



# SPORTON International Inc.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.  
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / [www.sporton.com.tw](http://www.sporton.com.tw)

## FCC RADIO TEST REPORT

|                        |                                                                                 |
|------------------------|---------------------------------------------------------------------------------|
| Applicant's company    | ZTE Corporation                                                                 |
| Applicant Address      | ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen, Guangdong,<br>518057 China |
| FCC ID                 | Q78-ZXWLW822E                                                                   |
| Manufacturer's company | ZTE Corporation                                                                 |
| Manufacturer Address   | ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen, Guangdong,<br>518057 China |

|                   |                                       |
|-------------------|---------------------------------------|
| Product Name      | Indoor Wireless AP                    |
| Brand Name        | ZTE                                   |
| Model No.         | ZXWL W822Ei                           |
| Test Rule Part(s) | 47 CFR FCC Part 15 Subpart E § 15.407 |
| Test Freq. Range  | 5150 ~ 5250MHz                        |
| Received Date     | Aug. 07, 2013                         |
| Final Test Date   | Feb. 24, 2014                         |
| Submission Type   | Class II Change                       |

### Statement

**Test result included is for the IEEE 802.11n and IEEE 802.11a (5150 ~ 5250MHz) 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 C63.10-2009, 47 CFR FCC Part 15 Subpart E, KDB 789033 D01 v01r03, KDB 662911 D01 v02r01.**

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



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## History of This Test Report

| REPORT NO.    | VERSION | DESCRIPTION             | ISSUED DATE   |
|---------------|---------|-------------------------|---------------|
| FR380712-01AB | Rev. 01 | Initial issue of report | Feb. 27, 2014 |
|               |         |                         |               |
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|               |         |                         |               |



## 1. CERTIFICATE OF COMPLIANCE

Product Name : Indoor Wireless AP  
Brand Name : ZTE  
Model No. : ZXWL W822Ei  
Applicant : ZTE Corporation  
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 Aug. 07, 2013 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.

A handwritten signature in blue ink, appearing to read "Sam Chen", written over a horizontal line.

Sam Chen

SPORTON INTERNATIONAL INC.

## 2. SUMMARY OF THE TEST RESULT

| Applied Standard: 47 CFR FCC Part 15 Subpart E |              |                                |          |             |
|------------------------------------------------|--------------|--------------------------------|----------|-------------|
| Part                                           | Rule Section | Description of Test            | Result   | Under Limit |
| 4.1                                            | 15.407(a)    | Maximum Conducted Output Power | Complies | 0.16 dB     |
| 4.2                                            | 15.407(b)    | Radiated Emissions             | Complies | 0.34 dB     |
| 4.3                                            | 15.407(b)    | Band Edge Emissions            | Complies | 6.80 dB     |
| 4.4                                            | 15.203       | Antenna Requirements           | Complies | -           |

### 3. GENERAL INFORMATION

#### 3.1. Product Details

##### IEEE 802.11n

| Items                          | Description                                     |
|--------------------------------|-------------------------------------------------|
| Product Type                   | WLAN (3TX, 3RX)                                 |
| Radio Type                     | Intentional Transceiver                         |
| Power Type                     | From Power Adapter or PoE                       |
| Modulation                     | see the below table for IEEE 802.11n            |
| Data Modulation                | OFDM (BPSK / QPSK / 16QAM / 64QAM)              |
| Data Rate (Mbps)               | see the below table for IEEE 802.11n            |
| Frequency Range                | 5150 ~ 5250MHz                                  |
| Channel Number                 | 4 for 20MHz bandwidth ; 2 for 40MHz bandwidth   |
| Maximum Conducted Output Power | MCS0 (HT20): 15.86 dBm ; MCS0 (HT40): 16.84 dBm |
| Carrier Frequencies            | Please refer to section 3.4                     |
| Antenna                        | Please refer to section 3.3                     |

##### IEEE 802.11a

| Items                          | Description                        |
|--------------------------------|------------------------------------|
| Product Type                   | WLAN (3TX, 3RX)                    |
| Radio Type                     | Intentional Transceiver            |
| Power Type                     | From Power Adapter or PoE          |
| Modulation                     | OFDM for IEEE 802.11a              |
| Data Modulation                | OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| Data Rate (Mbps)               | OFDM (6/9/12/18/24/36/48/54)       |
| Frequency Range                | 5150 ~ 5250MHz                     |
| Channel Number                 | 4                                  |
| Maximum Conducted Output Power | 15.45 dBm                          |
| Carrier Frequencies            | Please refer to section 3.4        |
| Antenna                        | Please refer to section 3.3        |

| Items                | Description                                               |                                                         |
|----------------------|-----------------------------------------------------------|---------------------------------------------------------|
| Communication Mode   | <input checked="" type="checkbox"/> IP Based (Load Based) | <input type="checkbox"/> Frame Based                    |
| Beamforming Function | <input type="checkbox"/> With beamforming                 | <input checked="" type="checkbox"/> Without beamforming |

