



**FCC 47 CFR PART 15 SUBPART C &  
INDUSTRY CANADA RSS-210  
(Class II Permissive Change)**

**TEST REPORT**

**For**

**802.11a/b/g/n/ac WLAN + Bluetooth PCI-E Mini Card**

**Model: BCM94352Z**

**Trade Name: Broadcom**

*Issued to*

**Broadcom Corporation  
190 Mathilda Avenue, Sunnyvale, CA 94086**

*Issued by*

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Issued Date: February 10, 2015**



Testing Laboratory  
1309

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**Revision History**

| Rev. | Issue Date        | Revisions     | Effect Page | Revised By |
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| 00   | February 10, 2015 | Initial Issue | ALL         | Doris Chu  |



## **TABLE OF CONTENTS**

|   |           |
|---|-----------|
| <b>1. TEST RESULT CERTIFICATION.....</b>                            | <b>4</b>  |
| <b>2. EUT DESCRIPTION .....</b>                                     | <b>5</b>  |
| <b>3. TEST METHODOLOGY .....</b>                                    | <b>6</b>  |
| 3.1 EUT CONFIGURATION .....   | 6         |
| 3.2 EUT EXERCISE .....  | 6         |
| 3.3 GENERAL TEST PROCEDURES.....                                    | 6         |
| 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS.....             | 7         |
| 3.5 DESCRIPTION OF TEST MODES.....                                  | 8         |
| <b>4. INSTRUMENT CALIBRATION.....</b>                               | <b>9</b>  |
| 4.1 MEASURING INSTRUMENT CALIBRATION .....                          | 9         |
| 4.2 MEASUREMENT EQUIPMENT USED.....                                 | 9         |
| 4.3 MEASUREMENT UNCERTAINTY.....                                    | 10        |
| <b>5. FACILITIES AND ACCREDITATIONS .....</b>                       | <b>11</b> |
| 5.1 FACILITIES .....  | 11        |
| 5.2 EQUIPMENT .....   | 11        |
| 5.3 LABORATORY ACCREDITATIONS AND LISTING.....                      | 11        |
| 5.4 TABLE OF ACCREDITATIONS AND LISTINGS .....                      | 12        |
| <b>6. SETUP OF EQUIPMENT UNDER TEST .....</b>                       | <b>13</b> |
| 6.1 SETUP CONFIGURATION OF EUT .....                                | 13        |
| 6.2 SUPPORT EQUIPMENT .....   | 13        |
| <b>7. FCC PART 15 REQUIREMENTS &amp; RSS 210 REQUIREMENTS .....</b> | <b>14</b> |
| 7.1 MAXIMUM OUTPUT POWER .....                                      | 14        |
| 7.2 RADIATED UNDESIRABLE EMISSION.....                              | 16        |
| <b>APPENDIX I PHOTOGRAPHS OF TEST SETUP .....</b>                   | <b>30</b> |



# 1. TEST RESULT CERTIFICATION

**Applicant:** Broadcom Corporation  
 190 Mathilda Avenue, Sunnyvale, CA 94086

**Equipment Under Test:** 802.11a/b/g/n/ac WLAN + Bluetooth PCI-E Mini Card

**Trade Name:** Broadcom

**Model:** BCM94352Z

**Date of Test:** January 20 ~ 25, 2015

| APPLICABLE STANDARDS   |                         |
|--|-------------------------|
| STANDARD   | TEST RESULT             |
| FCC 47 CFR Part 15 Subpart C & Industry Canada RSS-210 Issue 8 <small>December, 2010</small> | No non-compliance noted |

### We hereby certify that:

The above equipment was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4: 2009 and the energy emitted by the sample EUT tested as described in this report is in compliance with the requirements of FCC Rules Part 15.207, 15.209, 15.247 and Industry Canada RSS-210.

The test results of this report relate only to the tested sample identified in this report.

Approved by:

Reviewed by:

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Miller Lee  
 Section Manager  
 Compliance Certification Services Inc.

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Angel Cheng  
 Section Manager  
 Compliance Certification Services Inc.



