**SPORTON International Inc.**
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**SPORTON LAB.**

# FCC RADIO TEST REPORT

| Applicant's company | Belkin International, Inc. |
|---|---|
| Applicant Address | 12045 East Waterfront Drive, Playa Vista, CA 90094 |
| FCC ID | K7SF9K1105V2 |

| Product Name | N450 Dual Band Wireless Router |
|---|---|
| Brand Name | belkin |
| Model No. | F9K1105V4 |
| Test Rule Part(s) | 47 CFR FCC Part 15 Subpart E § 15.407 |
| Test Freq. Range | 5150 ~ 5250 MHz / 5725 ~ 5850 MHz |
| Received Date | Mar. 04, 2016 |
| Final Test Date | Jun. 26, 2016 |
| Submission Type | Class II Change |

## Statement

**Test result included is for the IEEE 802.11n and IEEE 802.11a 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, ET Docket No. 13–49; FCC 16–24.**

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 |
|---|---|---|---|
| FR4N1172-30AB | Rev. 01 | Initial issue of report | Jul. 12, 2016 |
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# 1. VERIFICATION OF COMPLIANCE

| | | |
|---|---|---|
| Product Name | : | N450 Dual Band Wireless Router |
| Brand Name | : | belkin |
| Model No. | : | F9K1105V4 |
| Applicant | : | Belkin International, 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 Mar. 04, 2016 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.
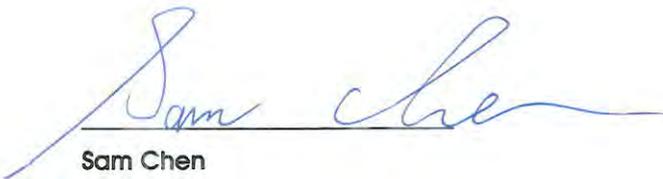
Sam Chen

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 |
| 4.1 | 15.207 | AC Power Line Conducted Emissions | Complies |
| 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 |
| 4.5 | 15.407(a) | Power Spectral Density | Complies |
| 4.6 | 15.407(b) | Radiated Emissions | Complies |
| 4.7 | 15.407(b) | Band Edge Emissions | Complies |
| 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 | IEEE 802.11a: WLAN (1TX, 1RX) |
| | IEEE 802.11n: WLAN (1TX/1RX, 2TX/2RX) |
| Radio Type | Intentional Transceiver |
| Power Type | From power adapter |
| Modulation | IEEE 802.11a: OFDM |
| | IEEE 802.11n: see the below table |
| Data Modulation | IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| Data Rate (Mbps) | IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) |
| | IEEE 802.11n: see the below table |
| Frequency Range | 5150 ~ 5250 MHz / 5725 ~ 5850 MHz |
| Channel Number | 9 for 20MHz bandwidth ; 4 for 40MHz bandwidth |
| Channel Band Width (99%) | Band 1: |
| | IEEE 802.11a: 17.37 MHz |
| | IEEE 802.11n MCS0 (HT20): 18.49 MHz (1TX) |
| | IEEE 802.11n MCS0 (HT40): 36.90 MHz (1TX) |
| | IEEE 802.11n MCS8 (HT20): 18.15 MHz (2TX) |
| | IEEE 802.11n MCS8 (HT40): 36.76 MHz (2TX) |
| | Band 4: |
| | IEEE 802.11a: 17.19 MHz |
| | IEEE 802.11n MCS0 (HT20): 18.32 MHz (1TX) |
| | IEEE 802.11n MCS0 (HT40): 36.90 MHz (1TX) |
| | IEEE 802.11n MCS8 (HT20): 18.06 MHz (2TX) |
| | IEEE 802.11n MCS8 (HT40): 36.61 MHz (2TX) |
| Maximum Conducted Output Power | Band 1: |
| | IEEE 802.11a: 17.25 dBm |
| | IEEE 802.11n MCS0 (HT20): 16.57 dBm (1TX) |
| | IEEE 802.11n MCS0 (HT40): 15.98 dBm (1TX) |
| | IEEE 802.11n MCS8 (HT20): 19.30 dBm (2TX) |
| | IEEE 802.11n MCS8 (HT40): 19.21 dBm (2TX) |
| | Band 4: |
| | IEEE 802.11a: 14.85 dBm |
| | IEEE 802.11n MCS0 (HT20): 13.75 dBm (1TX) |
| | IEEE 802.11n MCS0 (HT40): 13.83 dBm (1TX) |
| | IEEE 802.11n MCS8 (HT20): 16.56 dBm (2TX) |
| | IEEE 802.11n MCS0 (HT40): 16.45 dBm (2TX) |
| 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 |
| Beamforming Function | ☐ With beamforming | ☒ Without beamforming |
| Operate Condition | ☒ Indoor | ☐ Outdoor |

**Antenna and Band width**

| Antenna | Single (TX) | | Two (TX) | |
|---|---|---|---|---|
| Band width Mode | 20 MHz | 40 MHz | 20 MHz | 40 MHz |
| IEEE 802.11a | V | X | X | X |
| IEEE 802.11n | V | V | V | V |

**IEEE 11n Spec.**

| Protocol | Number of Transmit Chains (NTX) | Data Rate / MCS |
|---|---|---|
| 802.11n (HT20) | 1 | MCS0-7 |
| 802.11n (HT20) | 2 | MCS8-15 |
| 802.11n (HT40) | 1 | MCS0-7 |
| 802.11n (HT40) | 2 | MCS8-15 |
| Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput). Then EUT supports HT20 and HT40. Note 2: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n | | |

## 3.2. Accessories

| Power | Brand | Model | Rating |
|---|---|---|---|
| Adapter | Belkin | MU12AR120100-A1 | Input: 100-240V~50/60Hz, 0.3A<br>Output: 12V, 1A |

## 3.3. Table for Filed Antenna

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | |
|------|-------|------------|--------------|-----------|------------|--------|
| | | | | | 2.4GHz | 5GHz |
| 1 | - | - | PCB Antenna | I-PEX | 4.4 | 5.06 |
| 2 | - | - | PCB Antenna | I-PEX | - | 4.53 |

Note: The EUT has two antennas

**For 2.4GHz function:**

**For IEEE 802.11b/g/n mode (1TX/1RX)**

Only Ant. 1 can be used as transmitting antenna and receiving antenna.

**For 5GHz function:**

**For IEEE 802.11a mode (1TX/1RX)**

Only Ant. 1 can be used as transmitting antenna and receiving antenna.

**For IEEE 802.11n mode (1TX/1RX , 2TX/2RX)**

**For 1TX/1RX**

Only Ant. 1 can be used as transmitting antenna and receiving antenna.

**For 2TX/2RX**

Ant. 1 and Ant. 2 will transmit/receive the same signal simultaneously.

Ant. 1 and Ant. 2 can be used as transmitting/receiving antennas.
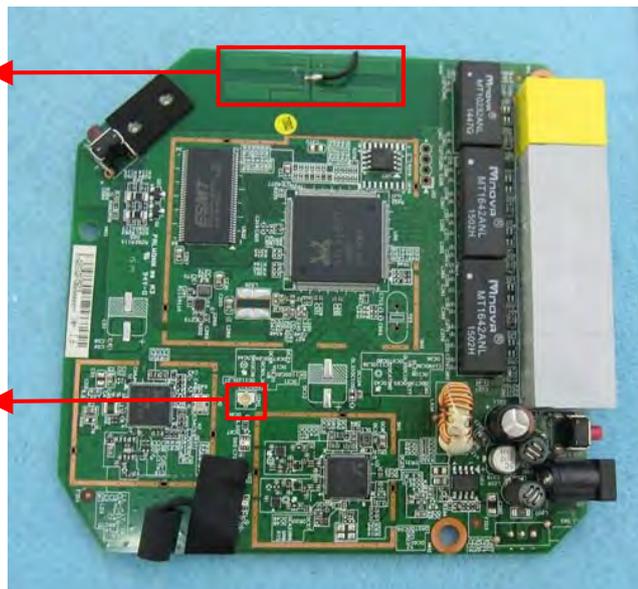
## 3.4. Table for Carrier Frequencies

The EUT has two bandwidth system.

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.

| 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 |
| 5725~5850 MHz Band 4 | 149 | 5745 MHz | 159 | 5795 MHz |
| | 151 | 5755 MHz | 161 | 5805 MHz |
| | 153 | 5765 MHz | 165 | 5825 MHz |
| | 157 | 5785 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 |
| | 11n HT20 | Band 1&4 | MCS0 | 36/40/48/149/157/165 | 1 |
| | 11n HT40 | Band 1&4 | MCS0 | 38/46/151/159 | 1 |
| | 11n HT20 | Band 1&4 | MCS8 | 36/40/48/149/157/165 | 1+2 |
| | 11n HT40 | Band 1&4 | MCS8 | 38/46/151/159 | 1+2 |
| Power Spectral Density | 11a/BPSK | Band 1&4 | 6Mbps | 36/40/48/149/157/165 | 1 |
| | 11n HT20 | Band 1&4 | MCS0 | 36/40/48/149/157/165 | 1 |
| | 11n HT40 | Band 1&4 | MCS0 | 38/46/151/159 | 1 |
| | 11n HT20 | Band 1&4 | MCS8 | 36/40/48/149/157/165 | 1+2 |
| | 11n HT40 | Band 1&4 | MCS8 | 38/46/151/159 | 1+2 |
| 26dB Spectrum Bandwidth & 99% Occupied Bandwidth Measurement | 11a/BPSK | Band 1&4 | 6Mbps | 36/40/48/149/157/165 | 1 |
| | 11n HT20 | Band 1&4 | MCS0 | 36/40/48/149/157/165 | 1 |
| | 11n HT40 | Band 1&4 | MCS0 | 38/46/151/159 | 1 |
| | 11n HT20 | Band 1&4 | MCS8 | 36/40/48/149/157/165 | 1+2 |
| | 11n HT40 | Band 1&4 | MCS8 | 38/46/151/159 | 1+2 |
| 6dB Spectrum Bandwidth Measurement | 11a/BPSK | Band 4 | 6Mbps | 149/157/165 | 1 |
| | 11n HT20 | Band 4 | MCS0 | 149/157/165 | 1 |
| | 11n HT40 | Band 4 | MCS0 | 151/159 | 1 |
| | 11n HT20 | Band 4 | MCS8 | 149/157/165 | 1+2 |
| | 11n HT40 | Band 4 | MCS8 | 151/159 | 1+2 |

| Radiated Emission Below 1GHz | Normal Link | - | - | - | - |
|---|---|---|---|---|---|
| Radiated Emission Above 1GHz | 11a/BPSK | Band 1&4 | 6Mbps | 36/40/48/149/157/165 | 1 |
| | 11n HT20 | Band 1&4 | MCS0 | 36/40/48/149/157/165 | 1 |
| | 11n HT40 | Band 1&4 | MCS0 | 38/46/151/159 | 1 |
| | 11n HT20 | Band 1&4 | MCS8 | 36/40/48/149/157/165 | 1+2 |
| | 11n HT40 | Band 1&4 | MCS8 | 38/46/151/159 | 1+2 |
| Band Edge Emission | 11a/BPSK | Band 1&4 | 6Mbps | 36/40/48/149/157/165 | 1 |
| | 11n HT20 | Band 1&4 | MCS0 | 36/40/48/149/157/165 | 1 |
| | 11n HT40 | Band 1&4 | MCS0 | 38/46/151/159 | 1 |
| | 11n HT20 | Band 1&4 | MCS8 | 36/40/48/149/157/165 | 1+2 |
| | 11n HT40 | Band 1&4 | MCS8 | 38/46/151/159 | 1+2 |
| Frequency Stability | 20 MHz | Band 1&4 | - | 40/157 | 1 |
| | 40 MHz | Band 1&4 | - | 38/151 | 1 |

The following test modes were performed for all tests:

**For Conducted Emission test:**

Mode 1. Normal Link

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

Mode 1. Normal Link

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

Mode 1. CTX

**For Co-location MPE Test:**

The EUT could be applied with 2.4GHz WLAN function and 5GHz WLAN function; therefore Co-location Maximum Permissible Exposure (Please refer to FA4N1172-30) test is 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 Designation No. | IC File No. | VCCI Reg. No |
| 03CH01-CB | SAC | Hsin Chu | TW0006 | IC 4086D | - |
| CO01-CB | Conduction | Hsin Chu | TW0006 | 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: FR222334AN and FR222334AI.

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

| Modifications | Performance Checking |
|---|---|
| 1. Adding a new power adapter (Model name: MU12AR120100-A1).<br>2. Updating the Flash version. | 1. AC Conducted Emissions<br>2. Radiated Emissions below 1GHz |
| 3. Updating 5GHz Band 1 to "New Rules" from "Old Rules". | 1. 26dB Bandwidth and 99% Occupied Bandwidth<br>2. Maximum Conducted Output Power<br>3. Power Spectral Density<br>4. Radiated Emissions above 1GHz<br>5. Band Edge Emissions<br>6. Frequency Stability |
| 4. Updating test rule of 5GHz band 4 to "15.407 (b)(4)(i) of New Rules (ET Docket No. 13–49; FCC 16–24)" from "Old Rules". | 1. 26dB Bandwidth and 99% Occupied Bandwidth<br>2. 6dB Spectrum Bandwidth<br>3. Maximum Conducted Output Power<br>4. Power Spectral Density<br>5. Radiated Emissions above 1GHz<br>6. Band Edge Emissions<br>7. Frequency Stability |
| 5. Updating the Model Name from "F9K1101V1, F9K1105V2" to "F9K1105V4".<br>6. Updating the Applicant address from "12045 E. Waterfront Drive Playa Viste, CA 90094, USA" to "12045 East Waterfront Drive, Playa Vista, CA 90094". | Do not effect the test results. |

## 3.8. Table for Supporting Units

### For Test Site No: CO01-CB

| Support Unit | Brand | Model | FCC ID |
|---|---|---|---|
| NB*4 | DELL | E6430 | DoC |

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

| Support Unit | Brand | Model | FCC ID |
|---|---|---|---|
| NB*4 | DELL | E4300 | DoC |

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

| Support Unit | Brand | Model | FCC ID |
|---|---|---|---|
| NB | DELL | E4300 | DoC |

### For Test Site No: TH01-CB

| Support Unit | Brand | Model | FCC ID |
|---|---|---|---|
| NB | DELL | E4300 | DoC |

## 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 | RTL891x 2.2.4 -11/12/20 | | | | | |
|---|---|---|---|---|---|---|
| Mode | Test Frequency (MHz) | | | | | |
| | NCB: 20MHz | | | | | |
| | 5180 MHz | 5200 MHz | 5240 MHz | 5745 MHz | 5785 MHz | 5825 MHz |
| 802.11a | 63 | 63 | 63 | 63 | 63 | 63 |
| 802.11n MCS0 HT20 | 60 | 63 | 63 | 63 | 63 | 63 |
| 802.11n MCS8 HT20 | 63/62 | 63/62 | 63/61 | 63/61 | 63/61 | 63/62 |
| Mode | NCB: 40MHz | | | | | |
| 802.11n MCS0 HT40 | 5190 MHz | | 5230 MHz | | 5755 MHz | 5795 MHz |
| | 51 | | 62 | | 63 | 63 |
| 802.11n MCS8 HT40 | 59/58 | | 63/61 | | 63/61 | 63/62 |

## 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 | 1.000 | 1.000 | 100.00 | 0.00 | 0.01 |
| 802.11n MCS0 HT20 | 1.000 | 1.000 | 100.00 | 0.00 | 0.01 |
| 802.11n MCS8 HT20 | 1.000 | 1.000 | 100.00 | 0.00 | 0.01 |
| 802.11n MCS0 HT40 | 1.000 | 1.000 | 100.00 | 0.00 | 0.01 |
| 802.11n MCS8 HT40 | 1.000 | 1.000 | 100.00 | 0.00 | 0.01 |

## 3.12.  Test Configurations

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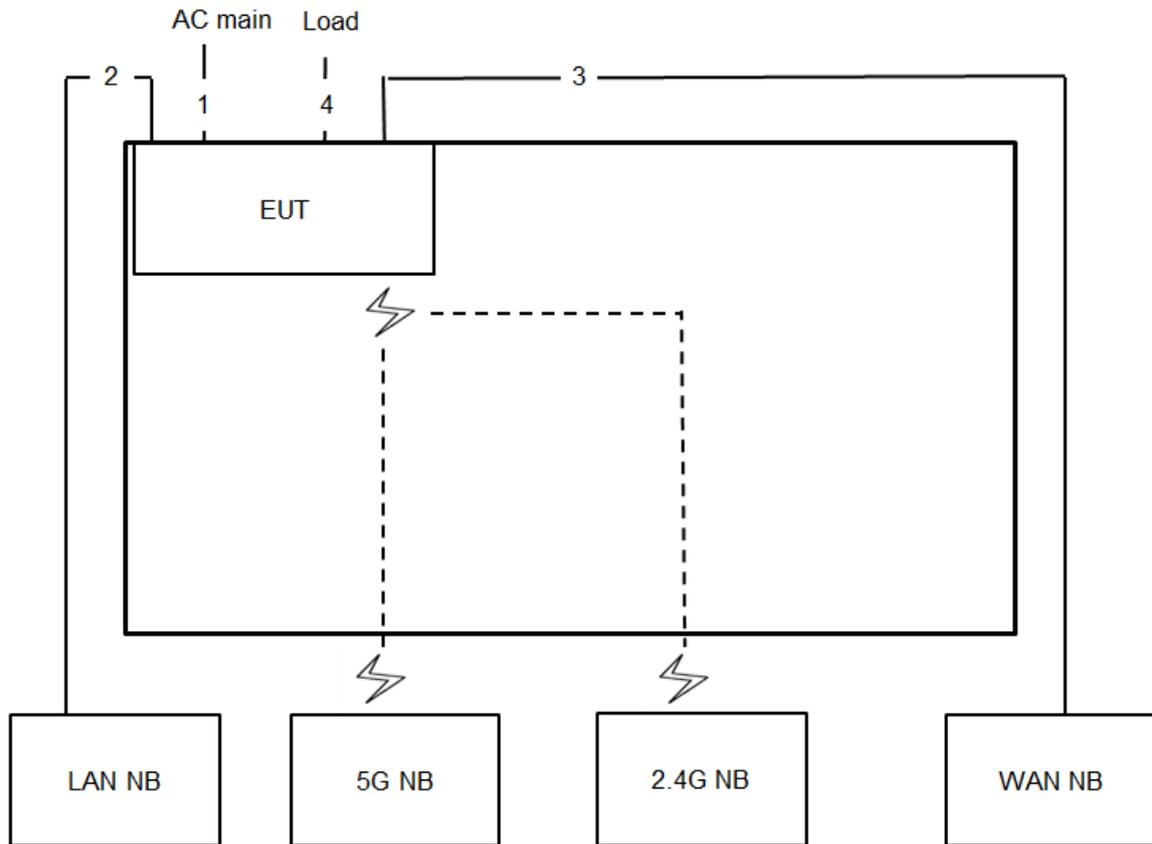


| Item | Connection | Shielded | Length |
|------|-----------|----------|--------|
| 1 | Power cable | No | 1.5m |
| 2 | RJ-45 cable | No | 10m |
| 3 | RJ-45 cable | No | 10m |
| 4 | RJ-45 cable*3 | No | 1.5m |

### 3.12.2. Radiation Emissions Test Configuration

Test Configuration: 30MHz ~1GHz
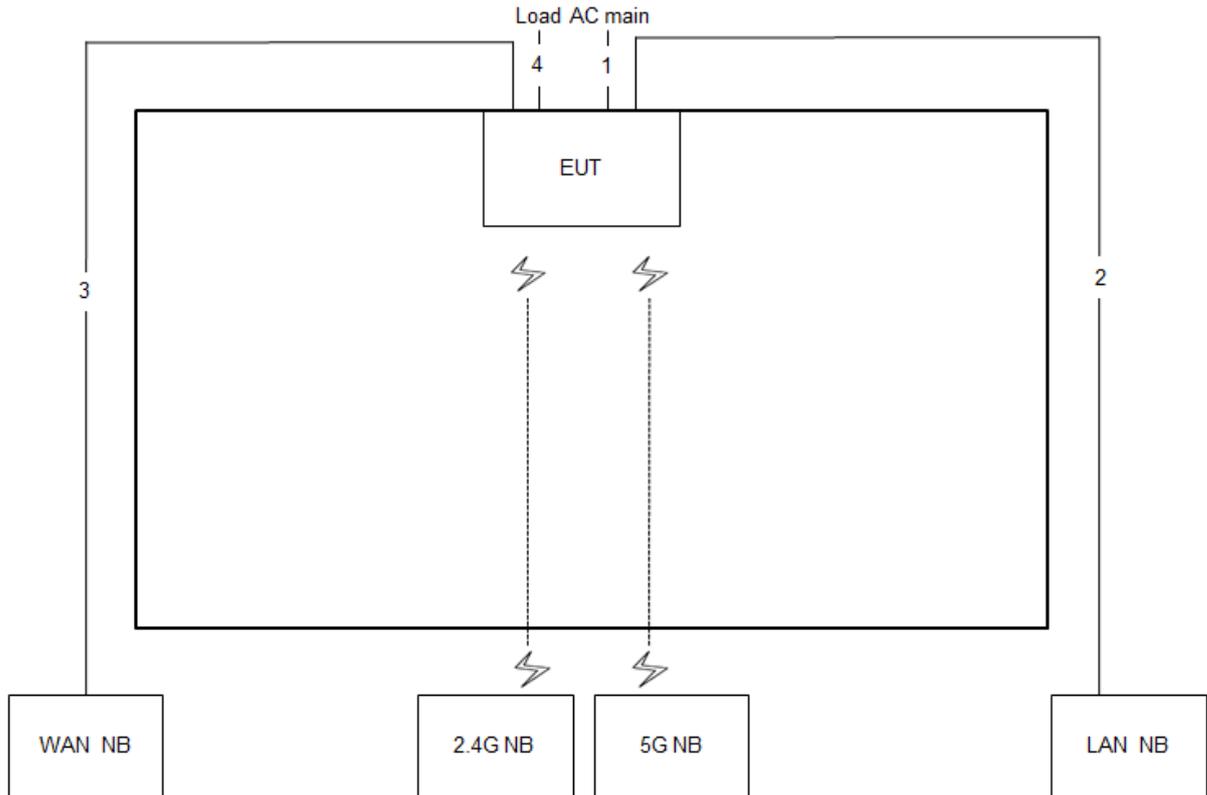


| Item | Connection | Shielded | Length |
|------|------------|----------|--------|
| 1 | Power cable | No | 1.5m |
| 2 | RJ-45 cable | No | 10m |
| 3 | RJ-45 cable | No | 10m |
| 4 | RJ-45 cable*3 | No | 1.5m |