#### Antenna and Band width

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

#### IEEE 11n Spec.

| Protocol                                                                                                                                                                                                                 | Number of Transmit Chains (NTX) | Data Rate / MCS |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------|
| 802.11n (HT20)                                                                                                                                                                                                           | 3                               | MCS 0-23        |
| 802.11n (HT40)                                                                                                                                                                                                           | 3                               | MCS 0-23        |
| <p>Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput).<br/>Then EUT support HT20 and HT40.</p> <p>Note 2: Modulation modes consist of below configuration: HT20/HT40: IEEE 802.11n</p> |                                 |                 |

### 3.2. Accessories

| Power                   | Brand | Model No.              | Rating                                                       |
|-------------------------|-------|------------------------|--------------------------------------------------------------|
| Adapter                 | MOSO  | MSP-C2000IC12.0-24W-US | Input: 100-240Vac, 50/60Hz, 0.8A max.<br>Output: 12.0Vdc, 2A |
| Other                   |       |                        |                                                              |
| Wall-mounted pedestal*1 |       |                        |                                                              |

### 3.3. Table for Filed Antenna

| Ant. | Brand   | Model No. | Antenna Type | Connector | Gain (dBi) |      |
|------|---------|-----------|--------------|-----------|------------|------|
|      |         |           |              |           | 2.4GHz     | 5GHz |
| 1    | Airgain | M2450DL6  | PIFA Antenna | I-PEX     | 4.9        | 5.0  |

Note: The EUT has six internal antennas.

<For 2.4GHz Band:>

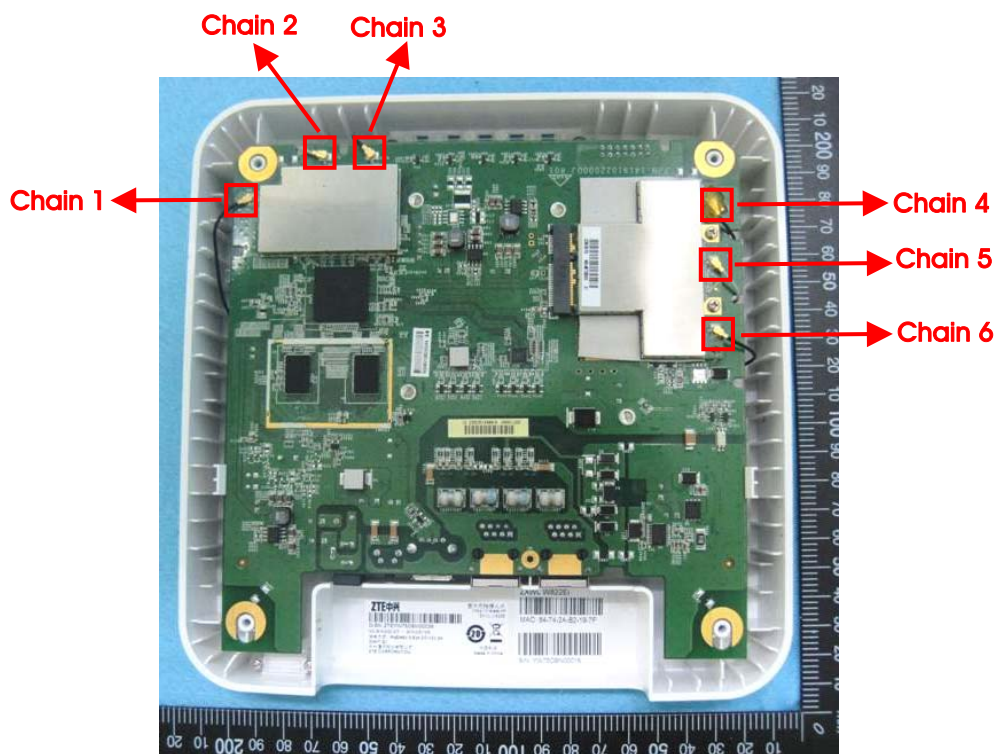
For IEEE 802.11b/g/n mode (3TX/3RX):

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

<For 5GHz Band:>

For IEEE 802.11a/n mode (3TX/3RX):

Chain 4, Chain 5 and Chain 6 could transmit/receive simultaneously.



