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# FCC RADIO TEST REPORT

| | |
|---|---|
| Applicant's company | **Extreme Networks, Inc.** |
| Applicant Address | 9 Northeastern Blvd. Salem, NH 03079 USA |
| FCC ID | **QXO-4411OU** |
| Manufacturer's company | **Senao Networks, Inc.** |
| Manufacturer Address | 3F, No. 529, Chung Cheng Rd., Hsintien, Taipei, Taiwan |

| | |
|---|---|
| Product Name | WS-AP3965i-FCC |
| Brand Name | Extreme Networks |
| Model No. | 31016 |
| Test Rule Part(s) | 47 CFR FCC Part 15 Subpart E § 15.407 |
| Test Freq. Range | 5150 ~ 5250 MHz / 5725 ~ 5850 MHz |
| Received Date | Nov. 17, 2015 |
| Final Test Date | Dec. 08, 2015 |
| Submission Type | Class II Change |

## Statement

**Test result included is for the IEEE 802.11n and IEEE 802.11a/ac of the product.**

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2013**, **47 CFR FCC Part 15 Subpart E, KDB789033 D02 v01r02, KDB662911 D01 v02r01, KDB644545 D03 v01.**

The test equipment used to perform the test is calibrated and traceable to NML/ROC.

TAF
Testing Laboratory
1190

# Table of Contents

# History of This Test Report

| REPORT NO. | VERSION | DESCRIPTION | ISSUED DATE |
|---|---|---|---|
| FR640141-01AB | Rev. 01 | Initial issue of report | May 04, 2016 |
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# 1. VERIFICATION OF COMPLIANCE

| | | |
|---|---|---|
| Product Name | : | WS-AP3965i-FCC |
| Brand Name | : | Extreme Networks |
| Model No. | : | 31016 |
| Applicant | : | Extreme Networks, Inc. |
| Test Rule Part(s) | : | 47 CFR FCC Part 15 Subpart E § 15.407 |

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Nov. 17, 2015 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.

Sam Chen

SPORTON INTERNATIONAL INC.

# 2. SUMMARY OF THE TEST RESULT

| Applied Standard: 47 CFR FCC Part 15 Subpart E | | | | |
|---|---|---|---|---|
| **Part** | **Rule Section** | **Description of Test** | **Result** | **Under Limit** |
| 4.1 | 15.207 | AC Power Line Conducted Emissions | Complies | 16.16 dB |
| 4.2 | 15.407(a) | 26dB Spectrum Bandwidth and 99% Occupied Bandwidth | Complies | - |
| 4.3 | 15.407(e) | 6dB Spectrum Bandwidth | Complies | - |
| 4.4 | 15.407(a) | Maximum Conducted Output Power | Complies | 1.34 dB |
| 4.5 | 15.407(a) | Power Spectral Density | Complies | 3.05 dB |
| 4.6 | 15.407(b) | Radiated Emissions | Complies | 3.63 dB |
| 4.7 | 15.407(b) | Band Edge Emissions | Complies | 1.09 dB |
| 4.8 | 15.407(g) | Frequency Stability | Complies | - |
| 4.9 | 15.203 | Antenna Requirements | Complies | - |

# 3. GENERAL INFORMATION

## 3.1. Product Details

| Items | Description |
|---|---|
| Product Type | WLAN (4TX, 4RX) |
| Radio Type | Intentional Transceiver |
| Power Type | From PoE |
| Modulation | IEEE 802.11a: OFDM<br>IEEE 802.11n/ac: see the below table |
| Data Modulation | IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM)<br>IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM) |
| Data Rate (Mbps) | IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54)<br>IEEE 802.11n/ac: see the below table |
| Frequency Range | 5150 ~ 5250 MHz / 5725 ~ 5850 MHz |
| Channel Number | 9 for 20MHz bandwidth ; 4 for 40MHz bandwidth<br>2 for 80MHz bandwidth |
| Channel Band Width (99%) | Band 1:<br>IEEE 802.11a: 15.98 MHz<br>IEEE 802.11ac MCS0/Nss1 (VHT20): 17.02 MHz<br>IEEE 802.11ac MCS0/Nss1 (VHT40): 36.61 MHz<br>IEEE 802.11ac MCS0/Nss1 (VHT80): 76.70 MHz<br>Band 4:<br>IEEE 802.11a: 37.08 MHz<br>IEEE 802.11ac MCS0/Nss1 (VHT20): 38.90 MHz<br>IEEE 802.11ac MCS0/Nss1 (VHT40): 36.76 MHz<br>IEEE 802.11ac MCS0/Nss1 (VHT80): 76.41 MHz |
| Maximum Conducted Output Power | Band 1:<br>IEEE 802.11a: 21.52 dBm<br>IEEE 802.11ac MCS0/Nss1 (VHT20): 21.44 dBm<br>IEEE 802.11ac MCS0/Nss1 (VHT40): 21.50 dBm<br>IEEE 802.11ac MCS0/Nss1 (VHT80): 17.55 dBm<br>Band 4:<br>IEEE 802.11a: 28.40 dBm<br>IEEE 802.11ac MCS0/Nss1 (VHT20): 28.41 dBm<br>IEEE 802.11ac MCS0/Nss1 (VHT40): 25.18 dBm<br>IEEE 802.11ac MCS0/Nss1 (VHT80): 16.79 dBm |
| Carrier Frequencies | Please refer to section 3.4 |
| Antenna | Please refer to section 3.3 |

| Items | Description | |
|---|---|---|
| Communication Mode | ☒ IP Based (Load Based) | ☐ Frame Based |
| Operating Mode | ☒ Outdoor access point | |
| | ☐ Indoor access point | |
| | ☐ Fixed point-to-point access points | |
| | ☐ Mobile and portable client devices | |

**Antenna and Band width**

| Antenna | Four (TX) | | |
|---|---|---|---|
| Band width Mode | 20 MHz | 40 MHz | 80 MHz |
| IEEE 802.11a | V | X | X |
| IEEE 802.11n | V | V | X |
| IEEE 802.11ac | V | V | V |

**IEEE 11n/ac Spec.**

| Protocol | Number of Transmit Chains (NTX) | Data Rate / MCS |
|---|---|---|
| 802.11n (HT20) | 4 | MCS 0-31 |
| 802.11n (HT40) | 4 | MCS 0-31 |
| 802.11ac (VHT20) | 4 | MCS 0-9/Nss1-4 |
| 802.11ac (VHT40) | 4 | MCS 0-9/Nss1-4 |
| 802.11ac (VHT80) | 4 | MCS 0-9/Nss1-4 |

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT supports HT20 and HT40.

Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT supports VHT20, VHT40 and VHT80 in 5GHz.

Note 3: Modulation modes consist of below configuration:
HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

## 3.2. Accessories

N/A

## 3.3. Table for Filed Antenna

| Set. | Brand Holder | Model Number (Part No.) | Extreme Part No. (Short Description) | Antenna Type | Connector | Polarized Antenna | Gain (dBi) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 2.4GHz | 5GHz |
| 1 | Senao Networks, Inc. | AP3965i | - | PIFA Antenna | MMCX | X | Note 1 | |

Note1:

| Set. | Antenna Gain (dBi) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2.4GHz | | | | 5GHz | | | |
| | Chain 1 | Chain 2 | Chain 3 | Chain 4 | Chain 1 | Chain 2 | Chain 3 | Chain 4 |
| 1 | 6.25 | 5.77 | 6.45 | 5.60 | 5.96 | 5.97 | 6.25 | 6.08 |

**<For 2.4GHz Function>**

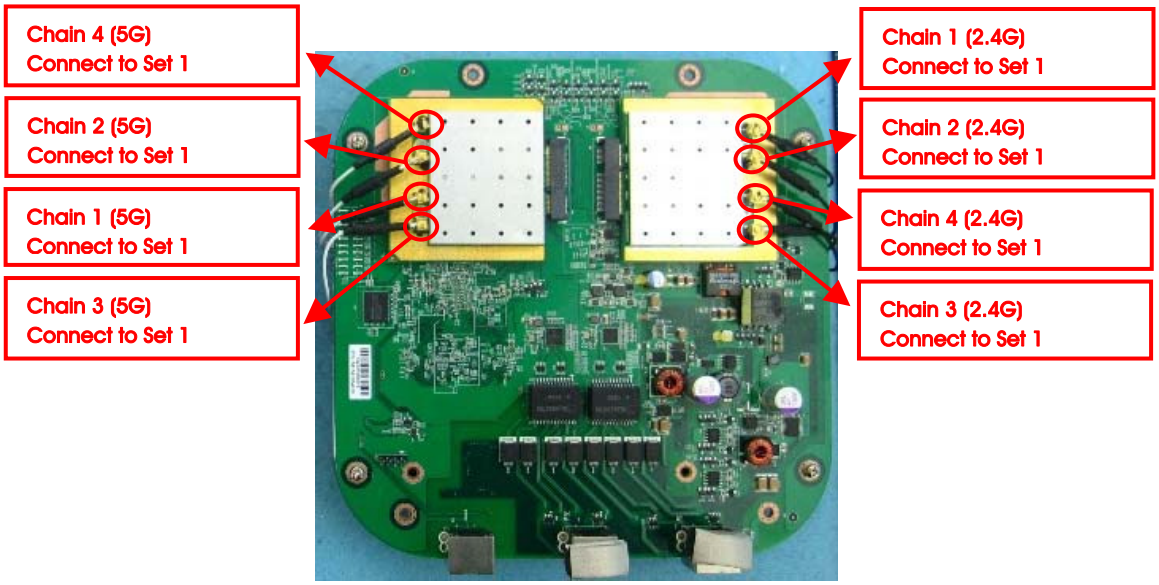
**For IEEE 802.11b/g/n/ac mode (4TX, 4RX):**

Chain 1, Chain 2, Chain 3 and Chain 4 could transmit/receive simultaneously.

**<For 5GHz Function>**

**For IEEE 802.11a/n/ac mode (4TX, 4RX):**

Chain 1, Chain 2, Chain 3 and Chain 4 could transmit/receive simultaneously.



## 3.4. Table for Carrier Frequencies

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48, 149, 153, 157, 161, 165.

For 40MHz bandwidth systems, use Channel 38, 46, 151, 159.

For 80MHz bandwidth systems, use Channel 42, 155.

| Frequency Band | Channel No. | Frequency | Channel No. | Frequency |
|---|---|---|---|---|
| 5150~5250 MHz Band 1 | 36 | 5180 MHz | 44 | 5220 MHz |
| | 38 | 5190 MHz | 46 | 5230 MHz |
| | 40 | 5200 MHz | 48 | 5240 MHz |
| | 42 | 5210 MHz | - | - |
| 5725~5850 MHz Band 4 | 149 | 5745 MHz | 157 | 5785 MHz |
| | 151 | 5755 MHz | 159 | 5795 MHz |
| | 153 | 5765 MHz | 161 | 5805 MHz |
| | 155 | 5775 MHz | 165 | 5825 MHz |

## 3.5. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

| Test Items | Mode | | Data Rate | Channel | Chain |
|---|---|---|---|---|---|
| AC Power Conducted Emission | Normal Link | | - | - | - |
| Max. Conducted Output Power | 11a/BPSK | Band 1&4 | 6Mbps | 36/40/48/149/157/165 | 1+2+3+4 |
| | 11ac VHT20 | Band 1&4 | MCS0/Nss1 | 36/40/48/149/157/165 | 1+2+3+4 |
| | 11ac VHT40 | Band 1&4 | MCS0/Nss1 | 38/46/151/159 | 1+2+3+4 |
| | 11ac VHT80 | Band 1&4 | MCS0/Nss1 | 42/155 | 1+2+3+4 |
| Power Spectral Density | 11a/BPSK | Band 1&4 | 6Mbps | 36/40/48/149/157/165 | 1+2+3+4 |
| | 11ac VHT20 | Band 1&4 | MCS0/Nss1 | 36/40/48/149/157/165 | 1+2+3+4 |
| | 11ac VHT40 | Band 1&4 | MCS0/Nss1 | 38/46/151/159 | 1+2+3+4 |
| | 11ac VHT80 | Band 1&4 | MCS0/Nss1 | 42/155 | 1+2+3+4 |
| 26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement | 11a/BPSK | Band 1&4 | 6Mbps | 36/40/48/149/157/165 | 1+2+3+4 |
| | 11ac VHT20 | Band 1&4 | MCS0/Nss1 | 36/40/48/149/157/165 | 1+2+3+4 |
| | 11ac VHT40 | Band 1&4 | MCS0/Nss1 | 38/46/151/159 | 1+2+3+4 |
| | 11ac VHT80 | Band 1&4 | MCS0/Nss1 | 42/155 | 1+2+3+4 |
| 6dB Spectrum Bandwidth Measurement | 11a/BPSK | Band 4 | 6Mbps | 149/157/165 | 1+2+3+4 |
| | 11ac VHT20 | Band 4 | MCS0/Nss1 | 149/157/165 | 1+2+3+4 |
| | 11ac VHT40 | Band 4 | MCS0/Nss1 | 151/159 | 1+2+3+4 |
| | 11ac VHT80 | Band 4 | MCS0/Nss1 | 155 | 1+2+3+4 |
| Radiated Emission Below 1GHz | Normal Link | | - | - | - |
| Radiated Emission Above 1GHz | 11a/BPSK | Band 1&4 | 6Mbps | 36/40/48/149/157/165 | 1+2+3+4 |
| | 11ac VHT20 | Band 1&4 | MCS0/Nss1 | 36/40/48/149/157/165 | 1+2+3+4 |
| | 11ac VHT40 | Band 1&4 | MCS0/Nss1 | 38/46/151/159 | 1+2+3+4 |
| | 11ac VHT80 | Band 1&4 | MCS0/Nss1 | 42/155 | 1+2+3+4 |

| | | | | | |
|---|---|---|---|---|---|
| Band Edge Emission | 11a/BPSK | Band 1&4 | 6Mbps | 36/40/48/149/157/165 | 1+2+3+4 |
| | 11ac VHT20 | Band 1&4 | MCS0/Nss1 | 36/40/48/149/157/165 | 1+2+3+4 |
| | 11ac VHT40 | Band 1&4 | MCS0/Nss1 | 38/46/151/159 | 1+2+3+4 |
| | 11ac VHT80 | Band 1&4 | MCS0/Nss1 | 42/155 | 1+2+3+4 |
| Frequency Stability | 20 MHz | Band 1&4 | - | 40/157 | 3, 4 |
| | 40 MHz | Band 1&4 | - | 38/151 | 3, 4 |
| | 80 MHz | Band 1&4 | - | 42/155 | 3, 4 |

Note1: VHT20/VHT40 covers HT20/HT40, due to same modulation. The power setting for 802.11n HT20 and HT40 are the same or lower than 802.11ac VHT20 and VHT40.

Note2:

The PoE is for measurement only, would not be marketed.

The PoE information as below:

| Power | Brand | Model |
|---|---|---|
| PoE | Microsemi | PD-9001GR |

Note3: All the specification of test configurations and test modes were based on customer's request.

Note4: The console port can not be used by end user. It is generally used for updating FW by professional installer.

The following test modes were performed for all tests:

**For Conducted Emission test:**

Mode 1. Normal Link - EUT

**For Radiated Emission Below 1GHz test:**

The EUT 1 was performed at Y axis and Z axis position. Z axis has been evaluated to be the worst case, thus measurement will follow this same test mode.

Mode 1. Normal Link - Place EUT in Z axis

**For Radiated Emission Above 1GHz test:**

The EUT was performed at Y axis and Z axis position. Y axis has been evaluated to be the worst case, thus measurement will follow this same test mode.

Mode 1. CTX - Place EUT in Y axis

**For Co-location MPE and Radiated Emission Co-location Test:**

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA640141-01) and Radiated Emission Co-location (please refer to Appendix B) tests are added for simultaneously transmit between 2.4GHz WLAN function and 5GHz WLAN function.

## 3.6. Table for Testing Locations

| Test Site Location | | | | | |
|---|---|---|---|---|---|
| Address: | No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C. | | | | |
| TEL: | 886-3-656-9065 | | | | |
| FAX: | 886-3-656-9085 | | | | |
| **Test Site No.** | **Site Category** | **Location** | **FCC Reg. No.** | **IC File No.** | **VCCI Reg. No** |
| 03CH01-CB | SAC | Hsin Chu | 262045 | IC 4086D | - |
| CO01-CB | Conduction | Hsin Chu | 262045 | IC 4086D | - |
| TH01-CB | OVEN Room | Hsin Chu | - | - | - |

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC).

## 3.7. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR640141AB

Below is the table for the change of the product with respect to the original one.

| Modifications | Performance Checking |
|---|---|
| 1. Updating product name to "WS-AP3965i-FCC" from "Wireless 802.11a/AC+ b/g/n Access Point"<br>2. Removing three model No.: 31018, 31017, 31019<br>3. Removing external antennas - Extreme Part No.: 30714, 30716, 30711, 30718, 30720, 30713, 30717, 30715, 30712, WS-AO-5D23009N, 30724<br>4. Changing the RF Exposure evluated separation distance to 20cm | It is not necessary to perform for all tests. |

Note: All test results are based on original report: FR640141AB.

## 3.8. Table for Supporting Units

**For Test Site No: 03CH01-CB (For Below 1GHz)**

| Support Unit | Brand | Model | FCC ID |
|---|---|---|---|
| NB*4 | DELL | E4300 | DoC |
| PoE Load | Senao | LT4321UF | N/A |
| PoE | Microsemi | PD-9001GR | N/A |

**For Test Site No: 03CH01-CB (For Above 1GHz)**

| Support Unit | Brand | Model | FCC ID |
|---|---|---|---|
| NB | DELL | E4300 | DoC |
| PoE | Microsemi | PD-9001GR | N/A |

**For Test Site No: CO01-CB**

| Support Unit | Brand | Model | FCC ID |
|---|---|---|---|
| NB*4 | DELL | E6430 | DoC |
| PoE Load | Senao | LT4321UF | N/A |
| PoE | Microsemi | PD-9001GR | N/A |

**For Test Site No: TH01-CB**

| Support Unit | Brand | Model | FCC ID |
|---|---|---|---|
| NB | DELL | E4300 | DoC |
| PoE | Microsemi | PD-9001GR | N/A |

## 3.9. Table for Parameters of Test Software Setting

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

| Test Software Version | QCA VER3.0.144.0 | | | | | |
|---|---|---|---|---|---|---|
| Mode | Test Frequency (MHz) | | | | | |
| | NCB: 20MHz | | | | | |
| | 5180 MHz | 5200 MHz | 5240 MHz | 5745 MHz | 5785 MHz | 5825 MHz |
| 802.11a | 15.5 | 15.5 | 15 | 16.5 | 25 | 19.5 |
| 802.11ac MCS0/Nss1 VHT20 | 15.5 | 15.5 | 15.5 | 16.5 | 25 | 19.5 |
| Mode | NCB: 40MHz | | | | | |
| 802.11ac MCS0/Nss1 VHT40 | 5190 MHz | | 5230 MHz | | 5755 MHz | 5795 MHz |
| | 15 | | 14.5 | | 14 | 19 |
| Mode | NCB: 80MHz | | | | | |
| 802.11ac MCS0/Nss1 VHT80 | 5210 MHz | | | | 5775 MHz | |
| | 11.5 | | | | 11 | |

## 3.10. EUT Operation during Test

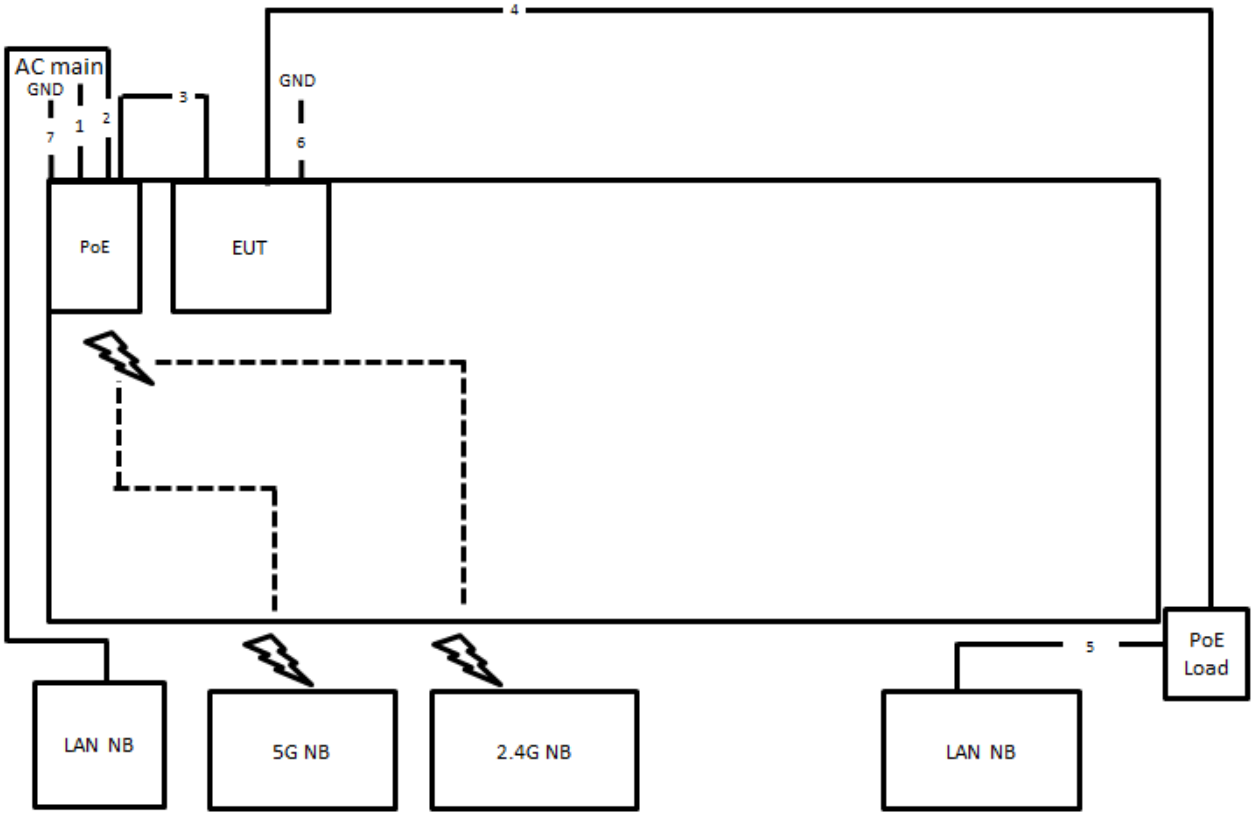
The EUT was programmed to be in continuously transmitting mode.