Test Configuration: above 1GHz
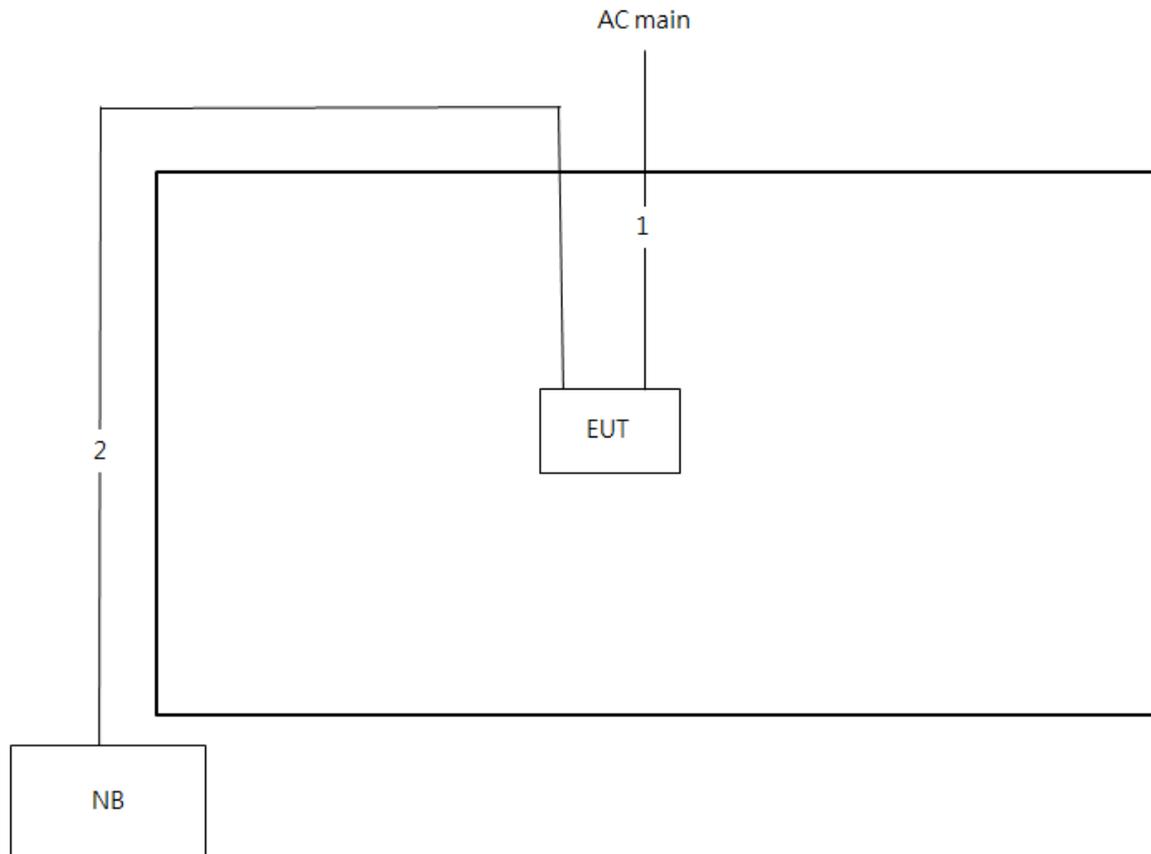


| Item | Connection | Shielded | Length |
|------|-----------|----------|--------|
| 1 | Power cable | No | 1.5m |
| 2 | RJ-45 cable | No | 10m |

# 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
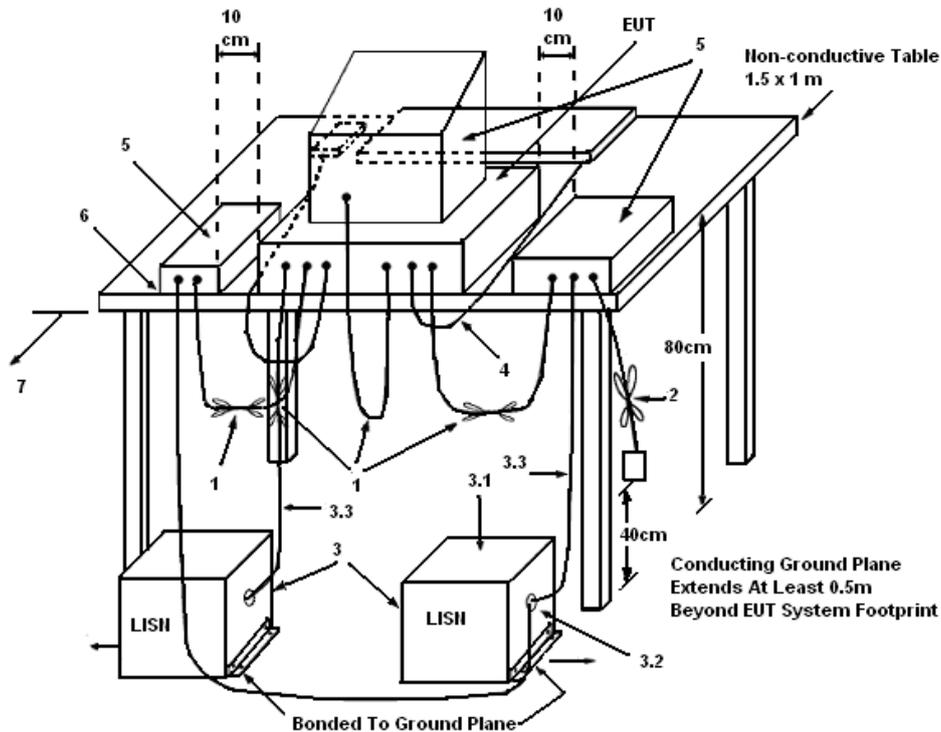


LEGEND:

(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℃ | Humidity | 63% |
|---|---|---|---|
| Test Engineer | Deven Huang / Da Deng | Phase | Line |
| Configuration | Normal Link | | |



```
                 Over  Limit  Read  LISN  Cable
          Freq  Level  Limit  Line  Level Factor Loss Remark      Pol/Phase

          MHz   dBuV    dB     dBuV  dBuV   dB    dB

    1    0.1516 38.49 -17.42  55.91 28.37  9.96  0.16 Average     LINE
    2    0.1516 52.22 -13.69  65.91 42.10  9.96  0.16 QP          LINE
    3    0.2378 32.22 -19.95  52.17 22.06  9.97  0.19 Average     LINE
    4    0.2378 40.60 -21.57  62.17 30.44  9.97  0.19 QP          LINE
    5    0.3731 33.88 -14.55  48.43 23.68 10.00  0.20 Average     LINE
    6    0.3731 40.07 -18.36  58.43 29.87 10.00  0.20 QP          LINE
    7    0.8528 22.54 -23.46  46.00 12.31 10.04  0.19 Average     LINE
    8    0.8528 28.15 -27.85  56.00 17.92 10.04  0.19 QP          LINE
    9    3.0901 21.85 -24.15  46.00 11.45 10.10  0.30 Average     LINE
   10    3.0901 28.70 -27.30  56.00 18.30 10.10  0.30 QP          LINE
   11    9.9130 25.61 -24.39  50.00 15.08 10.15  0.38 Average     LINE
   12    9.9130 32.38 -27.62  60.00 21.85 10.15  0.38 QP          LINE
```

| Temperature | 23℃ | Humidity | 63% |
|---|---|---|---|
| Test Engineer | Deven Huang / Da Deng | Phase | Neutral |
| Configuration | Normal Link | | |



```
             Over  Limit  Read  LISN  Cable
      Freq  Level  Limit  Line  Level Factor Loss Remark      Pol/Phase

      MHz   dBuV    dB    dBuV  dBuV    dB    dB

   1  0.1508 38.41 -17.55 55.96 28.29  9.96  0.16 Average     NEUTRAL
   2  0.1508 52.07 -13.89 65.96 41.95  9.96  0.16 QP          NEUTRAL
   3  0.2117 32.50 -20.64 53.14 22.36  9.96  0.18 Average     NEUTRAL
   4  0.2117 41.77 -21.37 63.14 31.63  9.96  0.18 QP          NEUTRAL
   5  0.3286 32.29 -17.20 49.49 22.13  9.97  0.19 Average     NEUTRAL
   6  0.3286 39.26 -20.23 59.49 29.10  9.97  0.19 QP          NEUTRAL
   7  3.1231 22.08 -23.92 46.00 11.77 10.01  0.30 Average     NEUTRAL
   8  3.1231 27.82 -28.18 56.00 17.51 10.01  0.30 QP          NEUTRAL
   9  8.9163 25.31 -24.69 50.00 14.81 10.13  0.37 Average     NEUTRAL
  10  8.9163 32.03 -27.97 60.00 21.53 10.13  0.37 QP          NEUTRAL
  11 12.7161 24.77 -25.23 50.00 14.16 10.20  0.41 Average     NEUTRAL
  12 12.7161 31.28 -28.72 60.00 20.67 10.20  0.41 QP          NEUTRAL
```

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℃ | Humidity | 65% |
|---|---|---|---|
| Test Engineer | Andy Tsai | | |

| Mode | Frequency | 26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---|---|---|---|
| 802.11a | 5180 MHz | 23.04 | 17.02 |
| | 5200 MHz | 33.65 | 17.37 |
| | 5240 MHz | 33.04 | 17.28 |
| | 5745 MHz | 31.83 | 17.11 |
| | 5785 MHz | 31.83 | 17.19 |
| | 5825 MHz | 31.74 | 17.11 |
| 802.11n MCS0 HT20 | 5180 MHz | 30.26 | 18.15 |
| | 5200 MHz | 35.74 | 18.41 |
| | 5240 MHz | 36.17 | 18.49 |
| | 5745 MHz | 33.30 | 18.32 |
| | 5785 MHz | 30.35 | 18.32 |
| | 5825 MHz | 29.91 | 18.23 |
| 802.11n MCS0 HT40 | 5190 MHz | 42.75 | 36.32 |
| | 5230 MHz | 72.75 | 36.90 |
| | 5755 MHz | 57.83 | 36.76 |
| | 5795 MHz | 53.77 | 36.90 |
| 802.11n MCS8 HT20 | 5180 MHz | 25.48 | 18.06 |
| | 5200 MHz | 23.04 | 18.15 |
| | 5240 MHz | 22.87 | 18.15 |
| | 5745 MHz | 22.00 | 17.89 |
| | 5785 MHz | 22.78 | 18.06 |
| | 5825 MHz | 21.91 | 17.89 |
| 802.11n MCS8 HT40 | 5190 MHz | 41.88 | 36.47 |
| | 5230 MHz | 41.88 | 36.76 |
| | 5755 MHz | 42.17 | 36.47 |
| | 5795 MHz | 42.32 | 36.61 |

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

Spectrum

Ref Level 97.00 dBμV　　RBW 300 kHz
Att　　0 dB　SWT 1 ms　VBW 1 MHz　Mode Sweep
1Pk View

M1[1]　53.18 dBμV
5.1681739 GHz
Occ Bw　17.018813314 MHz
D1[1]　−0.14 dB
23.0435 MHz

D1 78.965 dBμV
D2 52.965 dBμV

CF 5.18 GHz　　　691 pts　　　Span 60.0 MHz

Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|------|-----|-----|---------|---------|----------|-----------------|
| M1 | | 1 | 5.1681739 GHz | 53.18 dBμV | | |
| T1 | | 1 | 5.1714038 GHz | 68.53 dBμV | Occ Bw | 17.018813314 MHz |
| T2 | | 1 | 5.1884226 GHz | 69.39 dBμV | | |
| D1 | M1 | 1 | 23.0435 MHz | −0.14 dB | | |
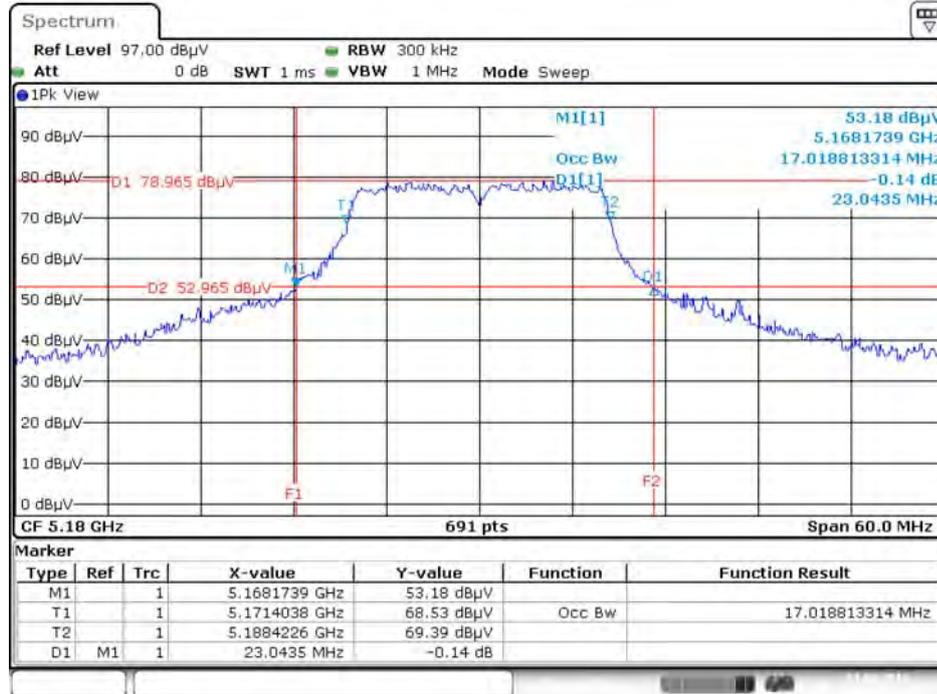
Date: 3.JUN.2016 14:17:55

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

Spectrum

Ref Level 97.00 dBμV　　RBW 300 kHz
Att　　0 dB　SWT 1 ms　VBW 1 MHz　Mode Sweep
1Pk View

M1[1]　53.07 dBμV
5.1832174 GHz
Occ Bw　17.366136035 MHz
D1[1]　−0.30 dB
33.6522 MHz

D1 78.728 dBμV
D2 52.728 dBμV

CF 5.2 GHz　　　691 pts　　　Span 60.0 MHz

Marker

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|------|-----|-----|---------|---------|----------|-----------------|
| M1 | | 1 | 5.1832174 GHz | 53.07 dBμV | | |
| T1 | | 1 | 5.1911433 GHz | 65.90 dBμV | Occ Bw | 17.366136035 MHz |
| T2 | | 1 | 5.2085094 GHz | 68.35 dBμV | | |
| D1 | M1 | 1 | 33.6522 MHz | −0.30 dB | | |

Date: 3.JUN.2016 14:19:13

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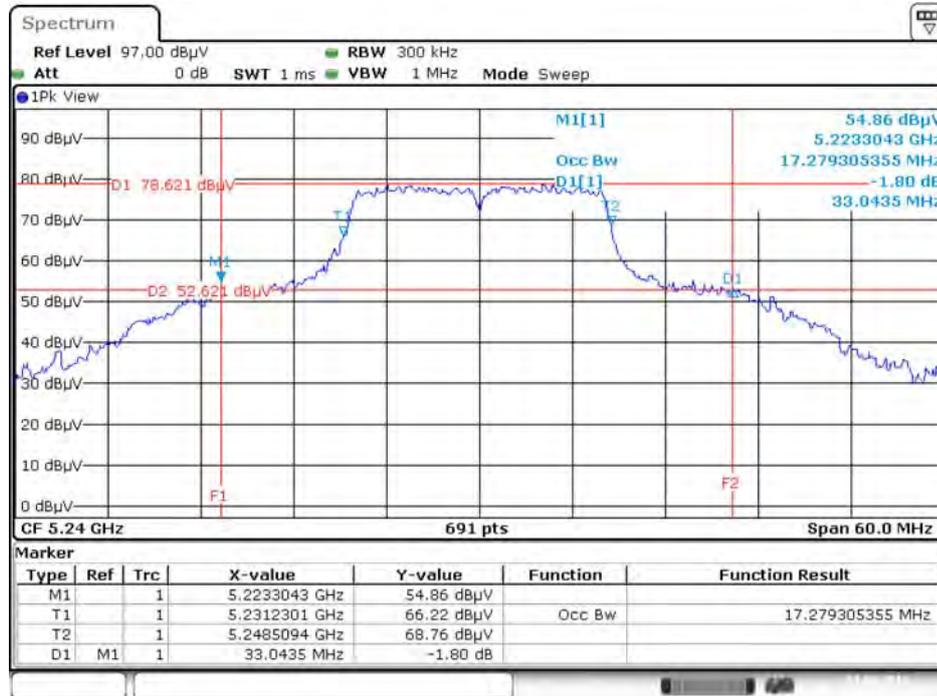


Date: 3.JUN.2016 14:19:55

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



Date: 3.JUN.2016 14:21:38

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



| Marker | | | | | | |
|---|---|---|---|---|---|---|
| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
| M1 | | 1 | 5.7682174 GHz | 49.69 dBµV | | |
| T1 | | 1 | 5.7762301 GHz | 62.07 dBµV | Occ Bw | 17.192474674 MHz |
| T2 | | 1 | 5.7934226 GHz | 66.23 dBµV | | |
| D1 | M1 | 1 | 31.8261 MHz | −0.23 dB | | |

Date: 3.JUN.2016 14:22:11

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



| Marker | | | | | | |
|---|---|---|---|---|---|---|
| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
| M1 | | 1 | 5.8083043 GHz | 50.03 dBµV | | |
| T1 | | 1 | 5.8164038 GHz | 65.27 dBµV | Occ Bw | 17.105643994 MHz |
| T2 | | 1 | 5.8335094 GHz | 65.32 dBµV | | |
| D1 | M1 | 1 | 31.7391 MHz | 0.05 dB | | |

Date: 3.JUN.2016 14:22:46

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 / 5180 MHz**
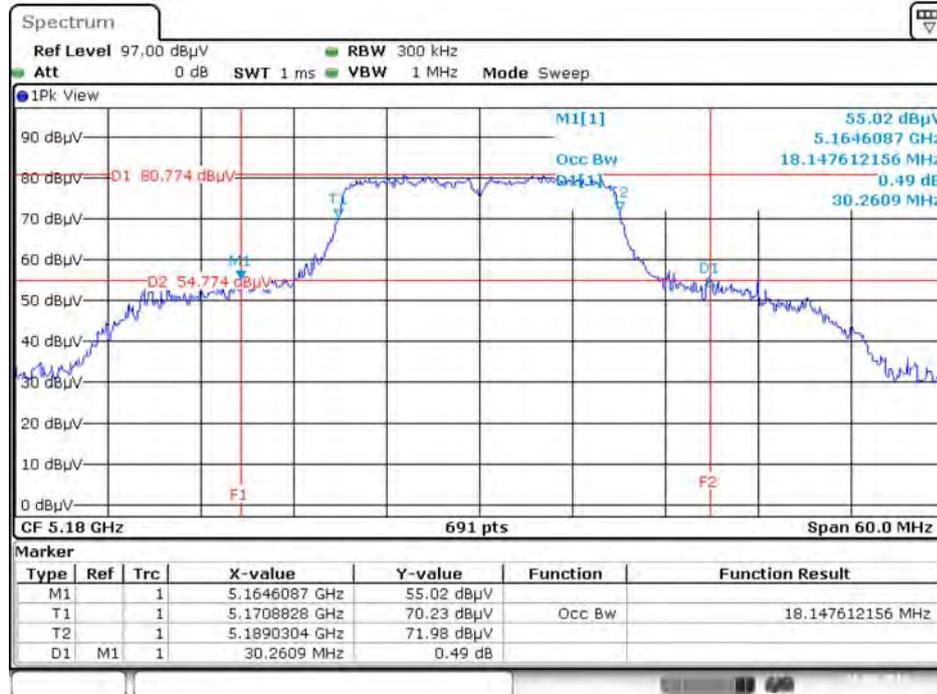


Date: 26.JUN.2016 04:51:28

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 / 5200 MHz**
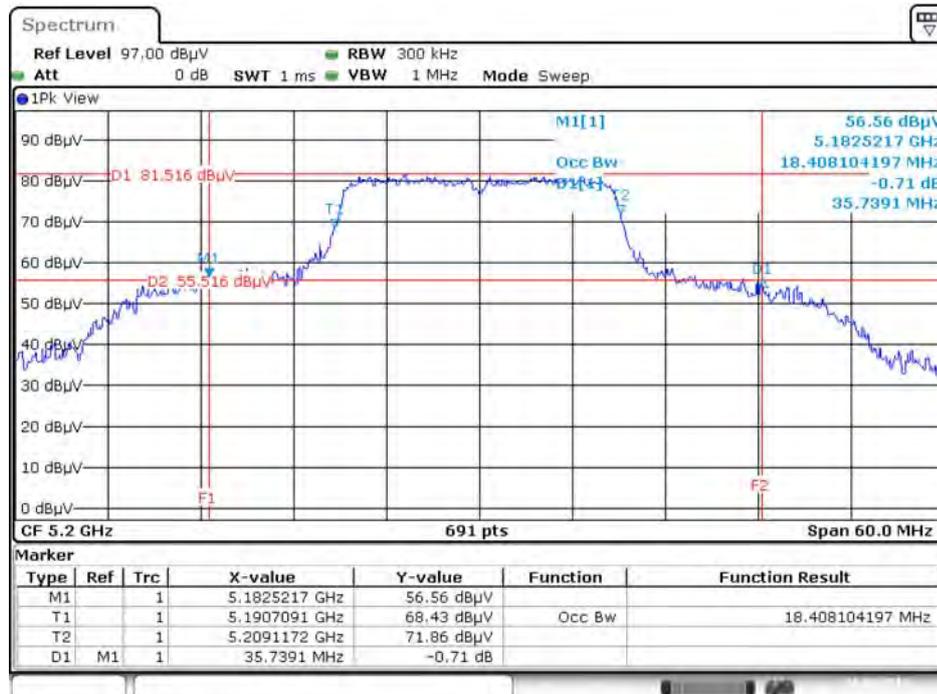


Date: 26.JUN.2016 04:53:10

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 / 5240 MHz**
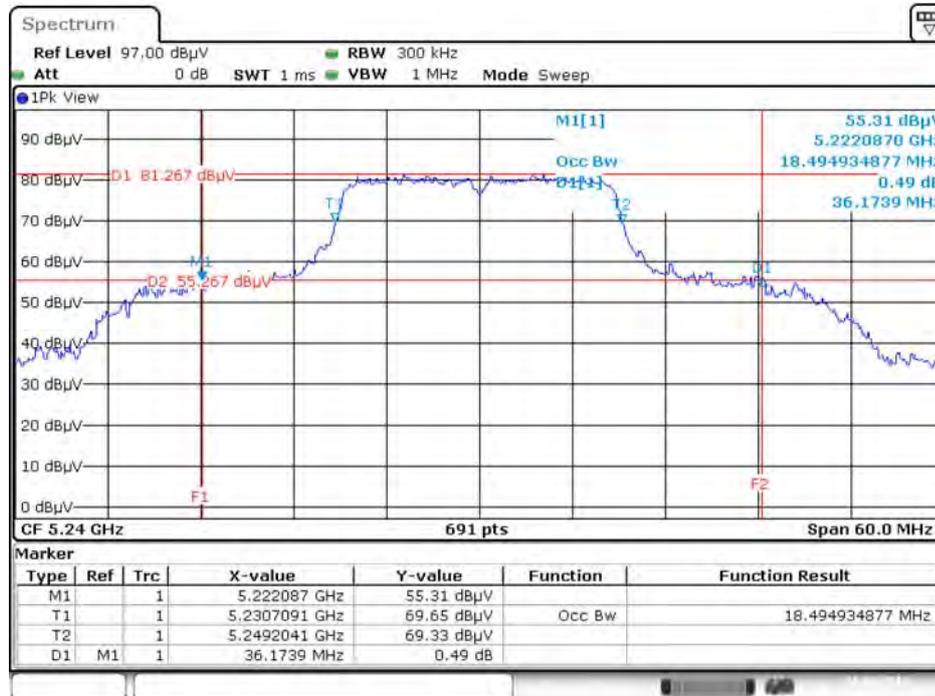


Date: 26.JUN.2016  04:54:10

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 / 5745 MHz**



Date: 26.JUN.2016  05:00:04

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 / 5785 MHz**



Date: 26.JUN.2016 05:02:03

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 / 5825 MHz**
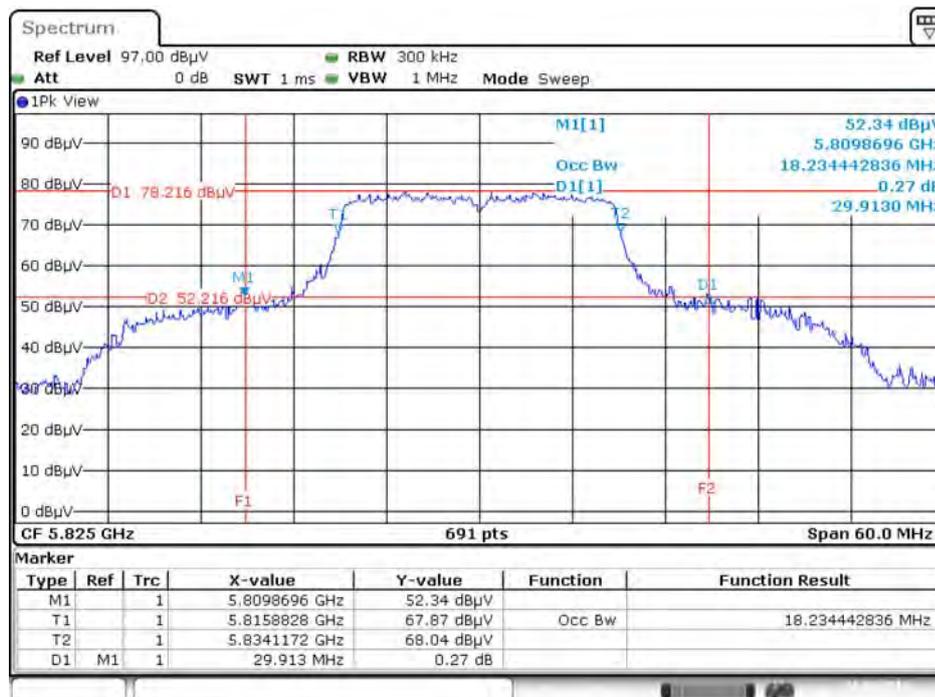