### 3.4. Table for Carrier Frequencies

The EUT has two bandwidth system.

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48.

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

| Frequency Band          | Channel No. | Frequency | Channel No. | Frequency |
|-------------------------|-------------|-----------|-------------|-----------|
| 5150~5250 MHz<br>Band 1 | 36          | 5180 MHz  | 44          | 5220 MHz  |
|                         | 38          | 5190 MHz  | 46          | 5230 MHz  |
|                         | 40          | 5200 MHz  | 48          | 5240 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 |
|------------------------------|-------------|--------|-----------|----------|-------|
| Max. Conducted Output Power  | 11n HT20    | Band 1 | MCS0      | 36/40/48 | 4+5+6 |
|                              | 11n HT40    | Band 1 | MCS0      | 38/46    | 4+5+6 |
|                              | 11a/BPSK    | Band 1 | 6Mbps     | 36/40/48 | 4+5+6 |
| Radiated Emission Below 1GHz | Normal Link |        | -         | -        | -     |
| Radiated Emission Above 1GHz | 11n HT20    | Band 1 | MCS0      | 36/40/48 | 4+5+6 |
|                              | 11n HT40    | Band 1 | MCS0      | 38/46    | 4+5+6 |
|                              | 11a/BPSK    | Band 1 | 6Mbps     | 36/40/48 | 4+5+6 |
| Band Edge Emission           | 11n HT20    | Band 1 | MCS0      | 36/40/48 | 4+5+6 |
|                              | 11n HT40    | Band 1 | MCS0      | 38/46    | 4+5+6 |
|                              | 11a/BPSK    | Band 1 | 6Mbps     | 36/40/48 | 4+5+6 |

The following test modes were performed for all tests:

#### For Radiated Emission below 1GHz test:

Mode 1. Stand of EUT + Adapter

Mode 2. Laying of EUT + Adapter

Mode 1 has been evaluated to be the worst case among Mode 1~2, thus measurement for Mode 3 will follow this same test mode.

Mode 3. Stand of EUT + PoE

Mode 1 and Mode 3 are worst test result among Mode 1~Mode 3, and the test result of those two modes are selected to record in the test report.

#### For Radiated Emission above 1GHz test:

The EUT for Radiated Emission above 1GHz test was performed at X axis, Y axis and Z axis and the worst-case was found at Y axis. So the measurement will follow this same test configuration.

#### For Co-location MPE and Radiated Emission Co-location tests:

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

### 3.6. Table for Testing Locations

| Test Site Location |                                                                            |          |              |             |              |
|--------------------|----------------------------------------------------------------------------|----------|--------------|-------------|--------------|
| Address:           | No.8, Lane 724, Bo-ai St., Jhubei City, Hsinchu County 302, Taiwan, R.O.C. |          |              |             |              |
| TEL:               | 886-3-656-9065                                                             |          |              |             |              |
| FAX:               | 886-3-656-9085                                                             |          |              |             |              |
| Test Site No.      | Site Category                                                              | Location | FCC Reg. No. | IC File No. | VCCI Reg. No |
| 03CH01-CB          | SAC                                                                        | Hsin Chu | 262045       | IC 4086D    | -            |
| 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: FR380712AB.

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

| Modifications                                                                                                                                                         | Performance Checking                                                                                                                                                                                                                     |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> <li>It adds six internal antennas for this device.</li> <li>Change the model number to "ZXWL W822Ei" from "ZXWL W822E".</li> </ol> | <ol style="list-style-type: none"> <li>Maximum Conducted Output Power.</li> <li>Radiated Emissions.</li> <li>Band Edges Emissions.</li> <li>Co-location Maximum Permissible Exposure.</li> <li>Radiated Emission Co-location.</li> </ol> |

### 3.8. Table for Supporting Units

For Radiated Emissions below 1GHz test:

| Support Unit | Brand      | Model       | FCC ID       |
|--------------|------------|-------------|--------------|
| Notebook     | DELL       | M1330       | E2K4965AGNM  |
| Notebook     | DELL       | M1340       | E2K4965AGNM  |
| Notebook     | DELL       | E6430       | DoC          |
| Notebook     | DELL       | D420        | E2KWM3945ABG |
| PoE          | PowerDsine | PD-6561G300 | NA           |

For Others test:

| Support Unit | Brand | Model | FCC ID |
|--------------|-------|-------|--------|
| Notebook     | DELL  | E6430 | 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.

