40** | **f = 5000 + 5k, k = 30 + 8n** | **f = 5000 + 5k, k = 143 + 8n** |
| | **n = 1, 2** | **n = 1, 2** |
| **IEEE 802.11ac-VHT80** | **f = 5000 + 5k, k = 26 + 16n** | **f = 5000 + 5k, k = 155** |
| | **n = 1** | |
| Note:<br>**f** is the operating frequency (MHz);<br>**k** is the operating channel. | | |

## 1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

| Description | Manufacturer | Model No. | Serial Number | Supplied by |
|---|---|---|---|---|
| Mainboard | Promethean | XM.H811.D-②-V0 | N/A | Promethean |
| Power board | Promethean | PV01-180828-C09 | N/A | Promethean |
| Adapter | SOY | SUN-1200400-039-I | N/A | Promethean |
| Display | DELL | P2416Db | N/A | UnionTrust |
| Mouse | Dell | MOCZUL | CN-0V7623-73826-65K-00XR | UnionTrust |

2) Support Cable

| Cable No. | Description | Connector | Length | Supplied by |
|---|---|---|---|---|
| 1 | Antenna Cable | SMA | 0.30 Meter | UnionTrust |
| 2 | HDMI Cable | HDMI-A | 1.5 Meter Shielded with two ferrite | UnionTrust |
| 3 | Ethernet Cable | RJ45 | 2 Meter Unshielded without ferrite | UnionTrust |

## 1.6 TEST LOCATION

**Shenzhen UnionTrust Quality and Technology Co., Ltd.**

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua New District, Shenzhen, China 518109
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

## 1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

**CNAS-Lab Code: L9069**
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

**IC-Registration No.: 21600-1**
The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

**A2LA-Lab Certificate No.: 4312.01**
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

**FCC Accredited Lab.**
Designation Number: CN1194

## 1.8 DEVIATION FROM STANDARDS

None.

## 1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

## 1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

## 1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| No. | Item | Measurement Uncertainty |
|---|---|---|
| 1 | Conducted emission 9KHz-150KHz | ±3.8 dB |
| 2 | Conducted emission 150KHz-30MHz | ±3.4 dB |
| 3 | Radiated emission 9KHz-30MHz | ±4.9 dB |
| 4 | Radiated emission 30MHz-1GHz | ±4.7 dB |
| 5 | Radiated emission 1GHz-18GHz | ±5.1 dB |
| 6 | Radiated emission 18GHz-26GHz | ±5.2 dB |
| 7 | Radiated emission 26GHz-40GHz | ±5.2 dB |

## 2. TEST SUMMARY

| FCC 47 CFR Part 15 Subpart E Test Cases | | | |
|---|---|---|---|
| **Test Item** | **Test Requirement** | **Test Method** | **Result** |
| **Antenna Requirement** | FCC 47 CFR Part 15 Subpart C Section 15.203<br>FCC 47 CFR Part 15 Subpart C Section 15.407(a)(1) (2) | N/A | PASS |
| **26 dB emission bandwidth** | FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(2)(5) | KDB 789033 D02 v02r01 Section C.1 | PASS |
| **6 dB bandwidth** | FCC 47 CFR Part 15 Subpart E Section 15.407 (e) | KDB 789033 D02 v02r01 Section C.2 | PASS |
| **Maximum conducted output power** | FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(3) | KDB 789033 D02 v02r01 Section E.3.a (Method PM) | PASS |
| **Peak Power Spectral Density** | FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(3) | KDB 789033 D02 v02r01 Section F | PASS |
| **Radiated Emissions and Band Edge Measurement** | FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(4)(6)<br>FCC 47 CFR Part 15 Subpart C Section 15.209/205 | KDB 789033 D02 v02r01 Section G.3, G.4, G.5, and G.6 | PASS |
| **Dynamic Frequency Selection** | FCC 47 CFR Part 15 Subpart E Section 15.407 (h) | KDB 905462 D03 Client Without DFS New Rules v01r02 | N/A (Note 1, 2) |
| **AC Power Line Conducted Emission** | FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(6)<br>FCC 47 CFR Part 15 Subpart C Section 15.207 | ANSI C63.10-2013, Section 6.2. | PASS |
| **Note:**<br>1) N/A: In this whole report not application.<br>2) This EUT does not support U-NII-2A and U-NII-2C frequency bands. | | | |

# 3. EQUIPMENT LIST

| Radiated Emission Test Equipment List | | | | | | |
|---|---|---|---|---|---|---|
| **Used** | **Equipment** | **Manufacturer** | **Model No.** | **Serial Number** | **Cal. date (mm dd, yyyy)** | **Cal. Due date (mm dd, yyyy)** |
| ☒ | 3M Chamber & Accessory Equipment | ETS-LINDGREN | 3M | N/A | Dec. 03, 2018 | Dec. 03, 2021 |
| ☒ | Receiver | R&S | ESIB26 | 100114 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☐ | EXA Spectrum Analyzer | KEYSIGHT | N9010A | MY51440197 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☒ | Loop Antenna | ETS-LINDGREN | 6502 | 00202525 | Dec. 03, 2018 | Dec. 03, 2019 |
| ☒ | Broadband Antenna | ETS-LINDGREN | 3142E | 00201566 | Dec. 08, 2018 | Dec. 08, 2019 |
| ☒ | 6dB Attenuator | Talent | RA6A5-N-18 | 18103001 | Dec. 08, 2018 | Dec. 08, 2019 |
| ☒ | Preamplifier | HP | 8447F | 2805A02960 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☐ | Broadband Antenna (Pre-amplifier) | ETS-LINDGREN | 3142E-PA | 00201891 | May 19, 2018 | May 19, 2019 |
| ☐ | 6dB Attenuator | Talent | RA6A5-N-18 | 18103002 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☐ | Horn Antenna | ETS-LINDGREN | 3117 | 00164202 | Dec. 08, 2018 | Dec. 08, 2019 |
| ☒ | Horn Antenna (Pre-amplifier) | ETS-LINDGREN | 3117-PA | 00201874 | May 22, 2018 | May 22, 2019 |
| ☐ | Horn Antenna | ETS-LINDGREN | 3116C | 00200180 | May 20, 2018 | May 20, 2019 |
| ☒ | Horn Antenna (Pre-amplifier) | ETS-LINDGREN | 3116C-PA | 00202652 | Jan. 05, 2019 | Jan. 05, 2020 |
| ☒ | Multi device Controller | ETS-LINDGREN | 7006-001 | 00160105 | N/A | N/A |
| ☐ | Band Rejection Filter (2400MHz~2500MHz) | Micro-Tronics | BRM50702 | G248 | Jun. 06, 2018 | Jun. 06, 2019 |
| ☒ | Band Rejection Filter (5150MHz~5880MHz) | Micro-Tronics | BRM50716 | G1868 | Jun. 06, 2018 | Jun. 06, 2019 |
| ☒ | Test Software | Audix | e3 | Software Version: 9.160333 | | |

| Conducted Emission Test Equipment List | | | | | | |
|---|---|---|---|---|---|---|
| **Used** | **Equipment** | **Manufacturer** | **Model No.** | **Serial Number** | **Cal. date (mm dd, yyyy)** | **Cal. Due date (mm dd, yyyy)** |
| ☒ | Receiver | R&S | ESR7 | 1316.3003K07 -101181-K3 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☒ | Pulse Limiter | R&S | ESH3-Z2 | 0357.8810.54 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☒ | LISN | R&S | ESH2-Z5 | 860014/024 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☐ | LISN | ETS-Lindgren | 3816/2SH | 00201088 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☒ | Test Software | Audix | e3 | Software Version: 9.160323 | | |

| Conducted RF test Equipment List | | | | | | |
|---|---|---|---|---|---|---|
| **Used** | **Equipment** | **Manufacturer** | **Model No.** | **Serial Number** | **Cal. date (mm dd, yyyy)** | **Cal. Due date (mm dd, yyyy)** |
| ☒ | EXA Spectrum Analyzer | KEYSIGHT | N9010B | MY57110211 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☐ | EXA Spectrum Analyzer | KEYSIGHT | N9010A | MY51440197 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☒ | USB Wideband Power Sensor | KEYSIGHT | U2021XA | MY55430035 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☐ | USB Wideband Power Sensor | KEYSIGHT | U2021XA | MY55430023 | Nov. 24, 2018 | Nov. 24, 2019 |
| ☒ | MXG X-Series RF Vector Signal Generator | KEYSIGHT | N5182B | MY51350267 | Nov. 24, 2018 | Nov. 24, 2019 |

# 4. TEST CONFIGURATION

## 4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

### 4.1.1 Normal or Extreme Test Conditions

| Environment Parameter | Selected Values During Tests | | |
|---|---|---|---|
| Test Condition | Ambient | | |
| | Temperature (°C) | Voltage | Relative Humidity (%) |
| NT/NV | +15 to +35 | 120V~60Hz | 20 to 75 |
| **Remark:**<br>1) NV: Normal Voltage; NT: Normal Temperature | | | |

### 4.1.2 Record of Normal Environment

| Test Item | Temperature (°C) | Relative Humidity (%) | Pressure (kPa) | Tested by |
|---|---|---|---|---|
| **AC Power Line Conducted Emission** | 23.3 | 63 | 99.8 | Gemini Huang |
| **26 dB emission bandwidth** | 24.3 | 48 | 100.1 | Tony Kang |
| **Maximum conducted output power** | 24.3 | 48 | 100.1 | Tony Kang |
| **Peak Power Spectral Density** | 24.3 | 48 | 100.1 | Tony Kang |
| **6 dB bandwidth** | 24.3 | 48 | 100.1 | Tony Kang |
| **Radiated Emissions and Band Edge Measurement** | 24.3 | 52 | 100.2 | Andy Lin |

## 4.2 TEST CHANNELS

| Mode | Tx/Rx Frequency | Test RF Channel Lists | | |
|---|---|---|---|---|
| | | Lowest(L) | Middle(M) | Highest(H) |
| IEEE 802.11a<br>IEEE 802.11n-HT20<br>IEEE 802.11ac-VHT20 | 5150 MHz to 5250 MHz | Channel 36 | Channel 44 | Channel 48 |
| | | 5180 MHz | 5220 MHz | 5240 MHz |
| | | 5500 MHz | 5580 MHz | 5700 MHz |
| | 5725 MHz to 5850 MHz | Channel 149 | Channel 157 | Channel 165 |
| | | 5745 MHz | 5785 MHz | 5825 MHz |
| IEEE 802.11n-HT40<br>IEEE 802.11ac-VHT40 | 5150 MHz to 5250 MHz | Channel 38 | -- | Channel 46 |
| | | 5190 MHz | -- | 5230 MHz |
| | 5725 MHz to 5850 MHz | Channel 151 | -- | Channel 159 |
| | | 5755 MHz | -- | 5795 MHz |
| IEEE 802.11ac-VHT80 | 5150 MHz to 5250 MHz | -- | Channel 42 | -- |
| | | -- | 5210 MHz | -- |
| | 5725 MHz to 5850 MHz | -- | Channel 155 | -- |
| | | -- | 5775 MHz | -- |

## 4.3 EUT TEST STATUS

| Mode | Tx/Rx Function | Description |
|---|---|---|
| IEEE 802.11a/n/ac | 1Tx/1Rx or 2Tx/2Rx | 1. Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate. |

| Power Setting | | | | |
|---|---|---|---|---|
| Mode | U-NII-1 | | U-NII-3 | |
| | Chain 0 | Chain 1 | Chain 0 | Chain 1 |
| IEEE 802.11a | 36 | 38 | 36 | 38 |
| IEEE 802.11n-HT20 | 37 | 38 | 37 | 38 |
| IEEE 802.11n-HT40 | 32 | 32 | 32 | 32 |
| IEEE 802.11ac-VHT20 | 32 | 32 | 32 | 32 |
| IEEE 802.11ac-VHT40 | 32 | 32 | 32 | 32 |
| IEEE 802.11ac-VHT80 | 33 | 34 | 33 | 34 |

| Test Software |
|---|
| Test software name: WLAN Test Tool (Version:2.3.0) |

## 4.4 WORST-CASE DATA RATES

| Mode | Worst-case data rates |
|---|---|
| IEEE 802.11a | 6 Mbps |
| IEEE 802.11n-HT20 | MCS0 |
| IEEE 802.11n-HT40 | MCS0 |
| IEEE 802.11ac-VHT20 | MCS0 |
| IEEE 802.11ac-VHT40 | MCS0 |
| IEEE 802.11ac-VHT80 | MCS0 |