## 3.11. Duty Cycle

| Mode | On Time (ms) | On+Off Time (ms) | Duty Cycle (%) | Duty Factor (dB) | 1/T Minimum VBW (kHz) |
|---|---|---|---|---|---|
| 802.11a | 2.051 | 2.123 | 96.60 | 0.15 | 0.49 |
| 802.11ac MCS0/Nss1 VHT20 | 5.016 | 5.088 | 98.58 | 0.06 | 0.01 |
| 802.11ac MCS0/Nss1 VHT40 | 2.392 | 2.493 | 95.95 | 0.18 | 0.42 |
| 802.11ac MCS0/Nss1 VHT80 | 1.145 | 1.211 | 94.51 | 0.25 | 0.87 |

## 3.12. Test Configurations

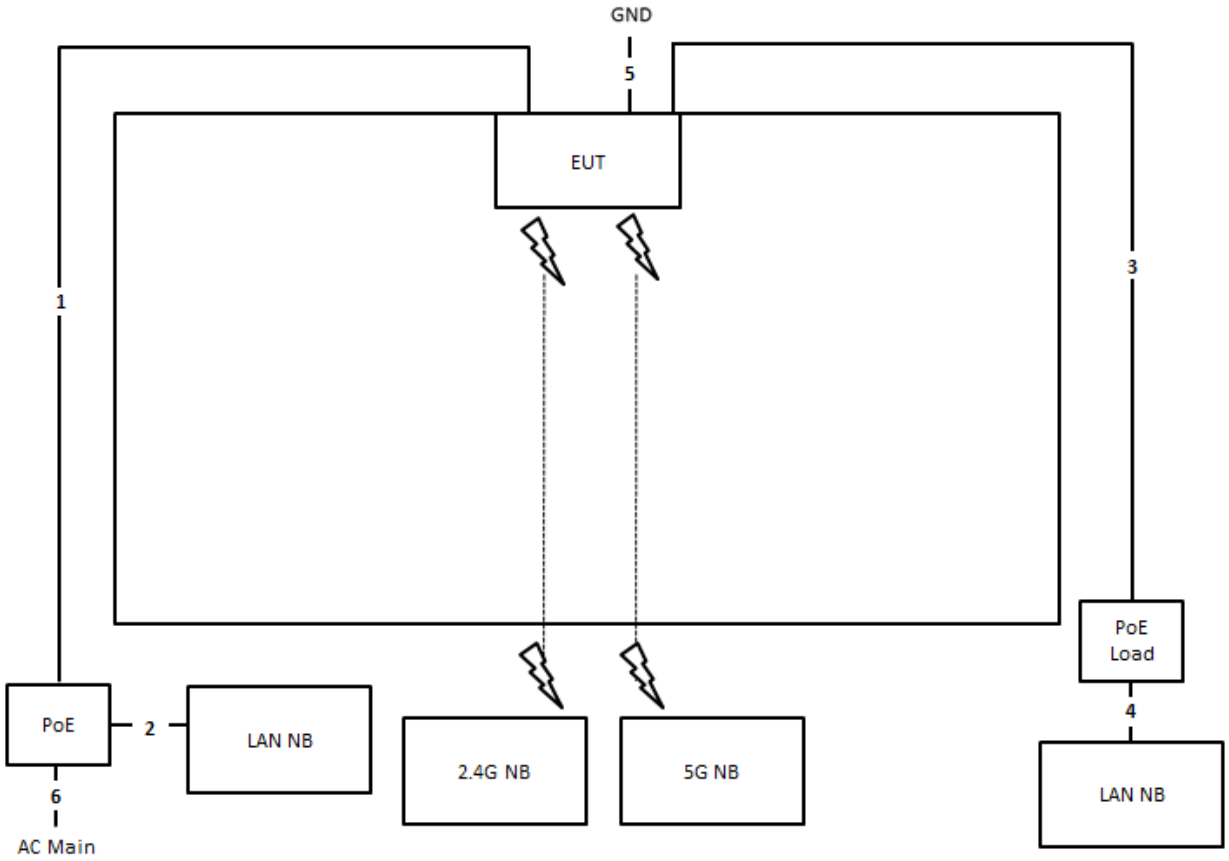
### 3.12.1. AC Power Line Conduction Emissions Test Configuration




| Item | Connection | Shielded | Length(m) |
|---|---|---|---|
| 1 | Power cable | No | 4.6m |
| 2 | RJ-45 cable | No | 10m |
| 3 | RJ-45 cable | No | 1.5m |
| 4 | RJ-45 cable | No | 10m |
| 5 | RJ-45 cable | No | 1.5m |
| 6 | Ground cable | No | 1.5m |
| 7 | Ground cable | No | 1.5m |

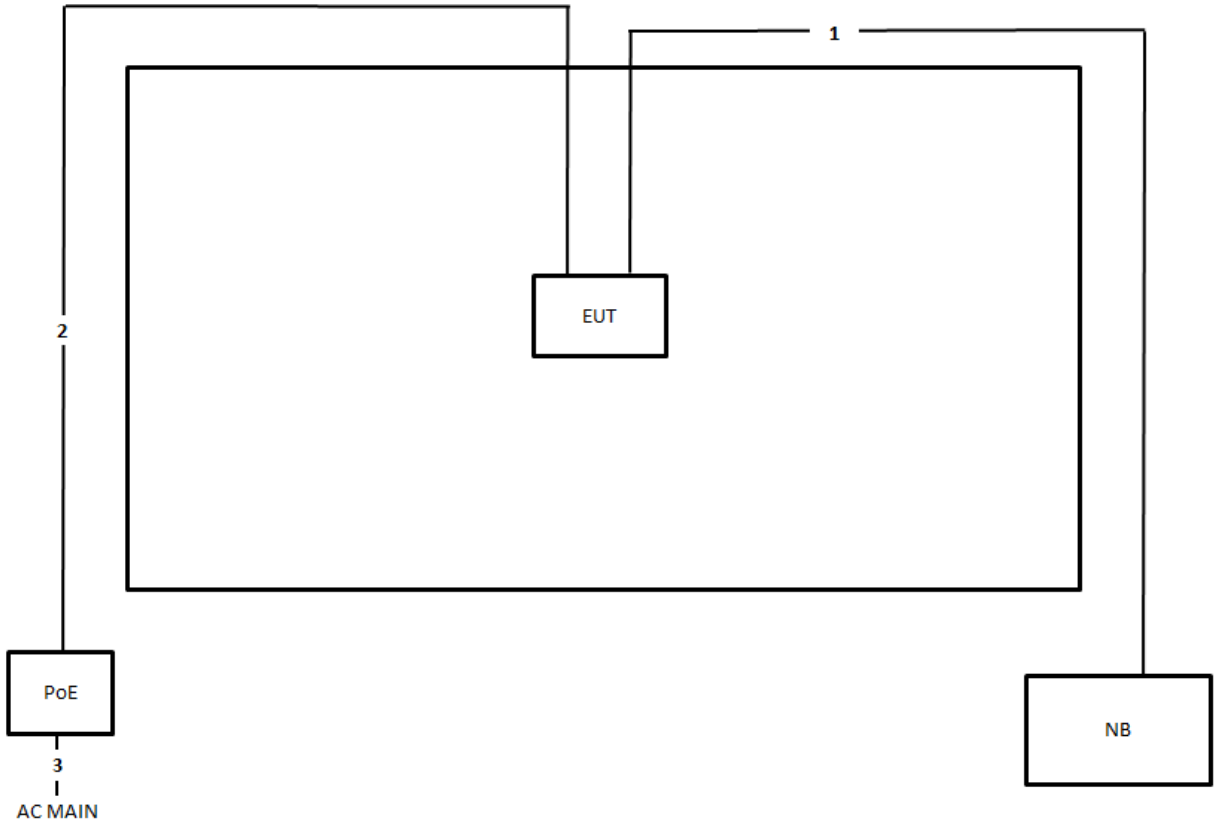
### 3.12.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz




| Item | Connection | Shielded | Length(m) |
|---|---|---|---|
| 1 | RJ-45 cable | No | 10m |
| 2 | RJ-45 cable | No | 1.5m |
| 3 | RJ-45 cable | No | 10m |
| 4 | RJ-45 cable | No | 1.5m |
| 5 | Ground cable | No | 1.5m |
| 6 | Power cable | No | 4.6m |

Test Configuration: above 1GHz




| Item | Connection | Shielded | Length(m) |
|---|---|---|---|
| 1 | RJ-45 cable | No | 10m |
| 2 | RJ-45 cable | No | 10m |
| 3 | Power cable | No | 4.6m |

# 4. TEST RESULT

## 4.1. AC Power Line Conducted Emissions Measurement

### 4.1.1. Limit

For this product that is designed to connect to the 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 below limits table.

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

### 4.1.2. Measuring Instruments and Setting

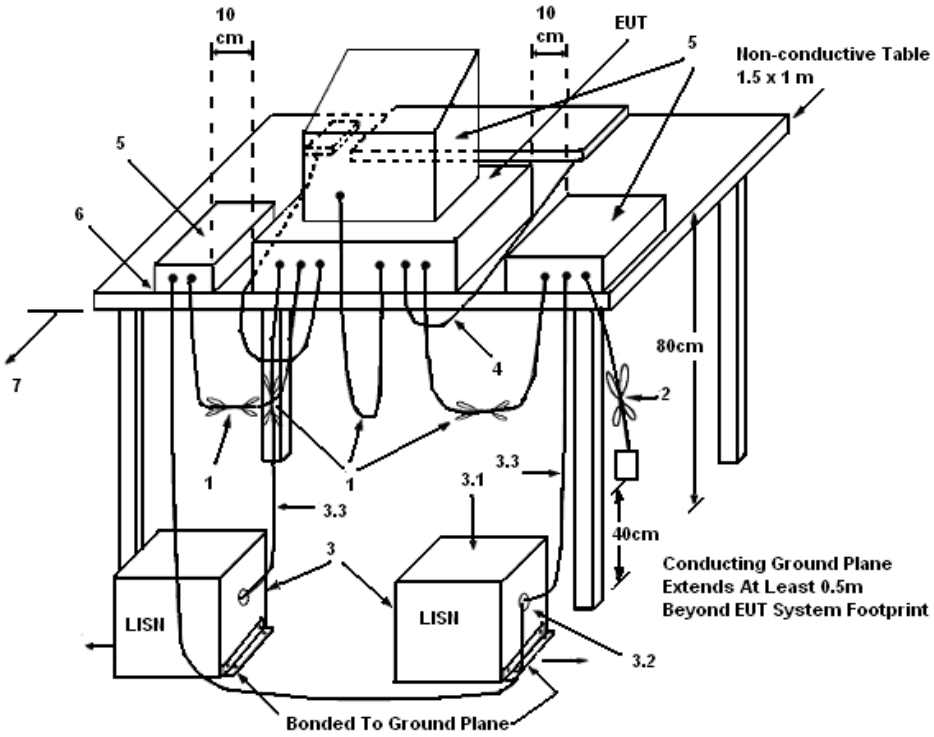
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

| Receiver Parameters | Setting |
|---|---|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

### 4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

### 4.1.4. Test Setup Layout




LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

### 4.1.5. Test Deviation

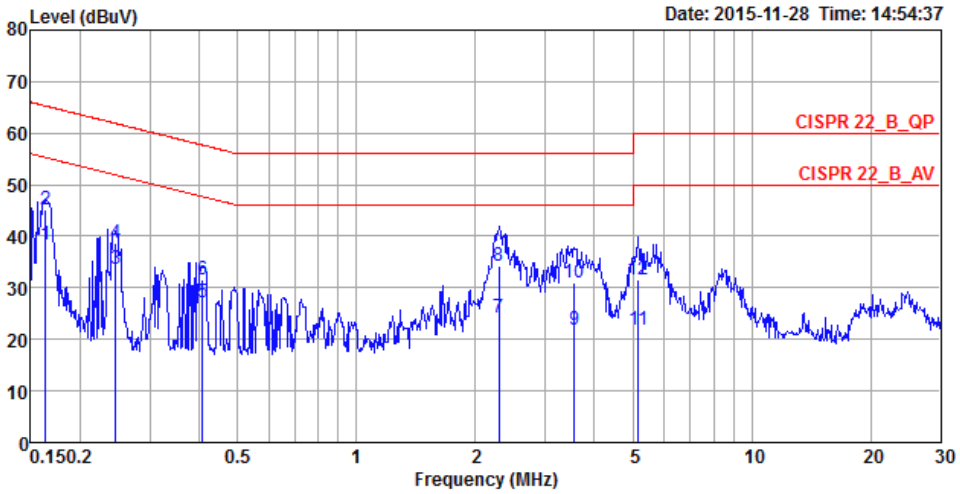
There is no deviation with the original standard.

### 4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

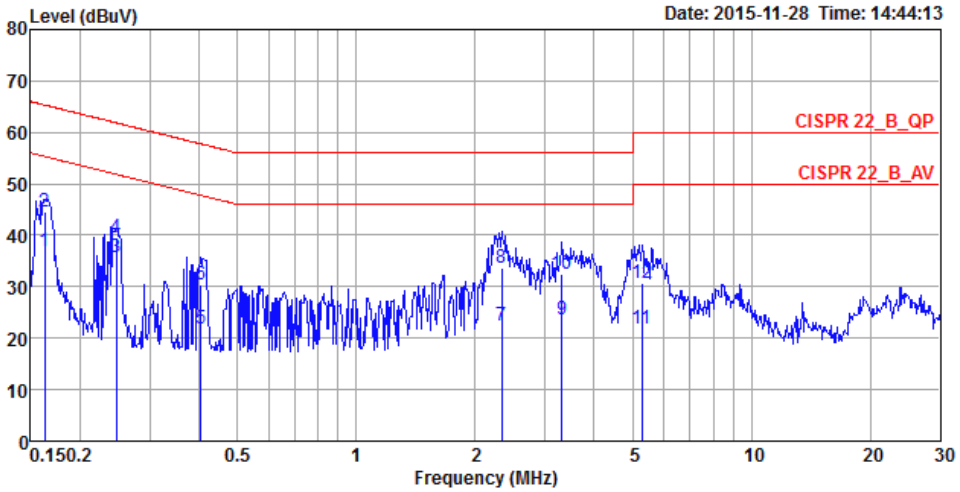
### 4.1.7. Results of AC Power Line Conducted Emissions Measurement

| Temperature | 23°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Edison Lin | Phase | Line |
| Configuration | Normal Link | Test Mode | Mode 1 |




| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | | |
| 1 | 0.1633 | 38.32 | -16.98 | 55.30 | 28.37 | 9.93 | 0.02 | LINE | Average |
| 2 | 0.1633 | 45.02 | -20.28 | 65.30 | 35.07 | 9.93 | 0.02 | LINE | QP |
| 3 | 0.2455 | 33.58 | -18.33 | 51.91 | 23.62 | 9.93 | 0.03 | LINE | Average |
| 4 | 0.2455 | 38.68 | -23.23 | 61.91 | 28.72 | 9.93 | 0.03 | LINE | QP |
| 5 | 0.4083 | 27.03 | -20.65 | 47.68 | 17.06 | 9.93 | 0.04 | LINE | Average |
| 6 | 0.4083 | 31.63 | -26.05 | 57.68 | 21.66 | 9.93 | 0.04 | LINE | QP |
| 7 | 2.2968 | 24.19 | -21.81 | 46.00 | 14.13 | 10.00 | 0.06 | LINE | Average |
| 8 | 2.2968 | 34.32 | -21.68 | 56.00 | 24.26 | 10.00 | 0.06 | LINE | QP |
| 9 | 3.5654 | 21.82 | -24.18 | 46.00 | 11.75 | 10.01 | 0.06 | LINE | Average |
| 10 | 3.5654 | 30.85 | -25.15 | 56.00 | 20.78 | 10.01 | 0.06 | LINE | QP |
| 11 | 5.1663 | 21.83 | -28.17 | 50.00 | 11.67 | 10.06 | 0.10 | LINE | Average |
| 12 | 5.1663 | 31.49 | -28.51 | 60.00 | 21.33 | 10.06 | 0.10 | LINE | QP |

| Temperature | 23℃ | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Edison Lin | Phase | Neutral |
| Configuration | Normal Link | Test Mode | Mode 1 |




| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Pol/Phase | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | | |
| 1 | 0.1624 | 36.93 | -18.41 | 55.34 | 27.13 | 9.78 | 0.02 | NEUTRAL | Average |
| 2 | 0.1624 | 44.62 | -20.72 | 65.34 | 34.82 | 9.78 | 0.02 | NEUTRAL | QP |
| 3 | 0.2468 | 35.70 | -16.16 | 51.86 | 25.88 | 9.79 | 0.03 | NEUTRAL | Average |
| 4 | 0.2468 | 39.56 | -22.30 | 61.86 | 29.74 | 9.79 | 0.03 | NEUTRAL | QP |
| 5 | 0.4040 | 21.74 | -26.03 | 47.77 | 11.91 | 9.79 | 0.04 | NEUTRAL | Average |
| 6 | 0.4040 | 30.52 | -27.25 | 57.77 | 20.69 | 9.79 | 0.04 | NEUTRAL | QP |
| 7 | 2.3336 | 22.34 | -23.66 | 46.00 | 12.43 | 9.85 | 0.06 | NEUTRAL | Average |
| 8 | 2.3336 | 33.76 | -22.24 | 56.00 | 23.85 | 9.85 | 0.06 | NEUTRAL | QP |
| 9 | 3.3105 | 23.57 | -22.43 | 46.00 | 13.65 | 9.86 | 0.06 | NEUTRAL | Average |
| 10 | 3.3105 | 32.50 | -23.50 | 56.00 | 22.58 | 9.86 | 0.06 | NEUTRAL | QP |
| 11 | 5.2770 | 21.74 | -28.26 | 50.00 | 11.73 | 9.91 | 0.10 | NEUTRAL | Average |
| 12 | 5.2770 | 30.79 | -29.21 | 60.00 | 20.78 | 9.91 | 0.10 | NEUTRAL | QP |

Note:

Level = Read Level + LISN Factor + Cable Loss.

## 4.2. 26dB Bandwidth and 99% Occupied Bandwidth Measurement

### 4.2.1. Limit

No restriction limits.

### 4.2.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| 26dB Bandwidth | |
|---|---|
| **Spectrum Parameters** | **Setting** |
| Attenuation | Auto |
| Span Frequency | > 26dB Bandwidth |
| RBW | Approximately 1% of the emission bandwidth |
| VBW | VBW > RBW |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |
| **99% Occupied Bandwidth** | |
| **Spectrum Parameters** | **Setting** |
| Span | 1.5 times to 5.0 times the OBW |
| RBW | 1 % to 5 % of the OBW |
| VBW | ≥ 3 x RBW |
| Detector | Peak |
| Trace | Max Hold |

### 4.2.3. Test Procedures

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. 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%.

### 4.2.4. Test Setup Layout

For Radiated 26dB Bandwidth and 99% Occupied Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.6.4.

### 4.2.5. Test Deviation

There is no deviation with the original standard.

### 4.2.6. EUT Operation during Test

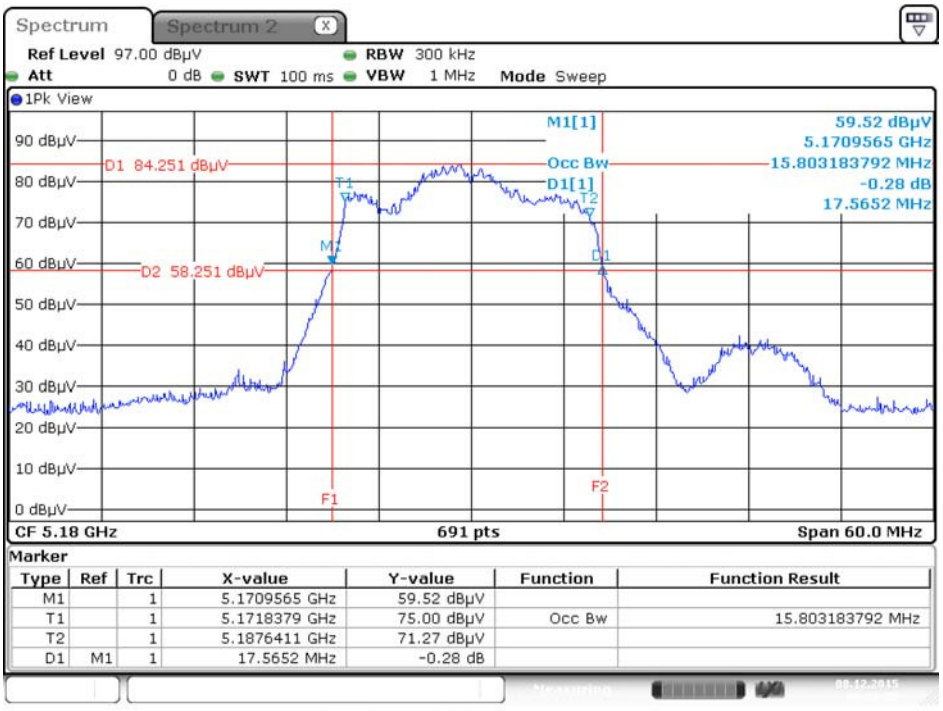
The EUT was programmed to be in continuously transmitting mode.