Date: 26.JUN.2016 05:03:33

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 / 5190 MHz**
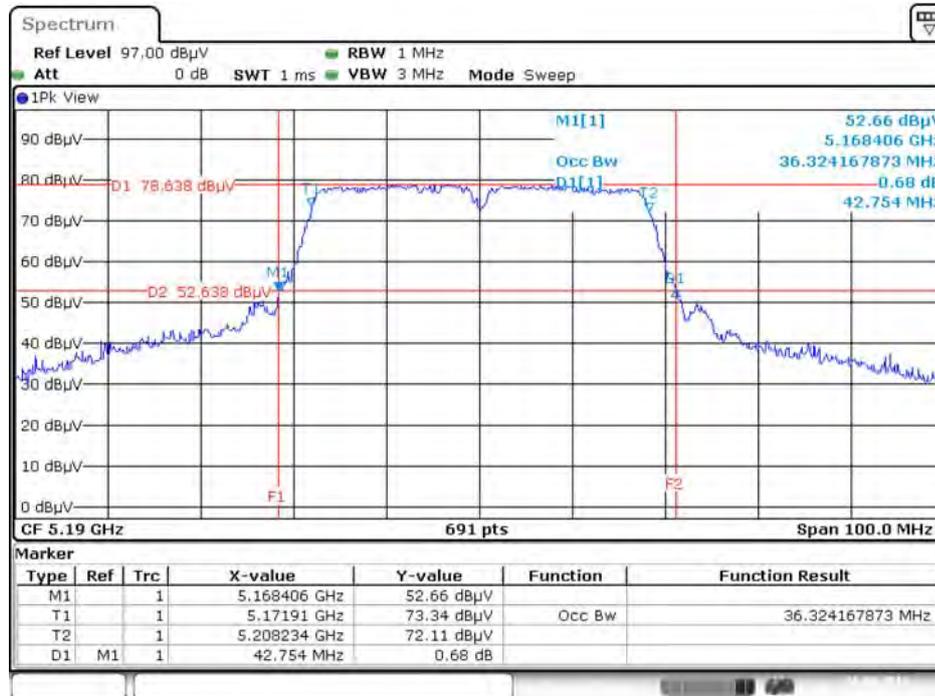


Date: 26.JUN.2016  05:07:03

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 / 5230 MHz**
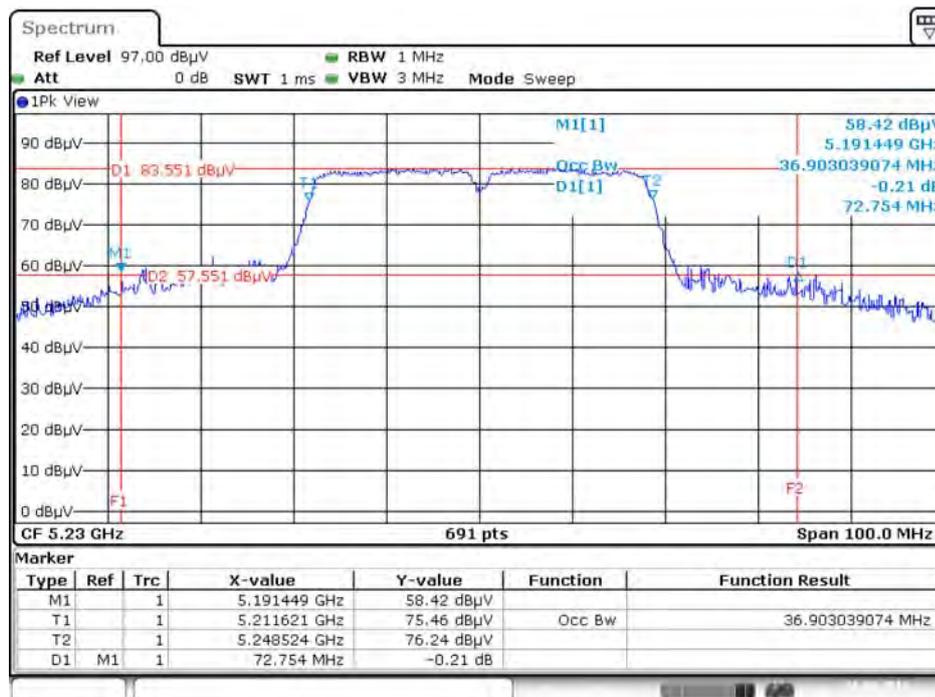


Date: 26.JUN.2016  05:08:54

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 / 5755 MHz**
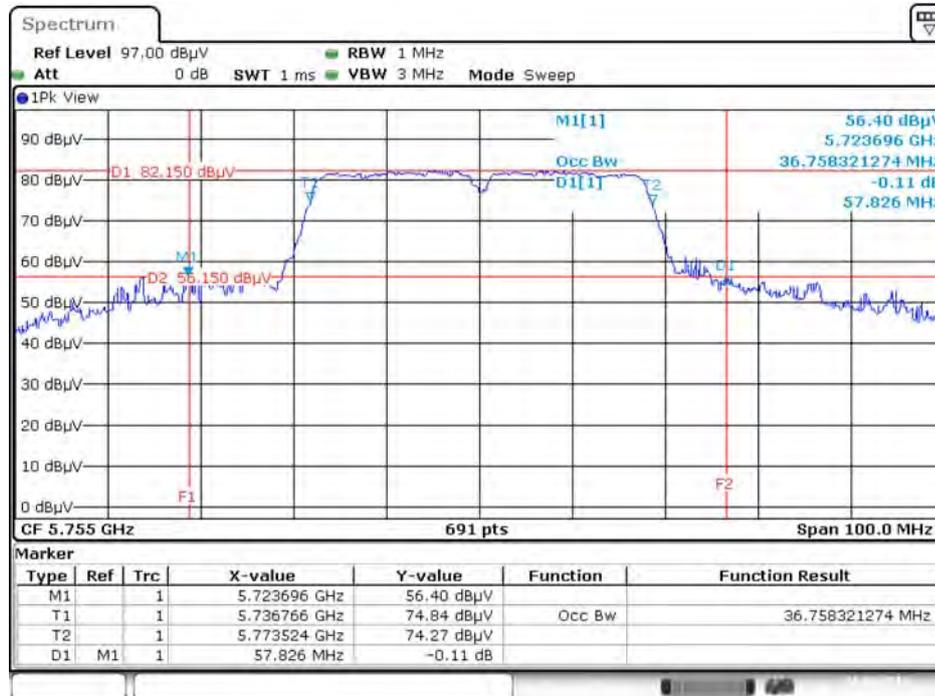


Date: 26.JUN.2016 05:10:04

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 / 5795 MHz**



Date: 26.JUN.2016 05:11:07

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT20 / Chain 1 + Chain 2 / 5180 MHz**



Date: 3.JUN.2016 14:24:35

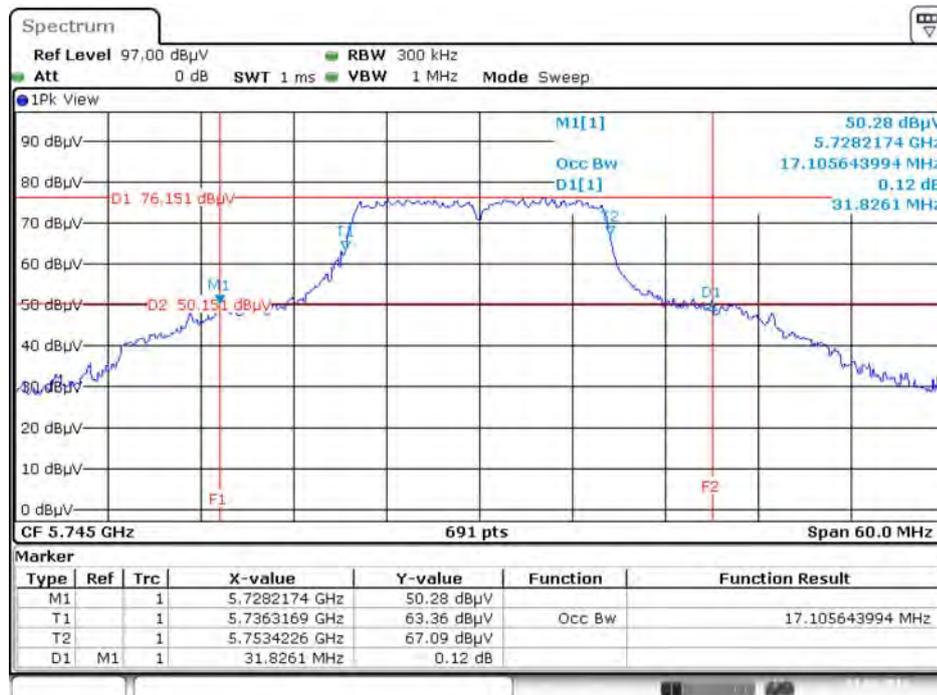**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT20 / Chain 1 + Chain 2 / 5200 MHz**
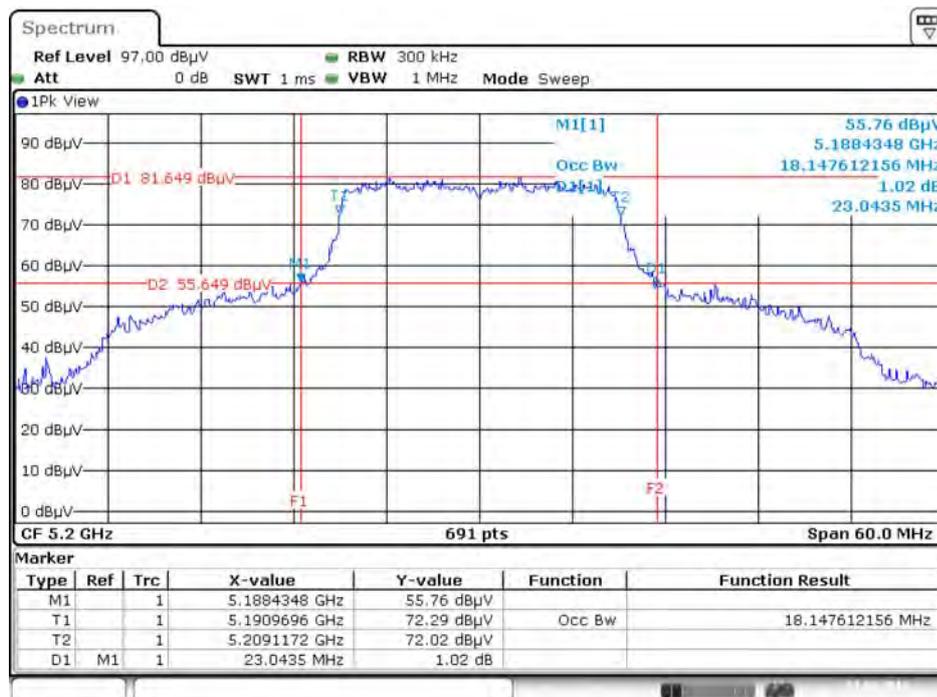


Date: 3.JUN.2016 14:25:20

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT20 / Chain 1 + Chain 2 / 5240 MHz**
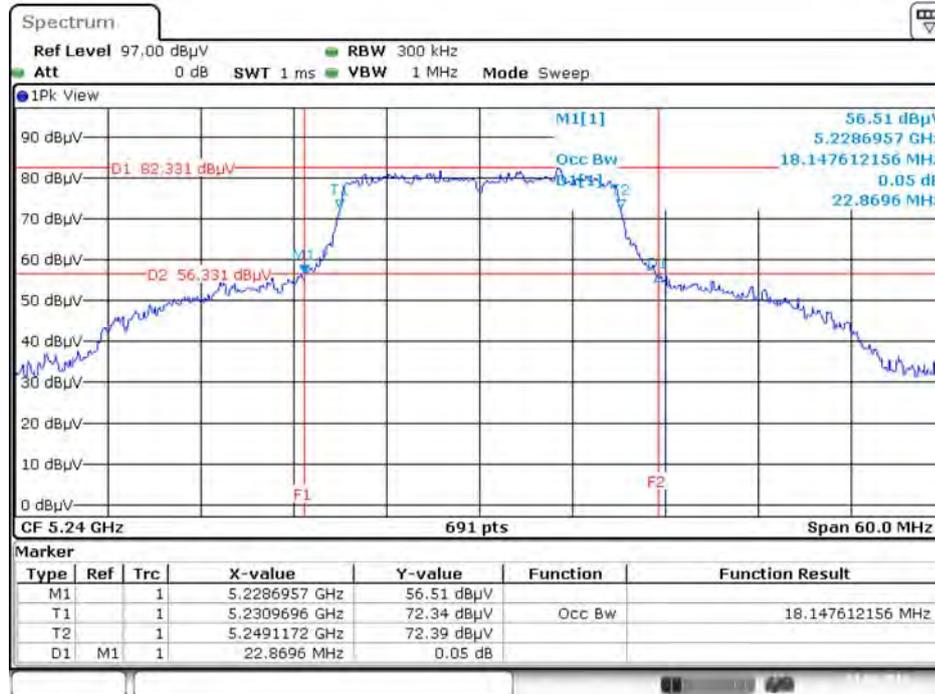


Date: 3.JUN.2016 14:26:03

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT20 / Chain 1 + Chain 2 / 5745 MHz**
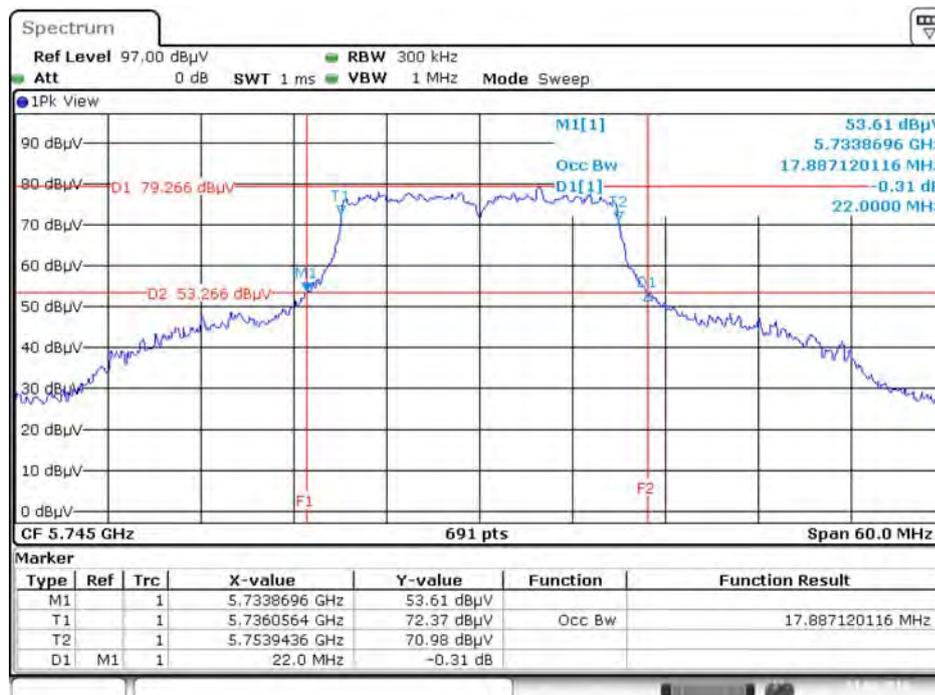


Date: 3.JUN.2016 14:34:13

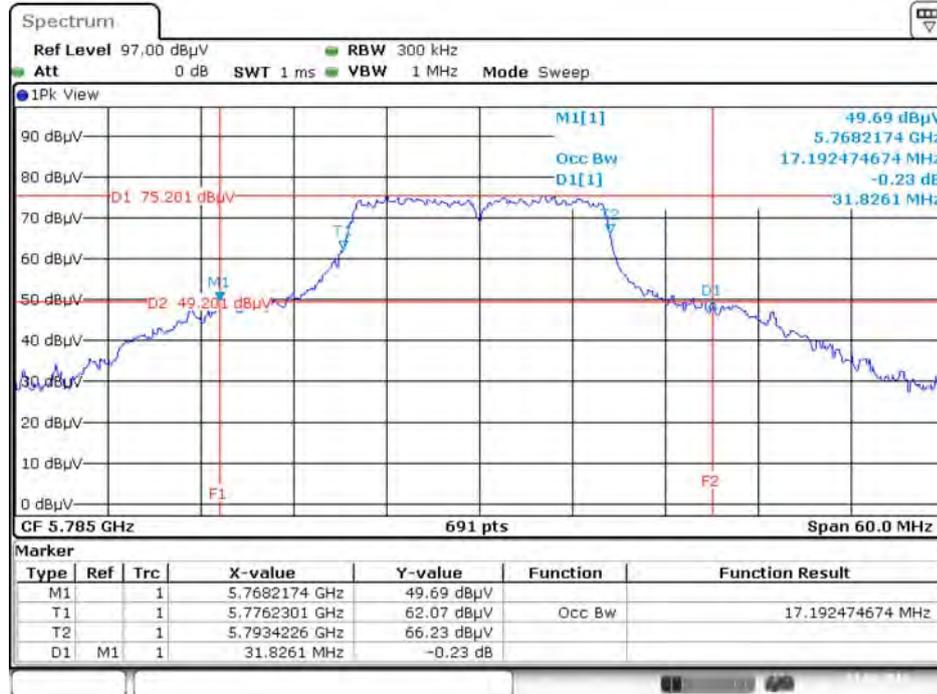**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT20 / Chain 1 + Chain 2 / 5785 MHz**
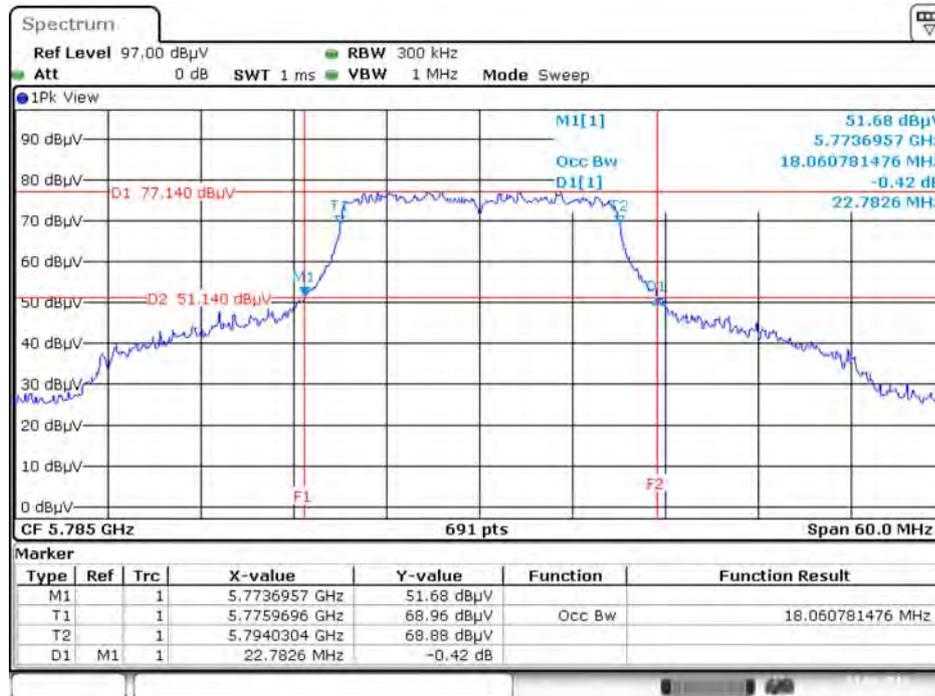


Date: 3.JUN.2016 14:37:07

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT20 / Chain 1 + Chain 2 / 5825 MHz**
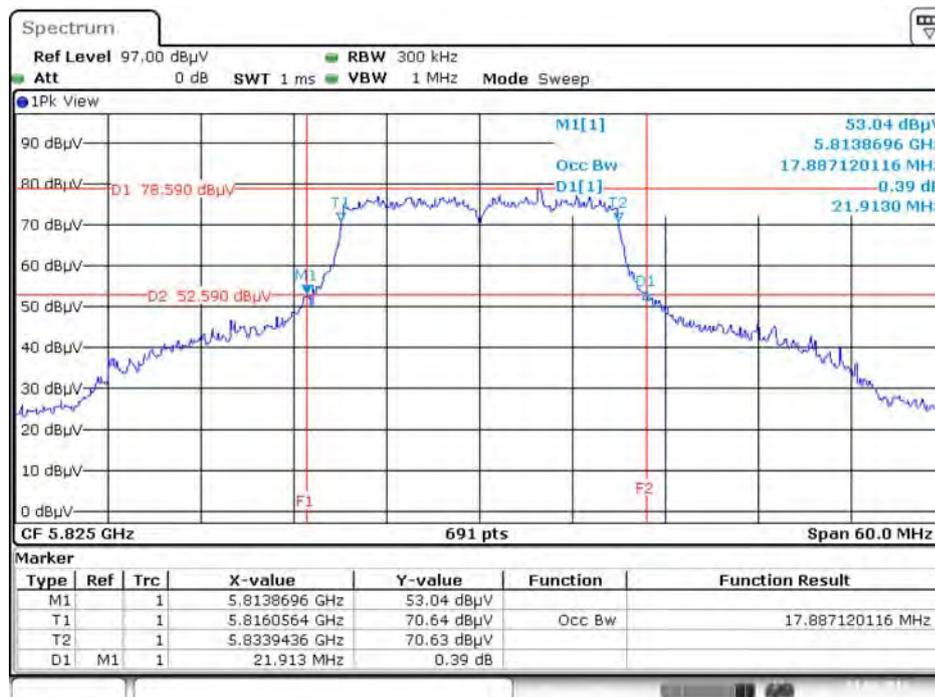


Date: 3.JUN.2016 14:37:31

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT40 / Chain 1 + Chain 2 / 5190 MHz**
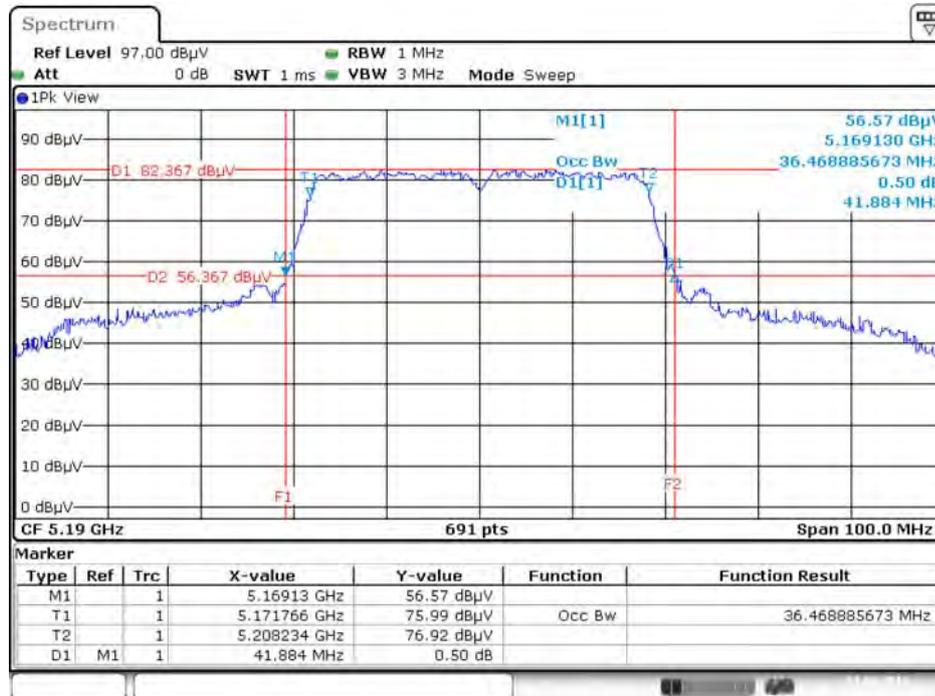