## 4.5 TEST SETUP

### 4.5.1 For Radiated Emissions test setup

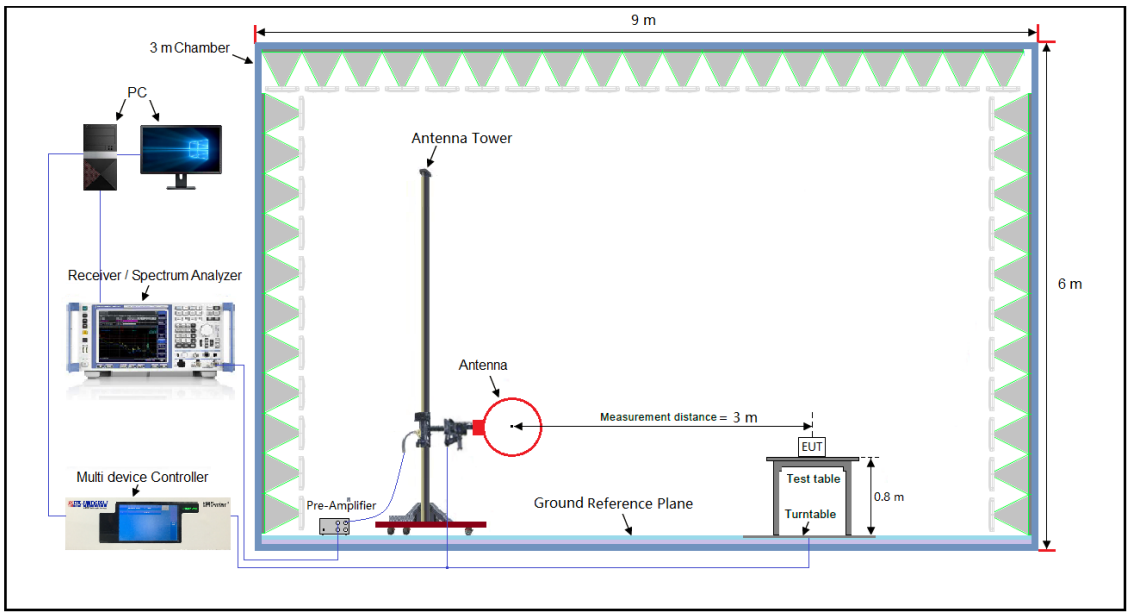



Figure 1. Below 30MHz

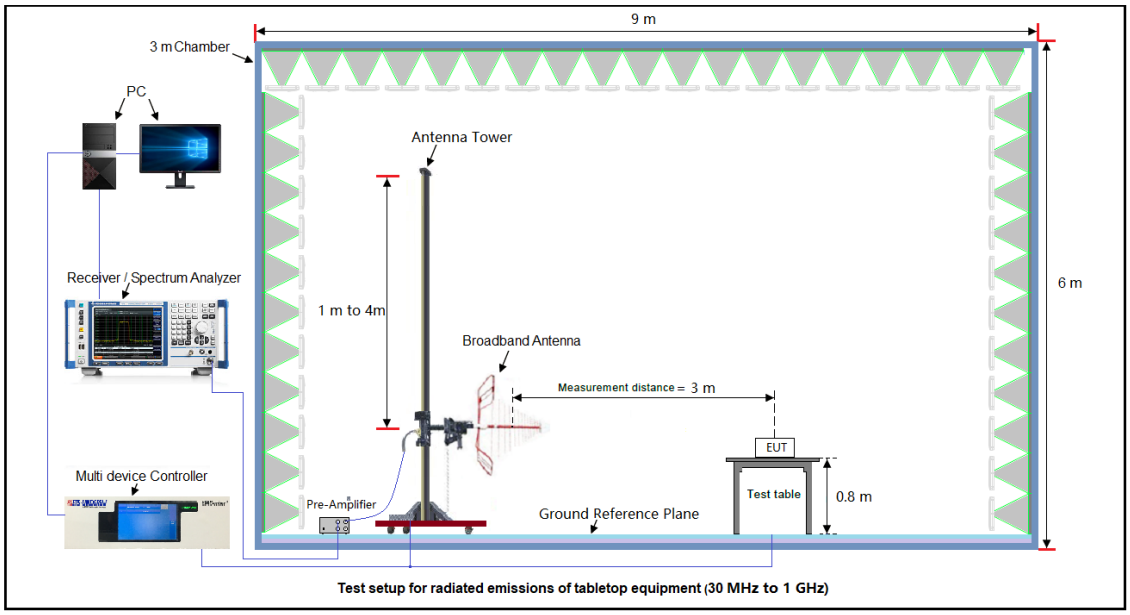



Figure 2. 30MHz to 1GHz

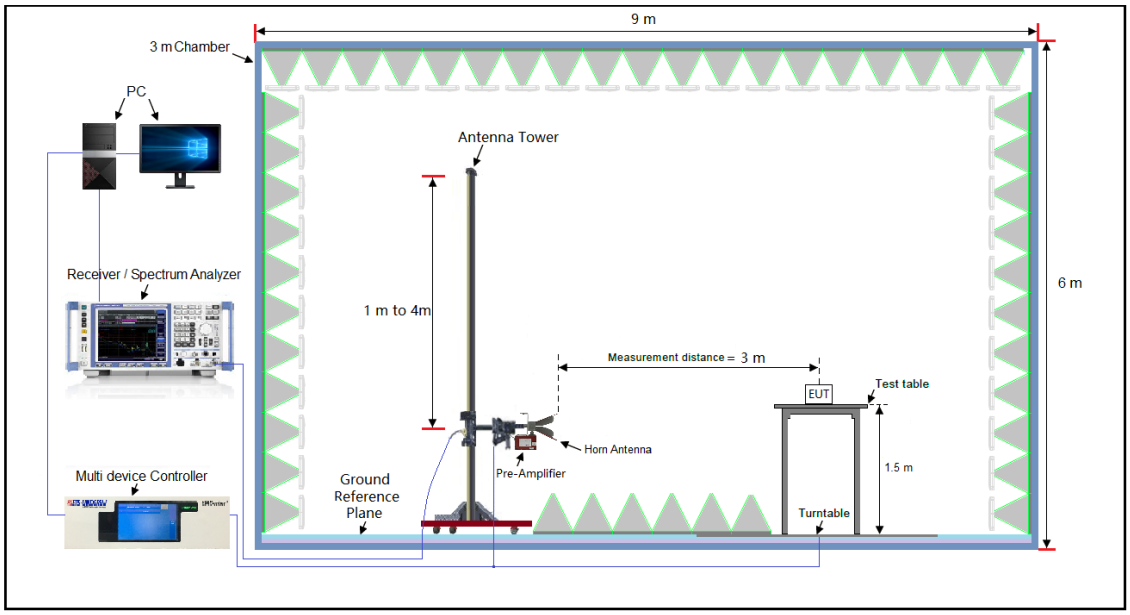
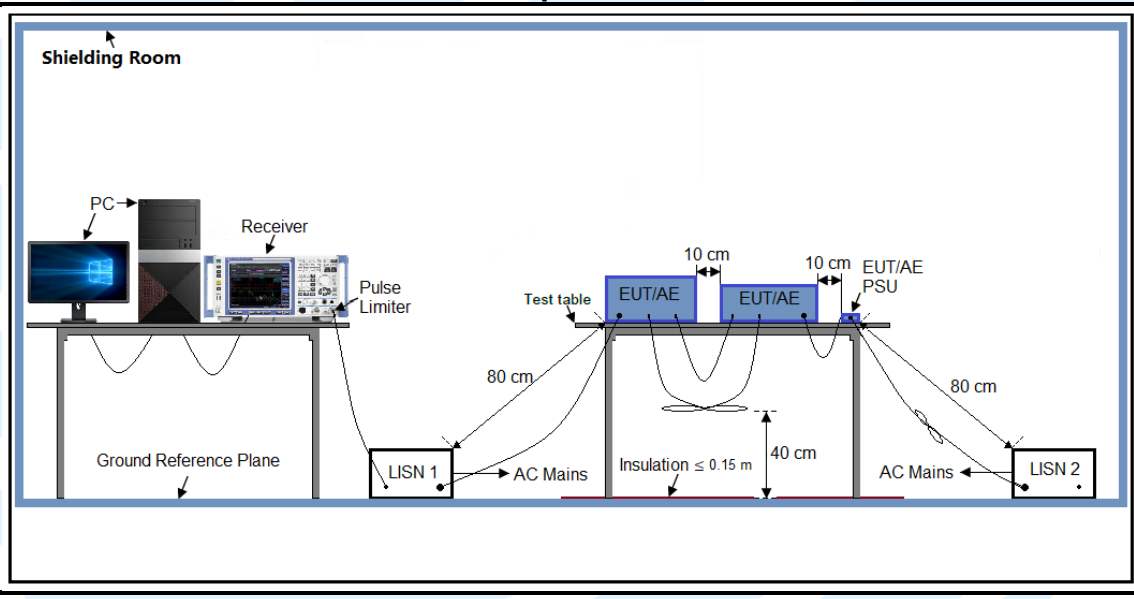
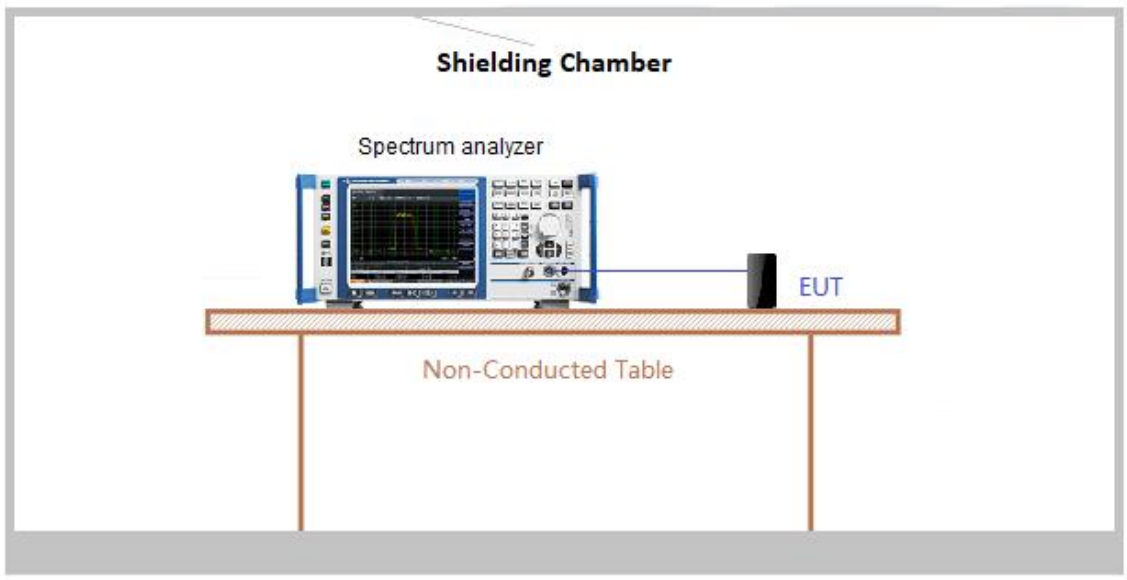



Figure 3. Above 1GHz

### 4.5.2 For Conducted Emissions test setup



### 4.5.3 For Conducted RF test setup




Normal Environment

## 4.6 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by 120V~60Hz. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. Therefore, all final radiated testing was performed with the EUT in (see table below) orientation.

| Frequency | Mode | Antenna Port | Worst-case axis positioning |
|---|---|---|---|
| Above 1GHz | 1TX | Chain 0 | Y axis |
| | 1TX | Chain 1 | Y axis |
| | 2TX | Chain 0+1 | Y axis |