## 2. EUT DESCRIPTION

|   |   |                          |                              |                           |                         |
|---|---|--------------------------|------------------------------|---------------------------|-------------------------|
| <b>Product</b>  | 802.11a/b/g/n/ac WLAN + Bluetooth PCI-E Mini Card   |                          |                              |                           |                         |
| <b>Trade Name</b>   | Broadcom  |                          |                              |                           |                         |
| <b>Model Number</b>                                       | BCM94352Z   |                          |                              |                           |                         |
| <b>Model Discrepancy</b>                                  | N/A   |                          |                              |                           |                         |
| <b>Received Date</b>                                      | January 9, 2015   |                          |                              |                           |                         |
| <b>Power Supply</b>                                       | Power form host device.   |                          |                              |                           |                         |
| <b>Operating Frequency Range &amp; Number of Channels</b> |   | <b>Mode</b>              | <b>Frequency Range (MHz)</b> | <b>Number of Channels</b> |                         |
|   | UNII Band IV  | IEEE 802.11a             | 5725~5850                    | 5 Channels                |                         |
|   |   | IEEE 802.11n HT 20 MHz   | 5725~5850                    | 5 Channels                |                         |
|   |   | IEEE 802.11n HT 40 MHz   | 5755~5795                    | 2 Channels                |                         |
|   |   | IEEE 802.11ac VHT 80 MHz | 5775                         | 1 Channels                |                         |
| <b>Transmit Power</b>                                     |   | <b>Mode</b>              | <b>Frequency Range (MHz)</b> | <b>Output Power (dBm)</b> | <b>Output Power (w)</b> |
|   | UNII Band IV  | IEEE 802.11a             | 5745~5825                    | 17.90                     | 0.0617                  |
|   |   | IEEE 802.11n HT 20 MHz   | 5745~5825                    | 20.21                     | 0.1050                  |
|   |   | IEEE 802.11n HT 40 MHz   | 5755~5795                    | 20.16                     | 0.1038                  |
|   |   | IEEE 802.11ac VHT 80 MHz | 5775                         | 16.24                     | 0.0421                  |
| <b>Modulation Technique</b>                               | OFDM (QPSK, BPSK, 16-QAM, 64-QAM)   |                          |                              |                           |                         |
| <b>Transmit Data Rate</b>                                 | IEEE 802.11a mode: 54, 48, 36, 24, 18, 12, 9, 6 Mbps<br>IEEE 802.11n HT 20 mode: OFDM (6.5, 7.2, 13, 14.4, 19.5, 21.7, 26, 28.89, 28.9, 39, 43.3, 43.33 52, 57.78, 57.8, 58.5, 65.0, 72.2, 78, 86.67, 104, 115.56, 117, 130, 144.44 Mbps)<br>IEEE 802.11n HT 40 mode: OFDM (13.5, 15, 27, 30, 40.5, 45, 54, 60, 81, 90, 108, 120, 121.5, 135, 150, 162, 180, 216, 240, 243, 270, 300 Mbps)<br>IEEE 802.11ac VHT 80 mode: OFDM (29.3, 58.5, 87.8, 117, 175.5, 234, 263.3, 292.5, 351, 390, 468, 526.5, 585, 702, 780 Mbps) |                          |                              |                           |                         |
| <b>Antenna Specification</b>                              | 1. High-Tek Electronics Co.,Ltd<br>P/N: 025.9006R.0011 (Main) / -0.41 dBi<br>025.9006S.0011 (Aux) / -0.70 dBi<br>2. Wistron NeWeb Corporation<br>P/N: 025.9006R.0001 (Main) / -0.95 dBi<br>025.9006S.0001 (Aux) / 0.20 dBi  |                          |                              |                           |                         |
| <b>Host Brand</b>   | lenovo  | <b>Host Model Name</b>   | Flex 3-1470                  |                           |                         |
|   |   |                          | Flex 3-1435                  |                           |                         |
|   |   |                          | Flex 3-1475                  |                           |                         |
| <b>Antenna Designation</b>                                | PIFA Antenna  |                          |                              |                           |                         |
| <b>Class II Permissive Change</b>                         | Adding the portable platforms Flex 3-1470, Flex 3-1435, Flex 3-1475, These hosts have the same antenna type as originally approved with lower gains.  |                          |                              |                           |                         |

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



### 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

The tests documented in this report were performed in accordance with IC RSS-210, IC RSS-Gen, IC RSS-102, IC RSS-212, and ANSI C63.4.

This submittal(s) (test report) is intended for IC Certification with Industry Canada RSS-210.

#### 3.1 EUT CONFIGURATION

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

#### 3.2 EUT EXERCISE

The EUT was operated in the engineering mode to fix the TX frequency that was for the purpose of the measurements.