### 4.2.7. Test Result of 26dB Bandwidth and 99% Occupied Bandwidth

| Temperature | 25°C | Humidity | 45% |
|---|---|---|---|
| Test Engineer | Roki Liu | | |

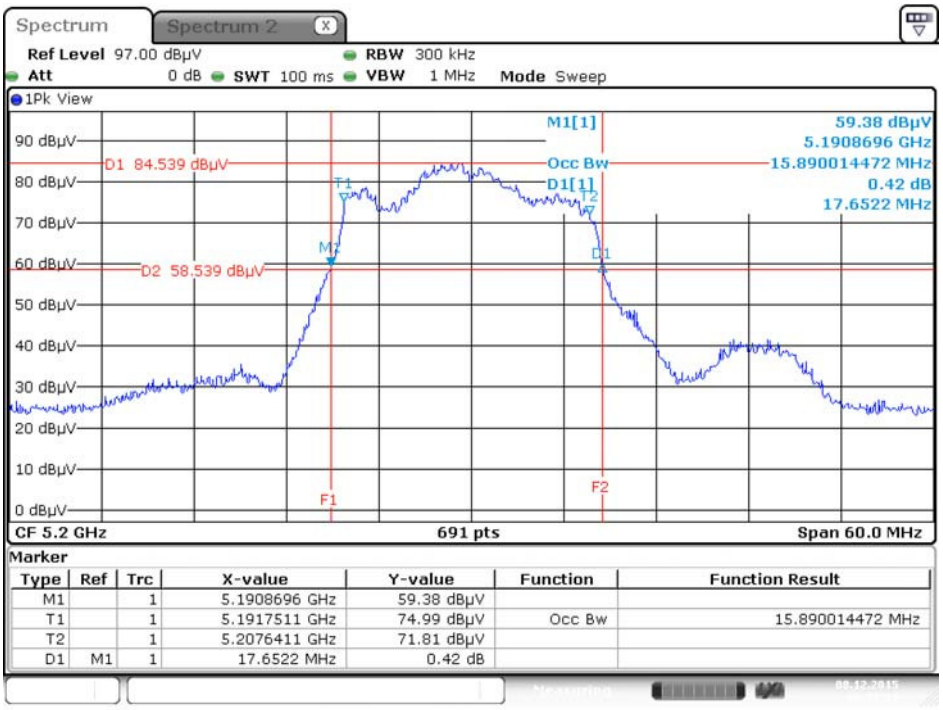
| Mode | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---|---|---|---|
| 802.11a | 5180 MHz | 17.57 | 15.80 |
| | 5200 MHz | 17.65 | 15.89 |
| | 5240 MHz | 17.74 | 15.98 |
| | 5745 MHz | 17.83 | 16.15 |
| | 5785 MHz | 44.78 | 37.08 |
| | 5825 MHz | 18.87 | 16.41 |
| 802.11ac MCS0/Nss1 VHT20 | 5180 MHz | 18.70 | 16.67 |
| | 5200 MHz | 18.52 | 16.67 |
| | 5240 MHz | 18.70 | 17.02 |
| | 5745 MHz | 18.87 | 17.19 |
| | 5785 MHz | 45.30 | 38.90 |
| | 5825 MHz | 19.22 | 17.45 |
| 802.11ac MCS0/Nss1 VHT40 | 5190 MHz | 39.57 | 36.47 |
| | 5230 MHz | 40.29 | 36.61 |
| | 5755 MHz | 40.00 | 36.61 |
| | 5795 MHz | 41.01 | 36.76 |
| 802.11ac MCS0/Nss1 VHT80 | 5210 MHz | 83.77 | 76.70 |
| | 5775 MHz | 84.06 | 76.41 |