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

## 4.7 DUTY CYCLE

**Test Procedure:** ANSI C63.10-2013 Clause 12.2.

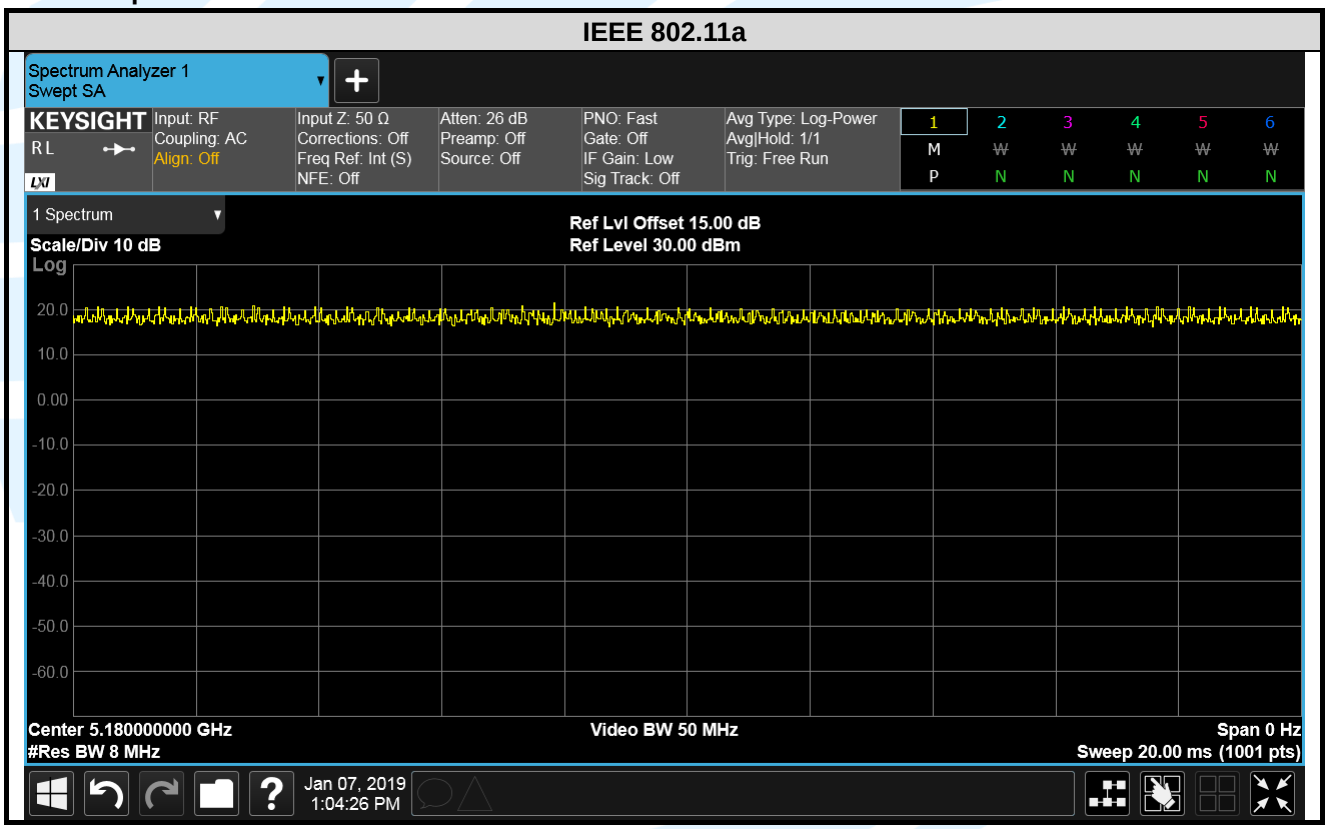
**Test Results**

| Mode | Data rates (Mbps) | On Time (msec) | Period (msec) | Duty Cycle (linear) | Duty Cycle (%) | Duty Cycle Factor (dB) | 1/ T Minimum VBW (kHz) | Average Factor (dB) |
|---|---|---|---|---|---|---|---|---|
| IEEE 802.11a | 6 | 1 | 1 | 1.00 | 100.00 | 0.00 | 0.01 | 0.00 |
| IEEE 802.11n-HT20 | MCS0 | 1 | 1 | 1.00 | 100.00 | 0.00 | 0.01 | 0.00 |
| IEEE 802.11n-HT40 | MCS0 | 1 | 1 | 1.00 | 100.00 | 0.00 | 0.01 | 0.00 |
| IEEE 802.11ac-VHT20 | MCS0 | 1 | 1 | 1.00 | 100.00 | 0.00 | 0.01 | 0.00 |
| IEEE 802.11ac-VHT40 | MCS0 | 1 | 1 | 1.00 | 100.00 | 0.00 | 0.01 | 0.00 |
| IEEE 802.11ac-VHT80 | MCS0 | 1 | 1 | 1.00 | 100.00 | 0.00 | 0.01 | 0.00 |

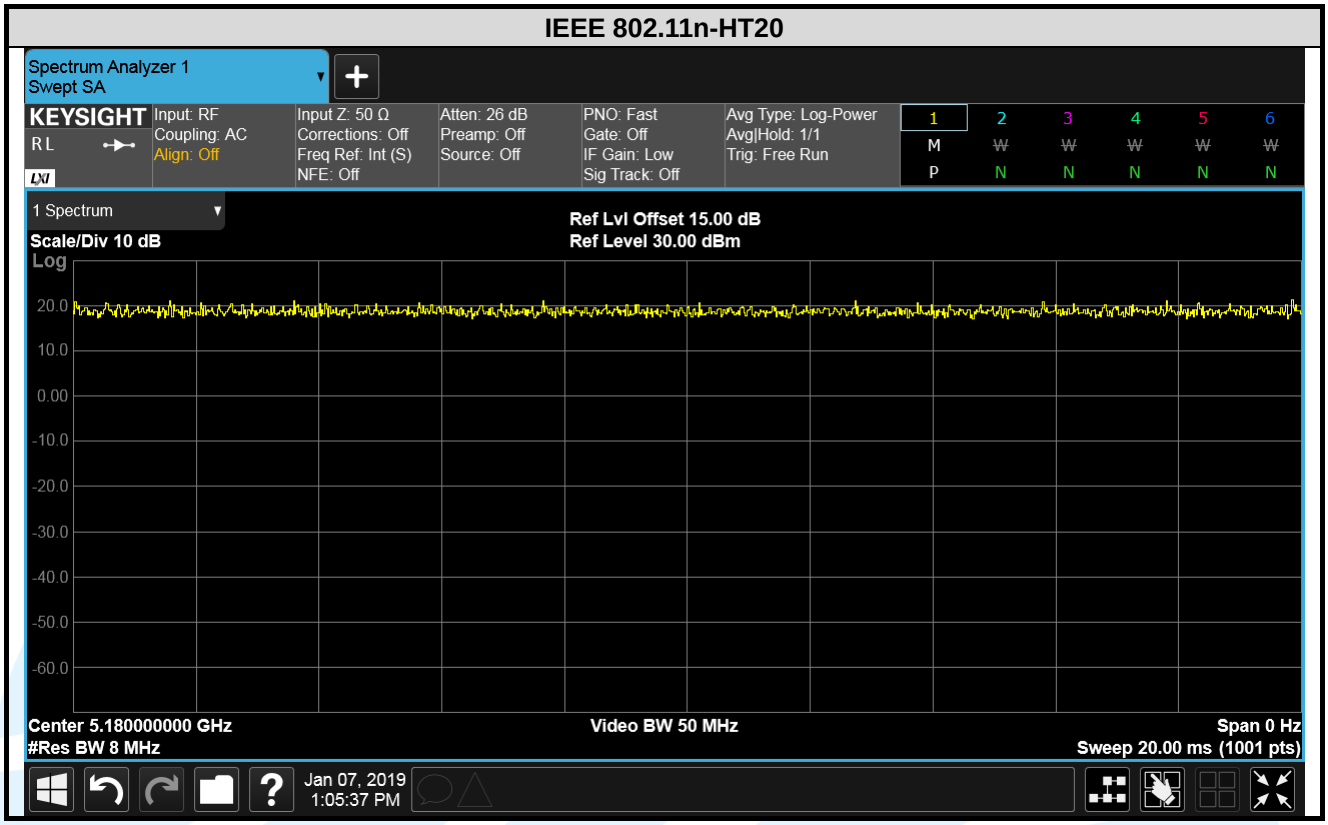
**Remark:**

1) Duty cycle= On Time/ Period;
2) Duty Cycle factor = 10 * log(1/ Duty cycle);
3) Average factor = 20 $\log_{10}$ Duty Cycle.