According to its specifications, the EUT must comply with the requirements of the Section 15.207, 15.209 and 15.247 under the FCC Rules Part 15 Subpart C.

The tests documented in this report were performed in accordance with IC RSS-210, IC RSS-Gen, IC RSS-102, and ANSI C63.4.

#### 3.3 GENERAL TEST PROCEDURES

##### Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.4 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-peak and average detector modes.

##### Radiated Emissions

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



### 3.4 FCC PART 15.205 RESTRICTED BANDS OF OPERATIONS

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

| MHz                        | MHz                 | MHz             | GHz              |
|----------------------------|---------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423      | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614       | 5.35 - 5.46      |
| 2.1735 - 2.1905            | 16.80425 - 16.80475 | 960 - 1240      | 7.25 - 7.75      |
| 4.125 - 4.128              | 25.5 - 25.67        | 1300 - 1427     | 8.025 - 8.5      |
| 4.17725 - 4.17775          | 37.5 - 38.25        | 1435 - 1626.5   | 9.0 - 9.2        |
| 4.20725 - 4.20775          | 73 - 74.6           | 1645.5 - 1646.5 | 9.3 - 9.5        |
| 6.215 - 6.218              | 74.8 - 75.2         | 1660 - 1710     | 10.6 - 12.7      |
| 6.26775 - 6.26825          | 108 - 121.94        | 1718.8 - 1722.2 | 13.25 - 13.4     |
| 6.31175 - 6.31225          | 123 - 138           | 2200 - 2300     | 14.47 - 14.5     |
| 8.291 - 8.294              | 149.9 - 150.05      | 2310 - 2390     | 15.35 - 16.2     |
| 8.362 - 8.366              | 156.52475 -         | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.52525           | 2655 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475          | 156.7 - 156.9       | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293             | 162.0125 - 167.17   | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025        | 167.72 - 173.2      | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 240 - 285           | 3600 - 4400     | ( <sup>2</sup> ) |
| 13.36 - 13.41              | 322 - 335.4         |                 |                  |

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

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



### 3.5 DESCRIPTION OF TEST MODES

The EUT (Model: BCM94352Z) had been tested under operating condition.

The EUT is a 2x2 configuration spatial MIMO (2Tx & 2Rx) without beam forming function. The 2x2 configuration is implemented with three outside TX & RX chains (Chain 0 and Chain 1).

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

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

#### **UNII Band VI:**

##### **IEEE 802.11a mode:**

Channel Low (5745MHz), Channel Mid (5785MHz) and Channel High (5825MHz) with 6Mbps data rate were chosen for full testing.

##### **IEEE 802.11n HT 20 MHz mode:**

Channel Low(5745MHz), Channel Mid(5785MHz) and Channel High(5825MHz) with 6.5Mbps data rate were chosen for full testing.

##### **IEEE 802.11n HT 40 MHz mode:**

Channel Low(5755MHz) and Channel High(5795MHz) with 13.5Mbps data rate were chosen for full testing.

##### **IEEE 802.11ac VHT 80 mode:**

Channel Low(5775MHz) with 29.3Mbps data rate were chosen for full testing.

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





## 4. INSTRUMENT CALIBRATION

### 4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

### 4.2 MEASUREMENT EQUIPMENT USED

#### Equipment Used for Emissions Measurement

*Remark: Each piece of equipment is scheduled for calibration once a year and Loop Antenna is scheduled for calibration once three years.*

| Wugu 966 Chamber A |                    |         |               |                 |
|--------------------|--------------------|---------|---------------|-----------------|
| Name of Equipment  | Manufacturer       | Model   | Serial Number | Calibration Due |
| Spectrum Analyzer  | Agilent            | E4446A  | US42510268    | 09/18/2015      |
| EMI Test Receiver  | R&S                | ESCI    | 100064        | 05/30/2015      |
| Bilog Antenna      | Sunol Sciences     | JB3     | A030105       | 08/19/2015      |
| Horn Antenna       | EMCO               | 3117    | 00055165      | 02/04/2015      |
| Turn Table         | CCS                | CC-T-1F | N/A           | N.C.R           |
| Antenna Tower      | CCS                | CC-A-1F | N/A           | N.C.R           |
| Controller         | CCS                | CC-C-1F | N/A           | N.C.R           |
| Test S/W           | EZ-EMC (CCS-3A1RE) |         |               |                 |