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5180 MHz**



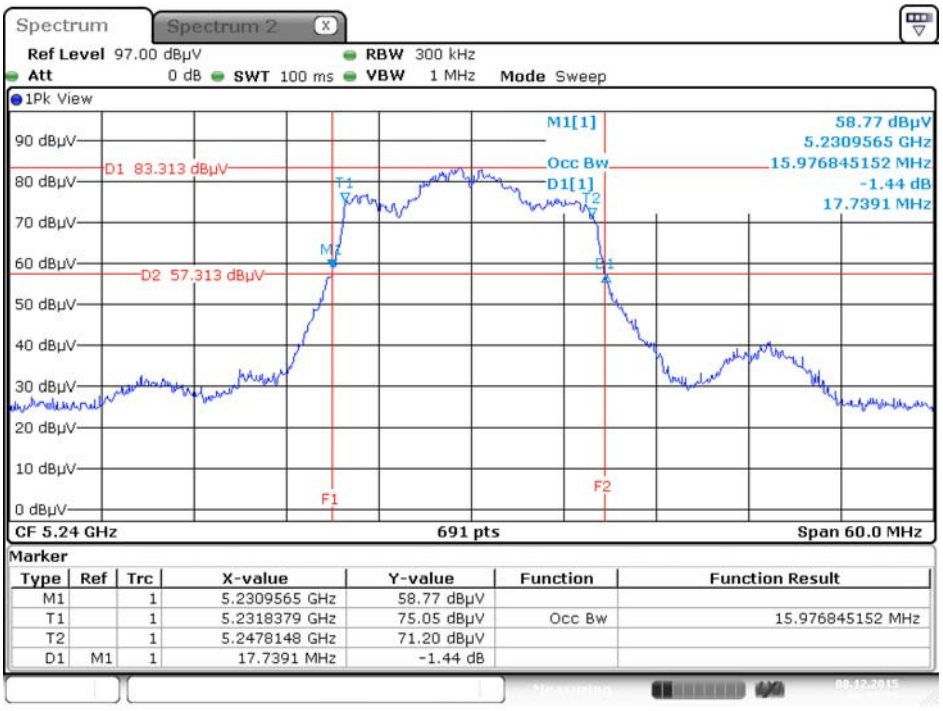

Date: 8.DEC.2015 00:36:27

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5200 MHz**



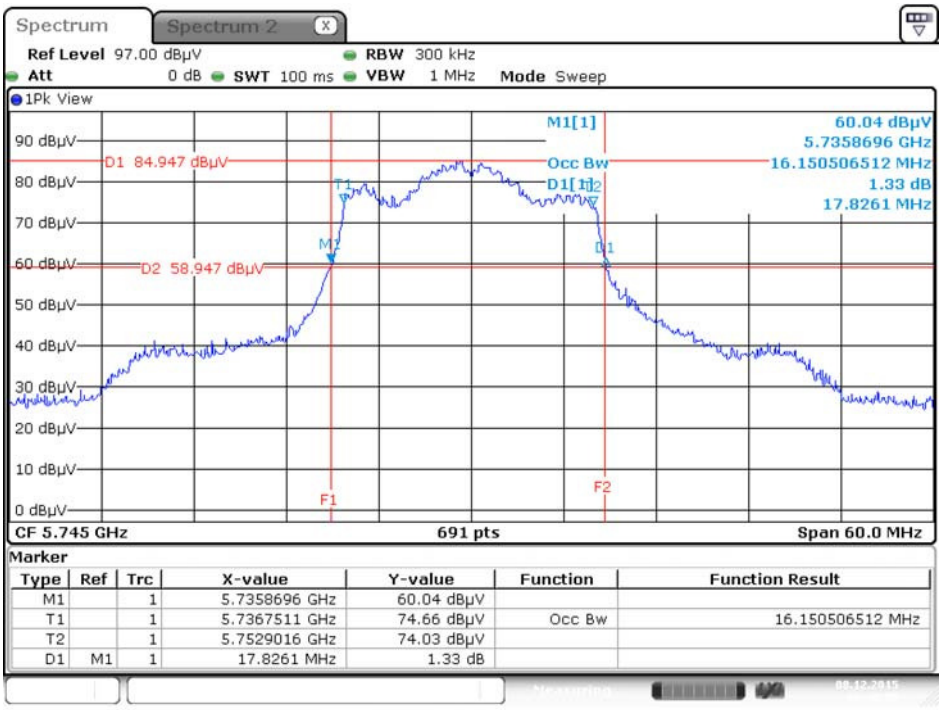

Date: 8.DEC.2015 00:37:11

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5240 MHz**



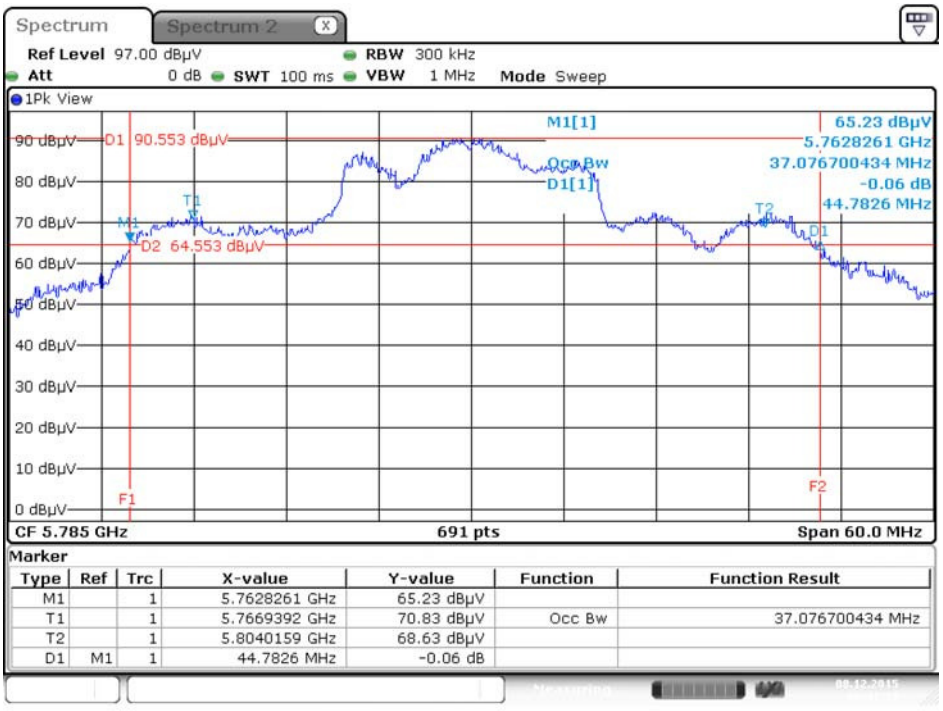

Date: 8.DEC.2015 00:37:33

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5745 MHz**



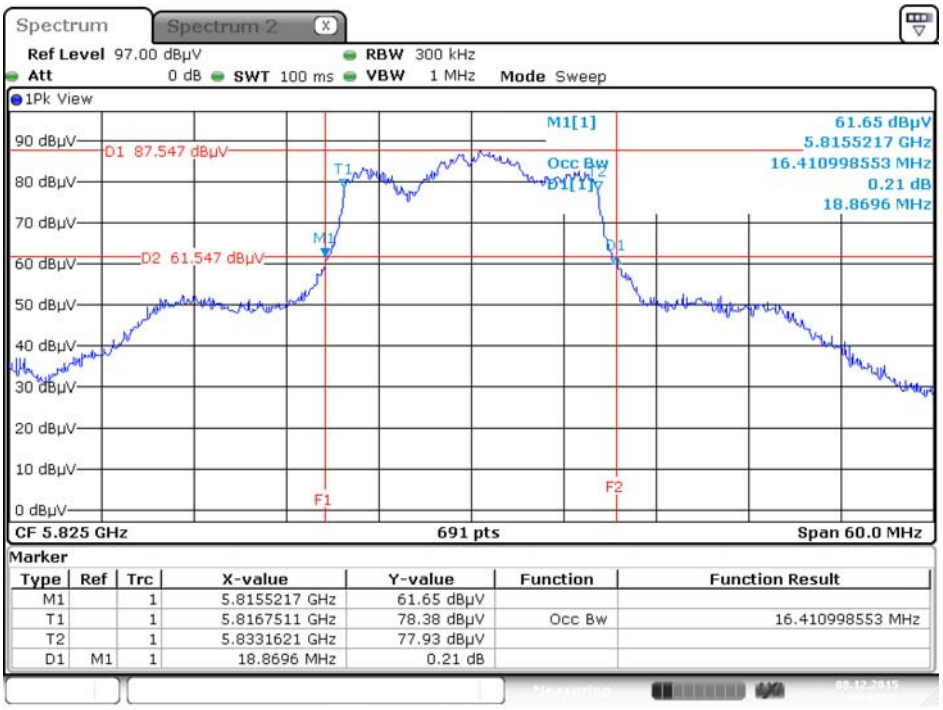

Date: 8.DEC.2015 00:40:58

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz**



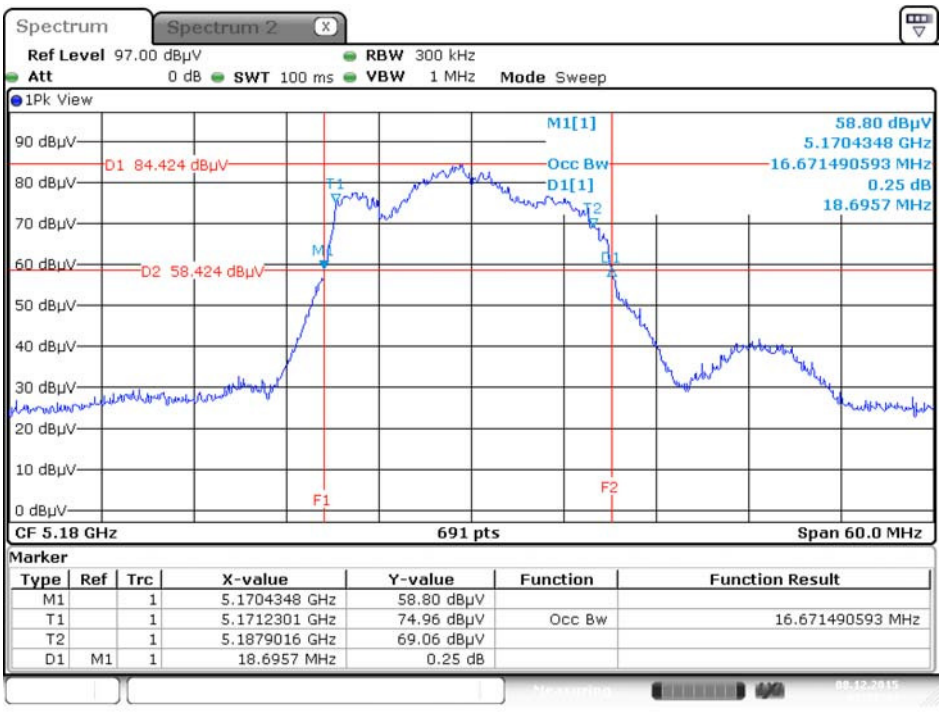

Date: 8.DEC.2015 00:41:19

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5825 MHz**



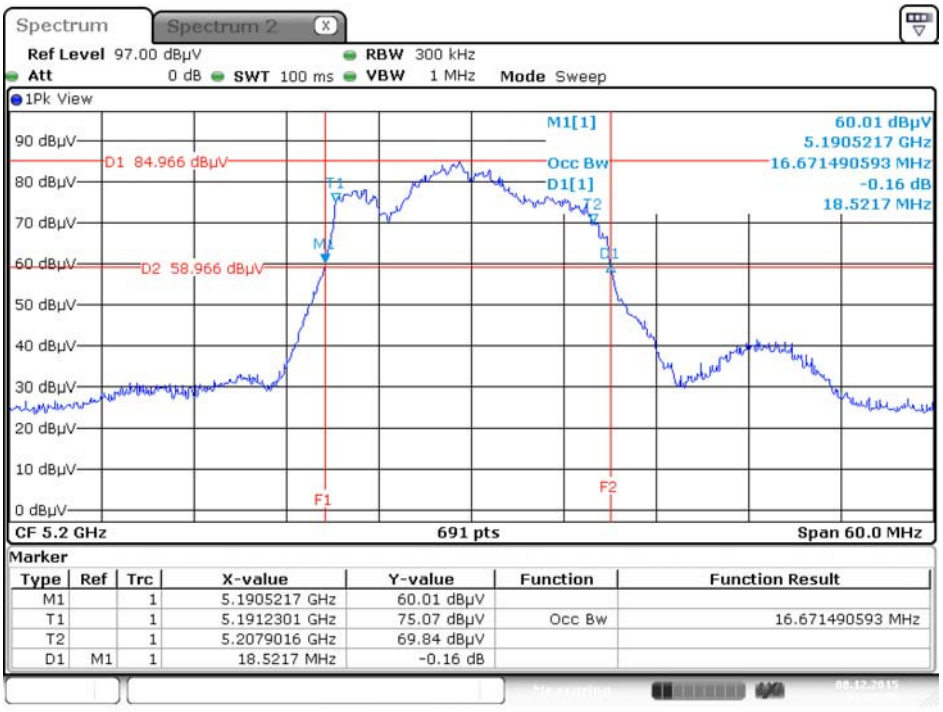

Date: 8.DEC.2015 00:41:42

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5180 MHz**



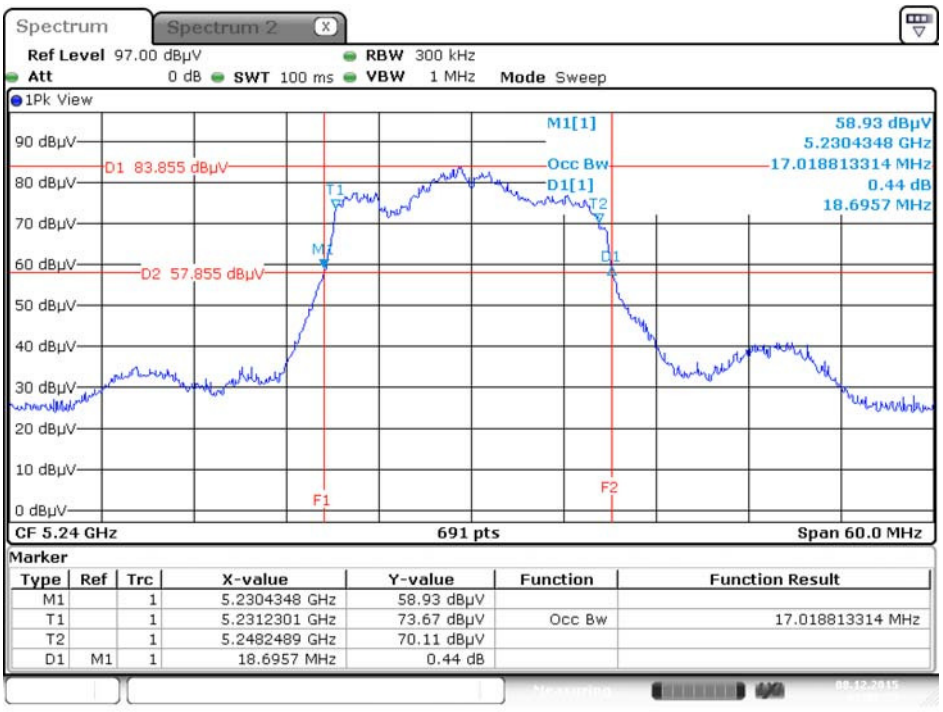

Date: 8.DEC.2015 01:01:43

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5200 MHz**



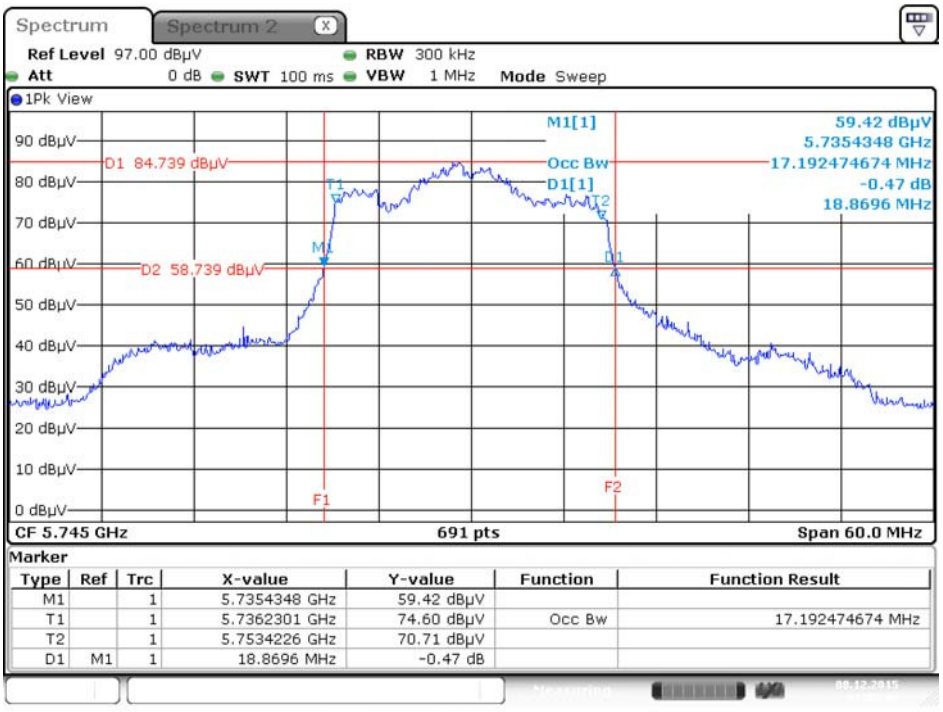

Date: 8.DEC.2015 01:02:05

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5240 MHz**



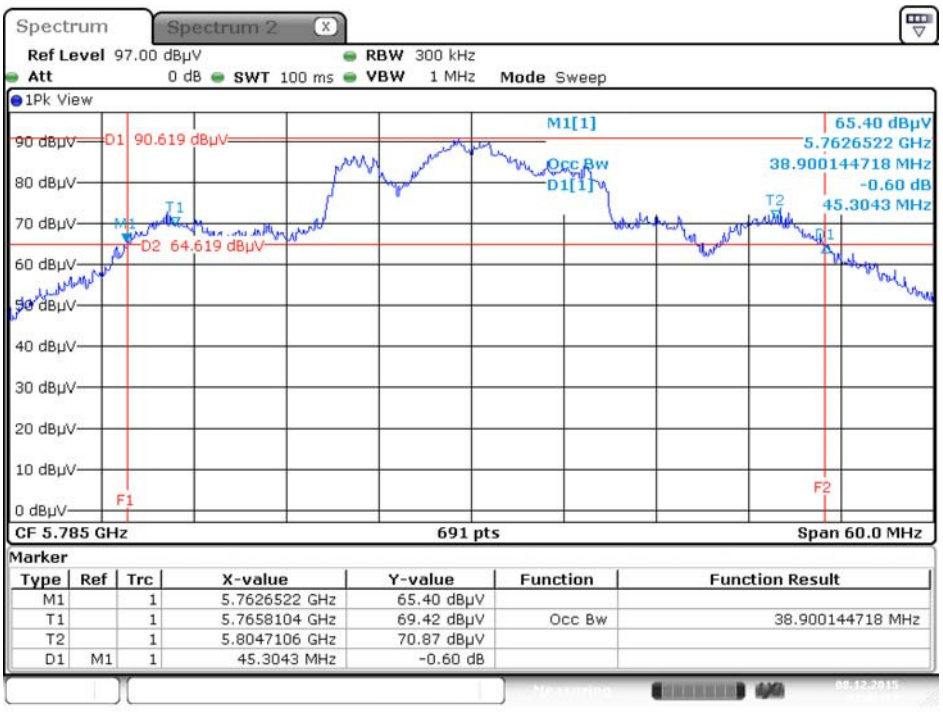

Date: 8.DEC.2015 01:02:23

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5745 MHz**



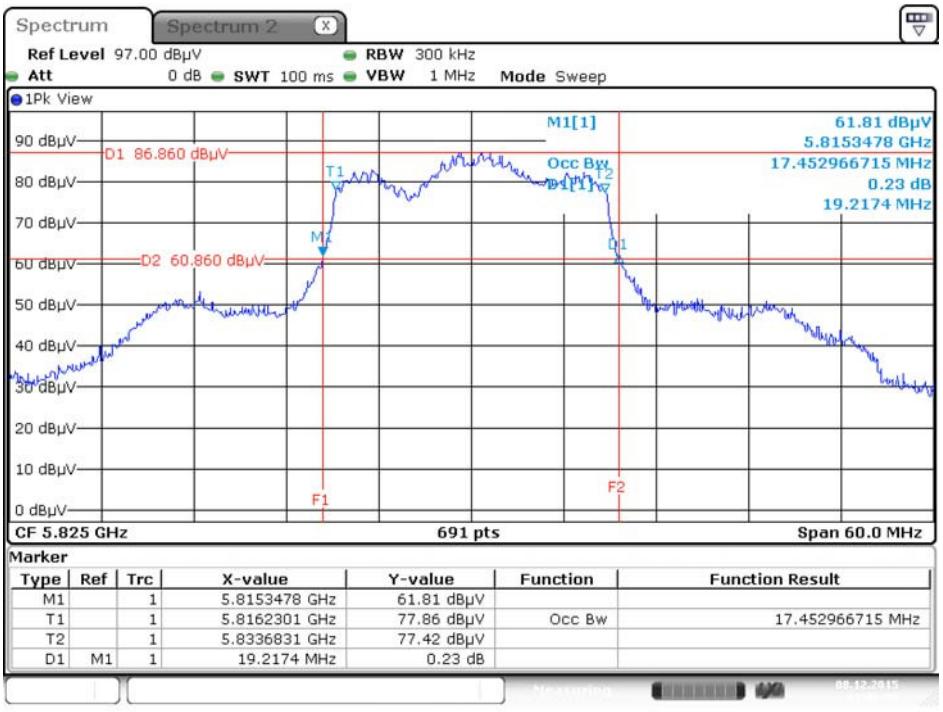

Date: 8.DEC.2015 01:05:49

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz**



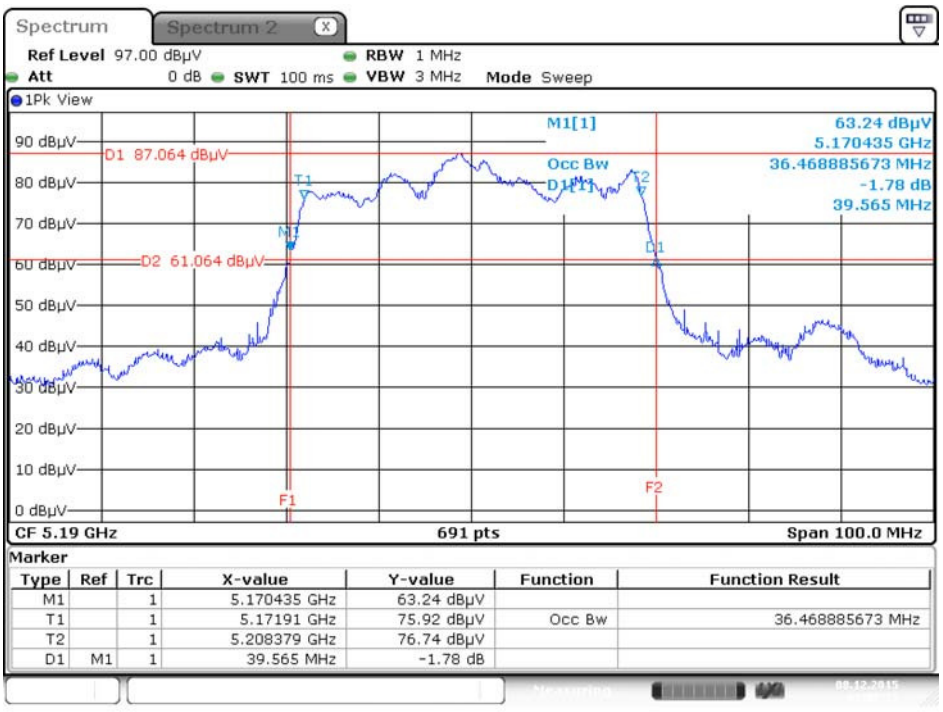

Date: 8.DEC.2015 01:06:11

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5825 MHz**



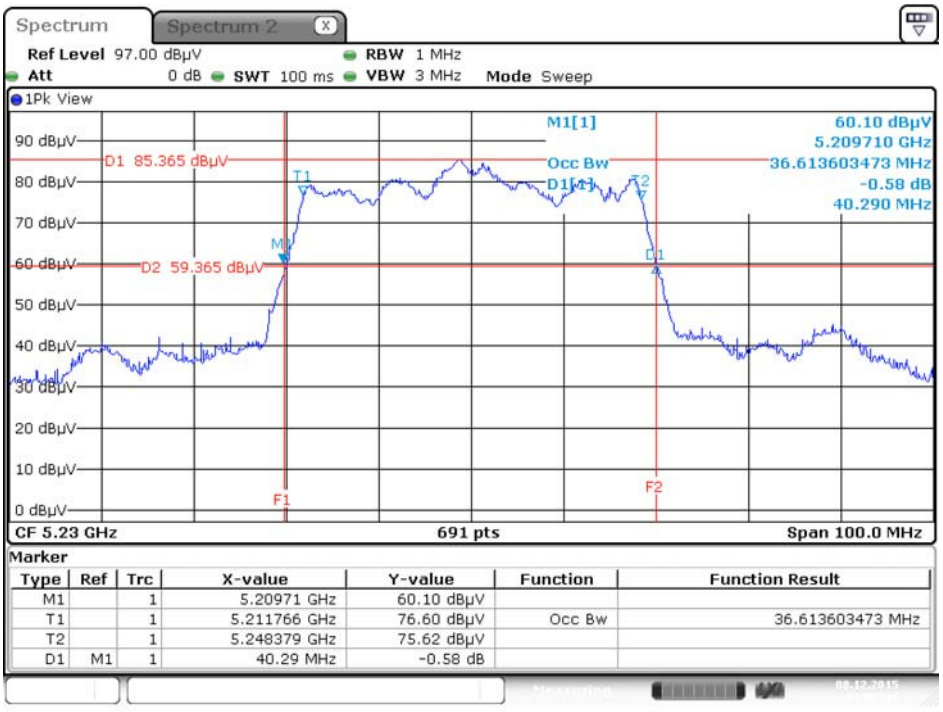

Date: 8.DEC.2015 01:06:34

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5190 MHz**



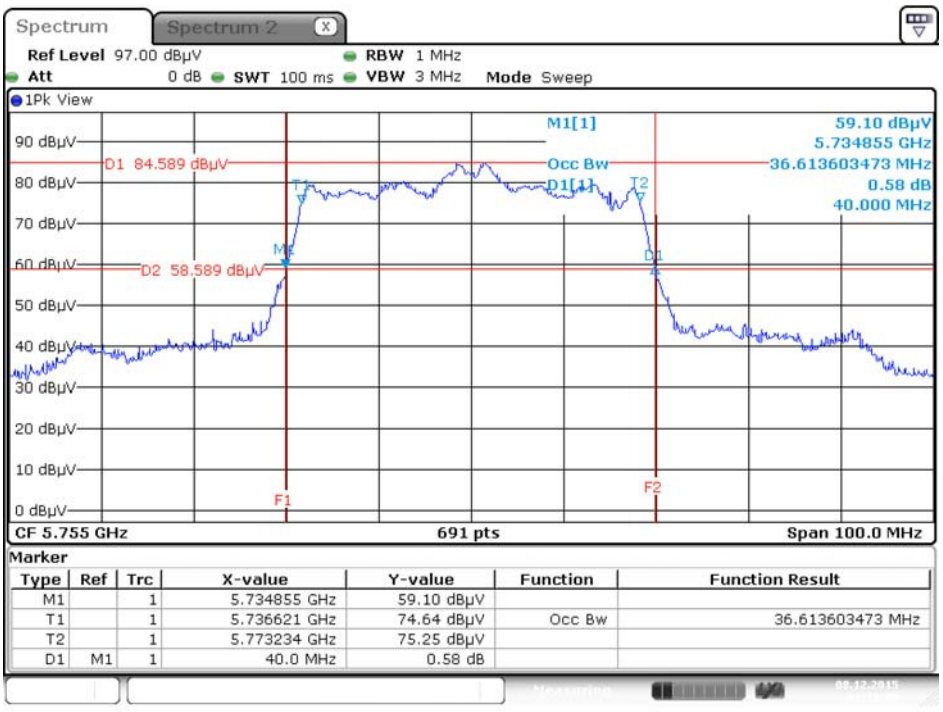

Date: 8.DEC.2015 01:07:21

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5230 MHz**



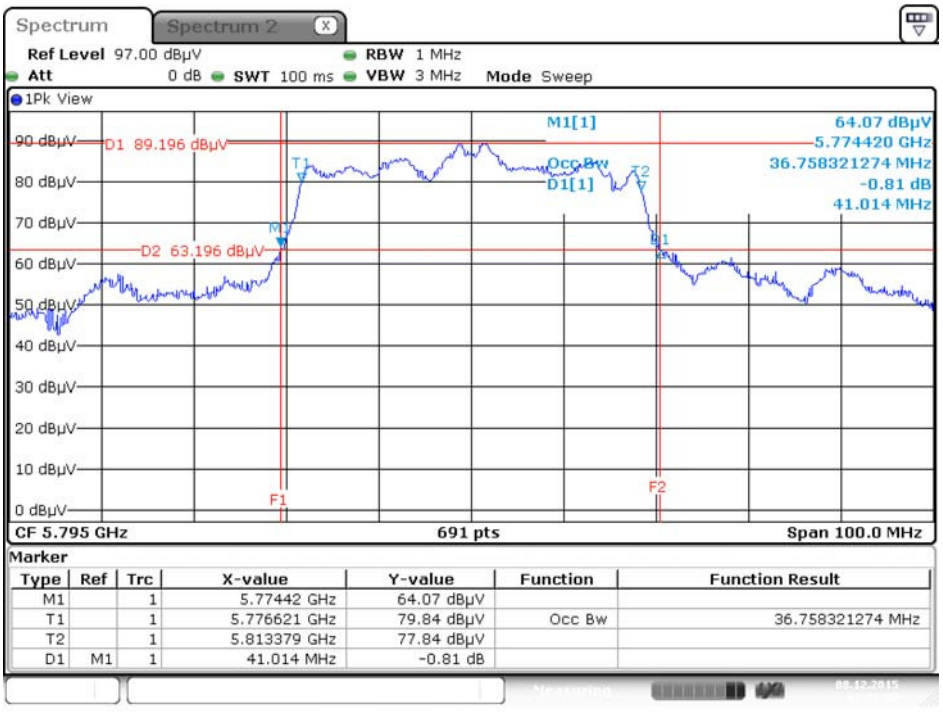

Date: 8.DEC.2015 01:07:42

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5755 MHz**



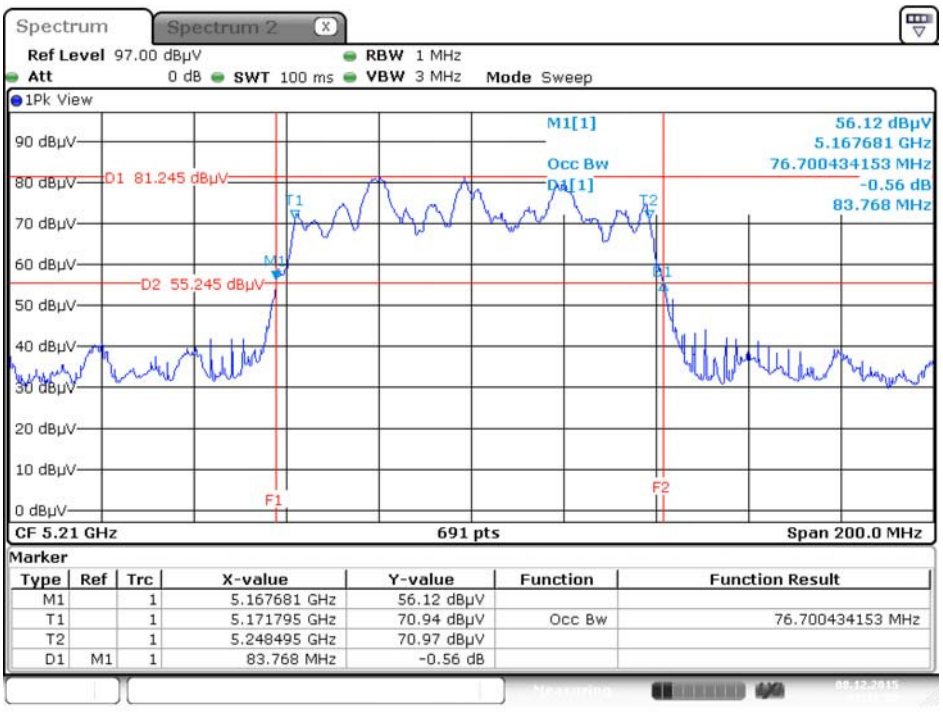

Date: 8.DEC.2015 01:10:59

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5795 MHz**



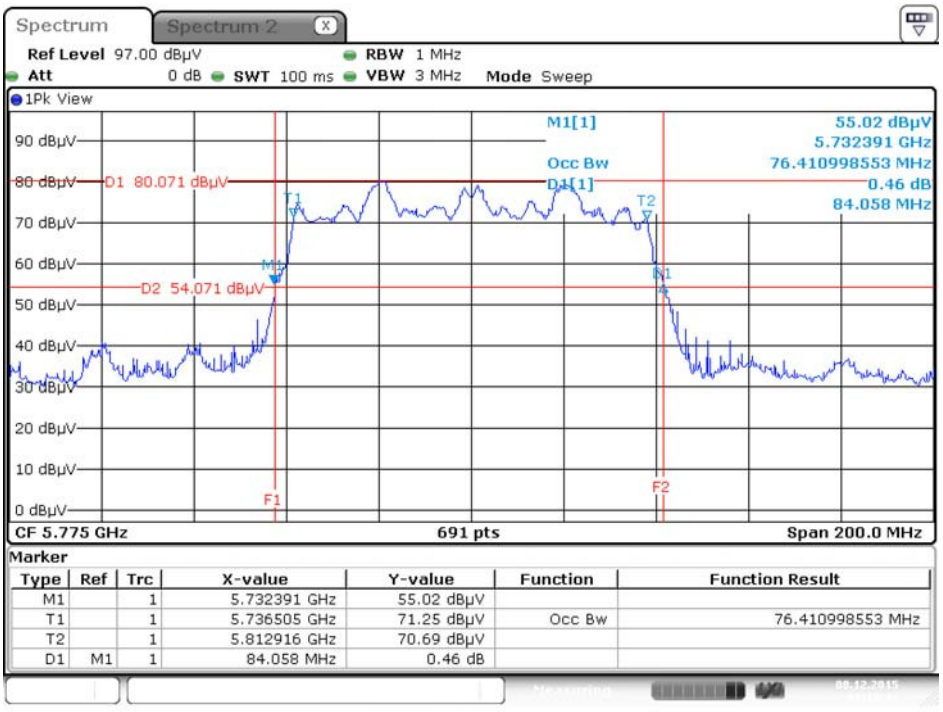

Date: 8.DEC.2015 01:11:21

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5210 MHz**




Date: 8.DEC.2015 01:12:09

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5775 MHz**




Date: 8.DEC.2015 01:15:41

## 4.3. 6dB Spectrum Bandwidth Measurement

### 4.3.1. Limit

For digital modulation systems, the minimum 6dB bandwidth shall be at least 500 kHz.

### 4.3.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer.

| 6dB Spectrum Bandwidth | |
|---|---|
| **Spectrum Parameters** | **Setting** |
| Attenuation | Auto |
| Span Frequency | > 6dB Bandwidth |
| RBW | 100kHz |
| VBW | ≥ 3 x RBW |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

### 4.3.3. Test Procedures

For Radiated 6dB Bandwidth Measurement:

1. The transmitter was radiated to the spectrum analyzer in peak hold mode.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (C) Emission Bandwidth.
3. Multiple antenna system was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. Measured the spectrum width with power higher than 6dB below carrier.

### 4.3.4. Test Setup Layout

For Radiated 6dB Bandwidth Measurement:

This test setup layout is the same as that shown in section 4.6.4.

### 4.3.5. Test Deviation

There is no deviation with the original standard.

### 4.3.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

### 4.3.7. Test Result of 6dB Spectrum Bandwidth

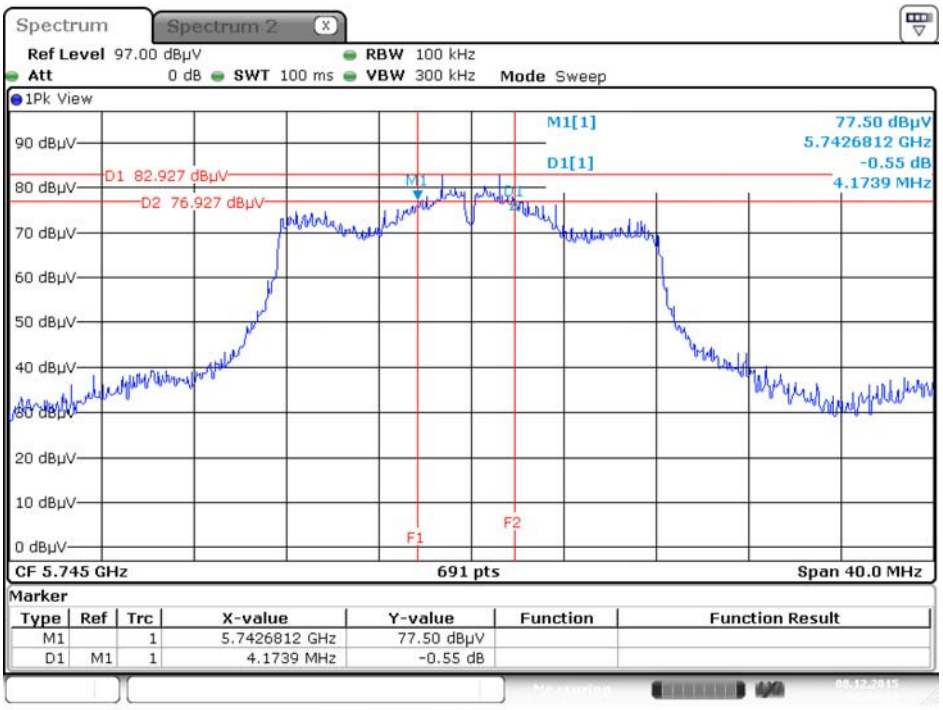
| Temperature | 25°C | Humidity | 45% |
|---|---|---|---|
| Test Engineer | Roki Liu | | |

| Mode | Frequency | 6dB Bandwidth (MHz) | Min. Limit (kHz) | Test Result |
|---|---|---|---|---|
| 802.11a | 5745 MHz | 4.17 | 500 | Complies |
| | 5785 MHz | 15.01 | 500 | Complies |
| | 5825 MHz | 10.90 | 500 | Complies |
| 802.11ac MCS0/Nss1 VHT20 | 5745 MHz | 3.54 | 500 | Complies |
| | 5785 MHz | 10.90 | 500 | Complies |
| | 5825 MHz | 13.45 | 500 | Complies |
| 802.11ac MCS0/Nss1 VHT40 | 5755 MHz | 30.73 | 500 | Complies |
| | 5795 MHz | 31.88 | 500 | Complies |
| 802.11ac MCS0/Nss1 VHT80 | 5775 MHz | 61.16 | 500 | Complies |

Note: All the test values were listed in the report.

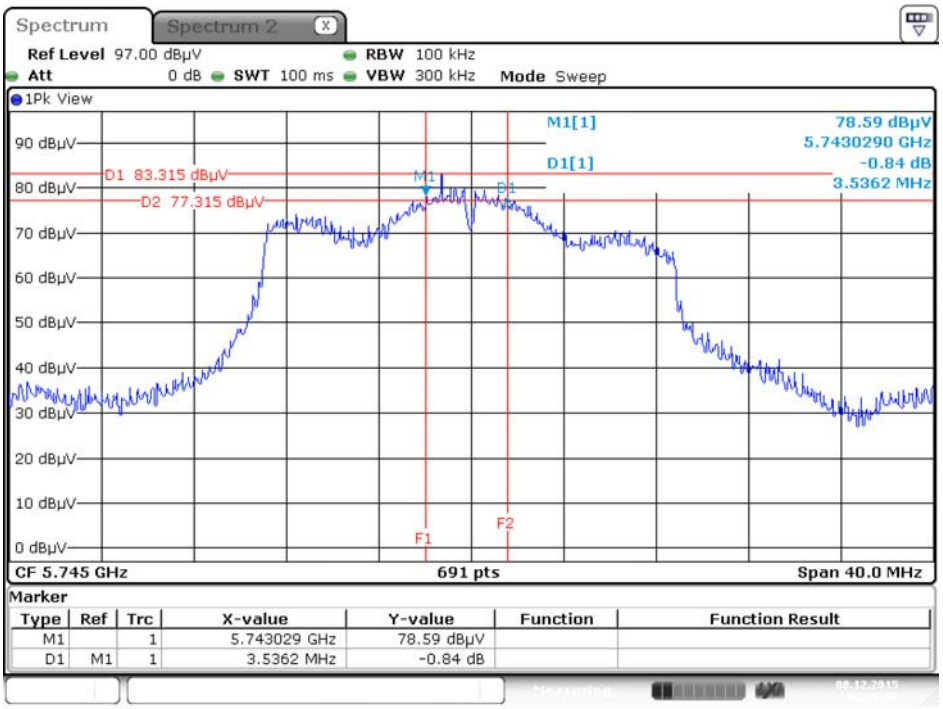
For plots, only the channel with worse result was shown.