Date: 3.JUN.2016 14:41:05

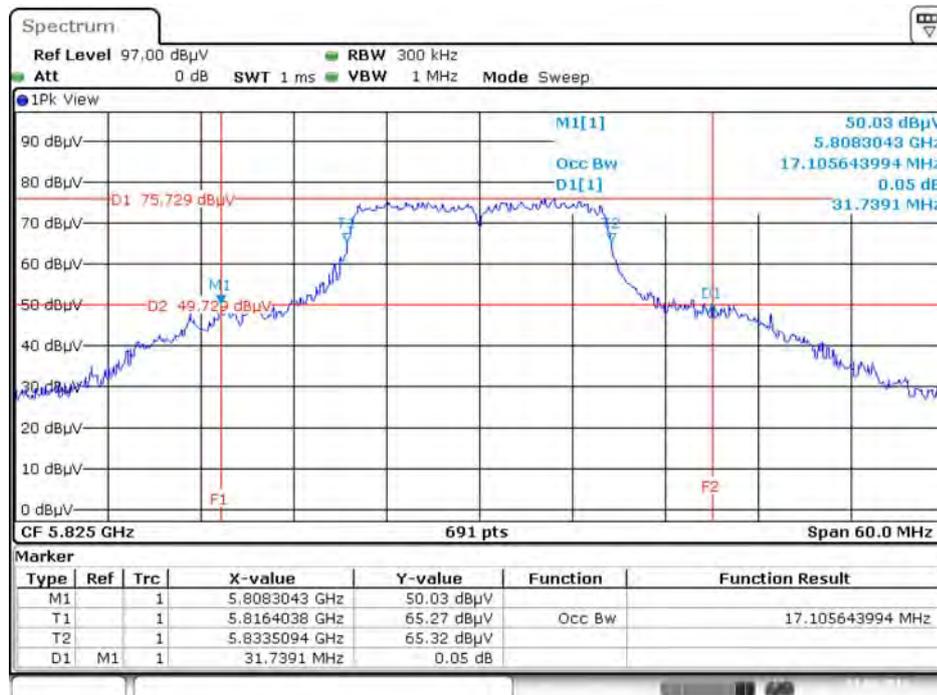**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT40 / Chain 1 + Chain 2 / 5230 MHz**
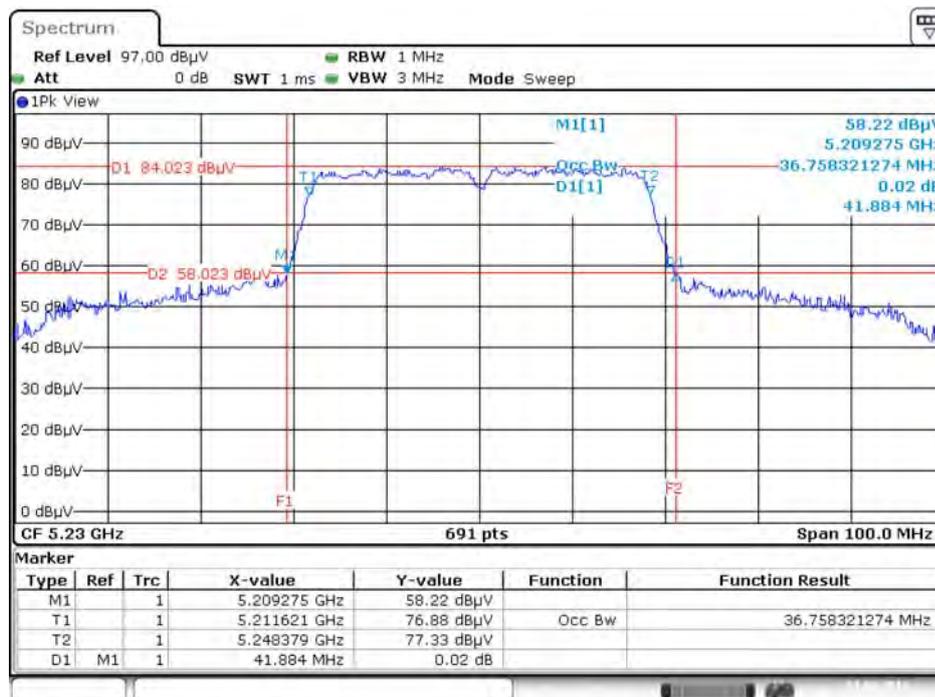


Date: 3.JUN.2016 14:41:46

**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT40 / Chain 1 + Chain 2 / 5755 MHz**



| Spectrum | | | | | | |
|---|---|---|---|---|---|---|
| Ref Level 97.00 dBμV | | | RBW 1 MHz | | | |
| Att | 0 dB | SWT 1 ms | VBW 3 MHz | Mode Sweep | | |

1Pk View

| M1[1] | 56.34 dBμV |
| | 5.733986 GHz |
| Occ Bw | 36.468885673 MHz |
| D1[1] | -0.73 dB |
| | 42.174 MHz |

D1 81.369 dBμV

D2 55.369 dBμV

CF 5.755 GHz    691 pts    Span 100.0 MHz

**Marker**

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 5.733986 GHz | 56.34 dBμV | | |
| T1 | | 1 | 5.736766 GHz | 74.82 dBμV | Occ Bw | 36.468885673 MHz |
| T2 | | 1 | 5.773234 GHz | 75.12 dBμV | | |
| D1 | M1 | 1 | 42.174 MHz | -0.73 dB | | |
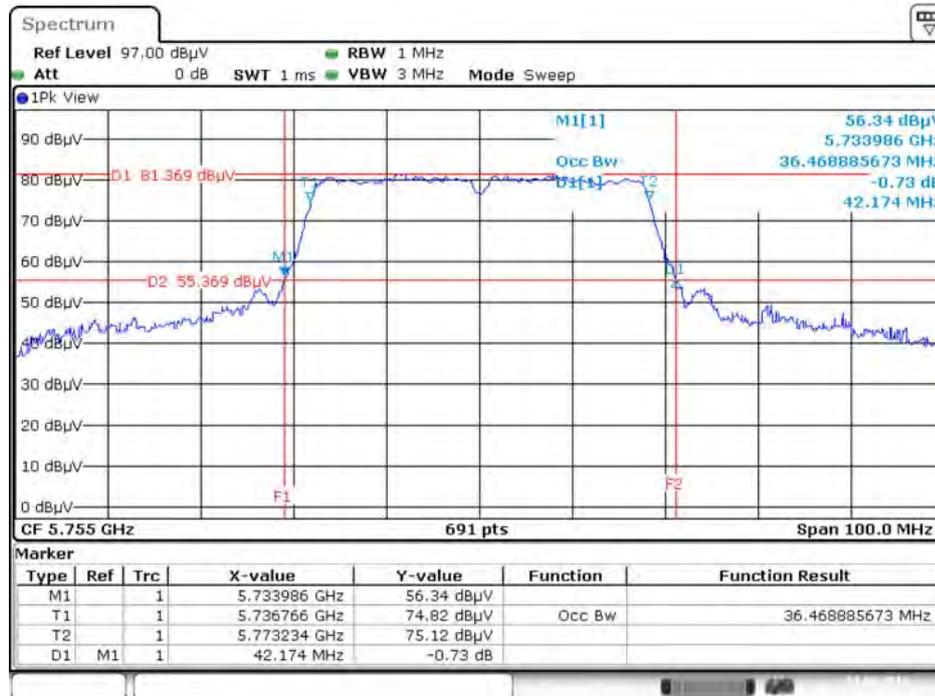
Date: 3.JUN.2016 14:43:23

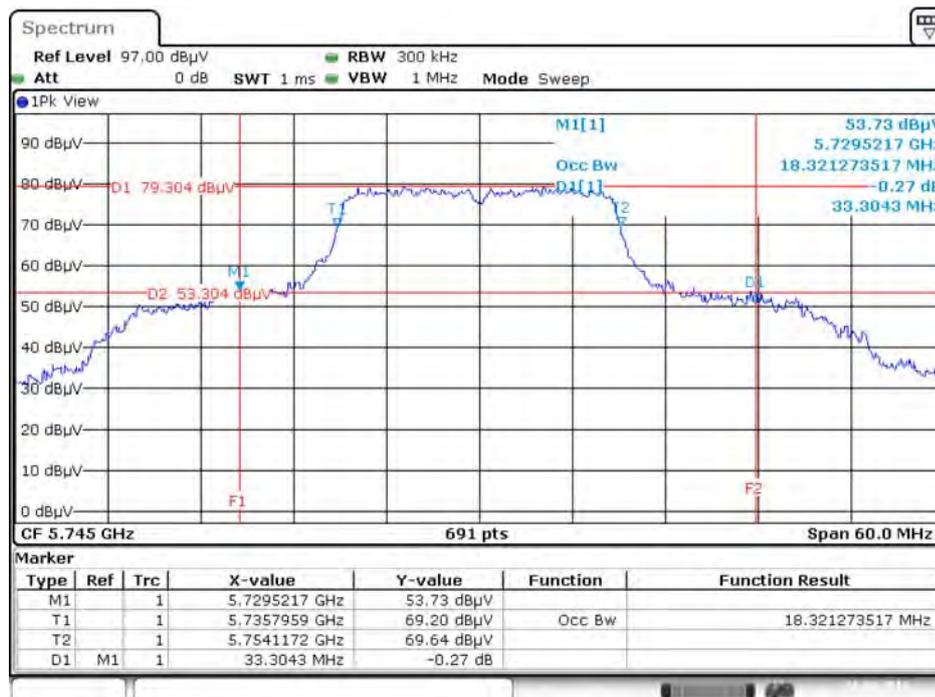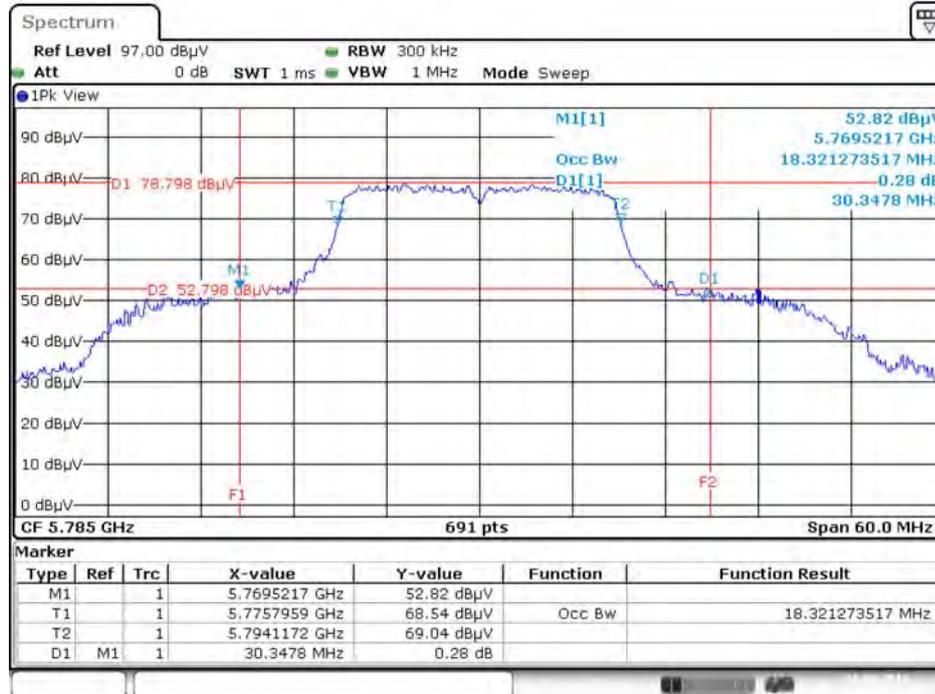**26dB Bandwidth and 99% Occupied Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT40 / Chain 1 + Chain 2 / 5795 MHz**



| Spectrum | | | | | | |
|---|---|---|---|---|---|---|
| Ref Level 97.00 dBμV | | | RBW 1 MHz | | | |
| Att | 0 dB | SWT 1 ms | VBW 3 MHz | Mode Sweep | | |

1Pk View

| M1[1] | 54.67 dBμV |
| | 5.773986 GHz |
| Occ Bw | 36.613603473 MHz |
| D1[1] | 0.53 dB |
| | 42.319 MHz |

D1 80.594 dBμV

D2 54.594 dBμV

CF 5.795 GHz    691 pts    Span 100.0 MHz

**Marker**

| Type | Ref | Trc | X-value | Y-value | Function | Function Result |
|---|---|---|---|---|---|---|
| M1 | | 1 | 5.773986 GHz | 54.67 dBμV | | |
| T1 | | 1 | 5.776621 GHz | 73.90 dBμV | Occ Bw | 36.613603473 MHz |
| T2 | | 1 | 5.813234 GHz | 75.32 dBμV | | |
| D1 | M1 | 1 | 42.319 MHz | 0.53 dB | | |
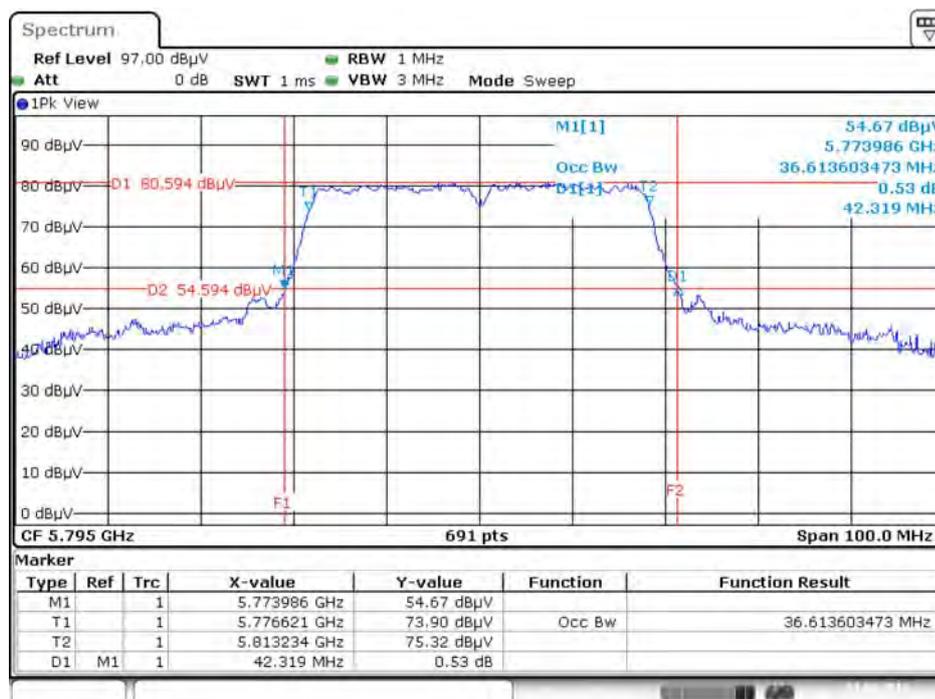
Date: 3.JUN.2016 14:44:02

## 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℃ | Humidity | 65% |
|---|---|---|---|
| Test Engineer | Andy Tsai | | |

| Mode | Frequency | 6dB Bandwidth (MHz) | Min. Limit (kHz) | Test Result |
|---|---|---|---|---|
| 802.11a | 5745 MHz | 16.52 | 500 | Complies |
| | 5785 MHz | 16.52 | 500 | Complies |
| | 5825 MHz | 16.52 | 500 | Complies |
| 802.11n MCS0 HT20 | 5745 MHz | 17.74 | 500 | Complies |
| | 5785 MHz | 17.74 | 500 | Complies |
| | 5825 MHz | 17.74 | 500 | Complies |
| 802.11n MCS0 HT40 | 5755 MHz | 36.41 | 500 | Complies |
| | 5795 MHz | 36.41 | 500 | Complies |
| 802.11n MCS8 HT20 | 5745 MHz | 17.74 | 500 | Complies |
| | 5785 MHz | 17.74 | 500 | Complies |
| | 5825 MHz | 17.74 | 500 | Complies |
| 802.11n MCS8 HT40 | 5755 MHz | 36.41 | 500 | Complies |
| | 5795 MHz | 36.41 | 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 / 5745 MHz**
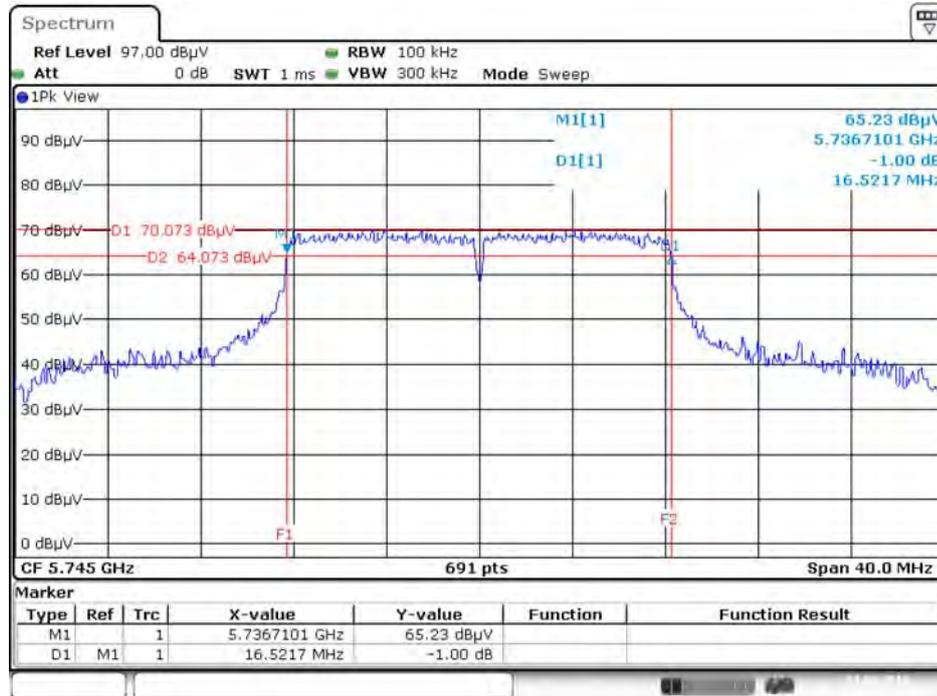


Date: 3.JUN.2016 14:51:08

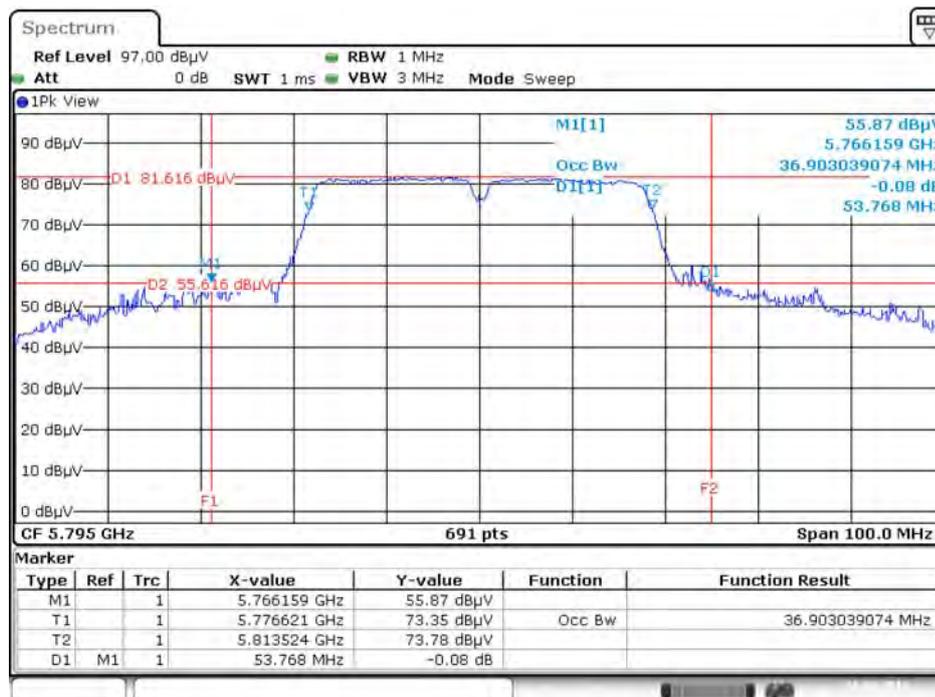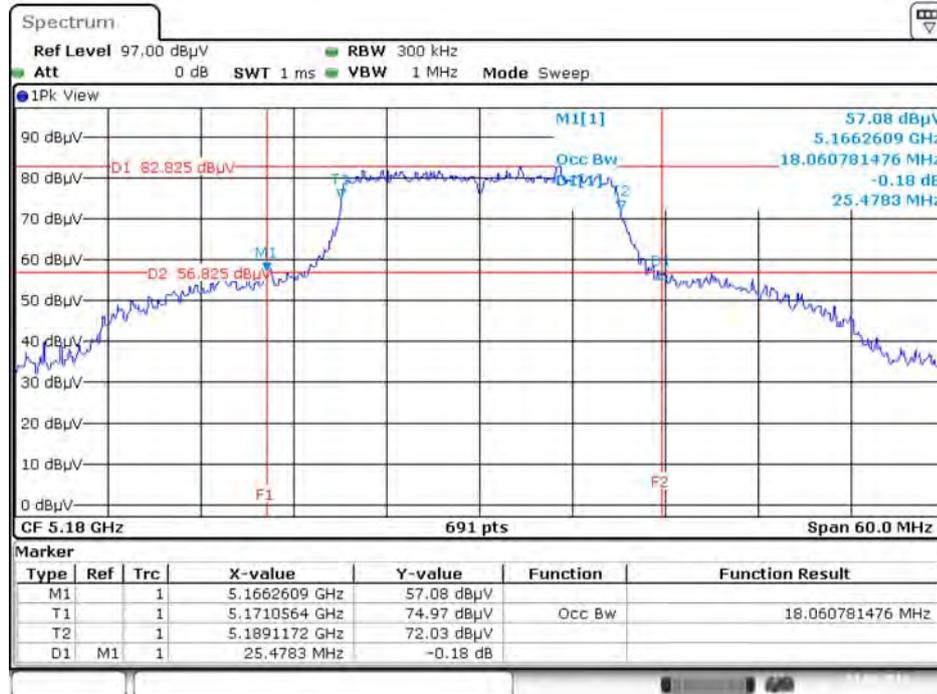**6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 / 5745 MHz**
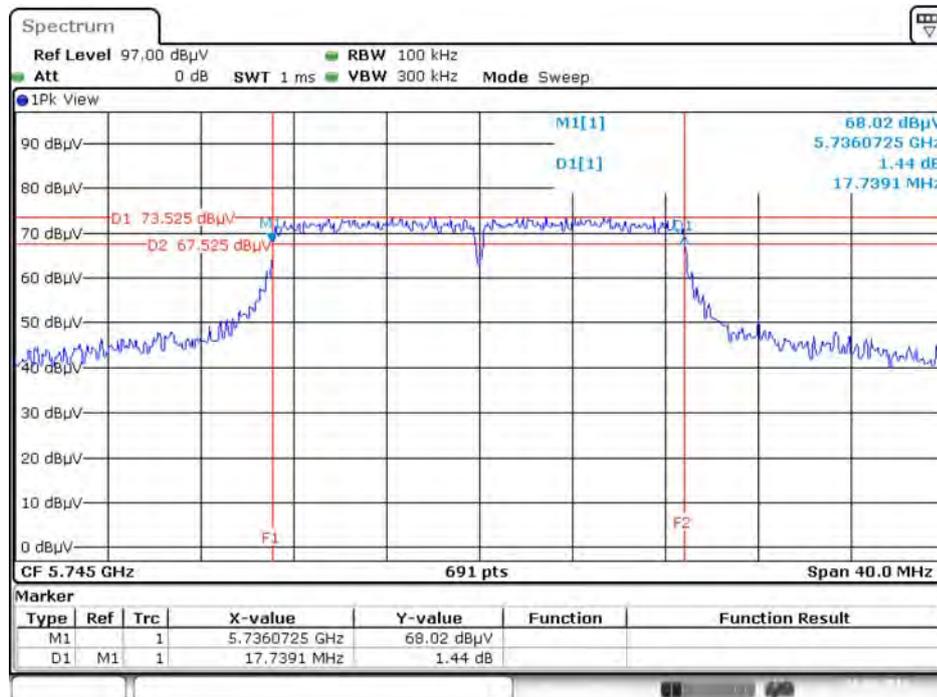