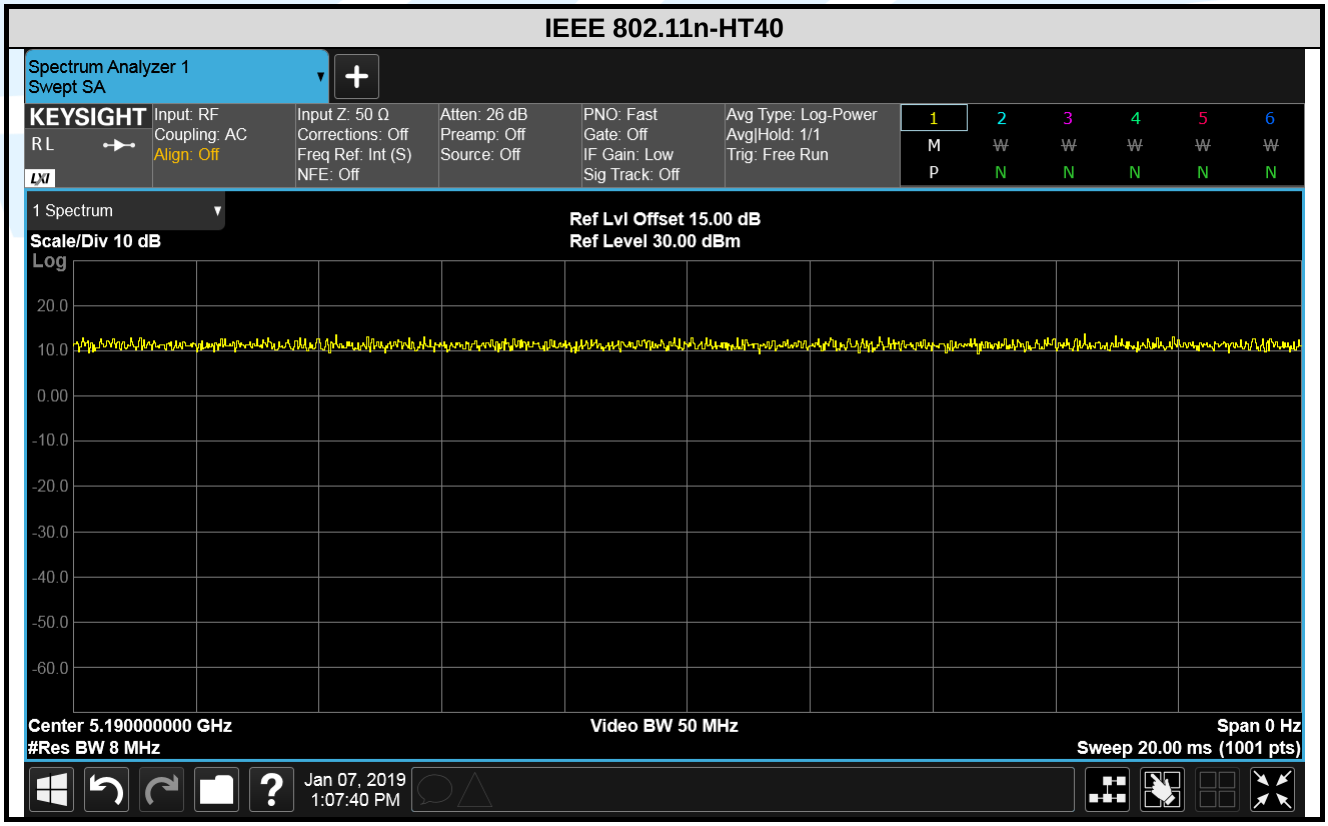
**The test plots as follows**



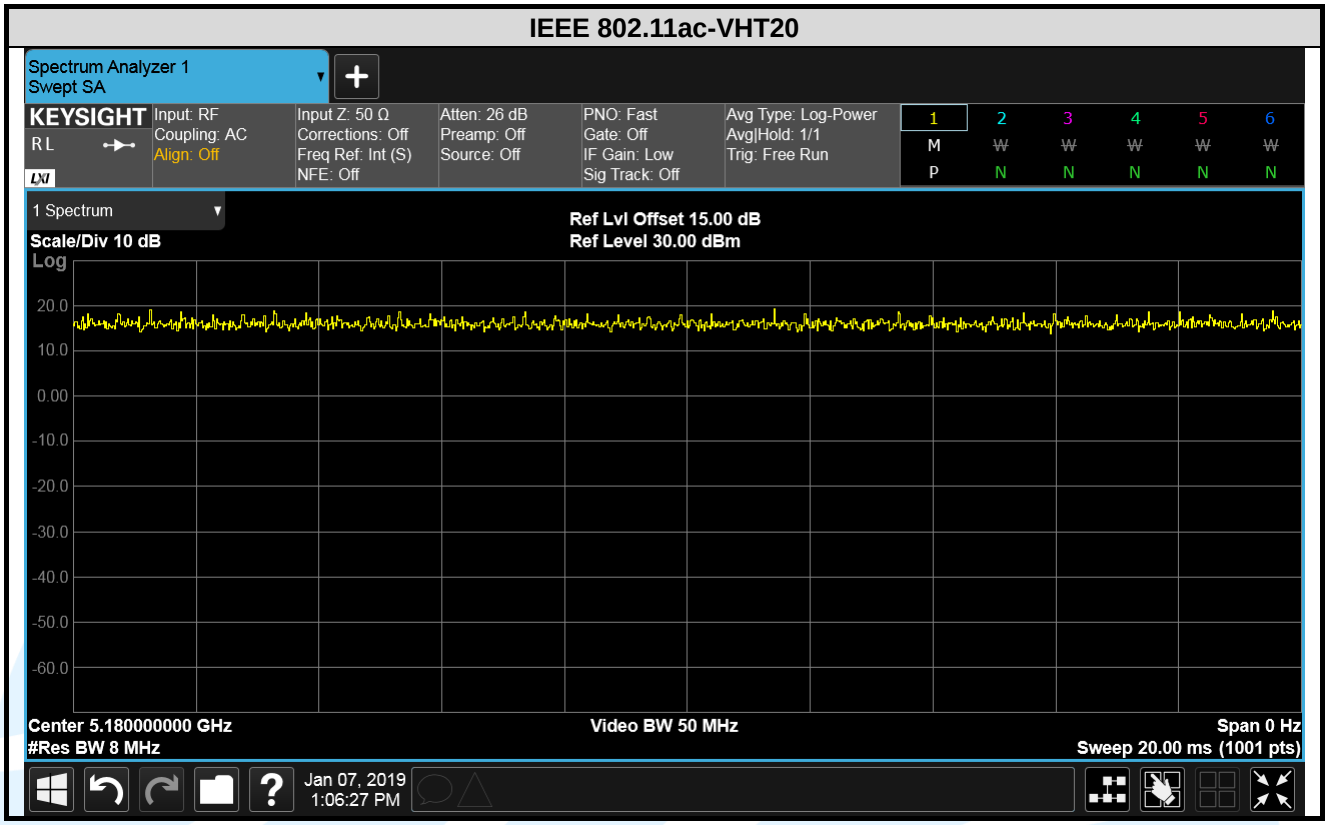
**IEEE 802.11n-HT20**



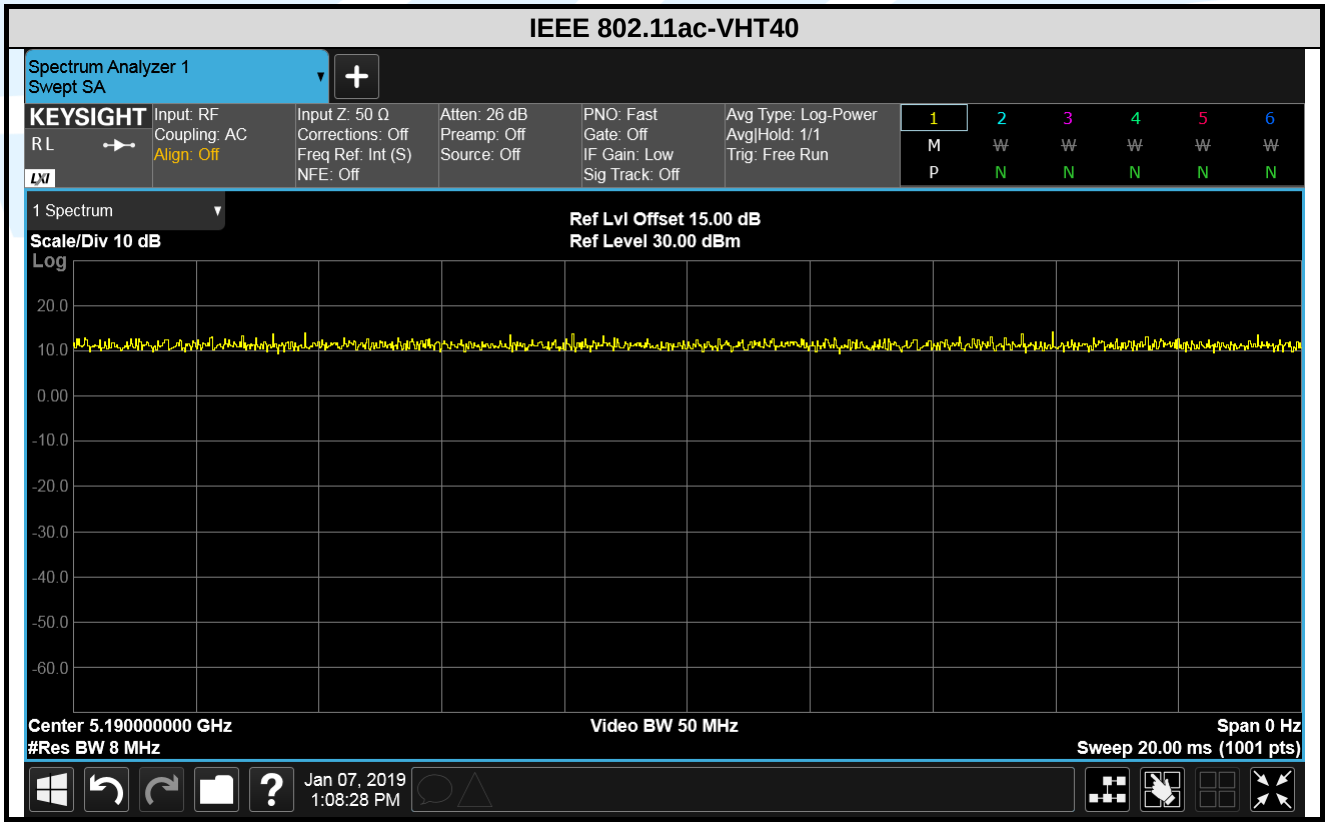

**IEEE 802.11n-HT40**

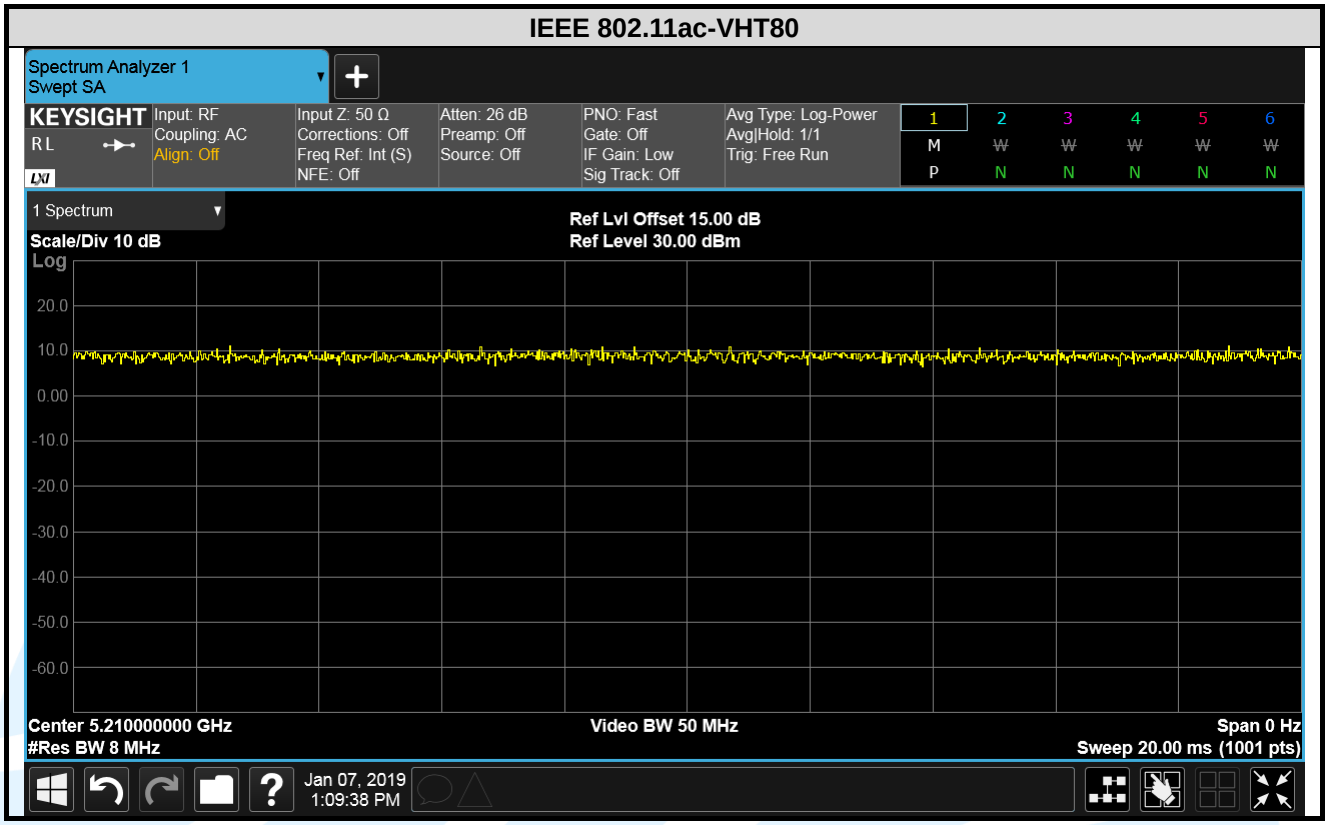


**IEEE 802.11ac-VHT20**




**IEEE 802.11ac-VHT40**




IEEE 802.11ac-VHT80
Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: AC
Align: Off
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Off
Atten: 26 dB
Preamp: Off
Source: Off
PNO: Fast
Gate: Off
IF Gain: Low
Sig Track: Off
Avg Type: Log-Power
Avg|Hold: 1/1
Trig: Free Run
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 15.00 dB
Ref Level 30.00 dBm
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
Center 5.210000000 GHz
#Res BW 8 MHz
Video BW 50 MHz
Span 0 Hz
Sweep 20.00 ms (1001 pts)
Jan 07, 2019
1:09:38 PM

# 5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

## 5.1 REFERENCE DOCUMENTS FOR TESTING

| No. | Identity | Document Title |
|---|---|---|
| 1 | FCC 47 CFR Part 2 | Frequency allocations and radio treaty matters; general rules and regulations |
| 2 | FCC 47 CFR Part 15 | Radio Frequency Devices |
| 3 | ANSI C63.10-2013 | American National Standard for Testing Unlicesed Wireless Devices |
| 4 | KDB 789033 D02 General UNII Test Procedures New Rules v02r01 | Guidelines for compliance testing of unlicensed national information infrastructure (U-NII) device part 15, subpart E |
| 5 | KDB 905462 D06 802.11 Channel Plans New Rules v02 | Operation in U-NII bands -802.11 channel PLAN(§15.407) |
| 6 | KDB 905462 D03 Client Without DFS New Rules v01r02 | U-NII client devices without radar detection capability |
| 7 | KDB 662911 D01 Multiple Transmitter Output v02r01 | Emissions Testing of Transmitters with Multiple Outputs in the Same Band |

## 5.2 ANTENNA REQUIREMENT

| Standard Requirement |
|---|
| **15.203 requirement:**<br>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.<br>**15.407(a)(1) (2) requirement:**<br>The conducted output power limit specified in paragraph (a) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (a) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power and the peak power spectral density shall be reduced by the by the amount in dB that the directional gain of the antenna exceeds 6 dBi. |
| **EUT Antenna:** |
| Both antenna in the external of the equipment and no consideration of replacement. The transmit signals are correlated with each other and the antenna gain of both chains is completely consistent, the best case directional gain of the antenna is 7.96 dBi (See section 5.5). |

## 5.3 26 DB BANDWIDTH

**Test Requirement:** FCC 47 CFR Part 15 Subpart E Section 15.407 (a) (2)(5)

**Test Method:** KDB 789033 D02 v02r01 Section C.1

**Limit:** None; for reporting purposes only.

**Test Procedure:**

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum analyzer.