### 4.3 MEASUREMENT UNCERTAINTY

| PARAMETER                             | UNCERTAINTY |
|---------------------------------------|-------------|
| 3M Semi Anechoic Chamber / 30M~200M   | +/- 4.0138  |
| 3M Semi Anechoic Chamber / 200M~1000M | +/- 3.9483  |
| 3M Semi Anechoic Chamber / 1G~8G      | +/- 2.5975  |
| 3M Semi Anechoic Chamber / 8G~18G     | +/- 2.6112  |
| 3M Semi Anechoic Chamber / 18G~26G    | +/- 2.7389  |
| 3M Semi Anechoic Chamber / 26G~40G    | +/- 2.9683  |

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



## 5. FACILITIES AND ACCREDITATIONS

### 5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

No.199, Chunghsen Road, Hsintien City, Taipei Hsien, Taiwan, R.O.C.  
Tel: 886-2-2217-0894 / Fax: 886-2-2217-1029

No.11, Wugong 6th Rd., Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.)  
Tel: 886-2-2299-9720 / Fax: 886-2-2298-4045

No.81-1, Lane 210, Bade 2nd Rd., Luchu Hsiang, Taoyuan Hsien 338, Taiwan  
Tel: 886-3-324-0332 / Fax: 886-3-324-5235

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

### 5.2 EQUIPMENT

Radiated emissions are measured with one or more of the following types of linearly polarized antennas: tuned dipole, biconical, log periodic, bi-log, and/or ridged waveguide, horn. Spectrum analyzers with pre-selectors and quasi-peak detectors are used to perform radiated measurements.

Conducted emissions are measured with Line Impedance Stabilization Networks and EMI Test Receivers.

Calibrated wideband preamplifiers, coaxial cables, and coaxial attenuators are also used for making measurements.




All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.3 LABORATORY ACCREDITATIONS AND LISTING

The test facilities used to perform radiated and conducted emissions tests are accredited by American Association for Laboratory Accreditation Program for the specific scope accreditation under Lab Code: 0824-01 to perform Electromagnetic Interference tests according to FCC Part 15 and CISPR 22 requirements. In addition, the test facilities are listed with Industry Canada, Certification and Engineering Bureau, IC 2324G-1 for 3M Semi Anechoic Chamber A, 2324G-2 for 3M Semi Anechoic Chamber B.



### 5.4 TABLE OF ACCREDITATIONS AND LISTINGS

| Country | Agency          | Scope of Accreditation   | Logo  |
|---------|-----------------|--|---|
| USA     | FCC             | 3M Semi Anechoic Chamber (FCC MRA: TW1039) to perform FCC Part 15 measurements   | <br>FCC MRA: TW1039          |
| Taiwan  | TAF             | LP0002, RTTE01, FCC Method-47 CFR Part 15 Subpart C, D, E, RSS-210, RSS-310<br>IDA TS SRD, AS/NZS 4268, AS/NZS 4771, TS 12.1 & 12.2, ETSI EN 300 440-1, ETSI EN 300 440-2, ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 301 893, ETSI EN 301 489-1/3/7/17<br>FCC OET Bulletin 65 + Supplement C,<br>EN 50360, EN 50361, EN 50371, RSS 102, EN 50383, EN 50385, EN 50392, IEC 62209, CNS 14958-1, CNS 14959<br>FCC Method -47 CFR Part 15 Subpart B<br>IEC / EN 61000-3-2, IEC / EN 61000-3-3,<br>IEC / EN 61000-4-2/3/4/5/6/8/11 |                              |
| Canada  | Industry Canada | 3M Semi Anechoic Chamber (IC 2324G-1 / IC 2324G-2) to perform  | <br>IC 2324G-1<br>IC 2324G-2 |

\* No part of this report may be used to claim or imply product endorsement by A2LA or any agency of the US Government.