Date: 26.JUN.2016 05:17:44

**6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 / 5755MHz**
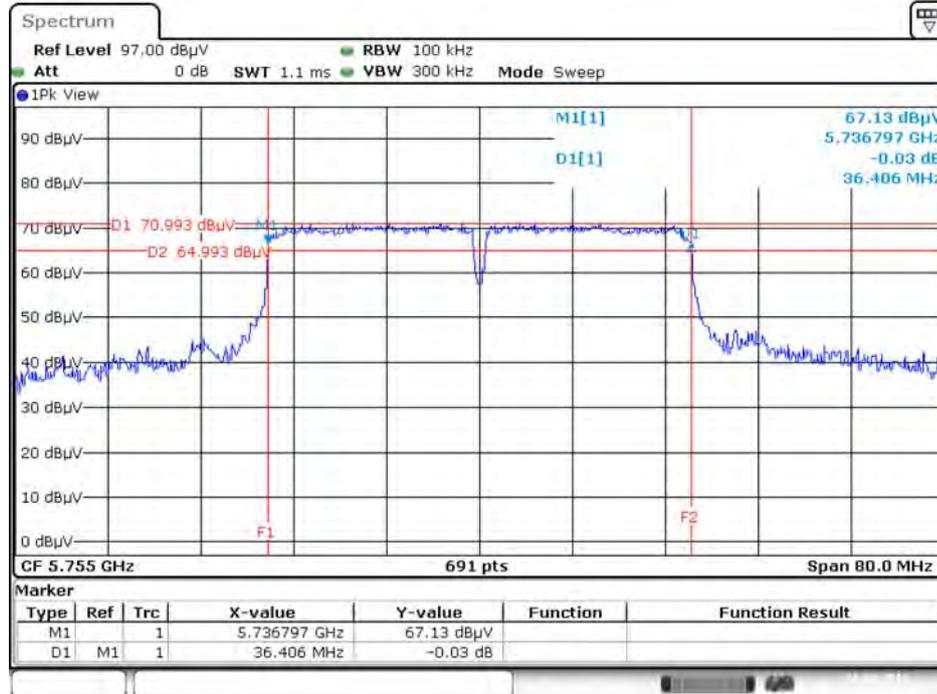


Date: 26.JUN.2016 05:14:51

**6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT20 / Chain 1 + Chain 2 / 5745 MHz**
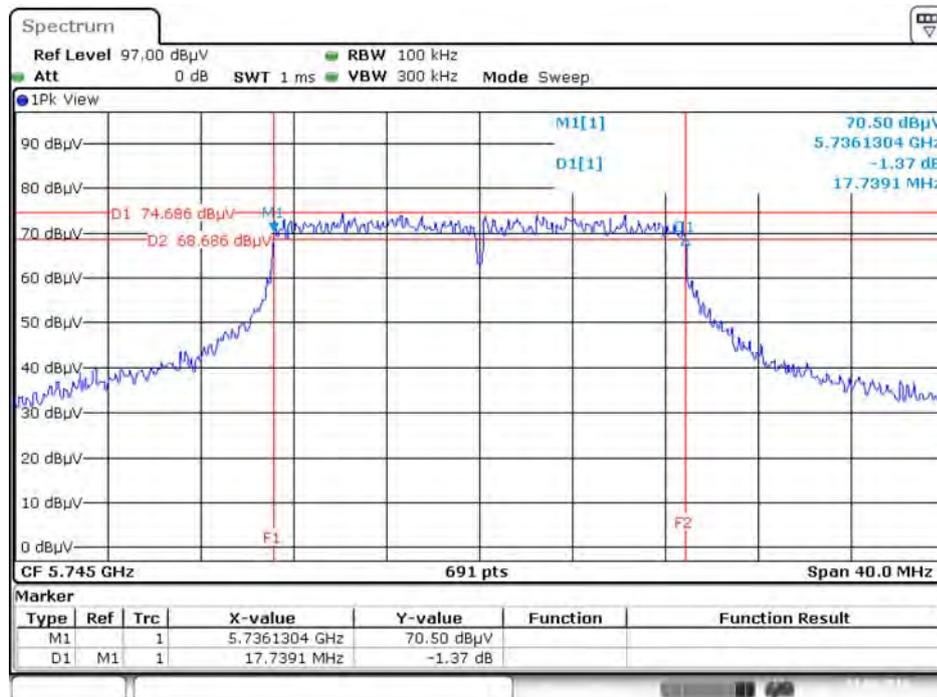


Date: 3.JUN.2016 14:49:35

**6 dB Bandwidth Plot on Configuration IEEE 802.11n MCS8 HT40 / Chain 1 + Chain 2 / 5755MHz**
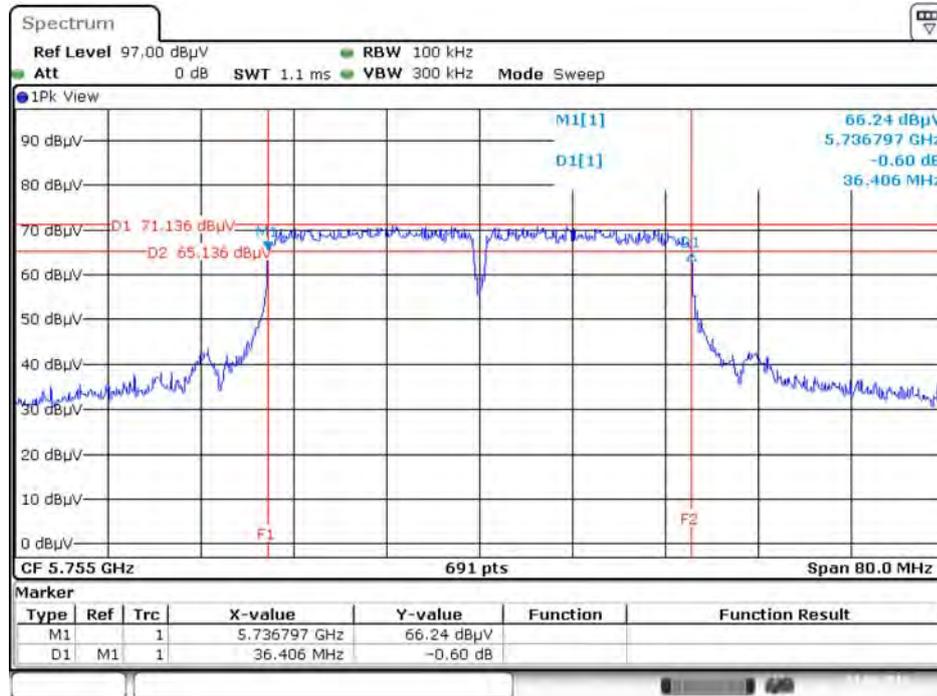


Date: 3.JUN.2016 14:48:57

## 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. |
| ☐ 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 |
|---|---|
| Bandwidth | 50MHz bandwidth is greater than the EUT emission bandwidth |
| 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
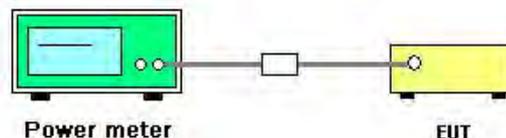


### 4.4.5. Test Deviation

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℃ | Humidity | 65% |
|---|---|---|---|
| Test Engineer | Andy Tsai | Test Date | Jun. 03, 2016 |

| Mode | Frequency | Conducted Power (dBm) | | | Max. Limit (dBm) | Result |
|---|---|---|---|---|---|---|
| | | Chain 1 | Chain 2 | Total | | |
| 802.11a | 5180 MHz | 17.24 | - | 17.24 | 30.00 | Complies |
| | 5200 MHz | 17.25 | - | 17.25 | 30.00 | Complies |
| | 5240 MHz | 17.05 | - | 17.05 | 30.00 | Complies |
| | 5745 MHz | 14.85 | - | 14.85 | 30.00 | Complies |
| | 5785 MHz | 14.65 | - | 14.65 | 30.00 | Complies |
| | 5825 MHz | 14.52 | - | 14.52 | 30.00 | Complies |
| 802.11n MCS0 HT20 | 5180 MHz | 15.48 | - | 15.48 | 30.00 | Complies |
| | 5200 MHz | 16.57 | - | 16.57 | 30.00 | Complies |
| | 5240 MHz | 16.33 | - | 16.33 | 30.00 | Complies |
| | 5745 MHz | 13.75 | - | 13.75 | 30.00 | Complies |
| | 5785 MHz | 13.62 | - | 13.62 | 30.00 | Complies |
| | 5825 MHz | 13.48 | - | 13.48 | 30.00 | Complies |
| 802.11n MCS0 HT40 | 5190 MHz | 10.83 | - | 10.83 | 30.00 | Complies |
| | 5230 MHz | 15.98 | - | 15.98 | 30.00 | Complies |
| | 5755 MHz | 13.83 | - | 13.83 | 30.00 | Complies |
| | 5795 MHz | 13.75 | - | 13.75 | 30.00 | Complies |
| 802.11n MCS8 HT20 | 5180 MHz | 16.32 | 16.26 | 19.30 | 30.00 | Complies |
| | 5200 MHz | 16.22 | 16.14 | 19.19 | 30.00 | Complies |
| | 5240 MHz | 16.18 | 16.12 | 19.16 | 30.00 | Complies |
| | 5745 MHz | 13.65 | 13.45 | 16.56 | 30.00 | Complies |
| | 5785 MHz | 13.58 | 13.52 | 16.56 | 30.00 | Complies |
| | 5825 MHz | 13.51 | 13.48 | 16.51 | 30.00 | Complies |
| 802.11n MCS8 HT40 | 5190 MHz | 14.43 | 14.45 | 17.45 | 30.00 | Complies |
| | 5230 MHz | 16.12 | 16.28 | 19.21 | 30.00 | Complies |
| | 5755 MHz | 13.35 | 13.52 | 16.45 | 30.00 | Complies |
| | 5795 MHz | 13.25 | 13.55 | 16.41 | 30.00 | Complies |

## 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 |
| | ☐ 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 $10\log(500kHz/RBW)$ 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 and sum the spectra across the outputs.

4. 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
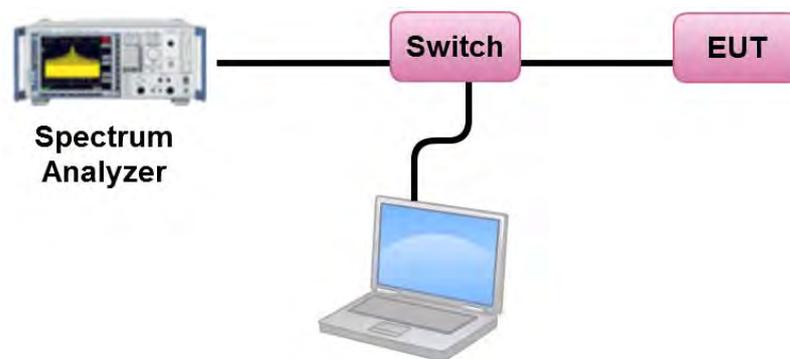


### 4.5.5. Test Deviation

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℃ | Humidity | 65% |
|---|---|---|---|
| Test Engineer | Andy Tsai | | |

### Configuration IEEE 802.11a / Chain 1

| Channel | Frequency | Power Density (dBm/MHz) | Max. Limit (dBm/MHz) | Result |
|---|---|---|---|---|
| 36 | 5180 MHz | 4.03 | 17.00 | Complies |
| 40 | 5200 MHz | 4.02 | 17.00 | Complies |
| 48 | 5240 MHz | 3.91 | 17.00 | Complies |

| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---|---|---|---|---|---|---|
| 149 | 5745 MHz | 1.73 | -3.01 | -1.28 | 30.00 | Complies |
| 157 | 5785 MHz | 1.48 | -3.01 | -1.53 | 30.00 | Complies |
| 165 | 5825 MHz | 1.50 | -3.01 | -1.51 | 30.00 | Complies |

### Configuration IEEE 802.11n MCS0 HT20 / Chain 1

| Channel | Frequency | Power Density (dBm/MHz) | Max. Limit (dBm/MHz) | Result |
|---|---|---|---|---|
| 36 | 5180 MHz | 2.20 | 17.00 | Complies |
| 40 | 5200 MHz | 3.32 | 17.00 | Complies |
| 48 | 5240 MHz | 3.06 | 17.00 | Complies |

| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---|---|---|---|---|---|---|
| 149 | 5745 MHz | 0.55 | -3.01 | -2.46 | 30.00 | Complies |
| 157 | 5785 MHz | 0.41 | -3.01 | -2.60 | 30.00 | Complies |
| 165 | 5825 MHz | 0.29 | -3.01 | -2.72 | 30.00 | Complies |

### Configuration IEEE 802.11n MCS0 HT40 / Chain 1

| Channel | Frequency | Power Density (dBm/MHz) | Max. Limit (dBm/MHz) | Result |
|---------|-----------|-------------------------|----------------------|--------|
| 38 | 5190 MHz | -5.32 | 17.00 | Complies |
| 46 | 5230 MHz | -0.24 | 17.00 | Complies |

| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---------|-----------|-------------------------|-------------------------------|----------------------------|----------------------------------|--------|
| 151 | 5755 MHz | -2.38 | -3.01 | -5.39 | 30.00 | Complies |
| 159 | 5795 MHz | -2.46 | -3.01 | -5.47 | 30.00 | Complies |

### Configuration IEEE 802.11n MCS8 HT20 / Chain 1 + Chain 2

| Channel | Frequency | Power Density (dBm/MHz) | Max. Limit (dBm/MHz) | Result |
|---------|-----------|-------------------------|----------------------|--------|
| 36 | 5180 MHz | 6.22 | 17.00 | Complies |
| 40 | 5200 MHz | 6.04 | 17.00 | Complies |
| 48 | 5240 MHz | 6.07 | 17.00 | Complies |

Note: $DirectionalGain = 10 \cdot \log\left[\dfrac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right] = 4.8\text{dBi} < 6\text{dBi}$, so the limit doesn't reduce.

| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---------|-----------|-------------------------|-------------------------------|----------------------------|----------------------------------|--------|
| 149 | 5745 MHz | 3.46 | -3.01 | 0.45 | 30.00 | Complies |
| 157 | 5785 MHz | 3.46 | -3.01 | 0.45 | 30.00 | Complies |
| 165 | 5825 MHz | 3.28 | -3.01 | 0.27 | 30.00 | Complies |

Note: $DirectionalGain = 10 \cdot \log\left[\dfrac{\sum_{j=1}^{N_{SS}}\left\{\sum_{k=1}^{N_{ANT}} g_{j,k}\right\}^2}{N_{ANT}}\right] = 4.8\text{dBi} < 6\text{dBi}$, so the limit doesn't reduce.

**Configuration IEEE 802.11n MCS8 HT40 / Chain 1 + Chain 2**

| Channel | Frequency | Power Density (dBm/MHz) | Max. Limit (dBm/MHz) | Result |
|---|---|---|---|---|
| 38 | 5190 MHz | 1.35 | 17.00 | Complies |
| 46 | 5230 MHz | 3.09 | 17.00 | Complies |

Note: $DirectionalGain = 10 \cdot \log \left[ \dfrac{\sum\limits_{j=1}^{N_{SS}} \left\{ \sum\limits_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 4.8 \text{dBi} < 6 \text{dBi}$, so the limit doesn't reduce.

| Channel | Frequency | Power Density (dBm/MHz) | 10log(500kHz/RBW) Factor (dB) | Power Density (dBm/500kHz) | Power Density Limit (dBm/500kHz) | Result |
|---|---|---|---|---|---|---|
| 151 | 5755 MHz | 0.26 | -3.01 | -2.75 | 30.00 | Complies |
| 159 | 5795 MHz | 0.28 | -3.01 | -2.73 | 30.00 | Complies |

Note: $DirectionalGain = 10 \cdot \log \left[ \dfrac{\sum\limits_{j=1}^{N_{SS}} \left\{ \sum\limits_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right] = 4.8 \text{dBi} < 6 \text{dBi}$, so the limit doesn't reduce.

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 / 5180 MHz**
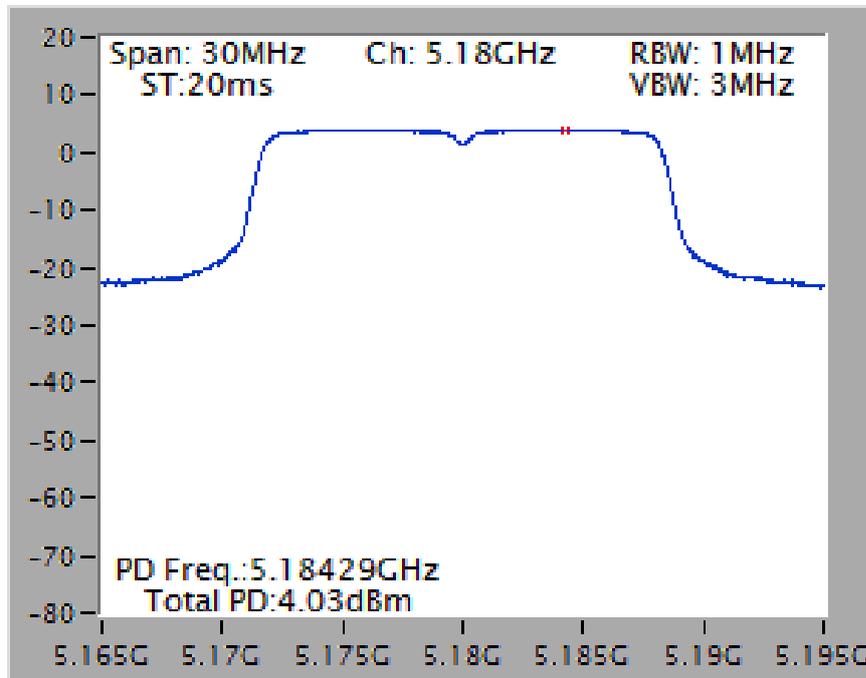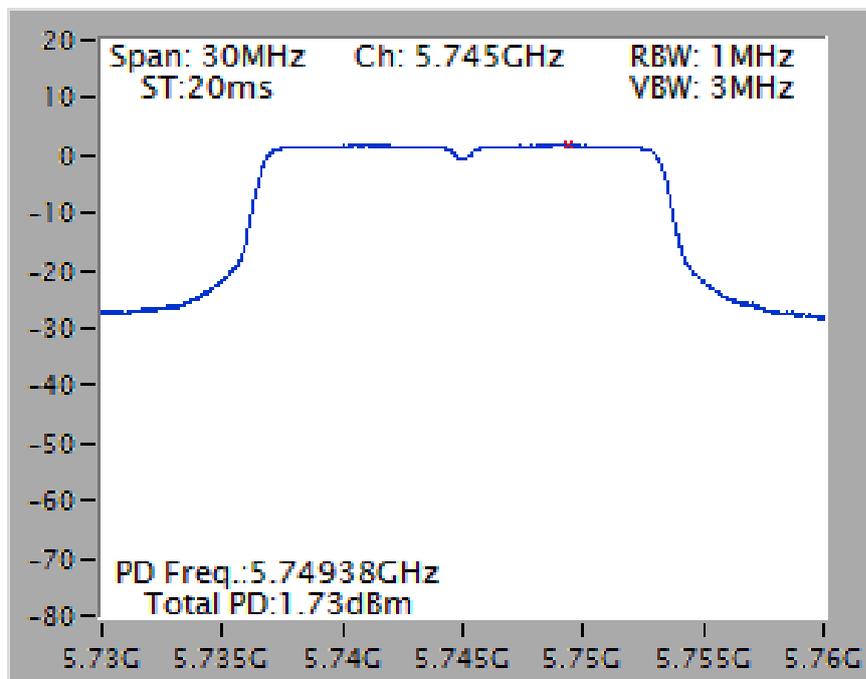


**Power Density Plot on Configuration IEEE 802.11a / Chain 1 / 5745 MHz**

**Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 / 5200 MHz**



```
Span: 30MHz    Ch: 5.2GHz       RBW: 1MHz
ST:20ms                         VBW: 3MHz

PD Freq.:5.2042GHz
Total PD:3.32dBm
```

**Power Density Plot on Configuration IEEE 802.11n MCS0 HT20 / Chain 1 / 5745 MHz**



```
Span: 30MHz    Ch: 5.745GHz      RBW: 1MHz
ST:20ms                          VBW: 3MHz

PD Freq.:5.74821GHz
Total PD:0.55dBm
```
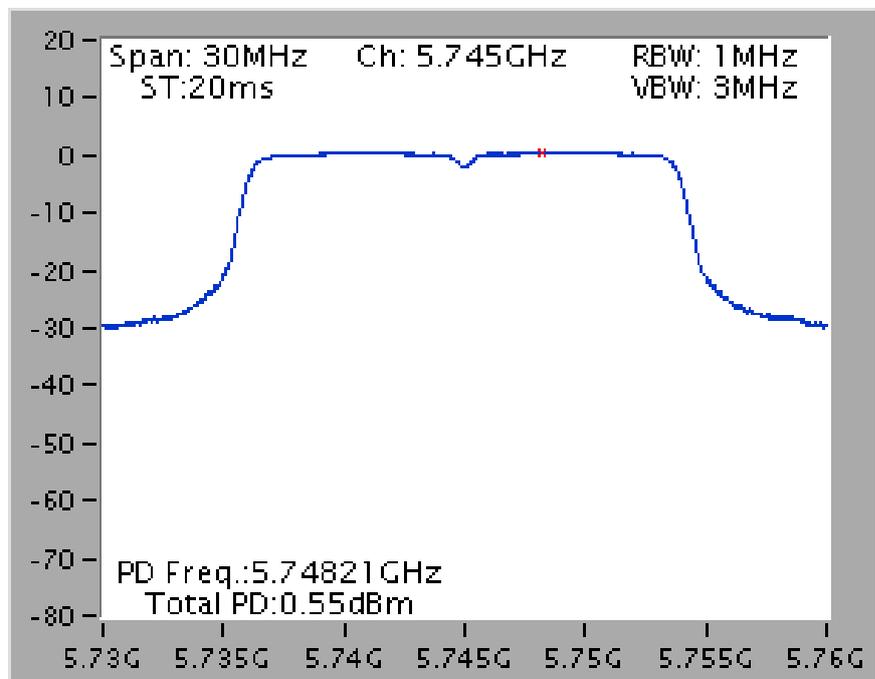
**Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 / 5230 MHz**
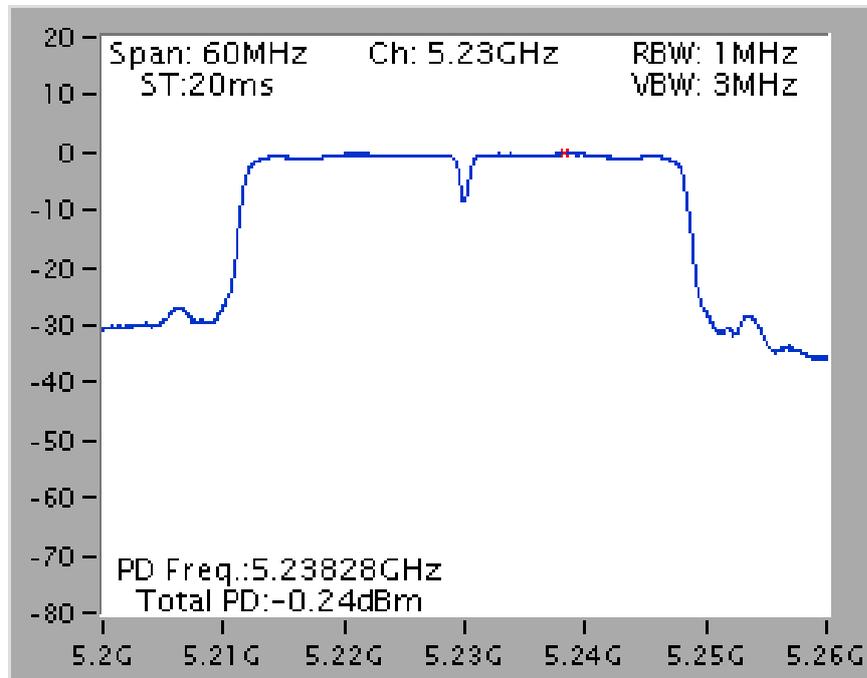