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

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.5.3 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Transmitter mode

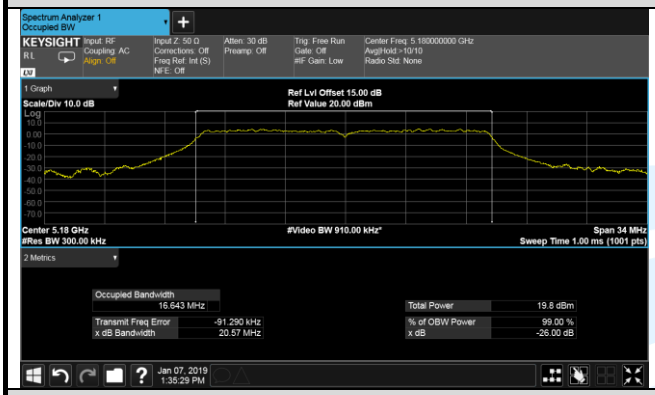
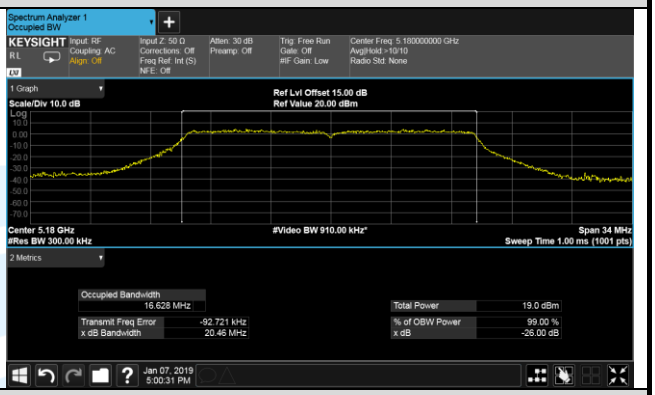
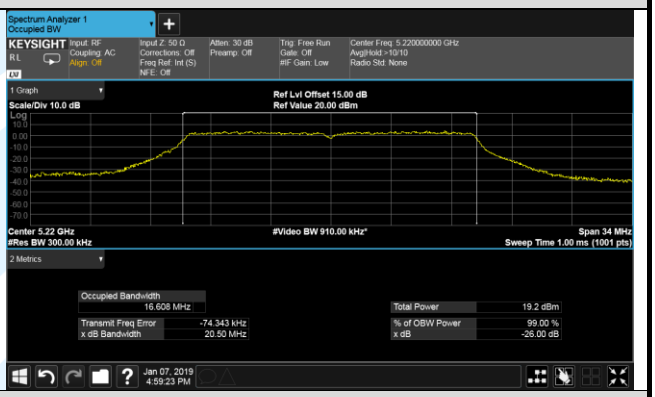
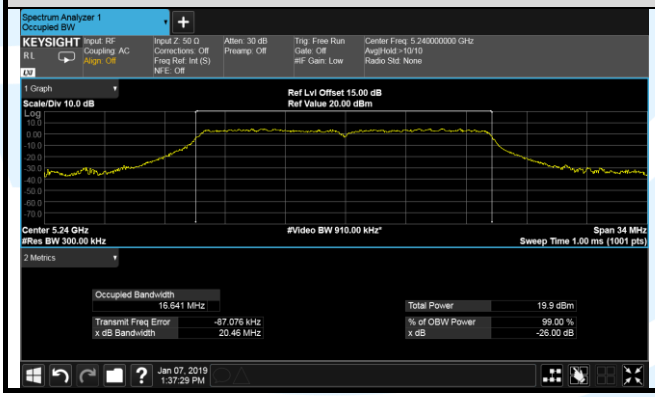
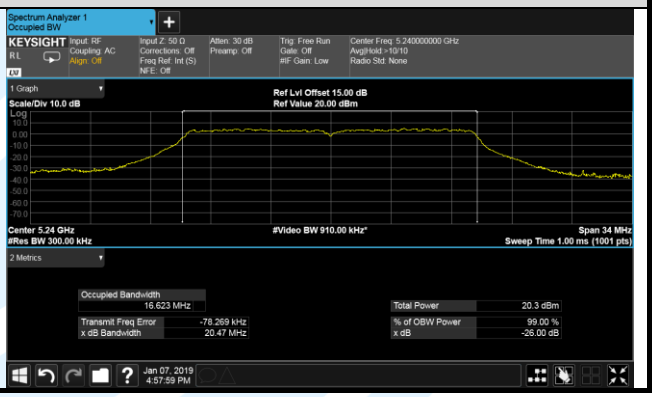
**Test Results:** Pass

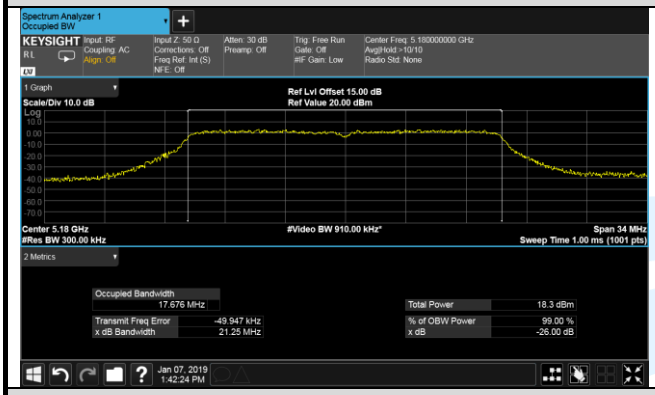
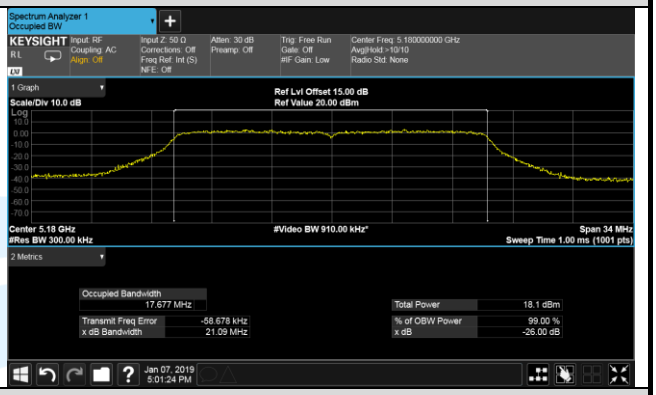
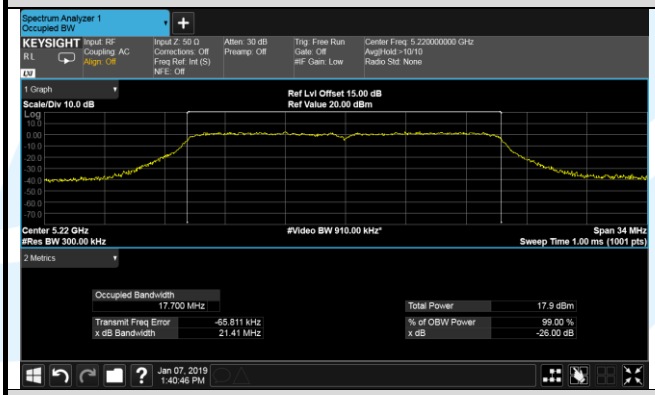
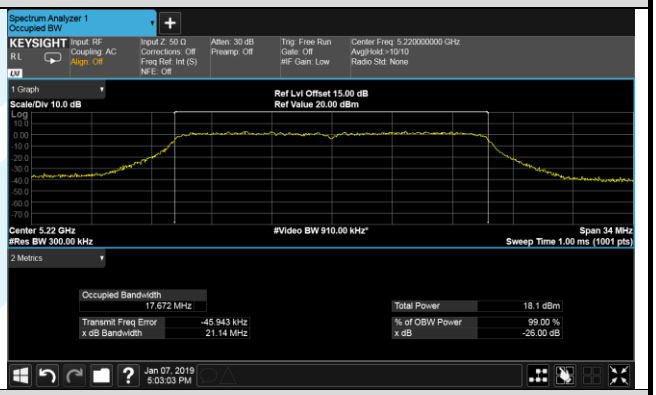
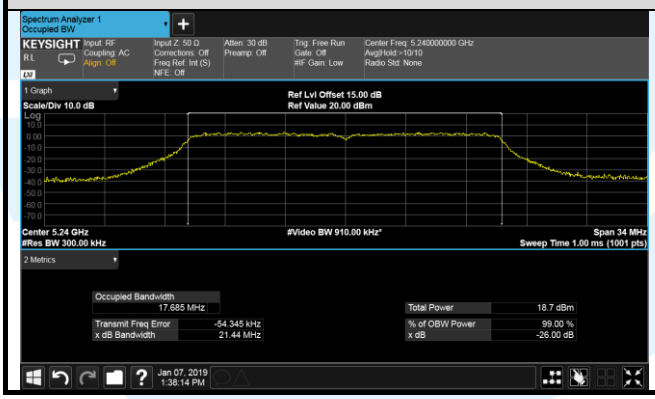
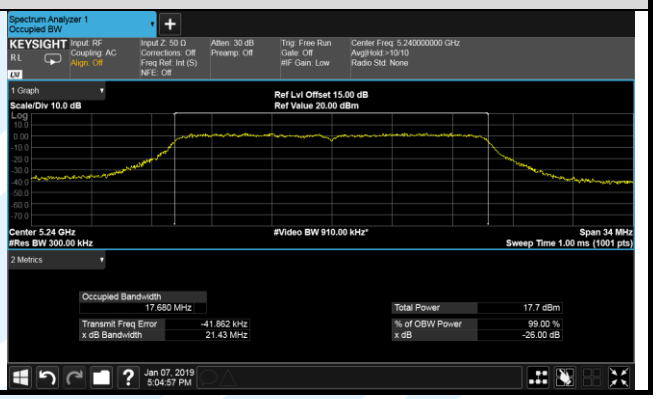
| Mode | Channel | 26 dB Bandwidth (MHz) | | 99% Bandwidth (MHz) | |
|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 0 | Chain 1 |
| IEEE 802.11a | 36 (5180) | 20.57 | 20.46 | 16.643 | 16.628 |
| | 44 (5220) | 20.58 | 20.50 | 16.643 | 16.608 |
| | 48 (5240) | 20.46 | 20.47 | 16.641 | 16.623 |
| IEEE 802.11n-HT20 | 36 (5180) | 21.25 | 21.09 | 17.676 | 17.677 |
| | 44 (5220) | 21.41 | 21.14 | 17.700 | 17.672 |
| | 48 (5240) | 21.44 | 21.43 | 17.685 | 17.680 |
| IEEE 802.11n-HT40 | 38 (5190) | 42.32 | 43.08 | 36.264 | 36.430 |
| | 46 (5230) | 41.46 | 42.76 | 36.252 | 36.395 |
| IEEE 802.11ac-VHT20 | 36 (5180) | 21.16 | 21.08 | 17.707 | 17.670 |
| | 44 (5220) | 21.29 | 21.12 | 17.693 | 17.680 |
| | 48 (5240) | 21.24 | 21.09 | 17.716 | 17.673 |
| IEEE 802.11ac-VHT40 | 38 (5190) | 42.29 | 42.83 | 36.260 | 36.388 |
| | 46 (5230) | 42.30 | 43.20 | 36.244 | 36.460 |
| IEEE 802.11ac-VHT80 | 42 (5230) | 83.23 | 82.43 | 75.887 | 75.824 |

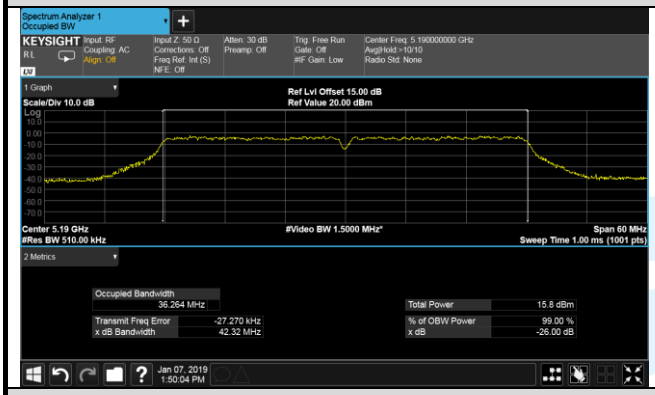
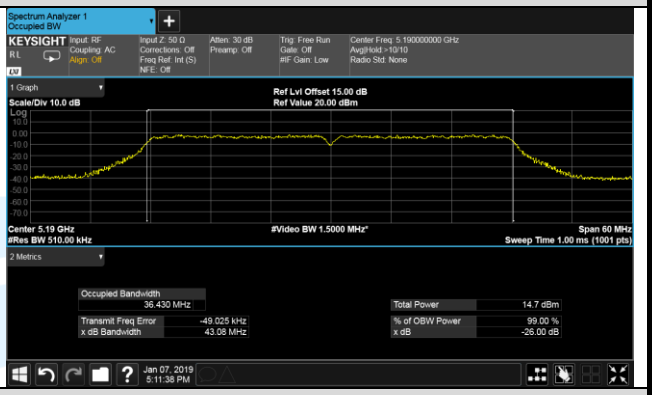
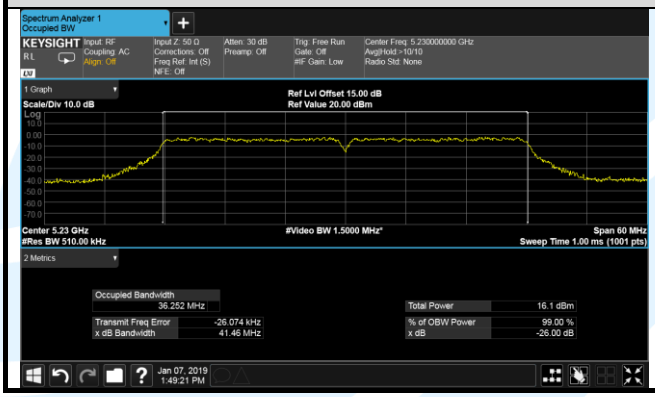
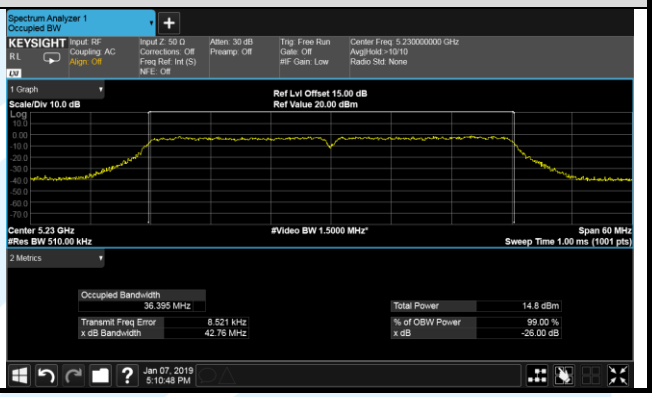
**Remark:**