**6 dB Bandwidth Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5745 MHz**



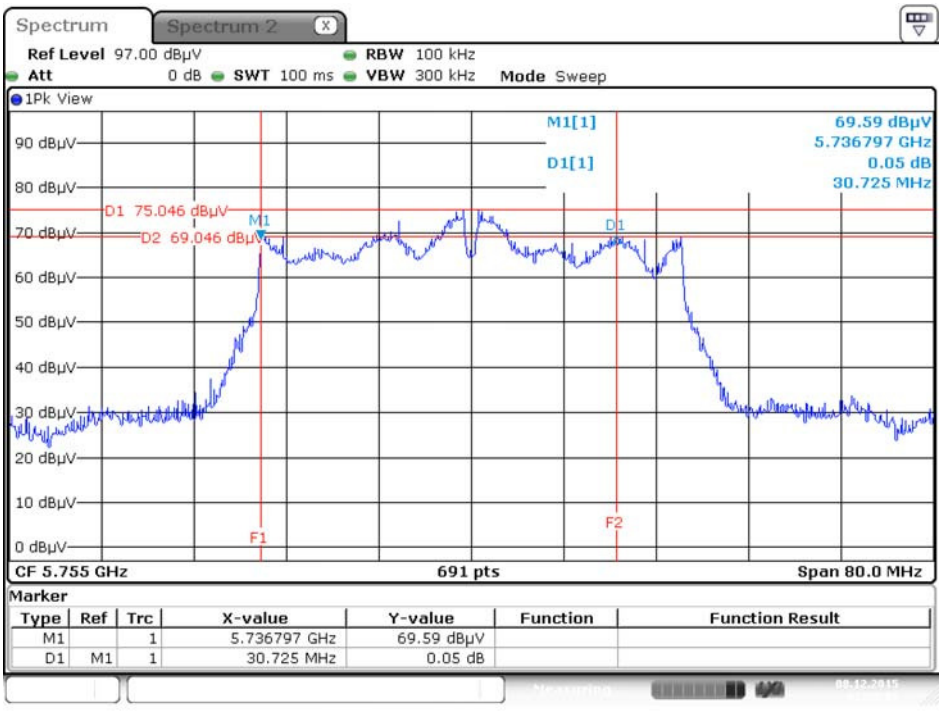

Date: 8.DEC.2015 02:44:32

**6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5745 MHz**



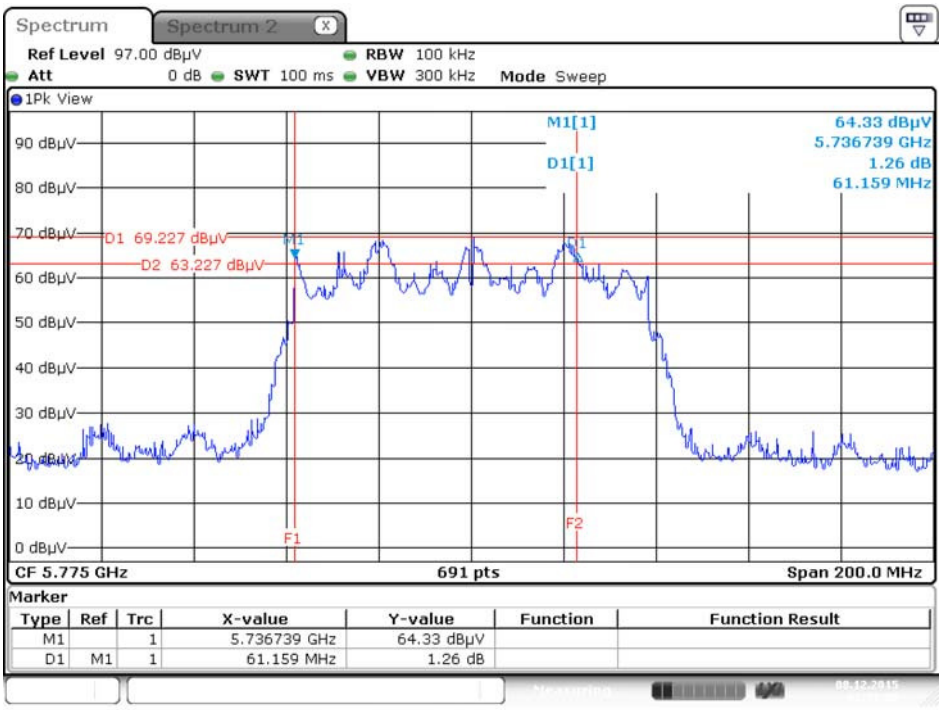

Date: 8.DEC.2015 02:46:50

**6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5755 MHz**




Date: 8.DEC.2015 02:50:01

**6 dB Bandwidth Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5775 MHz**




Date: 8.DEC.2015 02:51:00

## 4.4. Maximum Conducted Output Power Measurement

### 4.4.1. Limit

| Frequency Band | | | Limit |
|---|---|---|---|
| ☒ | 5.15~5.25 GHz | | |
| | Operating Mode | | |
| | ☒ | Outdoor access point | The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. 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). |
| | ☐ | Indoor access point | The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm) provided the maximum antenna gain does not exceed 6 dBi. 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. |
| | ☐ | Fixed point-to-point access points | The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). 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. |
| | ☐ | Mobile and portable client devices | The maximum conducted output power over the frequency band of operation shall not exceed 250 mW (24dBm) provided the maximum antenna gain does not exceed 6 dBi. 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. |

| | | |
|---|---|---|
| ☒ | 5.725~5.85 GHz | The maximum conducted output power over the frequency band of operation shall not exceed 1 W (30dBm). 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. |

### 4.4.2. Measuring Instruments and Setting

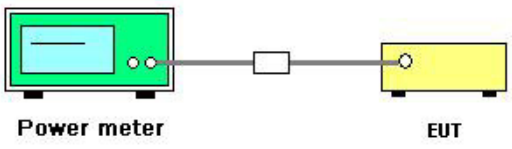
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

| Power Meter Parameter | Setting |
|---|---|
| Detector | AVERAGE |

### 4.4.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (E) Maximum conducted output power =>3. Measurement using a Power Meter (PM) =>b) Method PM-G (Measurement using a gated RF average power meter).
3. Multiple antenna systems was performed in accordance with KDB662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
4. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

### 4.4.4. Test Setup Layout




### 4.4.5. Test Deviation

There is no deviation with the original standard.

### 4.4.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

## 4.4.7. Test Result of Maximum Conducted Output Power

| Temperature | 25°C | Humidity | 45% |
|---|---|---|---|
| Test Engineer | Roki Liu | Test Date | Dec. 07, 2015 |

| Mode | Frequency | Conducted Power (dBm) | | | | | Max. Limit (dBm) | Result |
|---|---|---|---|---|---|---|---|---|
| | | Chain 1 | Chain 2 | Chain 3 | Chain 4 | Total | | |
| 802.11a | 5180 MHz | 15.31 | 14.54 | 15.36 | 15.77 | 21.29 | 29.75 | Complies |
| | 5200 MHz | 15.41 | 15.08 | 15.54 | 15.92 | 21.52 | 29.75 | Complies |
| | 5240 MHz | 15.11 | 14.98 | 15.19 | 15.69 | 21.27 | 29.75 | Complies |
| | 5745 MHz | 15.71 | 15.59 | 16.62 | 16.58 | 22.17 | 29.75 | Complies |
| | 5785 MHz | 22.37 | 21.85 | 22.86 | 22.36 | 28.40 | 29.75 | Complies |
| | 5825 MHz | 18.50 | 18.54 | 19.06 | 19.84 | 25.04 | 29.75 | Complies |
| 802.11ac MCS0/Nss1 VHT20 | 5180 MHz | 15.19 | 15.08 | 15.25 | 15.29 | 21.22 | 29.75 | Complies |
| | 5200 MHz | 15.26 | 14.95 | 15.28 | 15.82 | 21.36 | 29.75 | Complies |
| | 5240 MHz | 15.35 | 15.12 | 15.46 | 15.71 | 21.44 | 29.75 | Complies |
| | 5745 MHz | 15.50 | 15.45 | 16.37 | 16.47 | 21.99 | 29.75 | Complies |
| | 5785 MHz | 22.39 | 21.89 | 22.71 | 22.51 | 28.41 | 29.75 | Complies |
| | 5825 MHz | 18.42 | 18.38 | 18.99 | 19.81 | 24.96 | 29.75 | Complies |
| 802.11ac MCS0/Nss1 VHT40 | 5190 MHz | 15.28 | 15.13 | 15.54 | 15.93 | 21.50 | 29.75 | Complies |
| | 5230 MHz | 15.07 | 14.82 | 15.21 | 15.84 | 21.27 | 29.75 | Complies |
| | 5755 MHz | 13.77 | 13.76 | 14.67 | 14.76 | 20.29 | 29.75 | Complies |
| | 5795 MHz | 18.54 | 18.76 | 19.44 | 19.78 | 25.18 | 29.75 | Complies |
| 802.11ac MCS0/Nss1 VHT80 | 5210 MHz | 11.16 | 11.19 | 11.69 | 12.02 | 17.55 | 29.75 | Complies |
| | 5775 MHz | 10.16 | 10.34 | 11.25 | 11.21 | 16.79 | 29.75 | Complies |

Note: Antenna gain=6.25dBi > 6dBi, So Limit =30-(6.25-6)=29.75dBm.

## 4.5. Power Spectral Density Measurement

### 4.5.1. Limit

The following table is power spectral density limits and decrease power density limit rule refer to section 4.4.1.

| Frequency Band | | | Limit |
|---|---|---|---|
| ☒ | 5.15~5.25 GHz | | |
| | Operating Mode | | |
| | ☒ | Outdoor access point | 17 dBm/MHz |
| | ☐ | Indoor access point | 17 dBm/MHz |
| | ☐ | Fixed point-to-point access points | 17 dBm/MHz |
| | ☐ | Mobile and portable client devices | 11 dBm/MHz |
| ☒ | 5.725~5.85 GHz | | 30 dBm/500kHz |

### 4.5.2. Measuring Instruments and Setting

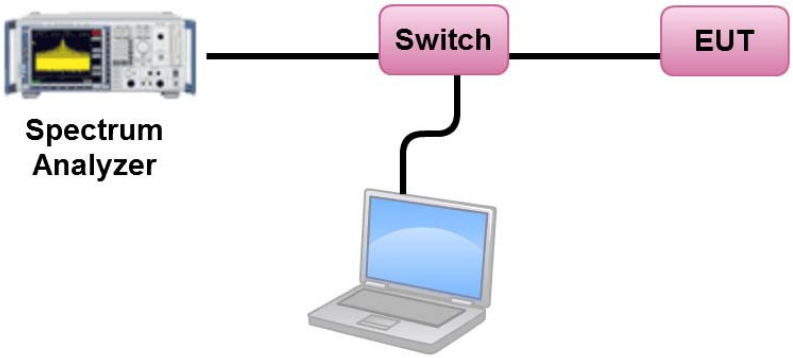
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | Encompass the entire emissions bandwidth (EBW) of the signal |
| RBW | 1000 kHz |
| VBW | 3000 kHz |
| Detector | RMS |
| Trace | AVERAGE |
| Sweep Time | Auto |
| Trace Average | 100 times |
| Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement. | |

### 4.5.3. Test Procedures

1. The transmitter output (antenna port) was connected RF switch to the spectrum analyzer.
2. Test was performed in accordance with KDB789033 D02 v01r02 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - section (F) Maximum Power Spectral Density (PSD).
3. Multiple antenna systems was performed in accordance KDB662911 D01 v02r01 in-Band Power Spectral Density (PSD) Measurements (a) Measure and sum the spectra across the outputs.
4. When measuring first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3 and so on up to the Nth output to obtain the value for the first frequency bin of the summed spectrum. The summed spectrum value for each of the other frequency bins is computed in the same way.
5. For 5.725~5.85 GHz, the measured result of PSD level must add 10log(500kHz/RBW) and the final result should ≤ 30 dBm.

### 4.5.4. Test Setup Layout




### 4.5.5. Test Deviation

There is no deviation with the original standard.

### 4.5.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

## 4.5.7. Test Result of Power Spectral Density

| Temperature | 25°C | Humidity | 45% |
|---|---|---|---|
| Test Engineer | Roki Liu | Test Date | Dec. 07, 2015 |

**Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4**

| Channel | Frequency | Power Density (dBm/MHz) | Max. Limit (dBm/MHz) | Result |
|---|---|---|---|---|
| 36 | 5180 MHz | 7.76 | 10.91 | Complies |
| 40 | 5200 MHz | 7.85 | 10.91 | Complies |
| 48 | 5240 MHz | 7.53 | 10.91 | Complies |

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.09dBi > 6dBi, So Limit =17-(12.09-6)=10.91dBm/MHz.

| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---|---|---|---|---|---|---|
| 149 | 5745 MHz | 9.10 | -3.01 | 6.09 | 23.91 | Complies |
| 157 | 5785 MHz | 15.29 | -3.01 | 12.28 | 23.91 | Complies |
| 165 | 5825 MHz | 11.88 | -3.01 | 8.87 | 23.91 | Complies |

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.09dBi > 6dBi, So Limit =30-(12.09-6)=23.91dBm/500kHz.

**Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4**

| Channel | Frequency | Power Density (dBm/MHz) | Max. Limit (dBm/MHz) | Result |
|---|---|---|---|---|
| 36 | 5180 MHz | 7.58 | 10.91 | Complies |
| 40 | 5200 MHz | 7.72 | 10.91 | Complies |
| 48 | 5240 MHz | 7.86 | 10.91 | Complies |

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.09dBi > 6dBi, So Limit =17-(12.09-6)=10.91dBm/MHz.

| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---|---|---|---|---|---|---|
| 149 | 5745 MHz | 9.20 | -3.01 | 6.19 | 23.91 | Complies |
| 157 | 5785 MHz | 15.26 | -3.01 | 12.25 | 23.91 | Complies |
| 165 | 5825 MHz | 11.88 | -3.01 | 8.87 | 23.91 | Complies |

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.09dBi > 6dBi, So Limit =30-(12.09-6)=23.91dBm/500kHz.

**Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4**

| Channel | Frequency | Power Density (dBm/MHz) | Max. Limit (dBm/MHz) | Result |
|---|---|---|---|---|
| 38 | 5190 MHz | 5.04 | 10.91 | Complies |
| 46 | 5230 MHz | 4.62 | 10.91 | Complies |

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.09dBi > 6dBi, So Limit =17-(12.09-6)=10.91dBm/MHz.

| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---|---|---|---|---|---|---|
| 151 | 5755 MHz | 4.45 | -3.01 | 1.44 | 23.91 | Complies |
| 159 | 5795 MHz | 9.22 | -3.01 | 6.21 | 23.91 | Complies |

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.09dBi > 6dBi, So Limit =30-(12.09-6)=23.91dBm/500kHz.

**Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4**

| Channel | Frequency | Power Density (dBm/MHz) | Max. Limit (dBm/MHz) | Result |
|---|---|---|---|---|
| 42 | 5210 MHz | -1.70 | 10.91 | Complies |

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.09dBi > 6dBi, So Limit =17-(12.09-6)=10.91dBm/MHz.

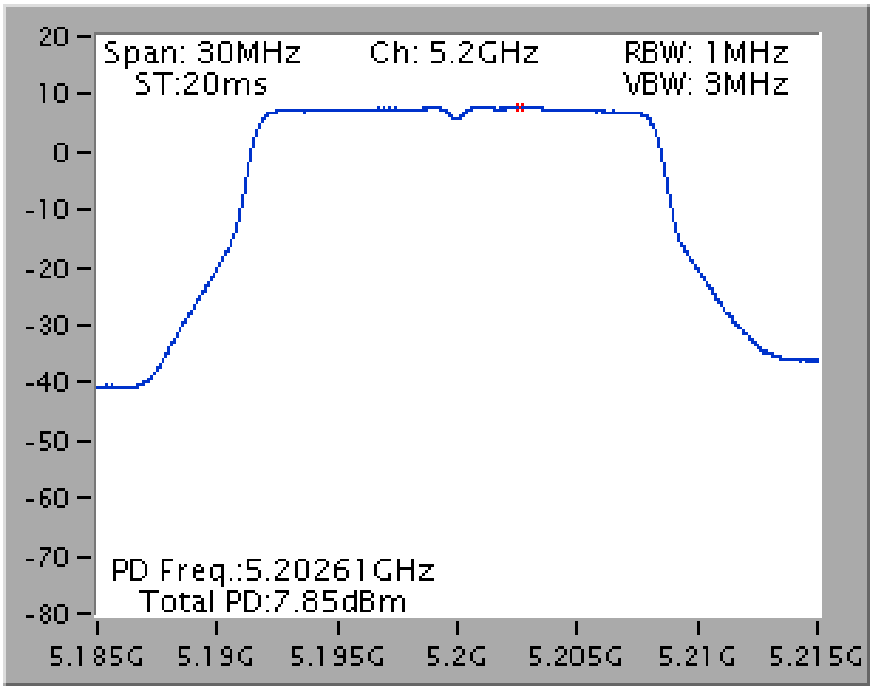
| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---|---|---|---|---|---|---|
| 155 | 5775 MHz | -2.21 | -3.01 | -5.22 | 23.91 | Complies |

Note: $DirectionalGain = 10 \cdot \log\left[\frac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right]$ =12.09dBi > 6dBi, So Limit =30-(12.09-6)=23.91dBm/500kHz.

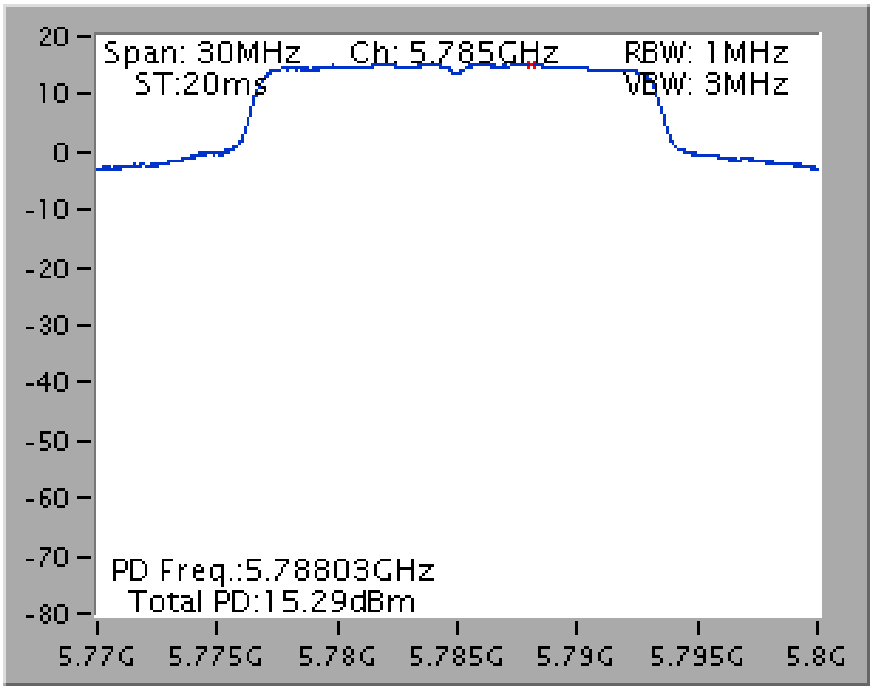
Note: All the test values were listed in the report.

For plots, only the channel with worse result was shown.