## 6. SETUP OF EQUIPMENT UNDER TEST

### 6.1 SETUP CONFIGURATION OF EUT

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

### 6.2 SUPPORT EQUIPMENT

| No. | Equipment   | Model No.   | Serial No. | FCC ID  | Trade Name | Data Cable | Power Cord  |
|-----|-------------|-------------|------------|---------|------------|------------|---|
| 1   | Notebook PC | Flex 3-1470 | N/A        | FCC DOC | Lenovo     | N/A        | AC I/P:<br>Unshielded, 1.8m<br>DC O/P:<br>Unshielded, 1.8m<br>with a core |

**Remark:**

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



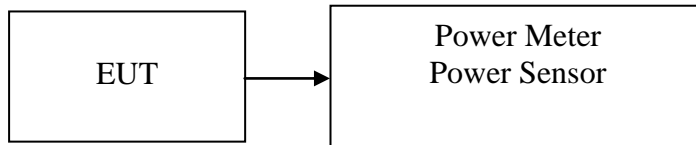
## 7. FCC PART 15 REQUIREMENTS & RSS 210 REQUIREMENTS

### 7.1 MAXIMUM OUTPUT POWER

#### LIMIT

None; for reporting purposes only.

Test Configuration



#### TEST PROCEDURE

The transmitter output is connected to the Power Meter. The Power Meter is set to the Average power detection.

#### TEST RESULTS

No non-compliance noted.

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

| Channel | Frequency (MHz) | Maximum Conducted Output Power (dBm) | Limit (dBm) |
|---------|-----------------|--------------------------------------|-------------|
| 149     | 5745            | 17.80                                | 30.00       |
| 157     | 5785            | <b>*17.90</b>                        | 30.00       |
| 165     | 5825            | 17.90                                | 30.00       |

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

| Channel | Frequency (MHz) | Chain 0 Output Power (dBm) | Chain 1 Output Power (dBm) | Total Output Power (dBm) | Maximum Conducted Output Power Limit (dBm) |
|---------|-----------------|----------------------------|----------------------------|--------------------------|--|
| 149     | 5745            | 17.10                      | 17.30                      | <b>*20.21</b>            | 30.00                                      |
| 157     | 5785            | 17.10                      | 17.20                      | 20.16                    | 30.00                                      |
| 165     | 5825            | 17.00                      | 17.10                      | 20.06                    | 30.00                                      |

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

| Channel | Frequency (MHz) | Chain 0 Output Power (dBm) | Chain 1 Output Power (dBm) | Total Output Power (dBm) | Maximum Conducted Output Power Limit (dBm) |
|---------|-----------------|----------------------------|----------------------------|--------------------------|--|
| 151     | 5755            | 13.60                      | 13.60                      | 16.61                    | 30.00                                      |
| 159     | 5795            | 17.20                      | 17.10                      | <b>*20.16</b>            | 30.00                                      |

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

| Channel | Frequency (MHz) | Chain 0 Output Power (dBm) | Chain 1 Output Power (dBm) | Total Output Power (dBm) | Maximum Conducted Output Power Limit (dBm) |
|---------|-----------------|----------------------------|----------------------------|--------------------------|--|
| 155     | 5775            | 12.30                      | 14.00                      | <b>*16.24</b>            | 30.00                                      |

Remark: Total Output Power (w) = Chain 0 (10^(Output Power /10)/1000) + Chain 1 (10^(Output Power /10)/1000)



### 7.2 RADIATED UNDESIRABLE EMISSION

1. According to §15.209(a) & RSS-210 §A9.3, except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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

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

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

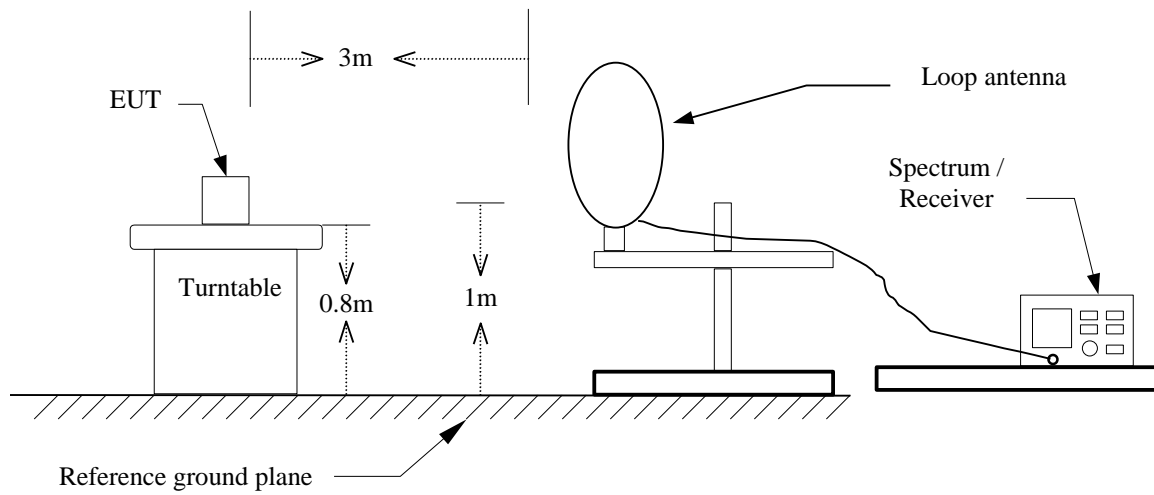
| Frequency (MHz) | Field Strength (µV/m at 3-meter) | Field Strength (dBµV/m at 3-meter) |
|-----------------|----------------------------------|------------------------------------|
| 30-88           | 100                              | 40                                 |
| 88-216          | 150 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