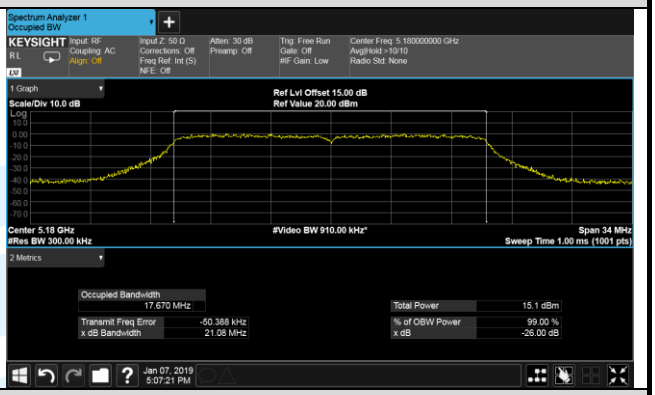
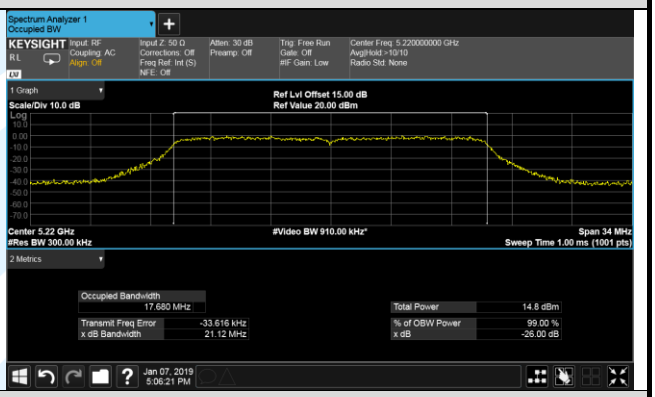
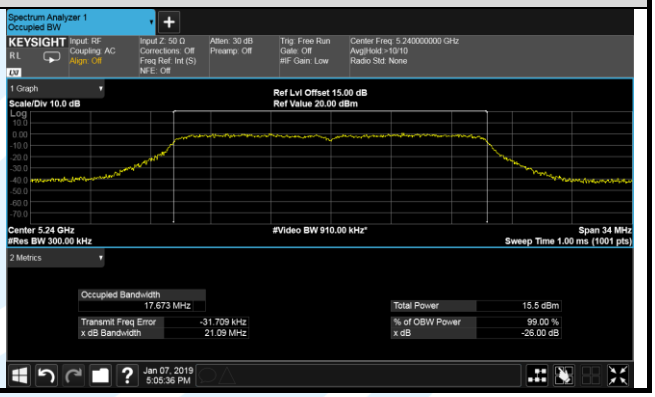
For the case if a channel operating in U-NII 1 band has a 26-dB bandwidth that straddles into U-NII 2A band but its 99% occupied power bandwidth does not. For this rare case, DFS requirement does not apply.

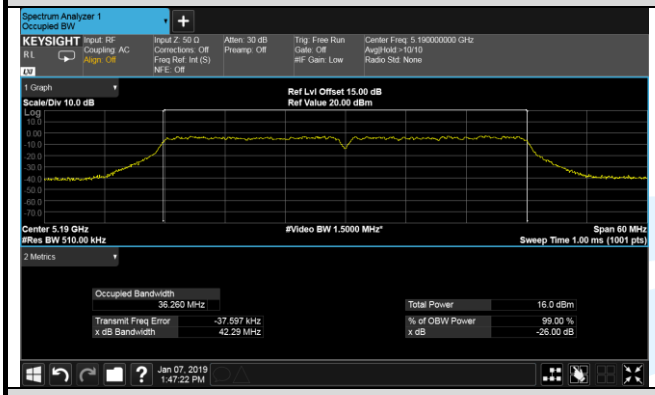
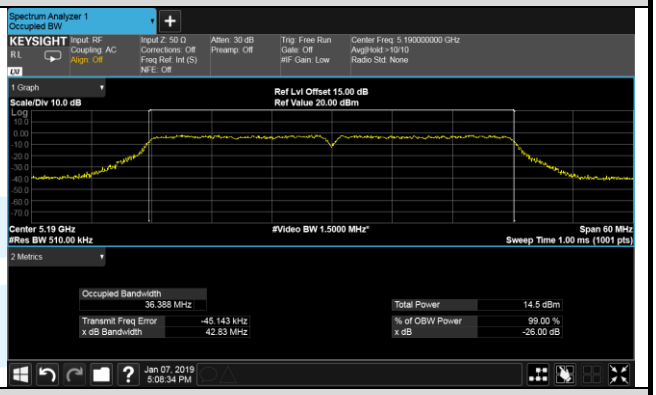
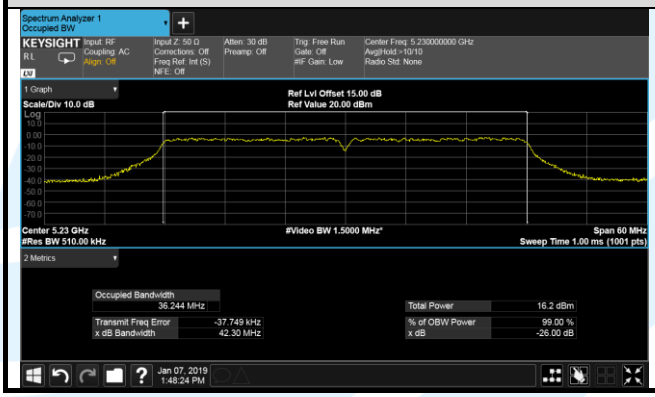
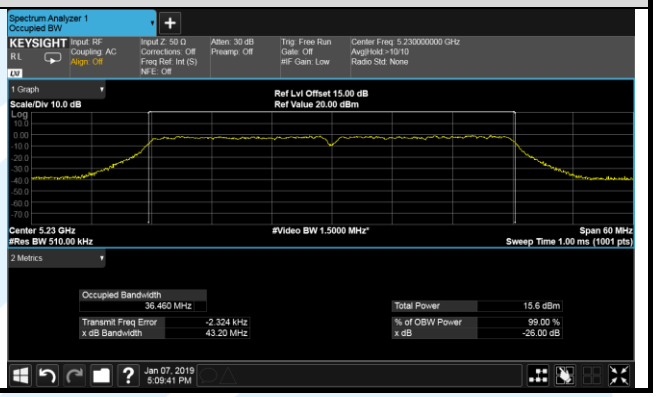
**The test plots as follows:**

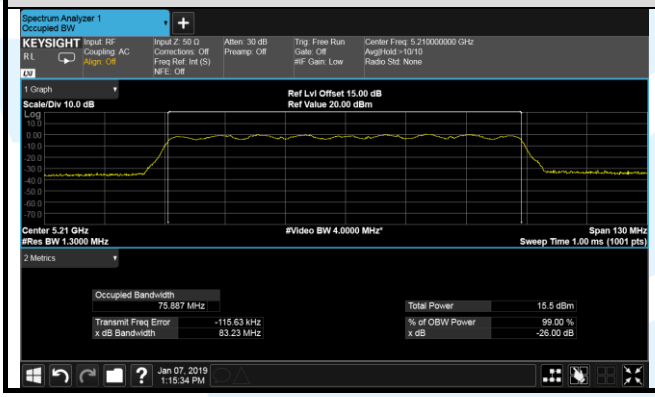
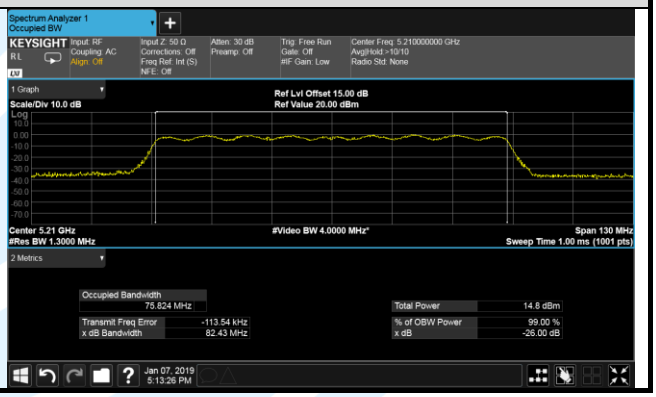
| IEEE 802.11a | |
|---|---|
| **Chain 0** | **Chain 1** |
| **Channel 36** | |
|  |  |
| **Channel 44** | |
|  |  |
| **Channel 48** | |
|  |  |

| IEEE 802.11n-HT20 | |
|---|---|
| Chain 0 | Chain 1 |
| Channel 36 | |
|  |  |
| Channel 44 | |
|  |  |
| Channel 48 | |
|  |  |

| IEEE 802.11n-HT40 | |
|---|---|
| Chain 0 | Chain 1 |
| Channel 38 | |
|  |  |
| Channel 46 | |
|  |  |

| IEEE 802.11ac-VHT20 | |
|---|---|
| Chain 0 | Chain 1 |
| Channel 36 | |
|  |  |
| Channel 44 | |
|  |  |
| Channel 48 | |
|  |  |

| IEEE 802.11ac-VHT40 | |
|---|---|
| Chain 0 | Chain 1 |
| Channel 38 | |
|  |  |
| Channel 46 | |
|  |  |

| IEEE 802.11ac-VHT80 | |
|---|---|
| Channel 42 | |
|  |  |

## 5.46 DB BANDWIDTH

**Test Requirement:** FCC 47 CFR Part 15 Subpart C Section 15.407 (e)

**Test Method:** KDB 789033 D02 v02r01Section C.2

**Limit:** Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

**Test Procedure:**

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer.

Spectrum analyzer according to the following Settings:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 * 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.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.5.3 for details.