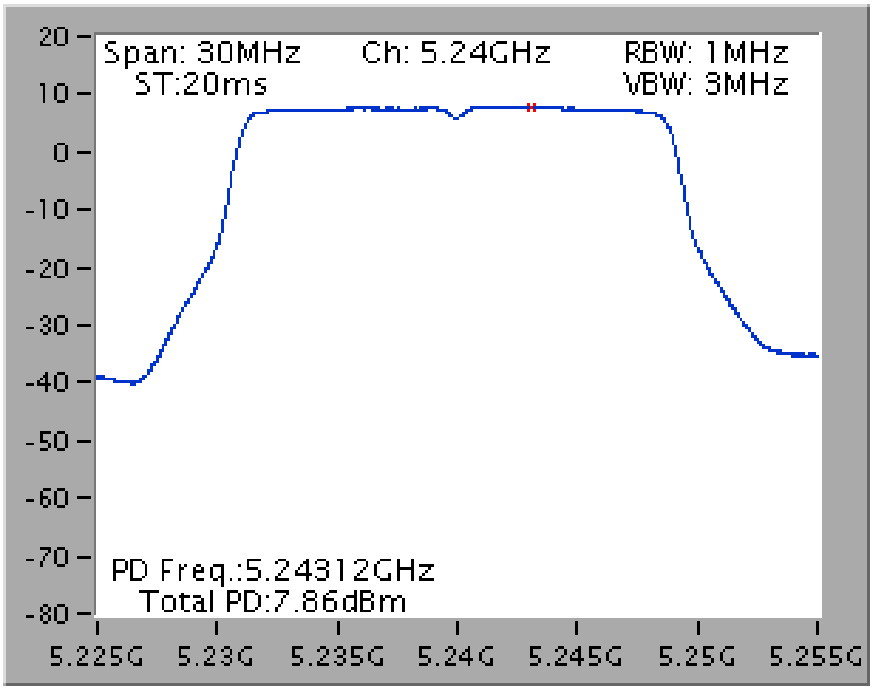
**Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5200 MHz**



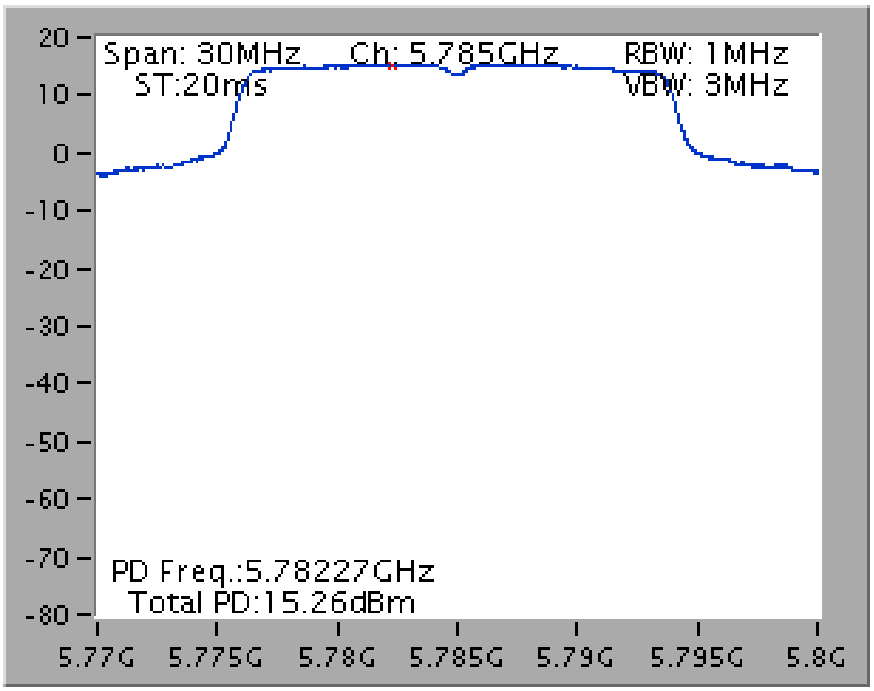

**Power Density Plot on Configuration IEEE 802.11a / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz**



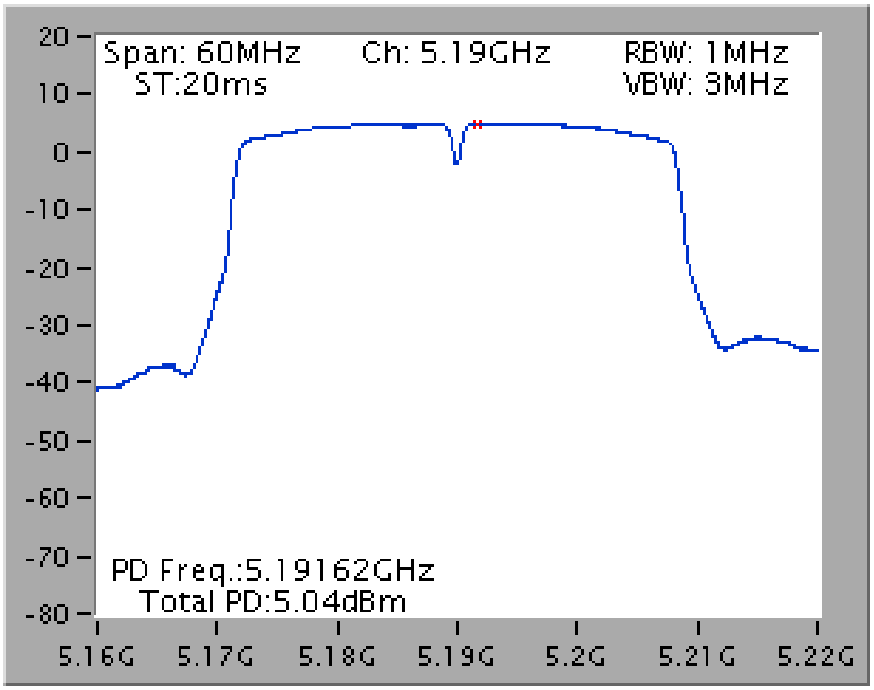
**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5240 MHz**



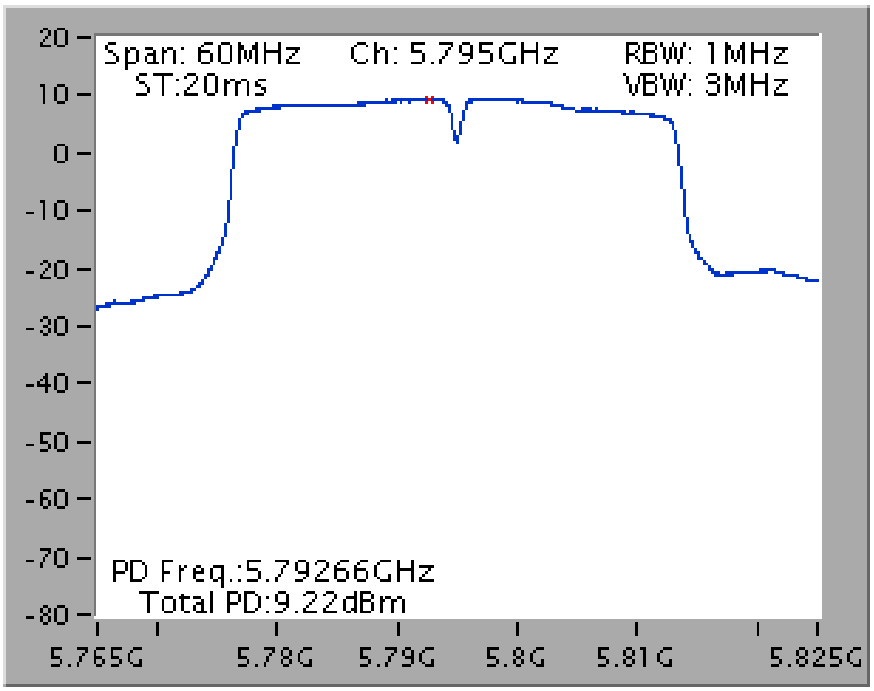

**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT20 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5785 MHz**



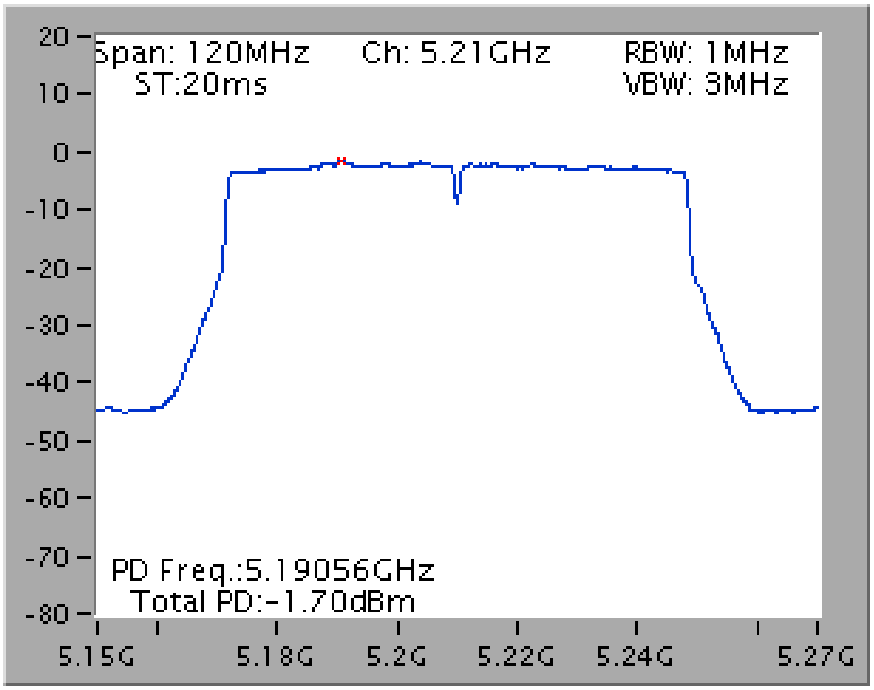
**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5190 MHz**



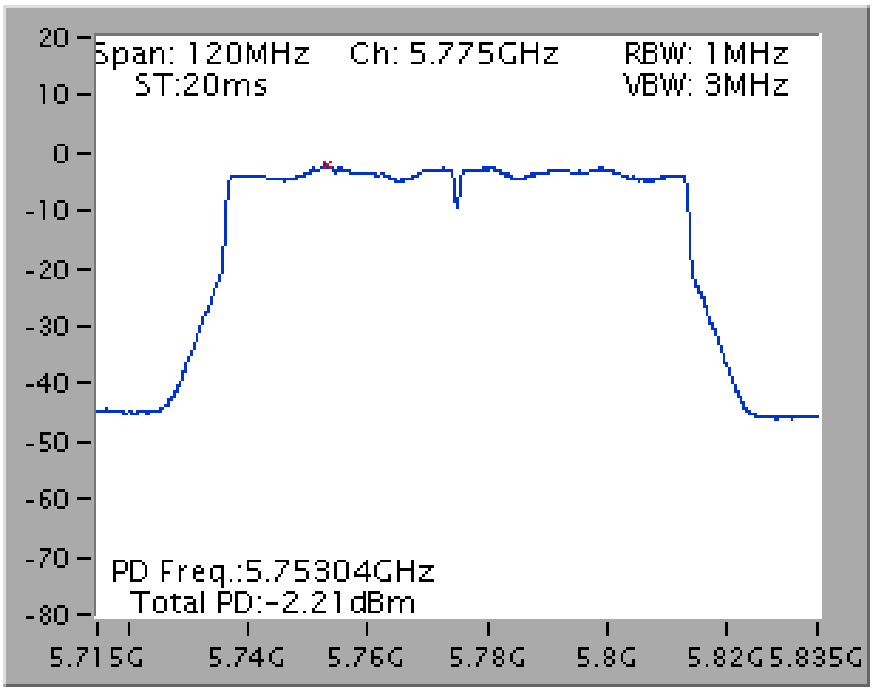

**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5795 MHz**



**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5210 MHz**




**Power Density Plot on Configuration IEEE 802.11ac MCS0/Nss1 VHT80 / Chain 1 + Chain 2 + Chain 3 + Chain 4 / 5775 MHz**



## 4.6. Radiated Emissions Measurement

### 4.6.1. Limit

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 e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 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 e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(kHz) | 300 |
| 0.490~1.705 | 24000/F(kHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

### 4.6.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 40 GHz |
| RBW / VBW (Emission in restricted band) | 1MHz / 3MHz for Peak,<br>1MHz / 1/T for Average |
| RBW / VBW (Emission in non-restricted band) | 1MHz / 3MHz for peak |

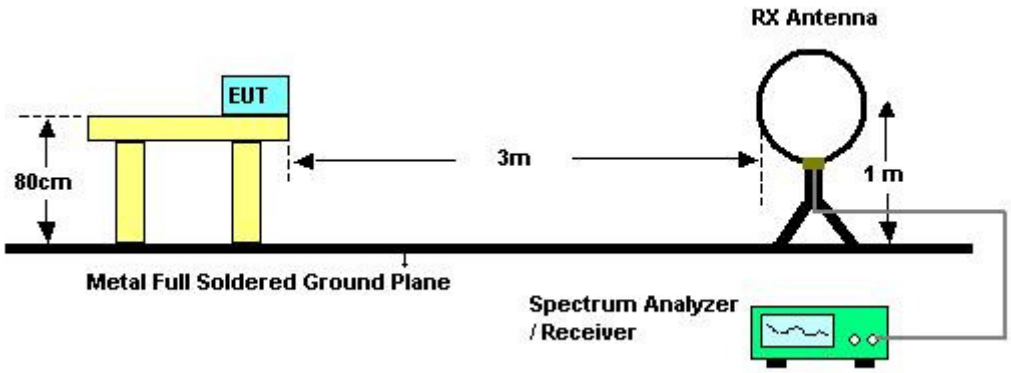
| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RBW 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RBW 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RBW 120kHz for QP |

### 4.6.3. Test Procedures

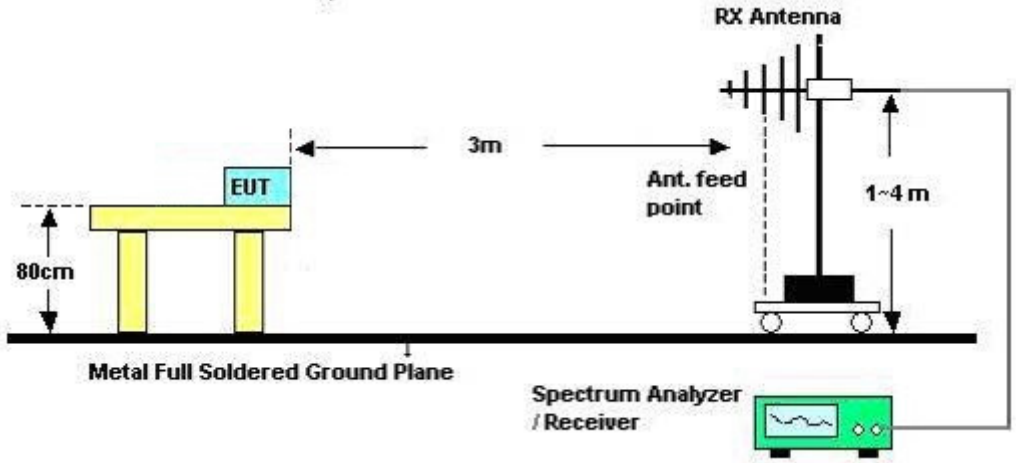
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

### 4.6.4. Test Setup Layout

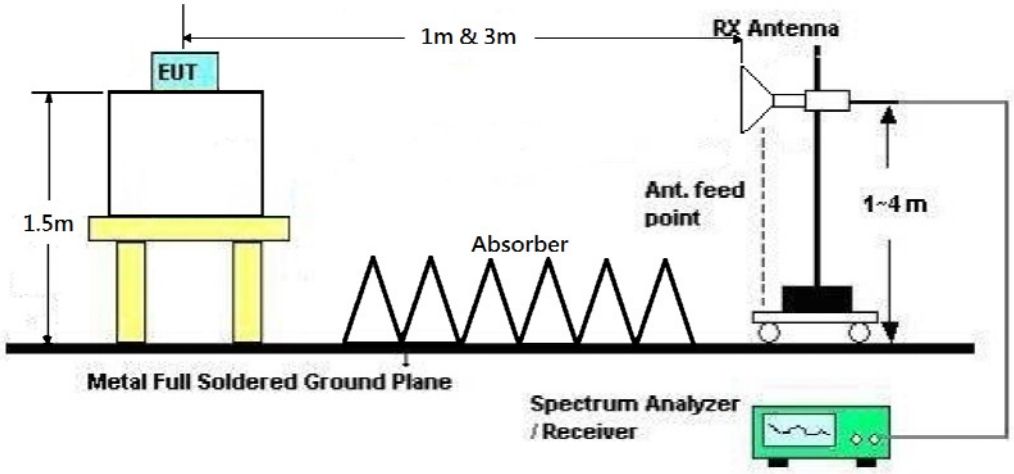
**For Radiated Emissions: 9kHz ~30MHz**




**For Radiated Emissions: 30MHz~1GHz**




**For Radiated Emissions: Above 1GHz**



### 4.6.5. Test Deviation

There is no deviation with the original standard.

### 4.6.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

### 4.6.7. Results of Radiated Emissions (9kHz~30MHz)

| Temperature | 22°C | Humidity | 55% |
|---|---|---|---|
| Test Engineer | Stim Sung & Owen Hsu | Configurations | Normal Link |
| Test Date | Nov. 18, 2015 | Test Mode | Mode 1 |

| Freq. (MHz) | Level (dBuV) | Over Limit (dB) | Limit Line (dBuV) | Remark |
|---|---|---|---|---|
| - | - | - | - | See Note |

Note:

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

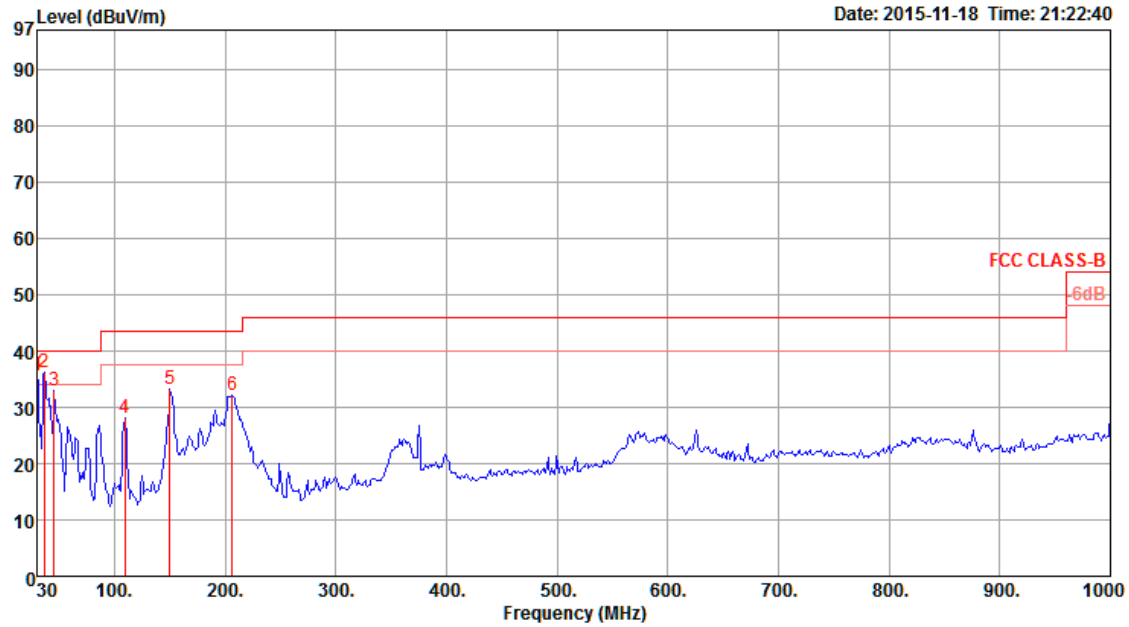
Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

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

## 4.6.8. Results of Radiated Emissions (30MHz~1GHz)

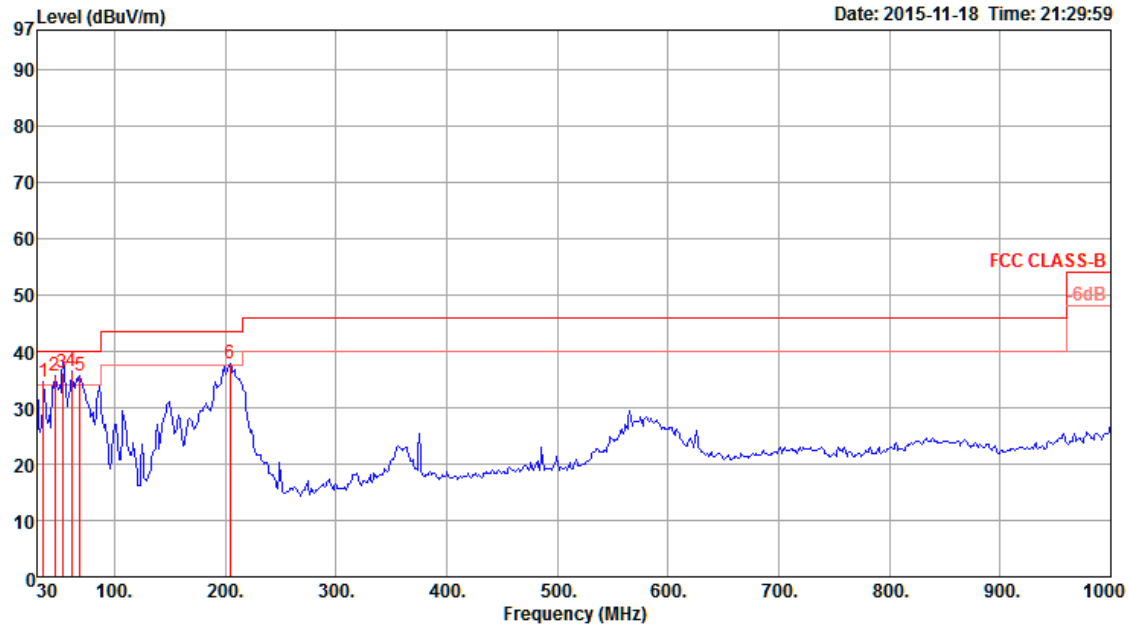
| Temperature | 22°C | Humidity | 55% |
|---|---|---|---|
| Test Engineer | Stim Sung & Owen Hsu | Configurations | Normal Link |
| Test Mode | Mode 1 | | |

*Horizontal*




| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | deg | cm | | |
| 1 | 30.00 | 35.60 | 40.00 | -4.40 | 45.09 | 0.20 | 19.80 | 29.49 | 124 | 114 | QP | HORIZONTAL |
| 2 | 36.79 | 36.10 | 40.00 | -3.90 | 49.67 | 0.25 | 15.66 | 29.48 | 360 | 200 | Peak | HORIZONTAL |
| 3 | 45.52 | 33.00 | 40.00 | -7.00 | 51.45 | 0.33 | 10.69 | 29.47 | 360 | 200 | Peak | HORIZONTAL |
| 4 | 109.54 | 28.19 | 43.50 | -15.31 | 44.14 | 0.75 | 12.51 | 29.21 | 360 | 200 | Peak | HORIZONTAL |
| 5 | 150.28 | 33.12 | 43.50 | -10.38 | 50.04 | 0.92 | 11.17 | 29.01 | 360 | 200 | Peak | HORIZONTAL |
| 6 | 206.54 | 32.08 | 43.50 | -11.42 | 49.15 | 1.16 | 10.56 | 28.79 | 360 | 200 | Peak | HORIZONTAL |

***Vertical***




| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | deg | cm | | |
| 1 | 35.82 | 34.47 | 40.00 | -5.53 | 47.49 | 0.23 | 16.23 | 29.48 | 360 | 100 | Peak | VERTICAL |
| 2 | 46.49 | 35.75 | 40.00 | -4.25 | 54.60 | 0.34 | 10.27 | 29.46 | 360 | 100 | Peak | VERTICAL |
| 3 | 53.28 | 36.12 | 40.00 | -3.88 | 56.97 | 0.41 | 8.18 | 29.44 | 225 | 142 | QP | VERTICAL |
| 4 | 61.04 | 36.37 | 40.00 | -3.63 | 58.35 | 0.45 | 6.98 | 29.41 | 360 | 100 | Peak | VERTICAL |
| 5 | 68.80 | 35.64 | 40.00 | -4.36 | 57.71 | 0.48 | 6.82 | 29.37 | 360 | 100 | Peak | VERTICAL |
| 6 | 204.60 | 37.70 | 43.50 | -5.80 | 54.80 | 1.15 | 10.55 | 28.80 | 360 | 100 | Peak | VERTICAL |