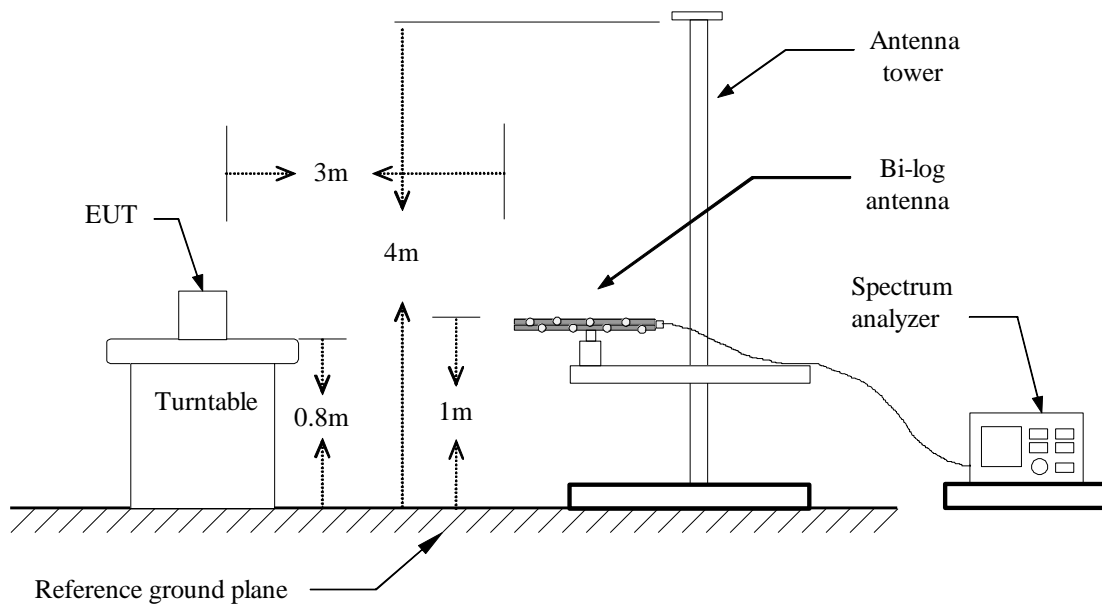


## Test Configuration

### 9kHz ~ 30MHz

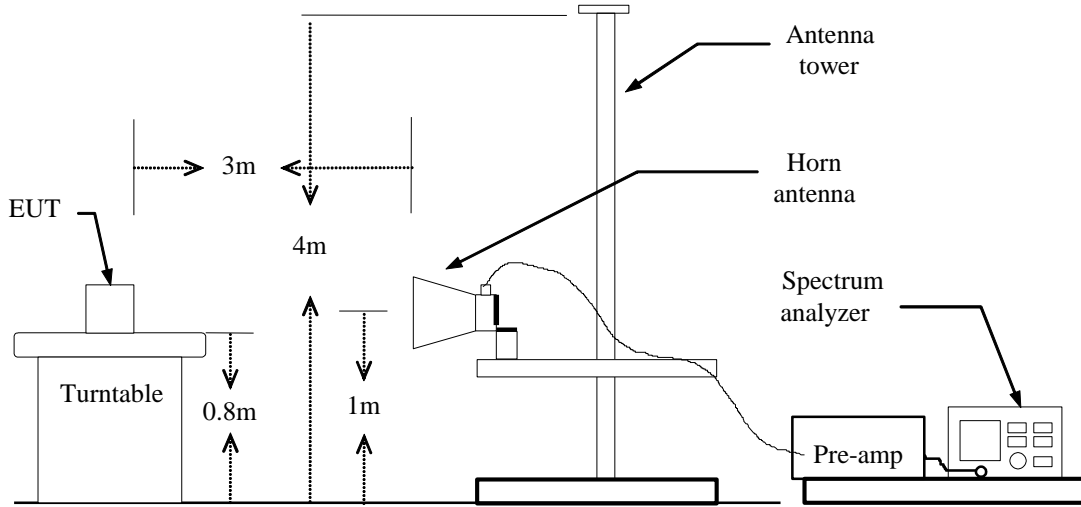


### 30MHz ~ 1GHz





Above 1 GHz





## **TEST PROCEDURE**

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

Below 1GHz:

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

Above 1GHz:

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

(b) A AVERAGE: RBW=1MHz,  
if duty cycle  $\geq 98\%$ , VBW=10Hz.  
if duty cycle  $< 98\%$  VBW=1/T.

**IEEE 802.11b mode:**  $\geq 98\%$ , VBW=10Hz

**IEEE 802.11g mode:**  $\geq 98\%$ , VBW=10Hz

**IEEE 802.11n HT 20 MHz mode:**  $\geq 98\%$ , VBW=10Hz

**IEEE 802.11n HT 40 MHz mode:**  $96\% = \text{VBW } 2\text{kHz}$

7. Repeat above procedures until the measurements for all frequencies are complete.



**Below 1 GHz**

**Operation Mode:** Normal Link

**Test Date:** January 20, 2015

**Temperature:** 27°C

**Tested by:** Owen Wu

**Humidity:** 53% RH

**Polarity:** Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------|----------------|
| 40.6700         | 55.57          | -17.58                   | 37.99           | 40.00          | -2.01       | peak   | V              |
| 140.5800        | 40.57          | -17.71                   | 22.86           | 43.50          | -20.64      | peak   | V              |
| 301.6000        | 37.50          | -16.37                   | 21.13           | 46.00          | -24.87      | peak   | V              |
| 450.9800        | 40.54          | -12.64                   | 27.90           | 46.00          | -18.10      | peak   | V              |
| 599.3900        | 38.19          | -10.52                   | 27.67           | 46.00          | -18.33      | peak   | V              |
| 833.1600        | 35.08          | -6.98                    | 28.10           | 46.00          | -17.90      | peak   | V              |
| 57.1600         | 57.48          | -23.64                   | 33.84           | 40.00          | -6.16       | peak   | H              |