**Instruments Used:** Refer to section 3 for details

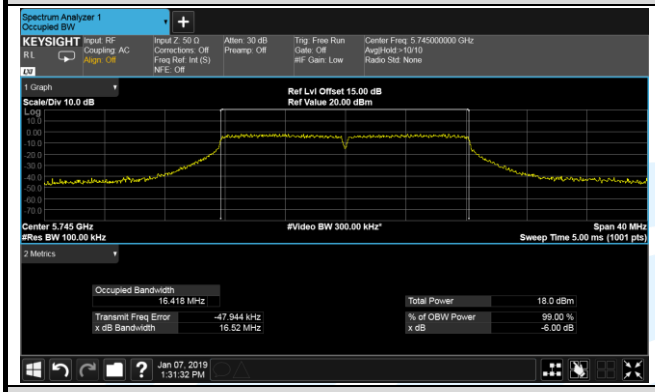
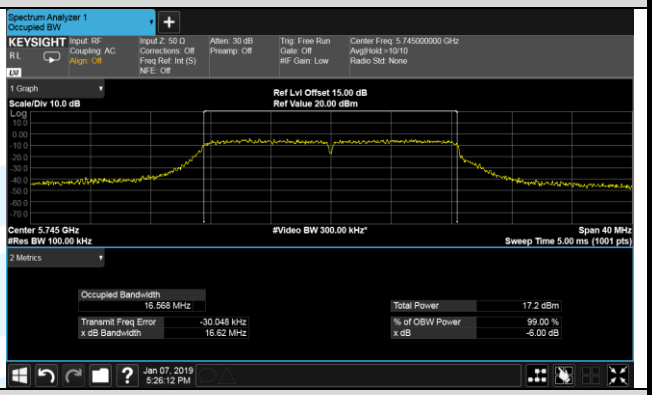
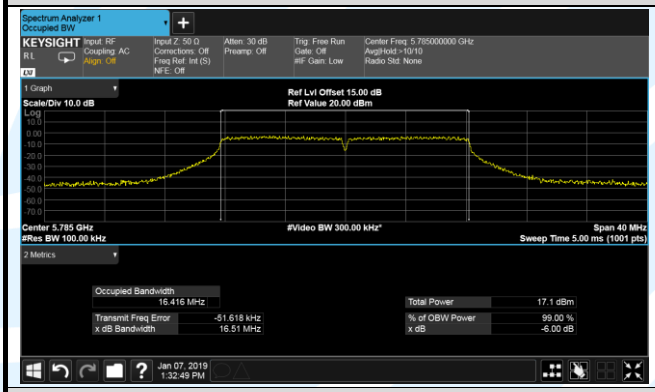
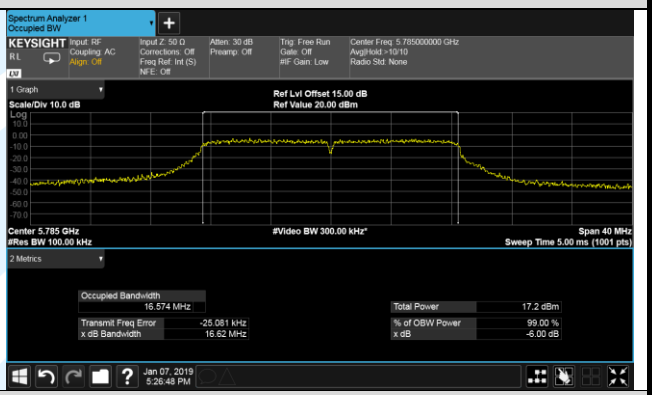
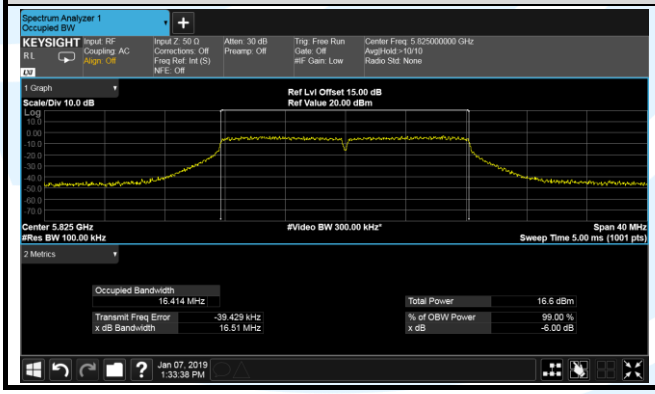
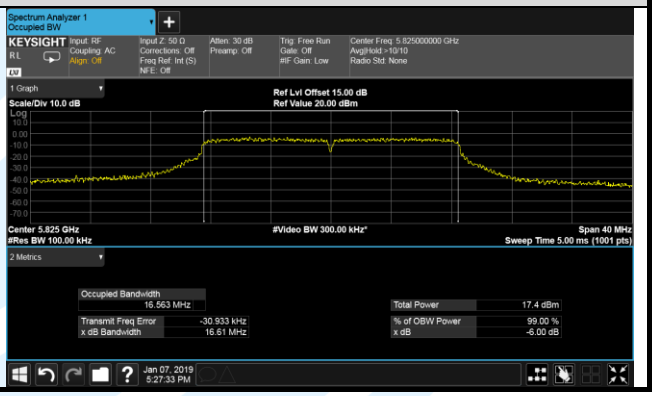
**Test Mode:** Transmitter mode

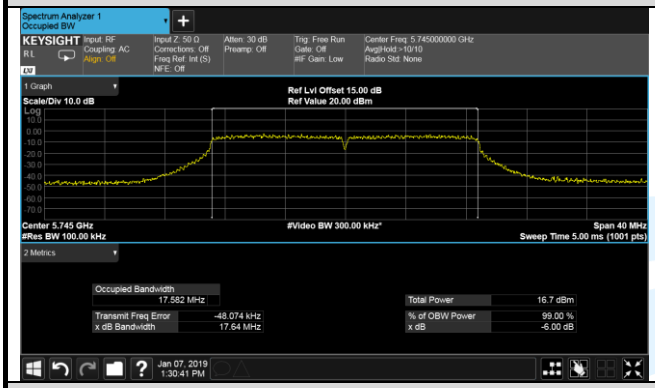
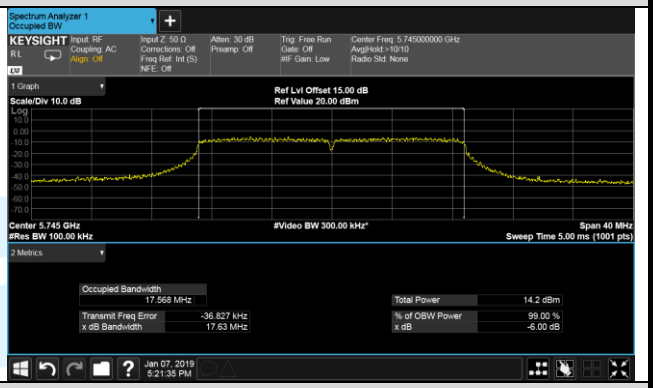
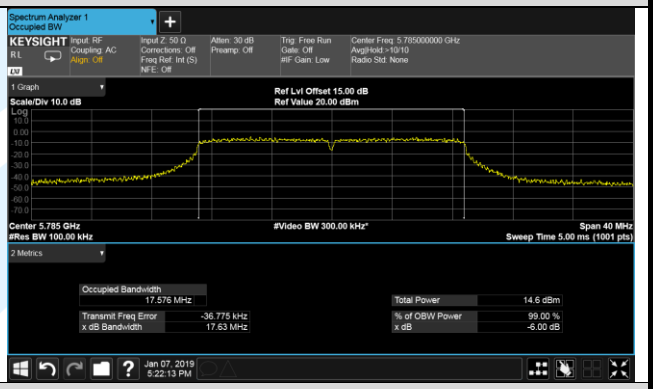
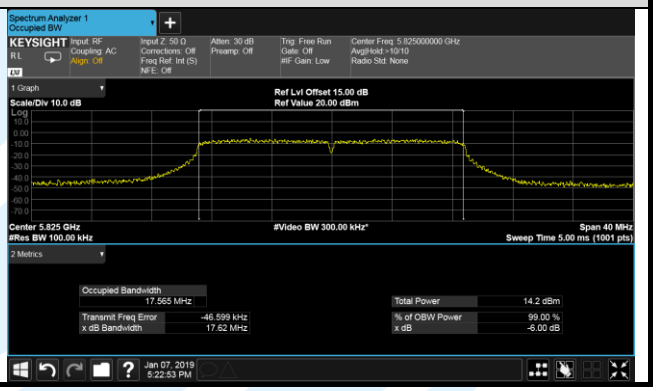
**Test Results:** Pass

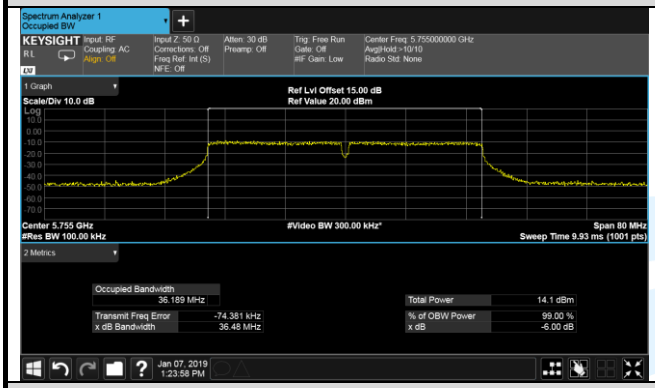
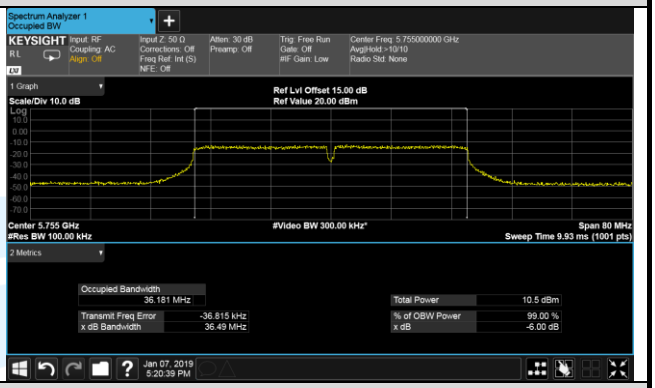
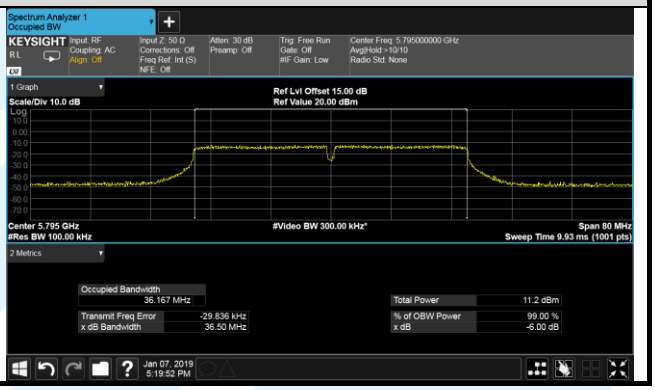
**Test Data:**

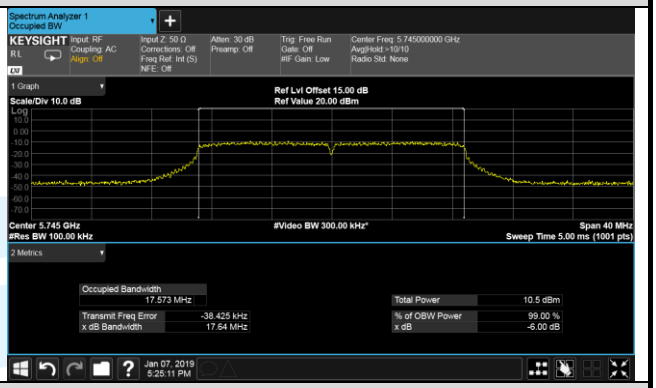
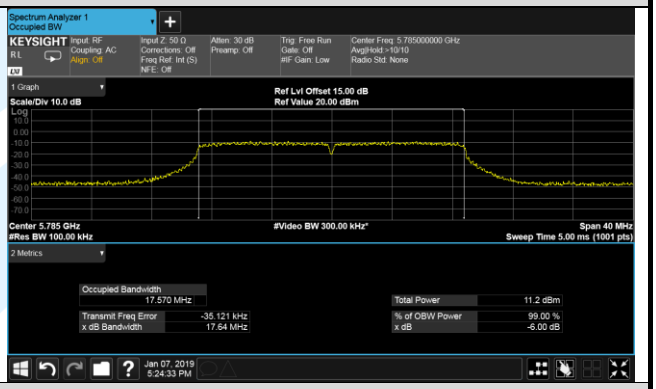
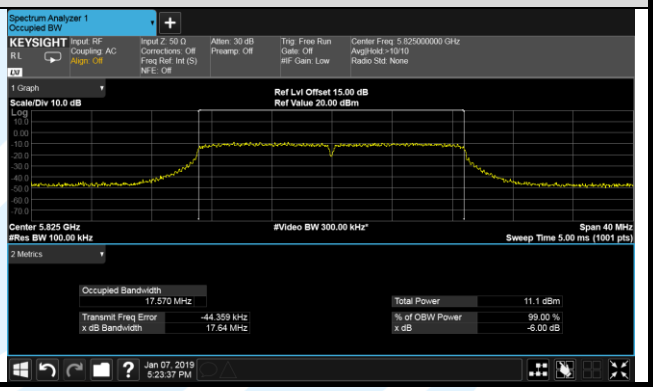
| Mode | Channel/ Frequency (MHz) | 6 dB Bandwidth (MHz) | | 99% Bandwidth (MHz) | | 6 dB Bandwidth Limit | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | Chain 0 | Chain 1 | | |
| IEEE 802.11a | 149 (5745) | 16.52 | 16.62 | 16.418 | 16.568 | > 500 kHz | Pass |
| | 157 (5785) | 16.51 | 16.62 | 16.416 | 16.574 | > 500 kHz | Pass |
| | 165 (5825) | 16.51 | 16.61 | 16.414 | 16.563 | > 500 kHz | Pass |
| IEEE 802.11n-HT20 | 149 (5745) | 17.64 | 17.63 | 17.582 | 17.568 | > 500 kHz | Pass |
| | 157 (5785) | 17.66 | 17.63 | 17.581 | 17.576 | > 500 kHz | Pass |
| | 165 (5825) | 17.65 | 17.62 | 17.580 | 17.565 | > 500 kHz | Pass |
| IEEE 802.11n-HT40 | 151 (5755) | 36.48 | 36.49 | 36.189 | 36.181 | > 500 kHz | Pass |
| | 159 (5795) | 36.53 | 36.50 | 36.213 | 36.167 | > 500 kHz | Pass |
| IEEE 802.11ac-VHT20 | 149 (5745) | 17.63 | 17.64 | 17.572 | 17.573 | > 500 kHz | Pass |
| | 157 (5785) | 17.63 | 17.64 | 17.580 | 17.570 | > 500 kHz | Pass |
| | 165 (5825) | 17.64 | 17.64 | 17.582 | 17.570 | > 500 kHz | Pass |
| IEEE 802.11ac-VHT40 | 151 (5755) | 36.51 | 36.47 | 36.195 | 36.177 | > 500 kHz | Pass |
| | 159 (5795) | 36.51 | 36.49 | 36.202 | 36.176 | > 500 kHz | Pass |
| IEEE 802.11ac-VHT80 | 155 (5775) | 76.38 | 76.09 | 75.449 | 75.424 | > 500 kHz | Pass |