**Power Density Plot on Configuration IEEE 802.11n MCS0 HT40 / Chain 1 / 5755 MHz**
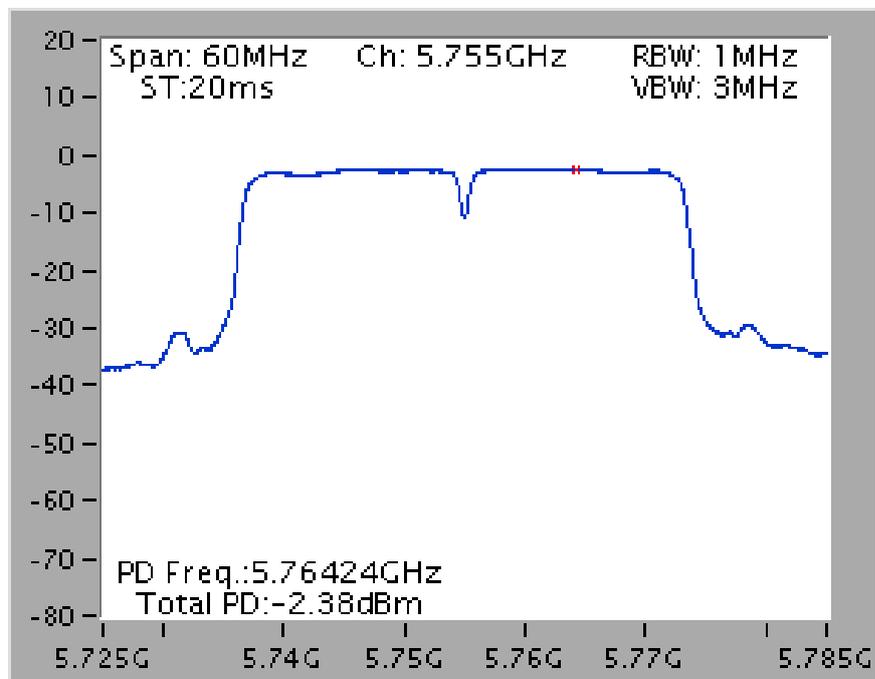
**Power Density Plot on Configuration IEEE 802.11n MCS8 HT20 / Chain 1 + Chain 2 / 5180 MHz**
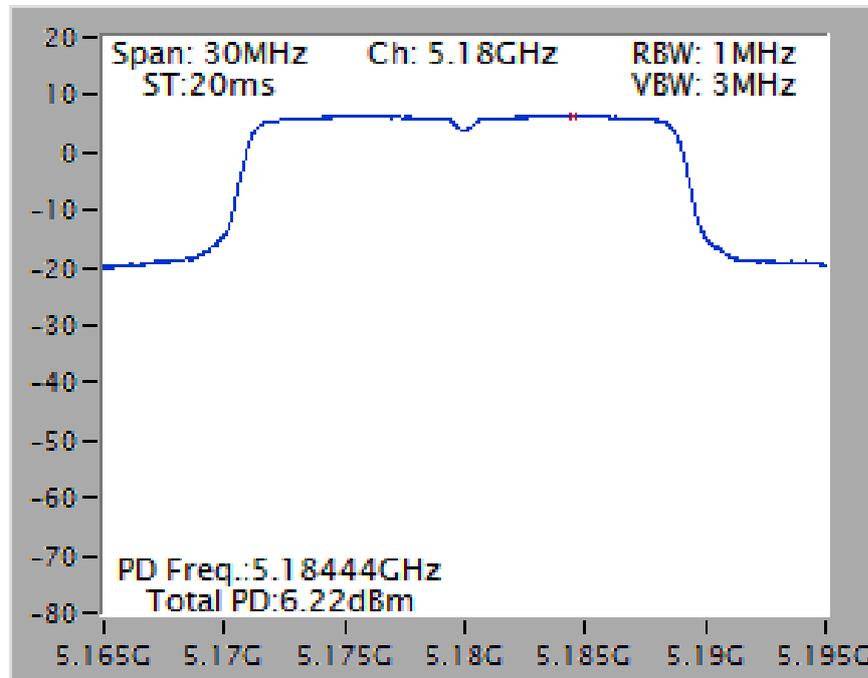


**Power Density Plot on Configuration IEEE 802.11n MCS8 HT20 / Chain 1 + Chain 2 / 5745 MHz**
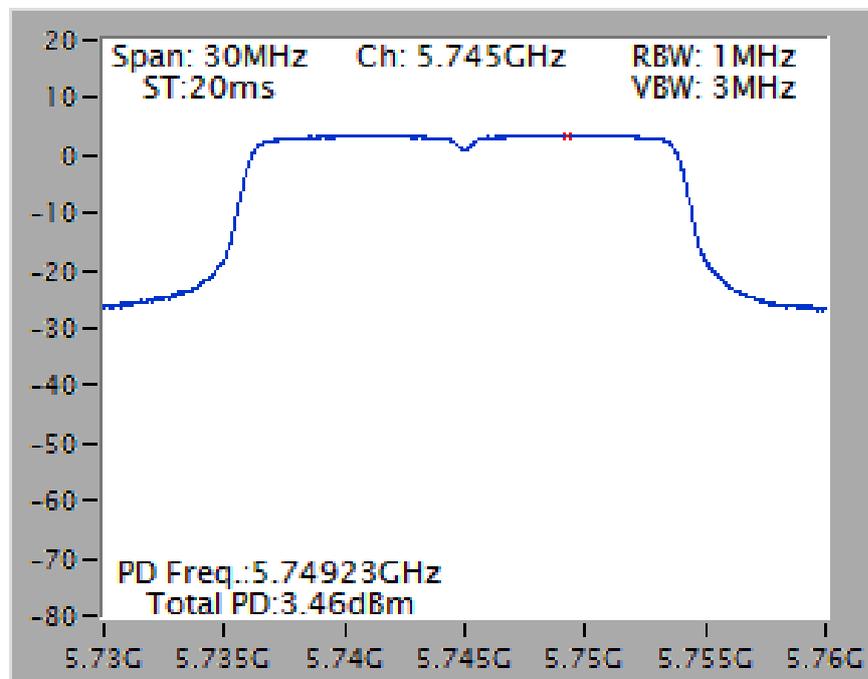
**Power Density Plot on Configuration IEEE 802.11n MCS8 HT40 / Chain 1 + Chain 2 / 5230 MHz**
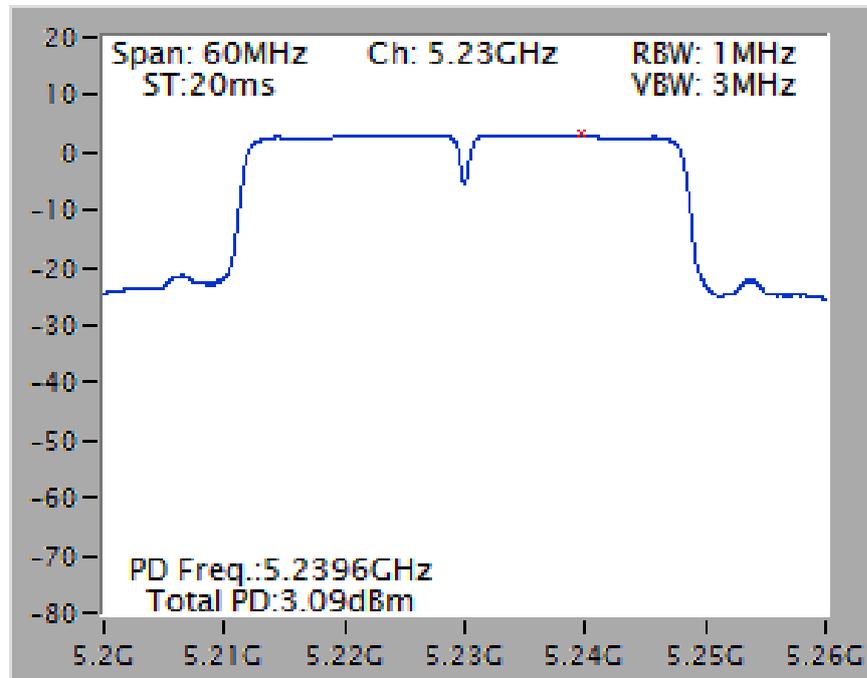


**Power Density Plot on Configuration IEEE 802.11n MCS8 HT40 / Chain 1 + Chain 2 / 5795 MHz**
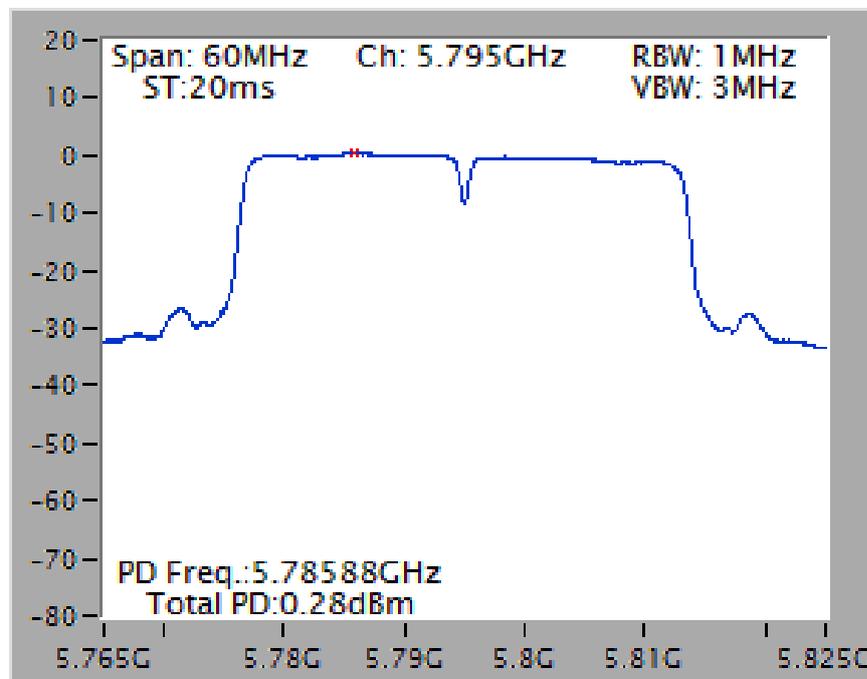
## 4.6. Radiated Emissions Measurement

### 4.6.1. Limit

For transmitters operating in the 5.15-5.35 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 5.470-5.725 GHz band: all emissions outside of the 5.47-5.725 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 shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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, 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**
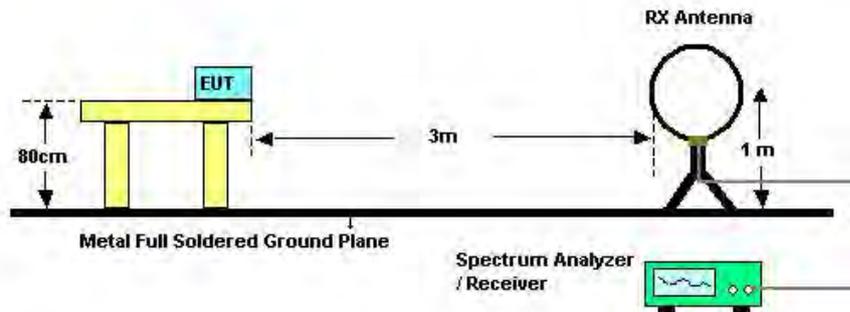


**For Radiated Emissions: 30MHz~1GHz**
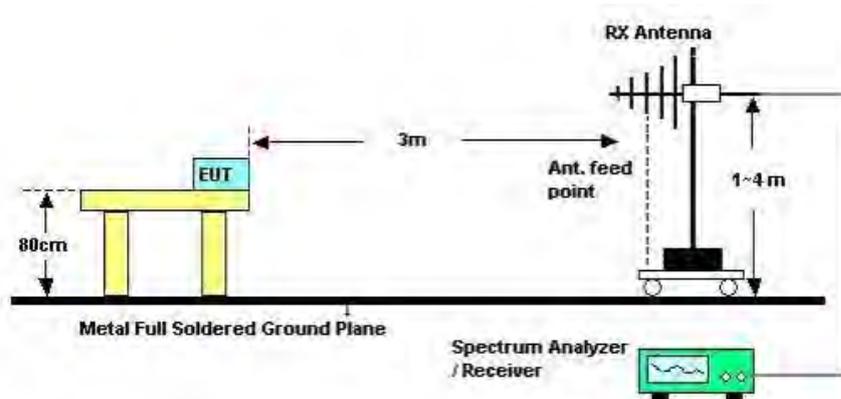


**For Radiated Emissions: Above 1GHz**
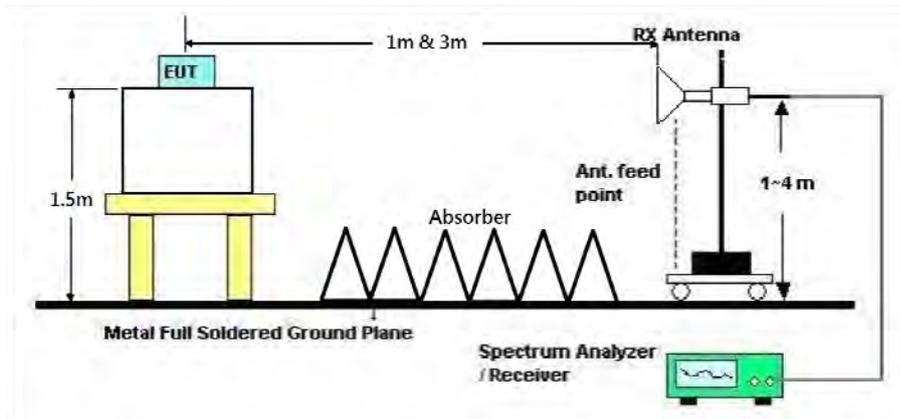


### 4.6.5. Test Deviation

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 | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | Normal Link |
| Test Date | Jun. 06, 2016 | | |

| 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 | 24°C | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | Normal Link |

*Horizontal*
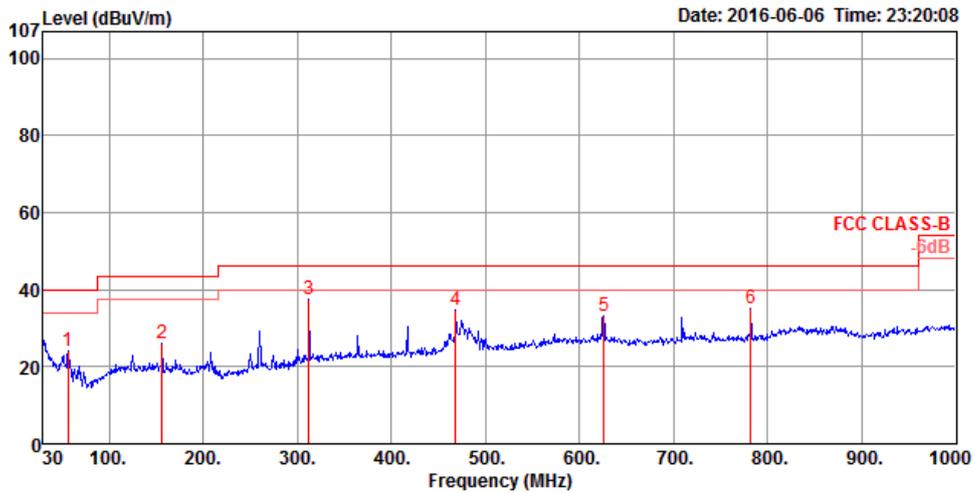


|  | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg |  |  |
| 1 | 56.19 | 24.02 | 40.00 | -15.98 | 41.78 | 0.61 | 13.40 | 31.77 | 100 | 253 | Peak | HORIZONTAL |
| 2 | 156.10 | 26.05 | 43.50 | -17.45 | 40.36 | 1.00 | 16.59 | 31.90 | 125 | 68 | Peak | HORIZONTAL |
| 3 | 312.27 | 37.65 | 46.00 | -8.35 | 48.30 | 1.39 | 19.98 | 32.02 | 125 | 35 | Peak | HORIZONTAL |
| 4 | 468.44 | 34.78 | 46.00 | -11.22 | 42.13 | 1.69 | 23.22 | 32.26 | 100 | 251 | Peak | HORIZONTAL |
| 5 | 625.58 | 33.10 | 46.00 | -12.90 | 38.42 | 1.97 | 25.16 | 32.45 | 100 | 101 | Peak | HORIZONTAL |
| 6 | 781.75 | 34.96 | 46.00 | -11.04 | 38.88 | 2.26 | 26.33 | 32.51 | 175 | 115 | Peak | HORIZONTAL |
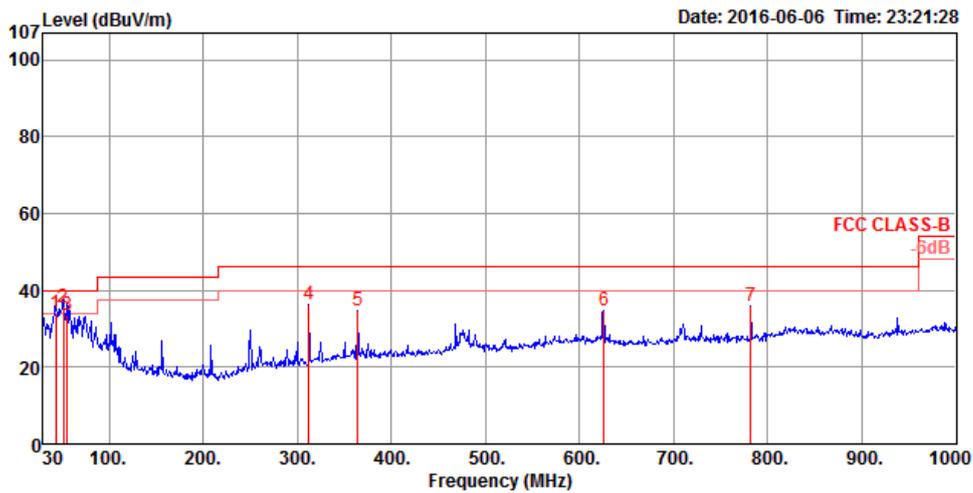
*Vertical*



| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 43.58 | 34.12 | 40.00 | -5.88 | 47.50 | 0.59 | 17.72 | 31.69 | 100 | 189 | QP | VERTICAL |
| 2 | 51.34 | 35.55 | 40.00 | -4.45 | 52.20 | 0.61 | 14.50 | 31.76 | 100 | 295 | QP | VERTICAL |
| 3 | 55.22 | 33.65 | 40.00 | -6.35 | 51.19 | 0.61 | 13.62 | 31.77 | 125 | 229 | QP | VERTICAL |
| 4 | 312.27 | 36.49 | 46.00 | -9.51 | 47.14 | 1.39 | 19.98 | 32.02 | 175 | 313 | Peak | VERTICAL |
| 5 | 364.65 | 34.81 | 46.00 | -11.19 | 43.98 | 1.48 | 21.45 | 32.10 | 150 | 323 | Peak | VERTICAL |
| 6 | 625.58 | 34.94 | 46.00 | -11.06 | 40.26 | 1.97 | 25.16 | 32.45 | 100 | 68 | Peak | VERTICAL |
| 7 | 781.75 | 35.76 | 46.00 | -10.24 | 39.68 | 2.26 | 26.33 | 32.51 | 150 | 195 | 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 | 24°C | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11a CH 36 / Chain 1 |
| Test Date | Mar. 30, 2016 | | |

*Horizontal*

|   | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15533.20 | 47.29 | 54.00 | -6.71 | 29.72 | 14.67 | 38.25 | 35.35 | 150 | 181 | Average | HORIZONTAL |
| 2 | 15538.24 | 62.40 | 74.00 | -11.60 | 44.83 | 14.67 | 38.25 | 35.35 | 150 | 181 | Peak | HORIZONTAL |

*Vertical*

|   | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15536.36 | 47.48 | 54.00 | -6.52 | 29.91 | 14.67 | 38.25 | 35.35 | 150 | 189 | Average | VERTICAL |
| 2 | 15536.40 | 61.73 | 74.00 | -12.27 | 44.16 | 14.67 | 38.25 | 35.35 | 150 | 189 | Peak | VERTICAL |

| Temperature | 24°C | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11a CH 40 / Chain 1 |
| Test Date | Mar. 30, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15591.08 | 47.22 | 54.00 | -6.78 | 29.70 | 14.69 | 38.19 | 35.36 | 150 | 99 | Average | HORIZONTAL |
| 2 | 15599.96 | 62.72 | 74.00 | -11.28 | 45.20 | 14.69 | 38.19 | 35.36 | 150 | 99 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15592.92 | 59.99 | 74.00 | -14.01 | 42.47 | 14.69 | 38.19 | 35.36 | 150 | 129 | Peak | VERTICAL |
| 2 | 15599.40 | 47.10 | 54.00 | -6.90 | 29.58 | 14.69 | 38.19 | 35.36 | 150 | 129 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11a CH 48 / Chain 1 |
| Test Date | Mar. 30, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15719.92 | 60.93 | 74.00 | -13.07 | 43.53 | 14.75 | 38.03 | 35.38 | 150 | 150 | Peak | HORIZONTAL |
| 2 | 15725.32 | 46.96 | 54.00 | -7.04 | 29.56 | 14.75 | 38.03 | 35.38 | 150 | 150 | Average | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15719.04 | 46.98 | 54.00 | -7.02 | 29.58 | 14.75 | 38.03 | 35.38 | 150 | 177 | Average | VERTICAL |
| 2 | 15729.80 | 59.72 | 74.00 | -14.28 | 42.32 | 14.75 | 38.03 | 35.38 | 150 | 177 | Peak | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11a CH 149 / Chain 1 |
| Test Date | May 27, 2016 | | |

*Horizontal*

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11489.76 | 44.11 | 54.00 | -9.89 | 28.41 | 10.75 | 39.70 | 34.75 | 112 | 220 | Average | HORIZONTAL |
| 2 | 11490.70 | 56.72 | 74.00 | -17.28 | 41.02 | 10.75 | 39.70 | 34.75 | 112 | 220 | Peak | HORIZONTAL |