| 252.1300        | 40.43          | -18.25                   | 22.18           | 46.00          | -23.82      | peak   | H              |
| 456.8000        | 37.64          | -12.55                   | 25.09           | 46.00          | -20.91      | peak   | H              |
| 597.4500        | 33.77          | -10.53                   | 23.24           | 46.00          | -22.76      | peak   | H              |
| 833.1600        | 41.56          | -6.98                    | 34.58           | 46.00          | -11.42      | peak   | H              |
| 998.0600        | 34.68          | -4.71                    | 29.97           | 54.00          | -24.03      | peak   | H              |

**Remark:**

- 1 Measuring frequencies from 30 MHz to the 1GHz.
- 2 Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
- 3 Quasi-peak test would be performed if the peak result were greater than the quasi-peak limit or as required by the applicant.
- 4 Measurements above show only up to 6 maximum emissions noted, or would be lesser, with " N/A " remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
- 5 Margin (dB) = Remark result (dBuV/m) – Quasi-peak limit (dBuV/m).



**Above 1 GHz**

**Operation Mode:** Tx / IEEE 802.11a mode / 5745MHz

**Test Date:** January 21, 2015

**Temperature:** 27°C

**Tested by:** Owen Wu

**Humidity:** 53% RH

**Polarity:** Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|-----------------|----------------|-------------------|-----------------|----------------|-------------|--------|----------------|
| 1903.000        | 49.28          | -5.39             | 43.89           | 74.00          | -30.11      | peak   | V              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
| 1973.000        | 49.99          | -5.02             | 44.97           | 74.00          | -29.03      | peak   | H              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |