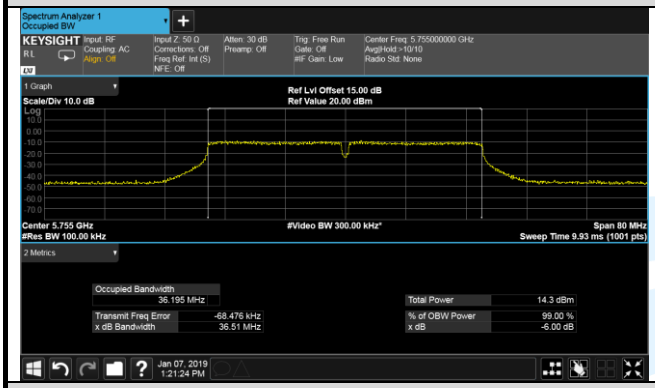
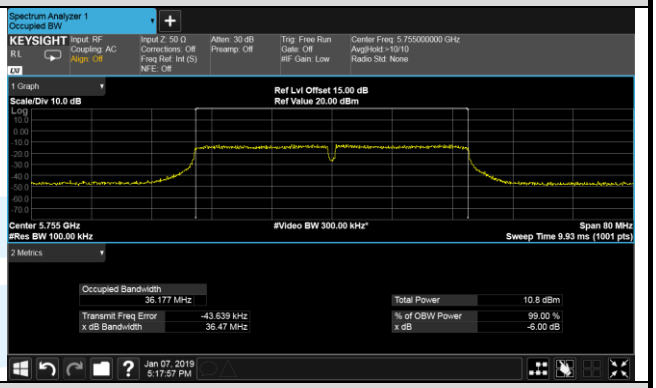
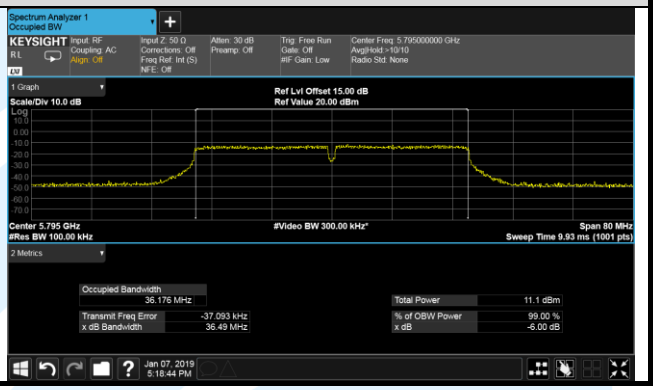
**The test plots as follows:**

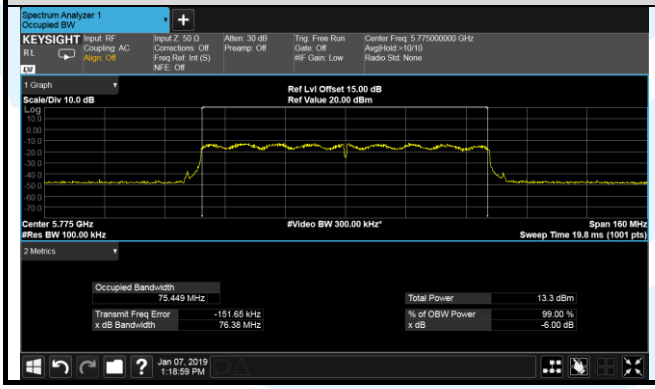
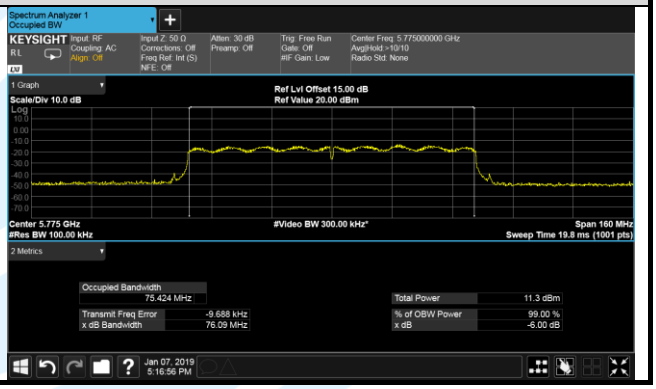
| IEEE 802.11a | |
|---|---|
| **Chain 0** | **Chain 1** |
| **Channel 149** | |
|  |  |
| **Channel 157** | |
|  |  |
| **Channel 165** | |
|  |  |

| IEEE 802.11n-HT20 | |
|---|---|
| Chain 0 | Chain 1 |
| Channel 149 | |
|  |  |
| Channel 157 | |
|  |  |
| Channel 165 | |
|  |  |

| IEEE 802.11n-HT40 | |
|---|---|
| Chain 0 | Chain 1 |
| Channel 151 | |
|  |  |
| Channel 159 | |
|  |  |

| IEEE 802.11ac-VHT20 | |
|---|---|
| Chain 0 | Chain 1 |
| Channel 149 | |
|  |  |
| Channel 157 | |
|  |  |
| Channel 165 | |
|  |  |

| IEEE 802.11ac-VHT40 | |
|---|---|
| Chain 0 | Chain 1 |
| Channel 151 | |
|  |  |
| Channel 159 | |
|  |  |

| IEEE 802.11ac-VHT80 | |
|---|---|
| Chain 0 | Chain 1 |
| Channel 151 | |
|  |  |

## 5.5 MAXIMUM CONDUCTED OUTPUT POWER

**Test Requirement:** FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(3)

**Test Method:** KDB 789033 D02 v02r01 Section E.3.a (Method PM)

**Limits:**

1. For the band 5.15-5.25 GHz.
   (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

   (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

   (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. 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.

   (iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. 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.

**Test Procedure:**

1. Connected the EUT's antenna port to measure device by 10dB attenuator.
2. Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of Tx on burst.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

**Test Setup:** Refer to section 4.5.3 for details.

**Instruments Used:** Refer to section 3 for details

**Test Mode:** Transmitter mode
**Test Results:** Pass
**Test Data:**

**Directional gain and the maximum output power limit.**

| Frequency Band | Chain 0 Antenna Gain (dBi) | Chain 1 Antenna Gain (dBi) | Correlated chains directional gain (dBi) | Peak Power Limits (dBm) |
|---|---|---|---|---|
| U-NII-1 | 4.95 | 4.95 | 7.96 | 22.04 |
| U-NII-3 | 4.72 | 4.72 | 7.73 | 28.27 |
| Basic methodology with $N_{ANT}$ transmit antennas, each with the same directional gain $G_{ANT}$ dBi, being driven by $N_{ANT}$ transmitter outputs of equal power. Directional gain is to be computed as follows: | | | | |
| If *any* transmit signals are *correlated* with each other, | | | | |
| Directional gain = $G_{ANT} + 10 \log(N_{ANT})$ dBi | | | | |

| Mode | Channel/ Frequency (MHz) | Maximum Conducted Output Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | SISO | | | | Total Power MIMO_ Chain 0+1 | Limits (dBm) | Pass / Fail |
| | | Chain 0 | | Chain 1 | | | | |
| | | Meas Power | Corr'd Power | Meas Power | Corr'd Power | | | |
| IEEE 802.11a | 36 (5180) | 13.12 | 13.12 | 11.34 | 11.34 | -- | 24 | Pass |
| | 44 (5220) | 13.49 | 13.49 | 11.61 | 11.61 | -- | 24 | Pass |
| | 48 (5240) | 13.42 | 13.42 | 11.69 | 11.69 | -- | 24 | Pass |
| | 149 (5745) | 12.74 | 12.74 | 8.82 | 8.82 | -- | 30 | Pass |
| | 157 (5785) | 12.51 | 12.51 | 8.95 | 8.95 | -- | 30 | Pass |
| | 165 (5825) | 12.11 | 12.11 | 8.80 | 8.80 | -- | 30 | Pass |

| Mode | Channel/ Frequency (MHz) | Maximum Conducted Output Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | MIMO | | | | Total Power MIMO_ Chain 0+1 | Limits (dBm) | Pass / Fail |
| | | Chain 0 | | Chain 1 | | | | |
| | | Meas Power | Corr'd Power | Meas Power | Corr'd Power | | | |
| IEEE 802.11n-HT20 | 36 (5180) | 12.38 | 12.38 | 11.35 | 11.35 | 14.91 | 22.04 | Pass |
| | 44 (5220) | 12.13 | 12.13 | 11.68 | 11.68 | 14.92 | 22.04 | Pass |
| | 48 (5240) | 12.14 | 12.14 | 11.52 | 11.52 | 14.85 | 22.04 | Pass |
| | 149 (5745) | 11.49 | 11.49 | 8.64 | 8.64 | 13.31 | 28.27 | Pass |
| | 157 (5785) | 11.38 | 11.38 | 8.73 | 8.73 | 13.26 | 28.27 | Pass |
| | 165 (5825) | 11.22 | 11.22 | 8.90 | 8.90 | 13.22 | 28.27 | Pass |

| Mode | Channel/ Frequency (MHz) | Maximum Conducted Output Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | MIMO | | | | Total Power MIMO_ Chain 0+1 | Limits (dBm) | Pass / Fail |
| | | Chain 0 | | Chain 1 | | | | |
| | | Meas Power | Corr'd Power | Meas Power | Corr'd Power | | | |
| IEEE 802.11n-HT40 | 38 (5190) | 10.22 | 10.22 | 8.97 | 8.97 | 12.65 | 22.04 | Pass |
| | 46 (5230) | 10.10 | 10.10 | 9.41 | 9.41 | 12.78 | 22.04 | Pass |
| | 151 (5755) | 9.73 | 9.73 | 5.41 | 5.41 | 11.10 | 28.27 | Pass |
| | 159 (5795) | 9.63 | 9.63 | 5.68 | 5.68 | 11.10 | 28.27 | Pass |

| Mode | Channel/ Frequency (MHz) | Maximum Conducted Output Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | MIMO | | | | Total Power MIMO_ Chain 0+1 | Limits (dBm) | Pass / Fail |
| | | Chain 0 | | Chain 1 | | | | |
| | | Meas Power | Corr'd Power | Meas Power | Corr'd Power | | | |
| IEEE 802.11ac-VHT20 | 36 (5180) | 9.81 | 9.81 | 8.74 | 8.74 | 12.32 | 22.04 | Pass |
| | 44 (5220) | 9.96 | 9.96 | 9.20 | 9.20 | 12.61 | 22.04 | Pass |
| | 48 (5240) | 10.18 | 10.18 | 9.34 | 9.34 | 12.79 | 22.04 | Pass |
| | 149 (5745) | 9.69 | 9.69 | 5.51 | 5.51 | 11.09 | 28.27 | Pass |
| | 157 (5785) | 9.67 | 9.67 | 5.54 | 5.54 | 11.09 | 28.27 | Pass |
| | 165 (5825) | 9.31 | 9.31 | 5.48 | 5.48 | 10.81 | 28.27 | Pass |

| Mode | Channel/ Frequency (MHz) | Maximum Conducted Output Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | MIMO | | | | Total Power MIMO_ Chain 0+1 | Limits (dBm) | Pass / Fail |
| | | Chain 0 | | Chain 1 | | | | |
| | | Meas Power | Corr'd Power | Meas Power | Corr'd Power | | | |
| IEEE 802.11ac-VHT40 | 38 (5190) | 9.94 | 9.94 | 8.98 | 8.98 | 12.50 | 22.04 | Pass |
| | 46 (5230) | 10.29 | 10.29 | 9.49 | 9.49 | 12.92 | 22.04 | Pass |
| | 151 (5755) | 9.97 | 9.97 | 5.58 | 5.58 | 11.32 | 28.27 | Pass |
| | 159 (5795) | 9.85 | 9.85 | 5.50 | 5.50 | 11.21 | 28.27 | Pass |

| Mode | Channel/ Frequency (MHz) | Maximum Conducted Output Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | MIMO | | | | Total Power MIMO_ Chain 0+1 | Limits (dBm) | Pass / Fail |
| | | Chain 0 | | Chain 1 | | | | |
| | | Meas Power | Corr'd Power | Meas Power | Corr'd Power | | | |
| IEEE 802.11ac-VHT80 | 42 (5230) | 9.86 | 9.86 | 9.96 | 9.96 | 12.92 | 22.04 | Pass |
| | 155 (5775) | 9.81 | 9.81 | 6.76 | 6.76 | 11.56 | 28.27 | Pass |

Remark:
1. Corr'd Power = Meas Power + Duty Cycle Factor
2. Total (Chain 0+1) = $10*\log[(10^{\text{Chain 0}/10})+(10^{\text{Chain 1}/10})]$