*Vertical*

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11490.16 | 57.61 | 74.00 | -16.39 | 41.91 | 10.75 | 39.70 | 34.75 | 201 | 326 | Peak | VERTICAL |
| 2 | 11490.30 | 44.38 | 54.00 | -9.62 | 28.68 | 10.75 | 39.70 | 34.75 | 201 | 326 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11a CH 157 / Chain 1 |
| Test Date | May 27, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11568.38 | 44.23 | 54.00 | -9.77 | 28.58 | 10.76 | 39.65 | 34.76 | 162 | 111 | Average | HORIZONTAL |
| 2 | 11572.36 | 57.60 | 74.00 | -16.40 | 41.95 | 10.76 | 39.65 | 34.76 | 162 | 111 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11570.46 | 58.03 | 74.00 | -15.97 | 42.38 | 10.76 | 39.65 | 34.76 | 132 | 23 | Peak | VERTICAL |
| 2 | 11572.80 | 44.17 | 54.00 | -9.83 | 28.52 | 10.76 | 39.65 | 34.76 | 132 | 23 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11a CH 165 / Chain 1 |
| Test Date | May 27, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11649.94 | 44.97 | 54.00 | -9.03 | 29.38 | 10.77 | 39.59 | 34.77 | 194 | 192 | Average | HORIZONTAL |
| 2 | 11650.62 | 58.34 | 74.00 | -15.66 | 42.75 | 10.77 | 39.59 | 34.77 | 194 | 192 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11650.98 | 57.23 | 74.00 | -16.77 | 41.67 | 10.77 | 39.57 | 34.78 | 171 | 164 | Peak | VERTICAL |
| 2 | 11652.50 | 44.02 | 54.00 | -9.98 | 28.46 | 10.77 | 39.57 | 34.78 | 171 | 164 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT20 CH 36 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15539.04 | 44.60 | 54.00 | -9.40 | 30.07 | 11.01 | 38.39 | 34.87 | 157 | 192 | Average | HORIZONTAL |
| 2 | 15540.38 | 57.34 | 74.00 | -16.66 | 42.81 | 11.01 | 38.39 | 34.87 | 157 | 192 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15539.63 | 44.39 | 54.00 | -9.61 | 29.86 | 11.01 | 38.39 | 34.87 | 134 | 193 | Average | VERTICAL |
| 2 | 15539.98 | 57.02 | 74.00 | -16.98 | 42.49 | 11.01 | 38.39 | 34.87 | 134 | 193 | Peak | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT20 CH 40 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15599.17 | 45.10 | 54.00 | -8.90 | 30.58 | 11.01 | 38.38 | 34.87 | 137 | 199 | Average | HORIZONTAL |
| 2 | 15599.44 | 58.66 | 74.00 | -15.34 | 44.14 | 11.01 | 38.38 | 34.87 | 137 | 199 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15599.40 | 44.87 | 54.00 | -9.13 | 30.35 | 11.01 | 38.38 | 34.87 | 124 | 263 | Average | VERTICAL |
| 2 | 15599.90 | 57.93 | 74.00 | -16.07 | 43.41 | 11.01 | 38.38 | 34.87 | 124 | 263 | Peak | VERTICAL |

| Temperature | 24°C | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT20 CH 48 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15720.15 | 45.31 | 54.00 | -8.69 | 30.84 | 11.01 | 38.35 | 34.89 | 153 | 58 | Average | HORIZONTAL |
| 2 | 15720.64 | 59.14 | 74.00 | -14.86 | 44.67 | 11.01 | 38.35 | 34.89 | 153 | 58 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15720.48 | 58.60 | 74.00 | -15.40 | 44.13 | 11.01 | 38.35 | 34.89 | 172 | 141 | Peak | VERTICAL |
| 2 | 15720.56 | 44.75 | 54.00 | -9.25 | 30.28 | 11.01 | 38.35 | 34.89 | 172 | 141 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT20 CH 149 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

*Horizontal*

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11489.14 | 56.42 | 74.00 | -17.58 | 41.34 | 10.51 | 39.20 | 34.63 | 197 | 154 | Peak | HORIZONTAL |
| 2 | 11490.71 | 44.10 | 54.00 | -9.90 | 29.02 | 10.51 | 39.20 | 34.63 | 197 | 154 | Average | HORIZONTAL |

*Vertical*

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11489.23 | 57.20 | 74.00 | -16.80 | 42.12 | 10.51 | 39.20 | 34.63 | 123 | 270 | Peak | VERTICAL |
| 2 | 11491.00 | 44.59 | 54.00 | -9.41 | 29.51 | 10.51 | 39.20 | 34.63 | 123 | 270 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT20 CH 157 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

*Horizontal*

```
                 Limit   Over   Read  CableAntenna Preamp  A/Pos  T/Pos
         Freq  Level   Line  Limit  Level   Loss Factor Factor                Remark      Pol/Phase
         _____ _____ _____ _____ _____ _____ _____ _____ _____ _____           _____      _____

          MHz dBuV/m dBuV/m    dB  dBuV    dB  dB/m    dB    cm   deg

  1  11569.05  55.87  74.00 -18.13  40.86 10.51 39.15 34.65   135   116 Peak     HORIZONTAL
  2  11569.46  43.78  54.00 -10.22  28.77 10.51 39.15 34.65   135   116 Average  HORIZONTAL
```

*Vertical*

```
                 Limit   Over   Read  CableAntenna Preamp  A/Pos  T/Pos
         Freq  Level   Line  Limit  Level   Loss Factor Factor                Remark      Pol/Phase
         _____ _____ _____ _____ _____ _____ _____ _____ _____ _____           _____      _____

          MHz dBuV/m dBuV/m    dB  dBuV    dB  dB/m    dB    cm   deg

  1  11569.24  57.99  74.00 -16.01  42.98 10.51 39.15 34.65   163   208 Peak     VERTICAL
  2  11570.00  44.79  54.00  -9.21  29.78 10.51 39.15 34.65   163   208 Average  VERTICAL
```

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT20 CH 165 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11650.09 | 44.22 | 54.00 | -9.78 | 29.28 | 10.51 | 39.09 | 34.66 | 206 | 306 | Average | HORIZONTAL |
| 2 | 11650.24 | 57.75 | 74.00 | -16.25 | 42.81 | 10.51 | 39.09 | 34.66 | 206 | 306 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11650.54 | 57.64 | 74.00 | -16.36 | 42.70 | 10.51 | 39.09 | 34.66 | 172 | 253 | Peak | VERTICAL |
| 2 | 11650.64 | 44.44 | 54.00 | -9.56 | 29.50 | 10.51 | 39.09 | 34.66 | 172 | 253 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT40 CH 38 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15569.10 | 57.44 | 74.00 | -16.56 | 42.92 | 11.01 | 38.38 | 34.87 | 117 | 88 | Peak | HORIZONTAL |
| 2 | 15569.26 | 44.30 | 54.00 | -9.70 | 29.78 | 11.01 | 38.38 | 34.87 | 117 | 88 | Average | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15569.56 | 58.96 | 74.00 | -15.04 | 44.44 | 11.01 | 38.38 | 34.87 | 213 | 159 | Peak | VERTICAL |
| 2 | 15569.77 | 45.91 | 54.00 | -8.09 | 31.39 | 11.01 | 38.38 | 34.87 | 213 | 159 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT40 CH 46 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

*Horizontal*

|  | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15689.74 | 44.79 | 54.00 | -9.21 | 30.30 | 11.01 | 38.36 | 34.88 | 209 | 196 | Average | HORIZONTAL |
| 2 | 15689.91 | 57.73 | 74.00 | -16.27 | 43.24 | 11.01 | 38.36 | 34.88 | 209 | 196 | Peak | HORIZONTAL |

*Vertical*

|  | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15689.84 | 44.71 | 54.00 | -9.29 | 30.22 | 11.01 | 38.36 | 34.88 | 240 | 259 | Average | VERTICAL |
| 2 | 15690.16 | 57.33 | 74.00 | -16.67 | 42.84 | 11.01 | 38.36 | 34.88 | 240 | 259 | Peak | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT40 CH 151 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11509.50 | 44.68 | 54.00 | -9.32 | 29.61 | 10.51 | 39.20 | 34.64 | 214 | 224 | Average | HORIZONTAL |
| 2 | 11509.64 | 57.92 | 74.00 | -16.08 | 42.85 | 10.51 | 39.20 | 34.64 | 214 | 224 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11512.06 | 43.87 | 54.00 | -10.13 | 28.80 | 10.51 | 39.20 | 34.64 | 261 | 277 | Average | VERTICAL |
| 2 | 11512.80 | 56.45 | 74.00 | -17.55 | 41.38 | 10.51 | 39.20 | 34.64 | 261 | 277 | Peak | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT40 CH 159 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11589.80 | 43.87 | 54.00 | -10.13 | 28.90 | 10.51 | 39.12 | 34.66 | 109 | 145 | Average | HORIZONTAL |
| 2 | 11590.98 | 57.28 | 74.00 | -16.72 | 42.31 | 10.51 | 39.12 | 34.66 | 109 | 145 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11589.19 | 57.87 | 74.00 | -16.13 | 42.90 | 10.51 | 39.12 | 34.66 | 163 | 58 | Peak | VERTICAL |
| 2 | 11589.87 | 44.93 | 54.00 | -9.07 | 29.96 | 10.51 | 39.12 | 34.66 | 163 | 58 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT20 CH 36 / Chain 1 + Chain 2 |
| Test Date | Mar. 30, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15538.52 | 47.39 | 54.00 | -6.61 | 29.82 | 14.67 | 38.25 | 35.35 | 150 | 127 | Average | HORIZONTAL |
| 2 | 15543.00 | 59.79 | 74.00 | -14.21 | 42.22 | 14.67 | 38.25 | 35.35 | 150 | 127 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15530.32 | 60.60 | 74.00 | -13.40 | 43.03 | 14.67 | 38.25 | 35.35 | 150 | 146 | Peak | VERTICAL |
| 2 | 15538.64 | 47.21 | 54.00 | -6.79 | 29.64 | 14.67 | 38.25 | 35.35 | 150 | 146 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT20 CH 40/ Chain 1 + Chain 2 |
| Test Date | Mar. 30, 2016 | | |

*Horizontal*

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15603.32 | 59.75 | 74.00 | -14.25 | 42.26 | 14.71 | 38.14 | 35.36 | 150 | 165 | Peak | HORIZONTAL |
| 2 | 15606.88 | 46.96 | 54.00 | -7.04 | 29.47 | 14.71 | 38.14 | 35.36 | 150 | 165 | Average | HORIZONTAL |

*Vertical*

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15597.88 | 46.90 | 54.00 | -7.10 | 29.38 | 14.69 | 38.19 | 35.36 | 150 | 206 | Average | VERTICAL |
| 2 | 15604.44 | 60.66 | 74.00 | -13.34 | 43.17 | 14.71 | 38.14 | 35.36 | 150 | 206 | Peak | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT20 CH 48 / Chain 1 + Chain 2 |
| Test Date | Mar. 30, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15714.32 | 46.78 | 54.00 | -7.22 | 29.38 | 14.75 | 38.03 | 35.38 | 150 | 300 | Average | HORIZONTAL |
| 2 | 15728.16 | 59.58 | 74.00 | -14.42 | 42.18 | 14.75 | 38.03 | 35.38 | 150 | 300 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15720.16 | 46.86 | 54.00 | -7.14 | 29.46 | 14.75 | 38.03 | 35.38 | 150 | 183 | Average | VERTICAL |
| 2 | 15724.64 | 59.57 | 74.00 | -14.43 | 42.17 | 14.75 | 38.03 | 35.38 | 150 | 183 | Peak | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT20 CH 149 / Chain 1 + Chain 2 |
| Test Date | May 27, 2016 | | |

*Horizontal*

```
                Limit  Over  Read  CableAntenna Preamp  A/Pos  T/Pos
       Freq  Level  Line  Limit  Level  Loss Factor Factor              Remark    Pol/Phase

        MHz dBuV/m dBuV/m    dB   dBuV    dB   dB/m    dB     cm    deg

1  11490.00  44.25  54.00  -9.75  28.55  10.75  39.70  34.75   129   124 Average   HORIZONTAL
2  11490.50  56.98  74.00 -17.02  41.28  10.75  39.70  34.75   129   124 Peak      HORIZONTAL
```

*Vertical*

```
                Limit  Over  Read  CableAntenna Preamp  A/Pos  T/Pos
       Freq  Level  Line  Limit  Level  Loss Factor Factor              Remark    Pol/Phase

        MHz dBuV/m dBuV/m    dB   dBuV    dB   dB/m    dB     cm    deg

1  11490.28  44.18  54.00  -9.82  28.48  10.75  39.70  34.75   109    99 Average   VERTICAL
2  11490.48  57.80  74.00 -16.20  42.10  10.75  39.70  34.75   109    99 Peak      VERTICAL
```

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT20 CH 157 / Chain 1 + Chain 2 |
| Test Date | May 27, 2016 | | |

*Horizontal*

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11570.70 | 57.28 | 74.00 | -16.72 | 41.63 | 10.76 | 39.65 | 34.76 | 139 | 128 | Peak | HORIZONTAL |
| 2 | 11571.98 | 44.21 | 54.00 | -9.79 | 28.56 | 10.76 | 39.65 | 34.76 | 139 | 128 | Average | HORIZONTAL |

*Vertical*

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11570.14 | 58.25 | 74.00 | -15.75 | 42.60 | 10.76 | 39.65 | 34.76 | 172 | 149 | Peak | VERTICAL |
| 2 | 11572.46 | 44.49 | 54.00 | -9.51 | 28.84 | 10.76 | 39.65 | 34.76 | 172 | 149 | Average | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT20 CH 165 / Chain 1 + Chain 2 |
| Test Date | May 27, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11650.84 | 45.52 | 54.00 | -8.48 | 29.96 | 10.77 | 39.57 | 34.78 | 254 | 187 | Average | HORIZONTAL |
| 2 | 11650.96 | 58.38 | 74.00 | -15.62 | 42.82 | 10.77 | 39.57 | 34.78 | 254 | 187 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11649.64 | 44.54 | 54.00 | -9.46 | 28.95 | 10.77 | 39.59 | 34.77 | 291 | 213 | Average | VERTICAL |
| 2 | 11650.76 | 57.07 | 74.00 | -16.93 | 41.51 | 10.77 | 39.57 | 34.78 | 291 | 213 | Peak | VERTICAL |

| Temperature | 24°C | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT40 CH 38 / Chain 1 + Chain 2 |
| Test Date | Mar. 30, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15561.44 | 60.24 | 74.00 | -13.76 | 42.72 | 14.69 | 38.19 | 35.36 | 150 | 137 | Peak | HORIZONTAL |
| 2 | 15571.60 | 47.33 | 54.00 | -6.67 | 29.81 | 14.69 | 38.19 | 35.36 | 150 | 137 | Average | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15561.44 | 47.05 | 54.00 | -6.95 | 29.53 | 14.69 | 38.19 | 35.36 | 150 | 113 | Average | VERTICAL |
| 2 | 15563.84 | 60.50 | 74.00 | -13.50 | 42.98 | 14.69 | 38.19 | 35.36 | 150 | 113 | Peak | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT40 CH 46 / Chain 1 + Chain 2 |
| Test Date | Mar. 30, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15681.72 | 46.69 | 54.00 | -7.31 | 29.25 | 14.73 | 38.08 | 35.37 | 150 | 244 | Average | HORIZONTAL |
| 2 | 15690.36 | 60.88 | 74.00 | -13.12 | 43.44 | 14.73 | 38.08 | 35.37 | 150 | 244 | Peak | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 15691.80 | 46.70 | 54.00 | -7.30 | 29.29 | 14.75 | 38.03 | 35.37 | 150 | 209 | Average | VERTICAL |
| 2 | 15691.88 | 59.76 | 74.00 | -14.24 | 42.35 | 14.75 | 38.03 | 35.37 | 150 | 209 | Peak | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT40 CH 151 / Chain 1 + Chain 2 |
| Test Date | May 27, 2016 | | |

*Horizontal*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11510.24 | 57.66 | 74.00 | -16.34 | 41.96 | 10.75 | 39.70 | 34.75 | 168 | 128 | Peak | HORIZONTAL |
| 2 | 11510.50 | 44.17 | 54.00 | -9.83 | 28.47 | 10.75 | 39.70 | 34.75 | 168 | 128 | Average | HORIZONTAL |

*Vertical*

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 11510.42 | 44.24 | 54.00 | -9.76 | 28.54 | 10.75 | 39.70 | 34.75 | 111 | 57 | Average | VERTICAL |
| 2 | 11510.64 | 57.71 | 74.00 | -16.29 | 42.01 | 10.75 | 39.70 | 34.75 | 111 | 57 | Peak | VERTICAL |

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT40 CH 159 / Chain 1 + Chain 2 |
| Test Date | May 27, 2016 | | |

*Horizontal*

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11590.68 | 57.59 | 74.00 | -16.41 | 41.98 | 10.76 | 39.62 | 34.77 | 110 | 248 | Peak | HORIZONTAL |
| 2 | 11592.68 | 44.67 | 54.00 | -9.33 | 29.06 | 10.76 | 39.62 | 34.77 | 110 | 248 | Average | HORIZONTAL |

*Vertical*

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 11589.44 | 44.31 | 54.00 | -9.69 | 28.70 | 10.76 | 39.62 | 34.77 | 143 | 269 | Average | VERTICAL |
| 2 | 11590.08 | 57.13 | 74.00 | -16.87 | 41.52 | 10.76 | 39.62 | 34.77 | 143 | 269 | 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.

## 4.7. Band Edge Emissions Measurement

### 4.7.1. Limit

For transmitters operating in the 5.15-5.35 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 5.470-5.725 GHz band: all emissions outside of the 5.47-5.725 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 shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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, 1MHz / 1/T for Average |
| RBW / VBW (Emission in non-restricted band) | 1MHz / 3MHz for Peak |

### 4.7.3. Test Procedures

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 | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11a CH 36, 40, 48 / Chain 1 |
| Test Date | Mar. 29, 2016 | | |

### Channel 36

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5149.20 | 63.03 | 74.00 | -10.97 | 55.77 | 8.68 | 31.52 | 32.94 | 261 | 80 | Peak | VERTICAL |
| 2 | 5149.80 | 48.70 | 54.00 | -5.30 | 41.44 | 8.68 | 31.52 | 32.94 | 261 | 80 | Average | VERTICAL |
| 3 | 5173.60 | 105.69 | | | 98.40 | 8.68 | 31.55 | 32.94 | 261 | 80 | Peak | VERTICAL |
| 4 | 5174.80 | 96.31 | | | 89.02 | 8.68 | 31.55 | 32.94 | 261 | 80 | Average | VERTICAL |

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 | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5127.60 | 59.96 | 74.00 | -14.04 | 52.70 | 8.69 | 31.51 | 32.94 | 231 | 143 | Peak | VERTICAL |
| 2 | 5130.00 | 47.22 | 54.00 | -6.78 | 39.96 | 8.69 | 31.51 | 32.94 | 231 | 143 | Average | VERTICAL |
| 3 | 5203.20 | 96.02 | | | 88.70 | 8.69 | 31.57 | 32.94 | 231 | 143 | Average | VERTICAL |
| 4 | 5203.60 | 105.06 | | | 97.74 | 8.69 | 31.57 | 32.94 | 231 | 143 | Peak | VERTICAL |

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 | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5140.80 | 47.12 | 54.00 | -6.88 | 39.86 | 8.69 | 31.51 | 32.94 | 254 | 80 | Average | VERTICAL |
| 2 | 5142.00 | 59.08 | 74.00 | -14.92 | 51.82 | 8.68 | 31.52 | 32.94 | 254 | 80 | Peak | VERTICAL |
| 3 | 5233.60 | 105.92 | | | 98.57 | 8.70 | 31.59 | 32.94 | 254 | 80 | Peak | VERTICAL |
| 4 | 5237.20 | 96.73 | | | 89.38 | 8.70 | 31.59 | 32.94 | 254 | 80 | Average | VERTICAL |

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

| Temperature | 24°C | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11a CH 149, 157, 165 / Chain 1 |
| Test Date | May 27, 2016 | | |

**Channel 149**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5501.00 | 61.47 | 68.20 | -6.73 | 53.42 | 7.77 | 35.20 | 34.92 | 214 | 124 | Peak | VERTICAL |
| 2 | 5581.00 | 60.76 | 68.20 | -7.44 | 52.56 | 7.91 | 35.22 | 34.93 | 214 | 124 | Peak | VERTICAL |
| 3 | 5747.00 | 97.67 | | | 89.59 | 7.77 | 35.25 | 34.94 | 214 | 124 | Average | VERTICAL |
| 4 | 5748.00 | 106.90 | | | 98.82 | 7.77 | 35.25 | 34.94 | 214 | 124 | Peak | VERTICAL |
| 5 | 5948.00 | 60.01 | 68.20 | -8.19 | 51.72 | 7.97 | 35.29 | 34.97 | 214 | 124 | Peak | VERTICAL |

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 | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5607.00 | 60.18 | 68.20 | -8.02 | 51.95 | 7.94 | 35.22 | 34.93 | 213 | 128 | Peak | VERTICAL |
| 2 | 5779.00 | 106.02 | | | 97.98 | 7.73 | 35.26 | 34.95 | 213 | 128 | Peak | VERTICAL |
| 3 | 5788.00 | 96.73 | | | 88.69 | 7.73 | 35.26 | 34.95 | 213 | 128 | Average | VERTICAL |
| 4 | 5939.00 | 60.85 | 68.20 | -7.35 | 52.58 | 7.94 | 35.29 | 34.96 | 213 | 128 | Peak | VERTICAL |

Item 2, 3 are the fundamental frequency at 5785 MHz.

**Channel 165**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5633.00 | 60.28 | 68.20 | -7.92 | 52.08 | 7.90 | 35.23 | 34.93 | 207 | 126 | Peak | VERTICAL |
| 2 | 5827.00 | 96.62 | | | 88.53 | 7.77 | 35.27 | 34.95 | 207 | 126 | Peak | VERTICAL |
| 3 | 5828.00 | 105.70 | | | 97.61 | 7.77 | 35.27 | 34.95 | 207 | 126 | Peak | VERTICAL |
| 4 | 5987.00 | 61.20 | 68.20 | -7.00 | 52.85 | 8.02 | 35.30 | 34.97 | 207 | 126 | Peak | VERTICAL |

Item 2, 3 are the fundamental frequency at 5825 MHz.

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT20 CH 36, 40, 48 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

**Channel 36**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5148.40 | 72.03 | 74.00 | -1.97 | 63.92 | 7.88 | 33.17 | 32.94 | 205 | 143 | Peak | VERTICAL |
| 2 | 5150.00 | 52.55 | 54.00 | -1.45 | 44.44 | 7.88 | 33.17 | 32.94 | 205 | 143 | Average | VERTICAL |
| 3 | 5185.60 | 103.87 | | | 95.66 | 7.91 | 33.23 | 32.93 | 205 | 143 | Average | VERTICAL |
| 4 | 5186.00 | 113.70 | | | 105.49 | 7.91 | 33.23 | 32.93 | 205 | 143 | Peak | VERTICAL |

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 | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5111.60 | 60.74 | 74.00 | -13.26 | 52.76 | 7.84 | 33.09 | 32.95 | 219 | 145 | Peak | VERTICAL |
| 2 | 5150.00 | 48.76 | 54.00 | -5.24 | 40.65 | 7.88 | 33.17 | 32.94 | 219 | 145 | Average | VERTICAL |
| 3 | 5196.80 | 113.70 | | | 105.46 | 7.92 | 33.25 | 32.93 | 219 | 145 | Peak | VERTICAL |
| 4 | 5205.20 | 103.66 | | | 95.39 | 7.92 | 33.28 | 32.93 | 219 | 145 | Average | VERTICAL |

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 | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | d8 | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5093.00 | 61.76 | 74.00 | -12.24 | 53.82 | 7.83 | 33.06 | 32.95 | 226 | 143 | Peak | VERTICAL |
| 2 | 5139.20 | 48.28 | 54.00 | -5.72 | 40.20 | 7.87 | 33.15 | 32.94 | 226 | 143 | Average | VERTICAL |
| 3 | 5237.00 | 103.67 | | | 95.34 | 7.91 | 33.34 | 32.92 | 226 | 143 | Average | VERTICAL |
| 4 | 5237.00 | 113.85 | | | 105.52 | 7.91 | 33.34 | 32.92 | 226 | 143 | Peak | VERTICAL |
| 5 | 5380.40 | 61.09 | 74.00 | -12.91 | 52.53 | 7.87 | 33.58 | 32.89 | 226 | 143 | Peak | VERTICAL |
| 6 | 5389.40 | 47.89 | 54.00 | -6.11 | 39.30 | 7.87 | 33.61 | 32.89 | 226 | 143 | Average | VERTICAL |

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

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT20 CH 149, 157, 165 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

**Channel 149**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5627.00 | 63.40 | 68.20 | -4.80 | 53.65 | 8.46 | 34.17 | 32.88 | 211 | 157 | Peak | VERTICAL |
| 2 | 5739.00 | 101.32 | | | 91.29 | 8.42 | 34.50 | 32.89 | 211 | 157 | Average | VERTICAL |
| 3 | 5740.00 | 110.70 | | | 100.67 | 8.42 | 34.50 | 32.89 | 211 | 157 | Peak | VERTICAL |
| 4 | 5980.00 | 63.19 | 68.20 | -5.01 | 52.60 | 8.36 | 35.15 | 32.92 | 211 | 157 | Peak | VERTICAL |

Item 2, 3 are the fundamental frequency at 5745 MHz.