**Remark:**

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



Operation Mode: Tx / IEEE 802.11a mode / 5785MHz

Test Date: January 21, 2015

Temperature: 27°C

Tested by: Owen Wu

Humidity: 53% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|-----------------|----------------|-------------------|-----------------|----------------|-------------|--------|----------------|
| 1791.000        | 51.90          | -5.99             | 45.91           | 74.00          | -28.09      | peak   | V              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
| 2568.000        | 49.84          | -2.98             | 46.86           | 74.00          | -27.14      | peak   | H              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |

**Remark:**

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



Operation Mode: Tx / IEEE 802.11a mode / 5825MHz

Test Date: January 21, 2015

Temperature: 27°C

Tested by: Owen Wu

Humidity: 53% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|-----------------|----------------|-------------------|-----------------|----------------|-------------|--------|----------------|
| 2330.000        | 51.13          | -4.22             | 46.91           | 74.00          | -27.09      | peak   | V              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
| 2386.000        | 49.72          | -3.81             | 45.91           | 74.00          | -28.09      | peak   | H              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |

Remark:

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



Operation Mode: Tx / IEEE 802.11n HT 20 MHz Channel mode / 5745MHz

Test Date: January 24, 2015

Temperature: 27°C

Tested by: Owen Wu

Humidity: 53% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|-----------------|----------------|-------------------|-----------------|----------------|-------------|--------|----------------|
| 4150.000        | 51.51          | 1.80              | 53.31           | 74.00          | -20.69      | peak   | V              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
| 3688.000        | 52.78          | -0.11             | 52.67           | 74.00          | -21.33      | peak   | H              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |

Remark:

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





Operation Mode: Tx / IEEE 802.11n HT 20 MHz Channel mode / 5785MHz

Test Date: January 24, 2015

Temperature: 27°C

Tested by: Owen Wu

Humidity: 53% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|-----------------|----------------|-------------------|-----------------|----------------|-------------|--------|----------------|
| 3807.000        | 52.07          | 0.40              | 52.47           | 74.00          | -21.53      | peak   | V              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
| 3772.000        | 52.78          | 0.25              | 53.03           | 74.00          | -20.97      | peak   | H              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |

Remark:

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



Operation Mode: Tx / IEEE 802.11n HT 20 MHz Channel mode / 5825MHz

Test Date: January 24, 2015

Temperature: 27°C

Tested by: Owen Wu

Humidity: 53% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|-----------------|----------------|-------------------|-----------------|----------------|-------------|--------|----------------|
| 3877.000        | 52.16          | 0.70              | 52.86           | 74.00          | -21.14      | peak   | V              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
| 3653.000        | 52.34          | -0.26             | 52.08           | 74.00          | -21.92      | peak   | H              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |

Remark:

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



Operation Mode: Tx / IEEE 802.11n HT 40 MHz mode / 5755 MHz

Test Date: January 24, 2015

Temperature: 27°C

Tested by: Owen Wu

Humidity: 53% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|-----------------|----------------|-------------------|-----------------|----------------|-------------|--------|----------------|
| 2204.000        | 50.05          | -4.42             | 45.63           | 74.00          | -28.37      | peak   | V              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
| 1952.000        | 50.73          | -5.13             | 45.60           | 74.00          | -28.40      | peak   | H              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |

Remark:

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



Operation Mode: Tx / IEEE 802.11n HT 40 MHz mode / 5795MHz

Test Date: January 24, 2015

Temperature: 27°C

Tested by: Owen Wu

Humidity: 53% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|-----------------|----------------|-------------------|-----------------|----------------|-------------|--------|----------------|
| 1952.000        | 50.76          | -5.13             | 45.63           | 74.00          | -28.37      | peak   | V              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
| 2743.000        | 49.83          | -2.63             | 47.20           | 74.00          | -26.80      | peak   | H              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |

Remark:

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



Operation Mode: Tx / IEEE 802.11ac VHT 80 MHz mode / 5775MHz

Test Date: January 24, 2015

Temperature: 27°C

Tested by: Owen Wu

Humidity: 53% RH

Polarity: Ver. / Hor.

| Frequency (MHz) | Reading (dBuV) | Correction (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark | Ant.Pol. (H/V) |
|-----------------|----------------|-------------------|-----------------|----------------|-------------|--------|----------------|
| 1833.000        | 51.48          | -5.77             | 45.71           | 74.00          | -28.29      | peak   | V              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
| 2547.000        | 48.90          | -3.03             | 45.87           | 74.00          | -28.13      | peak   | H              |
| N/A             |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |
|                 |                |                   |                 |                |             |        |                |

Remark:

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