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

## 4.6.9. Results for Radiated Emissions (1GHz~40GHz)

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11a CH 36 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15537.39 | 46.87 | 54.00 | -7.13 | 30.00 | 13.84 | 38.24 | 35.21 | Average | 200 | 327 | HORIZONTAL |
| 2 | 15543.09 | 60.56 | 74.00 | -13.44 | 43.69 | 13.84 | 38.24 | 35.21 | Peak | 200 | 327 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15538.48 | 60.83 | 74.00 | -13.17 | 43.96 | 13.84 | 38.24 | 35.21 | Peak | 199 | 320 | VERTICAL |
| 2 | 15542.63 | 46.86 | 54.00 | -7.14 | 29.99 | 13.84 | 38.24 | 35.21 | Average | 199 | 320 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11a CH 40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15595.37 | 59.61 | 74.00 | -14.39 | 42.84 | 13.83 | 38.17 | 35.23 | Peak | 199 | 316 | HORIZONTAL |
| 2 | 15596.04 | 46.79 | 54.00 | -7.21 | 30.02 | 13.83 | 38.17 | 35.23 | Average | 199 | 316 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15603.97 | 60.31 | 74.00 | -13.69 | 43.60 | 13.83 | 38.11 | 35.23 | Peak | 199 | 306 | VERTICAL |
| 2 | 15604.20 | 46.73 | 54.00 | -7.27 | 30.02 | 13.83 | 38.11 | 35.23 | Average | 199 | 306 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11a CH 48 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15717.26 | 59.06 | 74.00 | -14.94 | 42.56 | 13.82 | 37.98 | 35.30 | Peak | 200 | 315 | HORIZONTAL |
| 2 | 15719.54 | 46.39 | 54.00 | -7.61 | 29.89 | 13.82 | 37.98 | 35.30 | Average | 200 | 315 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15716.30 | 46.44 | 54.00 | -7.56 | 29.94 | 13.82 | 37.98 | 35.30 | Average | 200 | 325 | VERTICAL |
| 2 | 15719.54 | 59.24 | 74.00 | -14.76 | 42.74 | 13.82 | 37.98 | 35.30 | Peak | 200 | 325 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11a CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11489.26 | 56.50 | 74.00 | -17.50 | 41.95 | 10.25 | 39.10 | 34.80 | Peak | 200 | 293 | HORIZONTAL |
| 2 | 11493.59 | 43.46 | 54.00 | -10.54 | 28.91 | 10.25 | 39.10 | 34.80 | Average | 200 | 293 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11489.54 | 57.05 | 74.00 | -16.95 | 42.50 | 10.25 | 39.10 | 34.80 | Peak | 200 | 286 | VERTICAL |
| 2 | 11493.00 | 43.31 | 54.00 | -10.69 | 28.76 | 10.25 | 39.10 | 34.80 | Average | 200 | 286 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11a CH 157 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11570.14 | 43.02 | 54.00 | -10.98 | 28.41 | 10.29 | 39.14 | 34.82 | Average | 200 | 294 | HORIZONTAL |
| 2 | 11573.93 | 55.38 | 74.00 | -18.62 | 40.77 | 10.29 | 39.14 | 34.82 | Peak | 200 | 294 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11571.43 | 43.06 | 54.00 | -10.94 | 28.45 | 10.29 | 39.14 | 34.82 | Average | 200 | 287 | VERTICAL |
| 2 | 11574.49 | 55.54 | 74.00 | -18.46 | 40.93 | 10.29 | 39.14 | 34.82 | Peak | 200 | 287 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11a CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11649.52 | 56.80 | 74.00 | -17.20 | 42.14 | 10.32 | 39.18 | 34.84 | Peak | 200 | 279 | HORIZONTAL |
| 2 | 11653.33 | 43.20 | 54.00 | -10.80 | 28.51 | 10.33 | 39.20 | 34.84 | Average | 200 | 279 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11648.24 | 56.68 | 74.00 | -17.32 | 42.02 | 10.32 | 39.18 | 34.84 | Peak | 200 | 273 | VERTICAL |
| 2 | 11650.95 | 43.35 | 54.00 | -10.65 | 28.66 | 10.33 | 39.20 | 34.84 | Average | 200 | 273 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT20 CH 36 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15538.99 | 46.84 | 54.00 | -7.16 | 29.97 | 13.84 | 38.24 | 35.21 | Average | 200 | 284 | HORIZONTAL |
| 2 | 15540.53 | 61.17 | 74.00 | -12.83 | 44.30 | 13.84 | 38.24 | 35.21 | Peak | 200 | 284 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15540.53 | 61.17 | 74.00 | -12.83 | 44.30 | 13.84 | 38.24 | 35.21 | Peak | 200 | 277 | VERTICAL |
| 2 | 15540.69 | 47.01 | 54.00 | -6.99 | 30.14 | 13.84 | 38.24 | 35.21 | Average | 200 | 277 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT20 CH 40 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15595.71 | 59.85 | 74.00 | -14.15 | 43.08 | 13.83 | 38.17 | 35.23 | Peak | 200 | 284 | HORIZONTAL |
| 2 | 15601.75 | 46.74 | 54.00 | -7.26 | 30.03 | 13.83 | 38.11 | 35.23 | Average | 200 | 284 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15595.99 | 46.55 | 54.00 | -7.45 | 29.78 | 13.83 | 38.17 | 35.23 | Average | 200 | 265 | VERTICAL |
| 2 | 15597.63 | 60.45 | 74.00 | -13.55 | 43.68 | 13.83 | 38.17 | 35.23 | Peak | 200 | 265 | VERTICAL |

| Temperature | 25℃ | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT20 CH 48 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15718.37 | 46.45 | 54.00 | -7.55 | 29.95 | 13.82 | 37.98 | 35.30 | Average | 200 | 272 | HORIZONTAL |
| 2 | 15723.43 | 59.93 | 74.00 | -14.07 | 43.43 | 13.82 | 37.98 | 35.30 | Peak | 200 | 272 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15718.75 | 60.36 | 74.00 | -13.64 | 43.86 | 13.82 | 37.98 | 35.30 | Peak | 200 | 263 | VERTICAL |
| 2 | 15719.41 | 46.51 | 54.00 | -7.49 | 30.01 | 13.82 | 37.98 | 35.30 | Average | 200 | 263 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT20 CH 149 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11485.00 | 56.37 | 74.00 | -17.63 | 41.82 | 10.25 | 39.10 | 34.80 | Peak | 200 | 302 | HORIZONTAL |
| 2 | 11485.53 | 43.41 | 54.00 | -10.59 | 28.86 | 10.25 | 39.10 | 34.80 | Average | 200 | 302 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11486.76 | 57.15 | 74.00 | -16.85 | 42.60 | 10.25 | 39.10 | 34.80 | Peak | 200 | 311 | VERTICAL |
| 2 | 11487.02 | 43.25 | 54.00 | -10.75 | 28.70 | 10.25 | 39.10 | 34.80 | Average | 200 | 311 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT20 CH 157 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11565.34 | 56.16 | 74.00 | -17.84 | 41.55 | 10.29 | 39.14 | 34.82 | Peak | 200 | 302 | HORIZONTAL |
| 2 | 11569.04 | 42.94 | 54.00 | -11.06 | 28.33 | 10.29 | 39.14 | 34.82 | Average | 200 | 302 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11569.34 | 58.27 | 74.00 | -15.73 | 43.66 | 10.29 | 39.14 | 34.82 | Peak | 200 | 294 | VERTICAL |
| 2 | 11573.88 | 43.16 | 54.00 | -10.84 | 28.55 | 10.29 | 39.14 | 34.82 | Average | 200 | 294 | VERTICAL |

| Temperature | 25℃ | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT20 CH 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11646.15 | 43.17 | 54.00 | -10.83 | 28.51 | 10.32 | 39.18 | 34.84 | Average | 200 | 304 | HORIZONTAL |
| 2 | 11654.89 | 56.77 | 74.00 | -17.23 | 42.08 | 10.33 | 39.20 | 34.84 | Peak | 200 | 304 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11650.87 | 56.17 | 74.00 | -17.83 | 41.48 | 10.33 | 39.20 | 34.84 | Peak | 200 | 309 | VERTICAL |
| 2 | 11654.71 | 43.14 | 54.00 | -10.86 | 28.45 | 10.33 | 39.20 | 34.84 | Average | 200 | 309 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT40 CH 38 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15573.94 | 47.01 | 54.00 | -6.99 | 30.24 | 13.83 | 38.17 | 35.23 | Average | 200 | 311 | HORIZONTAL |
| 2 | 15574.50 | 60.02 | 74.00 | -13.98 | 43.25 | 13.83 | 38.17 | 35.23 | Peak | 200 | 311 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15565.34 | 59.54 | 74.00 | -14.46 | 42.77 | 13.83 | 38.17 | 35.23 | Peak | 200 | 322 | VERTICAL |
| 2 | 15574.17 | 46.73 | 54.00 | -7.27 | 29.96 | 13.83 | 38.17 | 35.23 | Average | 200 | 322 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT40 CH 46 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15572.12 | 59.88 | 74.00 | -14.12 | 43.11 | 13.83 | 38.17 | 35.23 | Peak | 200 | 328 | HORIZONTAL |
| 2 | 15573.49 | 46.92 | 54.00 | -7.08 | 30.15 | 13.83 | 38.17 | 35.23 | Average | 200 | 328 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15570.43 | 59.92 | 74.00 | -14.08 | 43.15 | 13.83 | 38.17 | 35.23 | Peak | 200 | 328 | VERTICAL |
| 2 | 15573.17 | 46.70 | 54.00 | -7.30 | 29.93 | 13.83 | 38.17 | 35.23 | Average | 200 | 328 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT40 CH 151 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11506.39 | 56.43 | 74.00 | -17.57 | 41.88 | 10.25 | 39.10 | 34.80 | Peak | 200 | 321 | HORIZONTAL |
| 2 | 11507.76 | 43.62 | 54.00 | -10.38 | 29.07 | 10.25 | 39.10 | 34.80 | Average | 200 | 321 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11512.07 | 56.39 | 74.00 | -17.61 | 41.85 | 10.25 | 39.10 | 34.81 | Peak | 200 | 315 | VERTICAL |
| 2 | 11513.30 | 43.42 | 54.00 | -10.58 | 28.88 | 10.25 | 39.10 | 34.81 | Average | 200 | 315 | VERTICAL |

| Temperature | 25℃ | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT40 CH 159 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11591.33 | 42.95 | 54.00 | -11.05 | 28.32 | 10.30 | 39.16 | 34.83 | Average | 200 | 315 | HORIZONTAL |
| 2 | 11592.66 | 55.92 | 74.00 | -18.08 | 41.29 | 10.30 | 39.16 | 34.83 | Peak | 200 | 315 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11586.31 | 56.22 | 74.00 | -17.78 | 41.59 | 10.30 | 39.16 | 34.83 | Peak | 200 | 300 | VERTICAL |
| 2 | 11591.06 | 42.87 | 54.00 | -11.13 | 28.24 | 10.30 | 39.16 | 34.83 | Average | 200 | 300 | VERTICAL |

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT80 CH 42 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15628.93 | 59.48 | 74.00 | -14.52 | 42.80 | 13.83 | 38.11 | 35.26 | Peak | 200 | 300 | HORIZONTAL |
| 2 | 15634.89 | 46.63 | 54.00 | -7.37 | 29.95 | 13.83 | 38.11 | 35.26 | Average | 200 | 300 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 15626.22 | 59.80 | 74.00 | -14.20 | 43.12 | 13.83 | 38.11 | 35.26 | Peak | 200 | 292 | VERTICAL |
| 2 | 15628.06 | 46.59 | 54.00 | -7.41 | 29.91 | 13.83 | 38.11 | 35.26 | Average | 200 | 292 | VERTICAL |

| Temperature | 25℃ | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT80 CH 155 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11547.92 | 43.05 | 54.00 | -10.95 | 28.48 | 10.27 | 39.12 | 34.82 | Average | 200 | 328 | HORIZONTAL |
| 2 | 11554.46 | 55.79 | 74.00 | -18.21 | 41.18 | 10.29 | 39.14 | 34.82 | Peak | 200 | 328 | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 11546.75 | 42.97 | 54.00 | -11.03 | 28.40 | 10.27 | 39.12 | 34.82 | Average | 200 | 328 | VERTICAL |
| 2 | 11554.58 | 56.36 | 74.00 | -17.64 | 41.75 | 10.29 | 39.14 | 34.82 | Peak | 200 | 328 | VERTICAL |

Note:

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

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

## 4.7. Band Edge Emissions Measurement

### 4.7.1. Limit

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 e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 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 e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(kHz) | 300 |
| 0.490~1.705 | 24000/F(kHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

### 4.7.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | 100 MHz |
| RBW / VBW (Emission in restricted band) | 1MHz / 3MHz for Peak,<br>1MHz / 1/T for Average |
| RBW / VBW (Emission in non-restricted band) | 1MHz / 3MHz for Peak |

### 4.7.3. Test Procedures

1. The test procedure is the same as section 4.6.3.

### 4.7.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.6.4.

### 4.7.5. Test Deviation

There is no deviation with the original standard.

### 4.7.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

## 4.7.7. Test Result of Band Edge and Fundamental Emissions

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11a CH 149, 157, 165 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 24, 2015 | | |

**Channel 149**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | deg | cm | | |
| 1 | 5713.00 | 62.76 | 68.20 | -5.44 | 56.32 | 6.50 | 34.45 | 34.51 | 348 | 211 | Peak | HORIZONTAL |
| 2 | 5725.00 | 77.05 | 78.20 | -1.15 | 70.63 | 6.43 | 34.50 | 34.51 | 348 | 211 | Peak | HORIZONTAL |
| 3 | 5745.60 | 105.75 | | | 99.36 | 6.36 | 34.55 | 34.52 | 348 | 211 | Average | HORIZONTAL |
| 4 | 5745.80 | 116.10 | | | 109.71 | 6.36 | 34.55 | 34.52 | 348 | 211 | Peak | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5745 MHz.

**Channel 157**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | deg | cm | | |
| 1 | 5700.40 | 63.77 | 68.20 | -4.43 | 57.31 | 6.57 | 34.40 | 34.51 | 310 | 190 | Peak | HORIZONTAL |
| 2 | 5724.40 | 69.47 | 78.20 | -8.73 | 63.05 | 6.43 | 34.50 | 34.51 | 310 | 190 | Peak | HORIZONTAL |
| 3 | 5782.00 | 125.47 | | | 119.13 | 6.22 | 34.65 | 34.53 | 310 | 190 | Peak | HORIZONTAL |
| 4 | 5782.00 | 113.93 | | | 107.59 | 6.22 | 34.65 | 34.53 | 310 | 190 | Average | HORIZONTAL |
| 5 | 5858.20 | 67.65 | 78.20 | -10.55 | 60.82 | 6.47 | 34.90 | 34.54 | 310 | 190 | Peak | HORIZONTAL |
| 6 | 5861.20 | 66.39 | 68.20 | -1.81 | 59.56 | 6.47 | 34.90 | 34.54 | 310 | 190 | Peak | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5785 MHz.

**Channel 165**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | deg | cm | | |
| 1 | 5821.80 | 121.64 | | | 115.20 | 6.23 | 34.75 | 34.54 | 307 | 185 | Peak | HORIZONTAL |
| 2 | 5821.80 | 110.70 | | | 104.26 | 6.23 | 34.75 | 34.54 | 307 | 185 | Average | HORIZONTAL |
| 3 | 5851.20 | 67.94 | 78.20 | -10.26 | 61.24 | 6.39 | 34.85 | 34.54 | 307 | 185 | Peak | HORIZONTAL |
| 4 | 5860.40 | 66.44 | 68.20 | -1.76 | 59.61 | 6.47 | 34.90 | 34.54 | 307 | 185 | Peak | HORIZONTAL |

Item 1, 2 are the fundamental frequency at 5825 MHz.

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT20<br>CH 36, 40, 48 /<br>Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 24, 2015 | | |

**Channel 36**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | deg | cm | | |
| 1 | 5148.20 | 67.92 | 74.00 | -6.08 | 62.97 | 6.11 | 33.31 | 34.47 | 339 | 224 | Peak | HORIZONTAL |
| 2 | 5148.60 | 52.53 | 54.00 | -1.47 | 47.58 | 6.11 | 33.31 | 34.47 | 339 | 224 | Average | HORIZONTAL |
| 3 | 5187.60 | 120.03 | | | 114.92 | 6.20 | 33.38 | 34.47 | 339 | 224 | Peak | HORIZONTAL |
| 4 | 5187.80 | 109.65 | | | 104.54 | 6.20 | 33.38 | 34.47 | 339 | 224 | Average | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5180 MHz.

**Channel 40**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | deg | cm | | |
| 1 | 5148.00 | 52.28 | 54.00 | -1.72 | 47.33 | 6.11 | 33.31 | 34.47 | 340 | 223 | Average | HORIZONTAL |
| 2 | 5149.20 | 65.73 | 74.00 | -8.27 | 60.78 | 6.11 | 33.31 | 34.47 | 340 | 223 | Peak | HORIZONTAL |
| 3 | 5207.60 | 123.79 | | | 118.62 | 6.24 | 33.40 | 34.47 | 340 | 223 | Peak | HORIZONTAL |
| 4 | 5208.00 | 113.65 | | | 108.48 | 6.24 | 33.40 | 34.47 | 340 | 223 | Average | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5200 MHz.

**Channel 48**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | T/Pos | A/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | deg | cm | | |
| 1 | 5120.00 | 59.12 | 74.00 | -14.88 | 54.28 | 6.04 | 33.27 | 34.47 | 337 | 198 | Peak | HORIZONTAL |
| 2 | 5149.40 | 47.26 | 54.00 | -6.74 | 42.31 | 6.11 | 33.31 | 34.47 | 337 | 198 | Average | HORIZONTAL |
| 3 | 5247.20 | 124.24 | | | 118.90 | 6.35 | 33.46 | 34.47 | 337 | 198 | Peak | HORIZONTAL |
| 4 | 5247.80 | 113.56 | | | 108.22 | 6.35 | 33.46 | 34.47 | 337 | 198 | Average | HORIZONTAL |
| 5 | 5356.40 | 47.05 | 54.00 | -6.95 | 41.29 | 6.62 | 33.61 | 34.47 | 337 | 198 | Average | HORIZONTAL |
| 6 | 5365.40 | 60.11 | 74.00 | -13.89 | 54.35 | 6.62 | 33.61 | 34.47 | 337 | 198 | Peak | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5240 MHz.

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT20<br>CH 149, 157, 165 /<br>Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

**Channel 149**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 5715.00 | 62.64 | 68.20 | -5.56 | 56.01 | 7.02 | 34.64 | 35.03 | Peak | 197 | 335 | HORIZONTAL |
| 2 | 5722.44 | 77.10 | 78.20 | -1.10 | 70.49 | 6.99 | 34.65 | 35.03 | Peak | 197 | 335 | HORIZONTAL |
| 3 | 5743.72 | 104.81 | | | 98.25 | 6.95 | 34.65 | 35.04 | Average | 197 | 335 | HORIZONTAL |
| 4 | 5743.72 | 115.54 | | | 108.98 | 6.95 | 34.65 | 35.04 | Peak | 197 | 335 | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5745 MHz.

**Channel 157**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 5715.00 | 64.72 | 68.20 | -3.48 | 58.09 | 7.02 | 34.64 | 35.03 | Peak | 196 | 302 | HORIZONTAL |
| 2 | 5725.00 | 67.67 | 78.20 | -10.53 | 61.06 | 6.99 | 34.65 | 35.03 | Peak | 196 | 302 | HORIZONTAL |
| 3 | 5783.40 | 111.65 | | | 105.15 | 6.89 | 34.66 | 35.05 | Average | 196 | 302 | HORIZONTAL |
| 4 | 5783.40 | 121.49 | | | 114.99 | 6.89 | 34.66 | 35.05 | Peak | 196 | 302 | HORIZONTAL |
| 5 | 5859.62 | 68.36 | 78.20 | -9.84 | 61.90 | 6.85 | 34.67 | 35.06 | Peak | 196 | 302 | HORIZONTAL |
| 6 | 5860.00 | 65.30 | 68.20 | -2.90 | 58.84 | 6.85 | 34.67 | 35.06 | Peak | 196 | 302 | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5785 MHz.

**Channel 165**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 5820.51 | 119.30 | | | 112.83 | 6.86 | 34.66 | 35.05 | Peak | 188 | 299 | HORIZONTAL |
| 2 | 5821.80 | 109.03 | | | 102.57 | 6.86 | 34.66 | 35.06 | Average | 188 | 299 | HORIZONTAL |
| 3 | 5850.00 | 69.84 | 78.20 | -8.36 | 63.38 | 6.85 | 34.67 | 35.06 | Peak | 188 | 299 | HORIZONTAL |
| 4 | 5860.00 | 66.91 | 68.20 | -1.29 | 60.45 | 6.85 | 34.67 | 35.06 | Peak | 188 | 299 | HORIZONTAL |

Item 1, 2 are the fundamental frequency at 5825 MHz.

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT40 CH 38, 46 / Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

**Channel 38**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 5143.27 | 52.54 | 54.00 | -1.46 | 46.86 | 6.64 | 34.04 | 35.00 | Average | 183 | 310 | HORIZONTAL |
| 2 | 5150.00 | 65.11 | 74.00 | -8.89 | 59.43 | 6.64 | 34.04 | 35.00 | Peak | 183 | 310 | HORIZONTAL |
| 3 | 5182.95 | 106.53 | | | 100.77 | 6.67 | 34.09 | 35.00 | Average | 183 | 310 | HORIZONTAL |
| 4 | 5183.27 | 116.44 | | | 110.68 | 6.67 | 34.09 | 35.00 | Peak | 183 | 310 | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5190 MHz.

**Channel 46**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 5149.04 | 52.91 | 54.00 | -1.09 | 47.23 | 6.64 | 34.04 | 35.00 | Average | 185 | 356 | VERTICAL |
| 2 | 5150.00 | 65.23 | 74.00 | -8.77 | 59.55 | 6.64 | 34.04 | 35.00 | Peak | 185 | 356 | VERTICAL |
| 3 | 5228.08 | 104.95 | | | 99.07 | 6.72 | 34.16 | 35.00 | Average | 185 | 356 | VERTICAL |
| 4 | 5228.56 | 114.60 | | | 108.72 | 6.72 | 34.16 | 35.00 | Peak | 185 | 356 | VERTICAL |

Item 3, 4 are the fundamental frequency at 5230 MHz.