**Channel 157**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5577.00 | 63.13 | 68.20 | -5.07 | 53.56 | 8.42 | 34.03 | 32.88 | 249 | 98 | Peak | HORIZONTAL |
| 2 | 5788.00 | 86.73 | | | 76.63 | 8.41 | 34.59 | 32.90 | 249 | 98 | Average | HORIZONTAL |
| 3 | 5788.00 | 95.99 | | | 85.89 | 8.41 | 34.59 | 32.90 | 249 | 98 | Peak | HORIZONTAL |
| 4 | 5968.00 | 62.93 | 68.20 | -5.27 | 52.37 | 8.37 | 35.11 | 32.92 | 249 | 98 | Peak | HORIZONTAL |

Item 2, 3 are the fundamental frequency at 5785 MHz.

**Channel 165**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5627.00 | 63.71 | 68.20 | -4.49 | 53.96 | 8.46 | 34.17 | 32.88 | 200 | 158 | Peak | VERTICAL |
| 2 | 5830.00 | 98.63 | | | 88.41 | 8.39 | 34.73 | 32.90 | 200 | 158 | Average | VERTICAL |
| 3 | 5831.00 | 107.89 | | | 97.67 | 8.39 | 34.73 | 32.90 | 200 | 158 | Peak | VERTICAL |
| 4 | 6067.00 | 64.94 | 68.20 | -3.26 | 53.99 | 8.59 | 35.29 | 32.93 | 200 | 158 | Peak | VERTICAL |

Item 2, 3 are the fundamental frequency at 5825 MHz.

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT40 CH 38, 46 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

## Channel 38

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5150.00 | 52.53 | 54.00 | -1.47 | 44.42 | 7.88 | 33.17 | 32.94 | 207 | 141 | Average | VERTICAL |
| 2 | 5150.00 | 67.11 | 74.00 | -6.89 | 59.00 | 7.88 | 33.17 | 32.94 | 207 | 141 | Peak | VERTICAL |
| 3 | 5188.20 | 95.34 | | | 87.10 | 7.92 | 33.25 | 32.93 | 207 | 141 | Average | VERTICAL |
| 4 | 5188.20 | 105.04 | | | 96.80 | 7.92 | 33.25 | 32.93 | 207 | 141 | Peak | VERTICAL |

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

## Channel 46

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5150.00 | 52.52 | 54.00 | -1.48 | 44.41 | 7.88 | 33.17 | 32.94 | 223 | 140 | Average | VERTICAL |
| 2 | 5150.00 | 71.14 | 74.00 | -2.86 | 63.03 | 7.88 | 33.17 | 32.94 | 223 | 140 | Peak | VERTICAL |
| 3 | 5233.00 | 112.63 | | | 104.30 | 7.91 | 33.34 | 32.92 | 223 | 140 | Peak | VERTICAL |
| 4 | 5238.40 | 102.25 | | | 93.92 | 7.91 | 33.34 | 32.92 | 223 | 140 | Average | VERTICAL |

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

| Temperature | 24°C | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS0 HT40 CH 151, 159 / Chain 1 |
| Test Date | Jun. 13, 2016 | | |

## Channel 151

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5589.00 | 62.94 | 68.20 | -5.26 | 53.37 | 8.42 | 34.03 | 32.88 | 203 | 146 | Peak | VERTICAL |
| 2 | 5745.00 | 98.15 | | | 88.12 | 8.42 | 34.50 | 32.89 | 203 | 146 | Average | VERTICAL |
| 3 | 5747.00 | 107.43 | | | 97.41 | 8.42 | 34.50 | 32.90 | 203 | 146 | Peak | VERTICAL |
| 4 | 5960.00 | 62.56 | 68.20 | -5.64 | 52.00 | 8.37 | 35.11 | 32.92 | 203 | 146 | Peak | VERTICAL |

Item 2, 3 are the fundamental frequency at 5755 MHz.

## Channel 159

| | Freq MHz | Level dBuV/m | Limit Line dBuV/m | Over Limit dB | Read Level dBuV | Cable Loss dB | Antenna Factor dB/m | Preamp Factor dB | A/Pos cm | T/Pos deg | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 5630.00 | 63.41 | 68.20 | -4.79 | 53.66 | 8.46 | 34.17 | 32.88 | 251 | 102 | Peak | HORIZONTAL |
| 2 | 5785.00 | 83.58 | | | 73.48 | 8.41 | 34.59 | 32.90 | 251 | 102 | Average | HORIZONTAL |
| 3 | 5787.00 | 93.01 | | | 82.91 | 8.41 | 34.59 | 32.90 | 251 | 102 | Peak | HORIZONTAL |
| 4 | 5979.00 | 62.10 | 68.20 | -6.10 | 51.51 | 8.36 | 35.15 | 32.92 | 251 | 102 | Peak | HORIZONTAL |

Item 2, 3 are the fundamental frequency at 5795 MHz.

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT20 CH 36, 40, 48 / Chain 1 + Chain 2 |
| Test Date | Mar. 29, 2016 | | |

### Channel 36

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5147.40 | 47.78 | 54.00 | -6.22 | 40.52 | 8.68 | 31.52 | 32.94 | 271 | 0 | Average | VERTICAL |
| 2 | 5150.00 | 60.93 | 74.00 | -13.07 | 53.67 | 8.68 | 31.52 | 32.94 | 271 | 0 | Peak | VERTICAL |
| 3 | 5173.40 | 105.78 | | | 98.49 | 8.68 | 31.55 | 32.94 | 271 | 0 | Peak | VERTICAL |
| 4 | 5184.60 | 95.42 | | | 88.13 | 8.68 | 31.55 | 32.94 | 271 | 0 | Average | VERTICAL |

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 | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5103.60 | 47.23 | 54.00 | -6.77 | 40.00 | 8.69 | 31.48 | 32.94 | 218 | 143 | Average | VERTICAL |
| 2 | 5128.80 | 59.33 | 74.00 | -14.67 | 52.07 | 8.69 | 31.51 | 32.94 | 218 | 143 | Peak | VERTICAL |
| 3 | 5198.00 | 106.01 | | | 98.71 | 8.68 | 31.56 | 32.94 | 218 | 143 | Peak | VERTICAL |
| 4 | 5204.80 | 96.13 | | | 88.81 | 8.69 | 31.57 | 32.94 | 218 | 143 | Average | VERTICAL |

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 | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5144.80 | 46.89 | 54.00 | -7.11 | 39.63 | 8.68 | 31.52 | 32.94 | 268 | 350 | Average | VERTICAL |
| 2 | 5149.20 | 58.11 | 74.00 | -15.89 | 50.85 | 8.68 | 31.52 | 32.94 | 268 | 350 | Peak | VERTICAL |
| 3 | 5235.60 | 106.57 | | | 99.22 | 8.70 | 31.59 | 32.94 | 268 | 350 | Peak | VERTICAL |
| 4 | 5244.80 | 96.29 | | | 88.93 | 8.70 | 31.59 | 32.93 | 268 | 350 | Average | VERTICAL |

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

| Temperature | 24°C | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT20 CH 149, 157, 165 / Chain 1 + Chain 2 |
| Test Date | May 27, 2016 | | |

**Channel 149**

```
                 Limit  Over   Read  CableAntenna Preamp  A/Pos  T/Pos
        Freq  Level Line  Limit  Level  Loss Factor Factor              Remark      Pol/Phase

        MHz dBuV/m dBuV/m   dB   dBuV    dB   dB/m    dB    cm    deg

1    5619.00  59.81  68.20  -8.39  51.60  7.92  35.22  34.93   170   264 Peak       HORIZONTAL
2    5742.00  95.87               87.79  7.77  35.25  34.94   170   264 Average    HORIZONTAL
3    5747.00 107.01               98.93  7.77  35.25  34.94   170   264 Peak       HORIZONTAL
4    5941.00  60.71  68.20  -7.49  52.44  7.94  35.29  34.96   170   264 Peak       HORIZONTAL
```

Item 2, 3 are the fundamental frequency at 5745 MHz.

**Channel 157**

```
                 Limit  Over   Read  CableAntenna Preamp  A/Pos  T/Pos
        Freq  Level Line  Limit  Level  Loss Factor Factor              Remark      Pol/Phase

        MHz dBuV/m dBuV/m   dB   dBuV    dB   dB/m    dB    cm    deg

1    5627.00  60.10  68.20  -8.10  51.90  7.90  35.23  34.93   201   126 Peak       VERTICAL
2    5781.00  94.54               86.50  7.73  35.26  34.95   201   126 Average    VERTICAL
3    5781.00 105.31               97.27  7.73  35.26  34.95   201   126 Peak       VERTICAL
4    5931.00  59.70  68.20  -8.50  51.43  7.94  35.29  34.96   201   126 Peak       VERTICAL
```

Item 2, 3 are the fundamental frequency at 5785 MHz.

**Channel 165**

```
                 Limit  Over   Read  CableAntenna Preamp  A/Pos  T/Pos
        Freq  Level Line  Limit  Level  Loss Factor Factor              Remark      Pol/Phase

        MHz dBuV/m dBuV/m   dB   dBuV    dB   dB/m    dB    cm    deg

1    5638.00  60.25  68.20  -7.95  52.05  7.90  35.23  34.93   180   268 Peak       HORIZONTAL
2    5819.00  94.95               86.90  7.74  35.26  34.95   180   268 Average    HORIZONTAL
3    5828.00 106.43               98.34  7.77  35.27  34.95   180   268 Peak       HORIZONTAL
4    5957.00  61.76  68.20  -6.44  53.47  7.97  35.29  34.97   180   268 Peak       HORIZONTAL
```

Item 2, 3 are the fundamental frequency at 5825 MHz.

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT40 CH 38, 46 / Chain 1 + Chain 2 |
| Test Date | Mar. 30, 2016 | | |

**Channel 38**

| | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5147.60 | 66.56 | 74.00 | -7.44 | 59.30 | 8.68 | 31.52 | 32.94 | 219 | 143 | Peak | VERTICAL |
| 2 | 5150.00 | 52.90 | 54.00 | -1.10 | 45.64 | 8.68 | 31.52 | 32.94 | 219 | 143 | Average | VERTICAL |
| 3 | 5199.20 | 92.52 | | | 85.22 | 8.68 | 31.56 | 32.94 | 219 | 143 | Average | VERTICAL |
| 4 | 5200.40 | 102.76 | | | 95.46 | 8.68 | 31.56 | 32.94 | 219 | 143 | Peak | VERTICAL |

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 | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5138.80 | 47.37 | 54.00 | -6.63 | 40.11 | 8.69 | 31.51 | 32.94 | 268 | 360 | Average | VERTICAL |
| 2 | 5144.40 | 59.69 | 74.00 | -14.31 | 52.43 | 8.68 | 31.52 | 32.94 | 268 | 360 | Peak | VERTICAL |
| 3 | 5231.20 | 103.73 | | | 96.40 | 8.69 | 31.58 | 32.94 | 268 | 360 | Peak | VERTICAL |
| 4 | 5239.20 | 93.37 | | | 86.02 | 8.70 | 31.59 | 32.94 | 268 | 360 | Average | VERTICAL |

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

| Temperature | 24℃ | Humidity | 67% |
|---|---|---|---|
| Test Engineer | Charlie Cheng / Akina Chiu / Stim Sung / Peter Wu | Configurations | IEEE 802.11n MCS8 HT40<br>CH 151, 159 / Chain 1 + Chain 2 |
| Test Date | May 27, 2016 | | |

Channel 151

|   | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5626.00 | 59.73 | 68.20 | -8.47 | 51.53 | 7.90 | 35.23 | 34.93 | 223 | 5 | Peak | VERTICAL |
| 2 | 5746.00 | 92.13 | | | 84.05 | 7.77 | 35.25 | 34.94 | 223 | 5 | Average | VERTICAL |
| 3 | 5746.00 | 102.02 | | | 93.94 | 7.77 | 35.25 | 34.94 | 223 | 5 | Peak | VERTICAL |
| 4 | 5955.00 | 60.59 | 68.20 | -7.61 | 52.30 | 7.97 | 35.29 | 34.97 | 223 | 5 | Peak | VERTICAL |

Item 2, 3 are the fundamental frequency at 5755 MHz.

Channel 159

|   | Freq | Level | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | A/Pos | T/Pos | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|   | MHz | dBuV/m | dBuV/m | dB | dBuV | dB | dB/m | dB | cm | deg | | |
| 1 | 5623.00 | 59.59 | 68.20 | -8.61 | 51.38 | 7.92 | 35.22 | 34.93 | 175 | 268 | Peak | HORIZONTAL |
| 2 | 5784.00 | 92.73 | | | 84.69 | 7.73 | 35.26 | 34.95 | 175 | 268 | Average | HORIZONTAL |
| 3 | 5785.00 | 103.88 | | | 95.84 | 7.73 | 35.26 | 34.95 | 175 | 268 | Peak | HORIZONTAL |
| 4 | 5945.00 | 60.39 | 68.20 | -7.81 | 52.10 | 7.97 | 35.29 | 34.97 | 175 | 268 | Peak | HORIZONTAL |

Item 2, 3 are the fundamental frequency at 5795 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 $(fc-f)/fc \times 10^6$ 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 -30°C~50°C.

### 4.8.4. Test Setup Layout



Spectrum Analyzer

EUT

OVEN
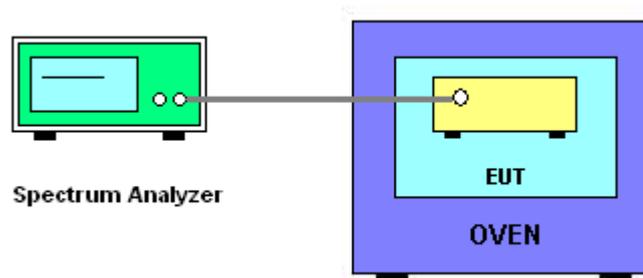
### 4.8.5. Test Deviation

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℃ | Humidity | 65% |
|---|---|---|---|
| Test Engineer | Andy Tsai | Test Date | Jun. 03, 2016 |

**Mode: 20 MHz / Chain 1**

**Voltage vs. Frequency Stability**

| Voltage | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (V) | 5200 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5199.9755 | 5199.9753 | 5199.9748 | 5199.9738 |
| 110.00 | 5199.9748 | 5199.9742 | 5199.9736 | 5199.9734 |
| 93.50 | 5199.9745 | 5199.9744 | 5199.9735 | 5199.9733 |
| Max. Deviation (MHz) | 0.0255 | 0.0258 | 0.0265 | 0.0267 |
| Max. Deviation (ppm) | 4.90 | 4.96 | 5.09 | 5.13 |
| Result | Complies | | | |

**Temperature vs. Frequency Stability**

| Temperature | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (℃) | 5200 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -30 | 5199.9702 | 5199.9701 | 5199.9692 | 5199.9684 |
| -20 | 5199.9712 | 5199.9710 | 5199.9709 | 5199.9706 |
| -10 | 5199.9720 | 5199.9718 | 5199.9713 | 5199.9707 |
| 0 | 5199.9733 | 5199.9727 | 5199.9724 | 5199.9716 |
| 10 | 5199.9737 | 5199.9730 | 5199.9723 | 5199.9722 |
| 20 | 5199.9748 | 5199.9742 | 5199.9741 | 5199.9732 |
| 30 | 5199.9757 | 5199.9750 | 5199.9743 | 5199.9733 |
| 40 | 5199.9765 | 5199.9758 | 5199.9751 | 5199.9743 |
| 50 | 5199.9771 | 5199.9767 | 5199.9763 | 5199.9762 |
| Max. Deviation (MHz) | 0.0298 | 0.0299 | 0.0308 | 0.0316 |
| Max. Deviation (ppm) | 5.73 | 5.75 | 5.92 | 6.07 |
| Result | Complies | | | |

Voltage vs. Frequency Stability

| Voltage | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (V) | 5785 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5784.9758 | 5784.9757 | 5784.9751 | 5784.9747 |
| 110.00 | 5784.9748 | 5784.9739 | 5784.9738 | 5784.9728 |
| 93.50 | 5784.9745 | 5784.9744 | 5784.9741 | 5784.9737 |
| Max. Deviation (MHz) | 0.0255 | 0.0261 | 0.0262 | 0.0272 |
| Max. Deviation (ppm) | 4.40 | 4.51 | 4.53 | 4.70 |
| Result | Complies | | | |

Temperature vs. Frequency Stability

| Temperature | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (°C) | 5785 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -30 | 5784.9663 | 5784.9660 | 5784.9655 | 5784.9648 |
| -20 | 5784.9682 | 5784.9673 | 5784.9671 | 5784.9667 |
| -10 | 5784.9701 | 5784.9698 | 5784.9689 | 5784.9686 |
| 0 | 5784.9714 | 5784.9707 | 5784.9705 | 5784.9700 |
| 10 | 5784.9730 | 5784.9726 | 5784.9721 | 5784.9720 |
| 20 | 5784.9748 | 5784.9746 | 5784.9740 | 5784.9739 |
| 30 | 5784.9757 | 5784.9752 | 5784.9745 | 5784.9743 |
| 40 | 5784.9763 | 5784.9759 | 5784.9751 | 5784.9746 |
| 50 | 5784.9773 | 5784.9769 | 5784.9759 | 5784.9757 |
| Max. Deviation (MHz) | 0.0337 | 0.0340 | 0.0345 | 0.0352 |
| Max. Deviation (ppm) | 5.82 | 5.87 | 5.96 | 6.08 |
| Result | Complies | | | |

## Mode: 40 MHz / Chain 1

### Voltage vs. Frequency Stability

| Voltage | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (V) | 5190 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5189.9758 | 5189.9749 | 5189.9747 | 5189.9738 |
| 110.00 | 5189.9748 | 5189.9739 | 5189.9737 | 5189.9730 |
| 93.50 | 5189.9743 | 5189.9742 | 5189.9732 | 5189.9731 |
| Max. Deviation (MHz) | 0.0257 | 0.0261 | 0.0268 | 0.0270 |
| Max. Deviation (ppm) | 4.95 | 5.03 | 5.16 | 5.20 |
| Result | Complies | | | |

### Temperature vs. Frequency Stability

| Temperature | Measurement Frequency (MHz) | | | |
|---|---|---|---|---|
| (°C) | 5190 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -30 | 5189.9706 | 5189.9699 | 5189.9694 | 5189.9688 |
| -20 | 5189.9719 | 5189.9716 | 5189.9710 | 5189.9708 |
| -10 | 5189.9732 | 5189.9729 | 5189.9719 | 5189.9716 |
| 0 | 5189.9734 | 5189.9726 | 5189.9721 | 5189.9717 |
| 10 | 5189.9740 | 5189.9736 | 5189.9731 | 5189.9725 |
| 20 | 5189.9748 | 5189.9739 | 5189.9729 | 5189.9724 |
| 30 | 5189.9757 | 5189.9755 | 5189.9751 | 5189.9744 |
| 40 | 5189.9775 | 5189.9772 | 5189.9764 | 5189.9756 |
| 50 | 5189.9790 | 5189.9782 | 5189.9774 | 5189.9769 |
| Max. Deviation (MHz) | 0.0294 | 0.0301 | 0.0306 | 0.0312 |
| Max. Deviation (ppm) | 5.66 | 5.80 | 5.89 | 6.01 |
| Result | Complies | | | |

### Voltage vs. Frequency Stability

| Voltage | Measurement Frequency (MHz) | | | |
|---------|---------|---------|---------|---------|
| (V) | 5755 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| 126.50 | 5754.9756 | 5754.9752 | 5754.9747 | 5754.9741 |
| 110.00 | 5754.9748 | 5754.9747 | 5754.9737 | 5754.9734 |
| 93.50 | 5754.9746 | 5754.9740 | 5754.9732 | 5754.9725 |
| Max. Deviation (MHz) | 0.0254 | 0.0260 | 0.0268 | 0.0275 |
| Max. Deviation (ppm) | 4.41 | 4.51 | 4.65 | 4.77 |
| Result | Complies | | | |

### Temperature vs. Frequency Stability

| Temperature | Measurement Frequency (MHz) | | | |
|-------------|---------|---------|---------|---------|
| (°C) | 5755 MHz | | | |
| | 0 Minute | 2 Minute | 5 Minute | 10 Minute |
| -30 | 5754.9685 | 5754.9683 | 5754.9673 | 5754.9672 |
| -20 | 5754.9704 | 5754.9695 | 5754.9686 | 5754.9677 |
| -10 | 5754.9720 | 5754.9712 | 5754.9706 | 5754.9700 |
| 0 | 5754.9725 | 5754.9718 | 5754.9709 | 5754.9699 |
| 10 | 5754.9741 | 5754.9731 | 5754.9723 | 5754.9721 |
| 20 | 5754.9748 | 5754.9738 | 5754.9733 | 5754.9732 |
| 30 | 5754.9757 | 5754.9752 | 5754.9746 | 5754.9737 |
| 40 | 5754.9770 | 5754.9765 | 5754.9759 | 5754.9753 |
| 50 | 5754.9789 | 5754.9787 | 5754.9785 | 5754.9784 |
| Max. Deviation (MHz) | 0.0315 | 0.0317 | 0.0327 | 0.0328 |
| Max. Deviation (ppm) | 5.47 | 5.50 | 5.68 | 5.70 |
| 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 Receiver | Agilent | N9038A | My52260123 | 9kHz ~ 8.45GHz | Jan. 27, 2016 | Conduction (CO01-CB) |
| LISN | F.C.C. | FCC-LISN-50-16-2 | 04083 | 150kHz ~ 100MHz | Dec. 08, 2015 | Conduction (CO01-CB) |
| LISN | Schwarzbeck | NSLK 8127 | 8127647 | 9kHz ~ 30MHz | Dec. 23, 2015 | Conduction (CO01-CB) |
| COND Cable | Woken | Cable | 01 | 150kHz ~ 30MHz | May 24, 2016 | Conduction (CO01-CB) |
| Software | Audix | E3 | 6.120210n | - | N.C.R. | Conduction (CO01-CB) |
| Loop Antenna | Teseq | HLA 6120 | 24155 | 9kHz - 30 MHz | Mar. 16, 2016* | Radiation (03CH01-CB) |
| BILOG ANTENNA | TESEQ | CBL6112D | 37880 | 20MHz ~ 2GHz | Sep. 03, 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 | Mar. 15, 2016 | Radiation (03CH01-CB) |
| Pre-Amplifier | Agilent | 8449B | 3008A02310 | 1GHz ~ 26.5GHz | Jan. 18, 2016 | Radiation (03CH01-CB) |
| Pre-Amplifier | WM | TF-130N-R1 | 923365 | 26GHz ~ 40GHz | Nov. 13, 2015 | Radiation (03CH01-CB) |
| Spectrum Analyzer | R&S | FSP40 | 100056 | 9kHz ~ 40GHz | Oct. 27, 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-I0-7 | N/A | N/A | Radiation (03CH01-CB) |
| Spectrum analyzer | R&S | FSV40 | 100979 | 9kHz~40GHz | Dec. 09, 2015 | Conducted (TH01-CB) |
| Temp. and Humidity Chamber | Ten Billion | TTH-D3SP | TBN-931011 | -30~100 degree | Jun. 03, 2016 | Conducted (TH01-CB) |
| RF Cable-high | Woken | RG402 | High Cable-6 | 1 GHz – 26.5 GHz | Nov. 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) |

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|---|---|---|---|---|---|---|
| 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) |
| 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% |