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT40<br>CH 151, 159 /<br>Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

**Channel 151**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 5715.00 | 66.72 | 68.20 | -1.48 | 60.09 | 7.02 | 34.64 | 35.03 | Peak | 180 | 313 | VERTICAL |
| 2 | 5718.27 | 66.21 | 78.20 | -11.99 | 59.58 | 7.02 | 34.64 | 35.03 | Peak | 180 | 313 | VERTICAL |
| 3 | 5747.63 | 107.91 | | | 101.35 | 6.95 | 34.65 | 35.04 | Peak | 180 | 313 | VERTICAL |
| 4 | 5760.45 | 97.44 | | | 90.91 | 6.92 | 34.65 | 35.04 | Average | 180 | 313 | VERTICAL |

Item 3, 4 are the fundamental frequency at 5755 MHz.

**Channel 159**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 5708.27 | 64.62 | 68.20 | -3.58 | 57.99 | 7.02 | 34.64 | 35.03 | Peak | 179 | 300 | HORIZONTAL |
| 2 | 5725.00 | 65.50 | 78.20 | -12.70 | 58.89 | 6.99 | 34.65 | 35.03 | Peak | 179 | 300 | HORIZONTAL |
| 3 | 5789.23 | 107.00 | | | 100.53 | 6.86 | 34.66 | 35.05 | Average | 179 | 300 | HORIZONTAL |
| 4 | 5789.55 | 117.26 | | | 110.79 | 6.86 | 34.66 | 35.05 | Peak | 179 | 300 | HORIZONTAL |
| 5 | 5850.00 | 72.28 | 78.20 | -5.92 | 65.82 | 6.85 | 34.67 | 35.06 | Peak | 179 | 300 | HORIZONTAL |
| 6 | 5870.26 | 66.85 | 68.20 | -1.35 | 60.39 | 6.85 | 34.67 | 35.06 | Peak | 179 | 300 | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5795 MHz.

| Temperature | 25°C | Humidity | 58% |
|---|---|---|---|
| Test Engineer | Peter Wu & Owen Hsu | Configurations | IEEE 802.11ac MCS0/Nss1 VHT80<br>CH 42, 155 /<br>Chain 1 + Chain 2 + Chain 3 + Chain 4 |
| Test Date | Nov. 25, 2015 | | |

**Channel 42**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 5130.77 | 52.82 | 54.00 | -1.18 | 47.17 | 6.63 | 34.02 | 35.00 | Average | 156 | 329 | HORIZONTAL |
| 2 | 5150.00 | 64.58 | 74.00 | -9.42 | 58.90 | 6.64 | 34.04 | 35.00 | Peak | 156 | 329 | HORIZONTAL |
| 3 | 5190.77 | 96.07 | | | 90.26 | 6.69 | 34.12 | 35.00 | Average | 156 | 329 | HORIZONTAL |
| 4 | 5190.77 | 105.99 | | | 100.18 | 6.69 | 34.12 | 35.00 | Peak | 156 | 329 | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5210 MHz.

**Channel 155**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | | cm | deg | |
| 1 | 5703.78 | 66.51 | 68.20 | -1.69 | 59.85 | 7.05 | 34.64 | 35.03 | Peak | 199 | 321 | HORIZONTAL |
| 2 | 5725.00 | 65.70 | 78.20 | -12.50 | 59.09 | 6.99 | 34.65 | 35.03 | Peak | 199 | 321 | HORIZONTAL |
| 3 | 5762.31 | 94.17 | | | 87.64 | 6.92 | 34.65 | 35.04 | Average | 199 | 321 | HORIZONTAL |
| 4 | 5762.98 | 104.78 | | | 98.25 | 6.92 | 34.65 | 35.04 | Peak | 199 | 321 | HORIZONTAL |
| 5 | 5850.80 | 60.10 | 78.20 | -18.10 | 53.64 | 6.85 | 34.67 | 35.06 | Peak | 199 | 321 | HORIZONTAL |
| 6 | 5861.60 | 62.78 | 68.20 | -5.42 | 56.32 | 6.85 | 34.67 | 35.06 | Peak | 199 | 321 | HORIZONTAL |

Item 3, 4 are the fundamental frequency at 5775 MHz.

Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

## 4.8. Frequency Stability Measurement

### 4.8.1. Limit

In-band emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

### 4.8.2. Measuring Instruments and Setting

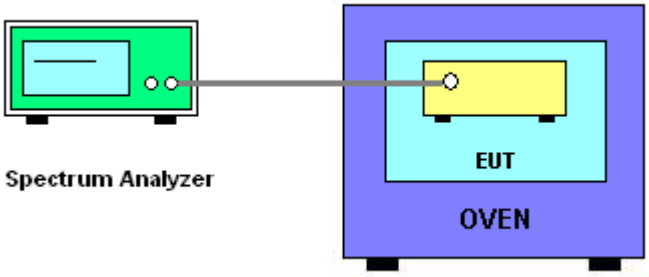
Please refer to section 5 of equipments list in this report. The following table is the setting of the spectrum analyzer.

| Spectrum Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Span Frequency | Entire absence of modulation emissions bandwidth |
| RBW | 10 kHz |
| VBW | 10 kHz |
| Sweep Time | Auto |

### 4.8.3. Test Procedures

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × $10^6$ ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
7. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
8. Extreme temperature is -40°C~70°C.

### 4.8.4. Test Setup Layout




### 4.8.5. Test Deviation

There is no deviation with the original standard.

### 4.8.6. EUT Operation during Test

The EUT was programmed to be in continuously un-modulation transmitting mode.

## 4.8.7. Test Result of Frequency Stability

| Temperature | 25°C | Humidity | 45% |
|---|---|---|---|
| Test Engineer | Roki Liu | Test Date | Dec. 07, 2015 |

**Mode: 20 MHz / Chain 4**

**Voltage vs. Frequency Stability**

| Voltage | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (V) | 5200 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5199.9490 | 5199.9476 | 5199.9458 | 5199.9437 |
| 110.00 | 5199.9478 | 5199.9465 | 5199.9449 | 5199.9430 |
| 93.50 | 5199.9464 | 5199.9453 | 5199.9441 | 5199.9419 |
| Max. Deviation (MHz) | 0.0536 | 0.0547 | 0.0559 | 0.0581 |
| Max. Deviation (ppm) | 10.31 | 10.52 | 10.75 | 11.17 |
| Result | Complies | | | |

**Temperature vs. Frequency Stability**

| Temperature | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (°C) | 5200 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -40 | 5199.9516 | 5199.9525 | 5199.9495 | 5199.9495 |
| -30 | 5199.9523 | 5199.9521 | 5199.9493 | 5199.9476 |
| -20 | 5199.9516 | 5199.9503 | 5199.9486 | 5199.9462 |
| -10 | 5199.9501 | 5199.9489 | 5199.9473 | 5199.9454 |
| 0 | 5199.9487 | 5199.9475 | 5199.9456 | 5199.9434 |
| 10 | 5199.9474 | 5199.9461 | 5199.9446 | 5199.9428 |
| 20 | 5199.9462 | 5199.9449 | 5199.9433 | 5199.9414 |
| 30 | 5199.9448 | 5199.9437 | 5199.9423 | 5199.9407 |
| 40 | 5199.9432 | 5199.9417 | 5199.9401 | 5199.9381 |
| 50 | 5199.9415 | 5199.9403 | 5199.9388 | 5199.9361 |
| 60 | 5199.9410 | 5199.9388 | 5199.9385 | 5199.9355 |
| 70 | 5199.9409 | 5199.9375 | 5199.9373 | 5199.9353 |
| Max. Deviation (MHz) | 0.0591 | 0.0625 | 0.0627 | 0.0647 |
| Max. Deviation (ppm) | 11.37 | 12.02 | 12.06 | 12.44 |
| Result | Complies | | | |

**Voltage vs. Frequency Stability**

| Voltage | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (V) | 5785 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5784.9441 | 5784.9427 | 5784.9409 | 5784.9388 |
| 110.00 | 5784.9429 | 5784.9416 | 5784.9400 | 5784.9381 |
| 93.50 | 5784.9415 | 5784.9404 | 5784.9392 | 5784.9370 |
| Max. Deviation (MHz) | 0.0585 | 0.0596 | 0.0608 | 0.0630 |
| Max. Deviation (ppm) | 10.11 | 10.30 | 10.51 | 10.89 |
| Result | Complies | | | |

**Temperature vs. Frequency Stability**

| Temperature | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (°C) | 5785 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -40 | 5784.9496 | 5784.9526 | 5784.9501 | 5784.9466 |
| -30 | 5784.9495 | 5784.9513 | 5784.9487 | 5784.9452 |
| -20 | 5784.9495 | 5784.9482 | 5784.9465 | 5784.9441 |
| -10 | 5784.9480 | 5784.9468 | 5784.9452 | 5784.9433 |
| 0 | 5784.9466 | 5784.9454 | 5784.9435 | 5784.9413 |
| 10 | 5784.9453 | 5784.9440 | 5784.9425 | 5784.9407 |
| 20 | 5784.9441 | 5784.9428 | 5784.9412 | 5784.9393 |
| 30 | 5784.9427 | 5784.9416 | 5784.9402 | 5784.9386 |
| 40 | 5784.9411 | 5784.9396 | 5784.9380 | 5784.9360 |
| 50 | 5784.9394 | 5784.9382 | 5784.9377 | 5784.9340 |
| 60 | 5784.9394 | 5784.9391 | 5784.9372 | 5784.9333 |
| 70 | 5784.9385 | 5784.9381 | 5784.9362 | 5784.9328 |
| Max. Deviation (MHz) | 0.0615 | 0.0619 | 0.0638 | 0.0672 |
| Max. Deviation (ppm) | 10.63 | 10.70 | 11.03 | 11.62 |
| Result | Complies | | | |

**Mode: 40 MHz / Chain 4**

**Voltage vs. Frequency Stability**

| Voltage | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (V) | 5190 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5189.9506 | 5189.9492 | 5189.9474 | 5189.9453 |
| 110.00 | 5189.9494 | 5189.9481 | 5189.9465 | 5189.9446 |
| 93.50 | 5189.9480 | 5189.9469 | 5189.9457 | 5189.9435 |
| Max. Deviation (MHz) | 0.0520 | 0.0531 | 0.0543 | 0.0565 |
| Max. Deviation (ppm) | 10.02 | 10.23 | 10.46 | 10.89 |
| Result | Complies | | | |

**Temperature vs. Frequency Stability**

| Temperature | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (°C) | 5190 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -40 | 5189.9533 | 5189.9516 | 5189.9495 | 5189.9470 |
| -30 | 5189.9516 | 5189.9505 | 5189.9488 | 5189.9466 |
| -20 | 5189.9502 | 5189.9489 | 5189.9472 | 5189.9448 |
| -10 | 5189.9487 | 5189.9475 | 5189.9459 | 5189.9440 |
| 0 | 5189.9473 | 5189.9461 | 5189.9442 | 5189.9420 |
| 10 | 5189.9460 | 5189.9447 | 5189.9432 | 5189.9414 |
| 20 | 5189.9448 | 5189.9435 | 5189.9419 | 5189.9400 |
| 30 | 5189.9434 | 5189.9423 | 5189.9409 | 5189.9393 |
| 40 | 5189.9418 | 5189.9403 | 5189.9387 | 5189.9367 |
| 50 | 5189.9401 | 5189.9389 | 5189.9374 | 5189.9347 |
| 60 | 5189.9400 | 5189.9379 | 5189.9370 | 5189.9329 |
| 70 | 5189.9398 | 5189.9373 | 5189.9366 | 5189.9326 |
| Max. Deviation (MHz) | 0.0602 | 0.0627 | 0.0634 | 0.0674 |
| Max. Deviation (ppm) | 11.60 | 12.08 | 12.22 | 12.99 |
| Result | Complies | | | |

**Voltage vs. Frequency Stability**

| Voltage | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (V) | 5755 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5754.9393 | 5754.9379 | 5754.9361 | 5754.9340 |
| 110.00 | 5754.9381 | 5754.9368 | 5754.9352 | 5754.9333 |
| 93.50 | 5754.9367 | 5754.9356 | 5754.9344 | 5754.9322 |
| Max. Deviation (MHz) | 0.0633 | 0.0644 | 0.0656 | 0.0678 |
| Max. Deviation (ppm) | 11.00 | 11.19 | 11.40 | 11.78 |
| Result | Complies | | | |

**Temperature vs. Frequency Stability**

| Temperature | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (°C) | 5755 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -40 | 5754.9472 | 5754.9520 | 5754.9479 | 5754.9470 |
| -30 | 5754.9466 | 5754.9485 | 5754.9456 | 5754.9452 |
| -20 | 5754.9458 | 5754.9445 | 5754.9428 | 5754.9404 |
| -10 | 5754.9443 | 5754.9431 | 5754.9415 | 5754.9396 |
| 0 | 5754.9429 | 5754.9417 | 5754.9398 | 5754.9376 |
| 10 | 5754.9416 | 5754.9403 | 5754.9388 | 5754.9370 |
| 20 | 5754.9404 | 5754.9391 | 5754.9375 | 5754.9356 |
| 30 | 5754.9390 | 5754.9379 | 5754.9365 | 5754.9349 |
| 40 | 5754.9374 | 5754.9359 | 5754.9343 | 5754.9323 |
| 50 | 5754.9357 | 5754.9345 | 5754.9330 | 5754.9303 |
| 60 | 5754.9362 | 5754.9341 | 5754.9388 | 5754.9305 |
| 70 | 5754.9358 | 5754.9329 | 5754.9374 | 5754.9302 |
| Max. Deviation (MHz) | 0.0642 | 0.0671 | 0.0657 | 0.0698 |
| Max. Deviation (ppm) | 11.16 | 11.66 | 11.42 | 12.13 |
| Result | Complies | | | |

**Mode: 80 MHz / Chain 4**

**Voltage vs. Frequency Stability**

| Voltage | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (V) | 5210 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5209.9671 | 5209.9657 | 5209.9639 | 5209.9618 |
| 110.00 | 5209.9659 | 5209.9646 | 5209.9630 | 5209.9611 |
| 93.50 | 5209.9645 | 5209.9634 | 5209.9622 | 5209.9600 |
| Max. Deviation (MHz) | 0.0355 | 0.0366 | 0.0378 | 0.0400 |
| Max. Deviation (ppm) | 6.81 | 7.02 | 7.26 | 7.68 |
| Result | Complies | | | |

**Temperature vs. Frequency Stability**

| Temperature | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (°C) | 5210 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -40 | 5209.9733 | 5209.9696 | 5209.9711 | 5209.9666 |
| -30 | 5209.9715 | 5209.9682 | 5209.9696 | 5209.9658 |
| -20 | 5209.9694 | 5209.9681 | 5209.9664 | 5209.9640 |
| -10 | 5209.9679 | 5209.9667 | 5209.9651 | 5209.9632 |
| 0 | 5209.9665 | 5209.9653 | 5209.9634 | 5209.9612 |
| 10 | 5209.9652 | 5209.9639 | 5209.9624 | 5209.9606 |
| 20 | 5209.9640 | 5209.9627 | 5209.9611 | 5209.9592 |
| 30 | 5209.9626 | 5209.9615 | 5209.9601 | 5209.9585 |
| 40 | 5209.9610 | 5209.9595 | 5209.9579 | 5209.9559 |
| 50 | 5209.9593 | 5209.9581 | 5209.9566 | 5209.9539 |
| 60 | 5209.9584 | 5209.9574 | 5209.9559 | 5209.9526 |
| 70 | 5209.9584 | 5209.9555 | 5209.9549 | 5209.9511 |
| Max. Deviation (MHz) | 0.0416 | 0.0445 | 0.0451 | 0.0489 |
| Max. Deviation (ppm) | 7.98 | 8.54 | 8.66 | 9.39 |
| Result | Complies | | | |

**Voltage vs. Frequency Stability**

| Voltage | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (V) | 5775 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5774.9773 | 5774.9759 | 5774.9741 | 5774.9720 |
| 110.00 | 5774.9761 | 5774.9748 | 5774.9732 | 5774.9713 |
| 93.50 | 5774.9747 | 5774.9736 | 5774.9724 | 5774.9702 |
| Max. Deviation (MHz) | 0.0253 | 0.0264 | 0.0276 | 0.0298 |
| Max. Deviation (ppm) | 4.38 | 4.57 | 4.78 | 5.16 |
| Result | Complies | | | |

**Temperature vs. Frequency Stability**

| Temperature | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (°C) | 5775 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -40 | 5774.9902 | 5774.9873 | 5774.9863 | 5774.9836 |
| -30 | 5774.9896 | 5774.9868 | 5774.9846 | 5774.9825 |
| -20 | 5774.9865 | 5774.9852 | 5774.9835 | 5774.9811 |
| -10 | 5774.9850 | 5774.9838 | 5774.9822 | 5774.9803 |
| 0 | 5774.9836 | 5774.9824 | 5774.9805 | 5774.9783 |
| 10 | 5774.9823 | 5774.9810 | 5774.9795 | 5774.9777 |
| 20 | 5774.9811 | 5774.9798 | 5774.9782 | 5774.9763 |
| 30 | 5774.9797 | 5774.9786 | 5774.9772 | 5774.9756 |
| 40 | 5774.9781 | 5774.9766 | 5774.9750 | 5774.9730 |
| 50 | 5774.9764 | 5774.9752 | 5774.9737 | 5774.9710 |
| 60 | 5774.9755 | 5774.9742 | 5774.9730 | 5774.9709 |
| 70 | 5774.9742 | 5774.9729 | 5774.9730 | 5774.9681 |
| Max. Deviation (MHz) | 0.0258 | 0.0271 | 0.0270 | 0.0319 |
| Max. Deviation (ppm) | 4.47 | 4.69 | 4.68 | 5.52 |
| Result | Complies | | | |

## 4.9. Antenna Requirements

### 4.9.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. 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 shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

### 4.9.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

# 5. LIST OF MEASURING EQUIPMENTS

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|---|---|---|---|---|---|---|
| EMI Test Receiver | R&S | ESCS 30 | 100355 | 9kHz ~ 2.75GHz | Apr. 22, 2015 | Conduction (CO01-CB) |
| LISN | Schwarzbeck | NSLK 8127 | 8127650 | 9kHz ~ 30MHz | Nov. 16, 2015 | Conduction (CO01-CB) |
| LISN | Schwarzbeck | NSLK 8127 | 8127478 | 9kHz ~ 30MHz | Nov. 13, 2015 | Conduction (CO01-CB) |
| COND Cable | Woken | Cable | 01 | 150kHz ~ 30MHz | May 25, 2015 | Conduction (CO01-CB) |
| Software | Audix | E3 | 6.120210n | - | N.C.R. | Conduction (CO01-CB) |
| BILOG ANTENNA | Schaffner | CBL6112D | 37880 | 20MHz ~ 2GHz | Sep. 03, 2015 | Radiation (03CH01-CB) |
| Loop Antenna | Teseq | HLA 6120 | 24155 | 9kHz - 30 MHz | Mar. 12, 2015* | Radiation (03CH01-CB) |
| Horn Antenna | EMCO | 3115 | 00075790 | 750MHz ~ 18GHz | Oct. 22, 2015 | Radiation (03CH01-CB) |
| Horn Antenna | Schwarzbeck | BBHA 9170 | BBHA9170252 | 15GHz ~ 40GHz | Jul. 21, 2015 | Radiation (03CH01-CB) |
| Pre-Amplifier | Agilent | 8447D | 2944A10991 | 0.1MHz ~ 1.3GHz | Feb. 24, 2015 | Radiation (03CH01-CB) |
| Pre-Amplifier | Agilent | 8449B | 3008A02310 | 1GHz ~ 26.5GHz | Jan. 12, 2015 | Radiation (03CH01-CB) |
| Pre-Amplifier | WM | TF-130N-R1 | 923365 | 26GHz ~ 40GHz | Feb. 10, 2015 | Radiation (03CH01-CB) |
| Spectrum Analyzer | R&S | FSP40 | 100056 | 9kHz ~ 40GHz | Oct. 27, 2015 | Radiation (03CH01-CB) |
| EMI Receiver | Agilent | N9038A | MY52260123 | 9kHz ~ 8.4GHz | Jan. 21, 2015 | Radiation (03CH01-CB) |
| RF Cable-low | Woken | Low Cable-1 | N/A | 30 MHz ~ 1 GHz | Nov. 02, 2015 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-16 | N/A | 1 GHz ~ 18 GHz | Nov. 02, 2015 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-17 | N/A | 1 GHz ~ 18 GHz | Nov. 02, 2015 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-40G-1 | N/A | 18GHz ~ 40 GHz | Nov. 02, 2015 | Radiation (03CH01-CB) |
| RF Cable-high | Woken | High Cable-40G-2 | N/A | 18GHz ~ 40 GHz | Nov. 02, 2015 | Radiation (03CH01-CB) |
| Test Software | Audix | E3 | 6.2009-l0-7 | N/A | N/A | Radiation (03CH01-CB) |
| Spectrum analyzer | R&S | FSV40 | 100979 | 9kHz~40GHz | Dec. 12, 2014 | Conducted (TH01-CB) |
| Temp. and Humidity Chamber | Ten Billion | TTH-D3SP | TBN-931011 | -30~100 degree | Jun. 02, 2015 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-7 | 1 GHz – 26.5 GHz | Nov. 02, 2015 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-8 | 1 GHz – 26.5 GHz | Nov. 02, 2015 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-9 | 1 GHz – 26.5 GHz | Nov. 02, 2015 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-10 | 1 GHz – 26.5 GHz | Nov. 02, 2015 | Conducted (TH01-CB) |

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|---|---|---|---|---|---|---|
| RF Cable-high | Woken | RG402 | High Cable-6 | 1 GHz – 26.5 GHz | Nov. 02, 2015 | Conducted (TH01-CB) |
| Power Sensor | Agilent | U2021XA | MY53410001 | 50MHz~18GHz | Nov. 02, 2015 | Conducted (TH01-CB) |

Note: Calibration Interval of instruments listed above is one year.

"*" Calibration Interval of instruments listed above is two years.

N.C.R. means Non-Calibration required.

# 6. MEASUREMENT UNCERTAINTY

| Test Items | Uncertainty | Remark |
|---|---|---|
| Conducted Emission (150kHz ~ 30MHz) | 3.2 dB | Confidence levels of 95% |
| Radiated Emission (30MHz ~ 1,000MHz) | 3.6 dB | Confidence levels of 95% |
| Radiated Emission (1GHz ~ 18GHz) | 3.7 dB | Confidence levels of 95% |
| Radiated Emission (18GHz ~ 40GHz) | 3.5 dB | Confidence levels of 95% |
| Conducted Emission | 1.7 dB | Confidence levels of 95% |