#### Power Parameters of IEEE 802.11n MCS0 HT20 / Chain 4 + Chain 5 + Chain 6

| Test Software Version | ART2-GUI |          |          |
|-----------------------|----------|----------|----------|
| Frequency             | 5180 MHz | 5200 MHz | 5240 MHz |
| MCS0 HT20             | 10       | 10       | 9.5      |

#### Power Parameters of IEEE 802.11n MCS0 HT40 / Chain 4 + Chain 5 + Chain 6

| Test Software Version | ART2-GUI |          |
|-----------------------|----------|----------|
| Frequency             | 5190 MHz | 5230 MHz |
| MCS0 HT40             | 11.5     | 11.5     |

#### Power Parameters of IEEE 802.11a / Chain 4 + Chain 5 + Chain 6

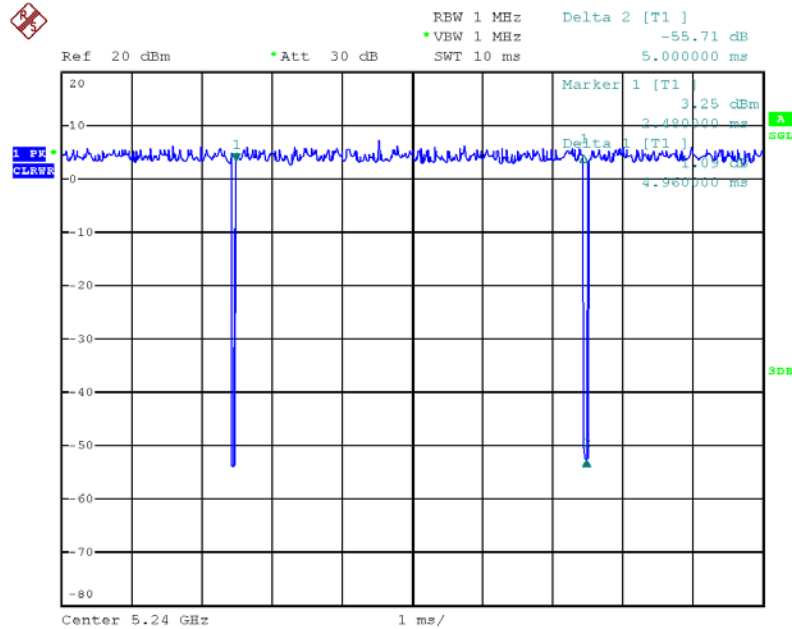
| Test Software Version | ART2-GUI |          |          |
|-----------------------|----------|----------|----------|
| Frequency             | 5180 MHz | 5200 MHz | 5240 MHz |
| IEEE 802.11a          | 9.5      | 9.5      | 9        |

### 3.10. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

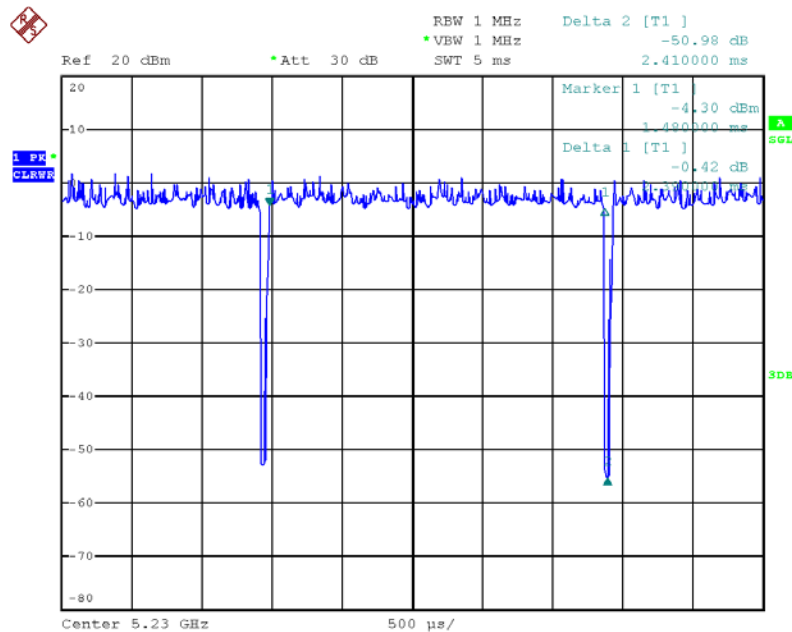
### 3.11. Duty Cycle

#### IEEE 802.11n MCS0 HT20



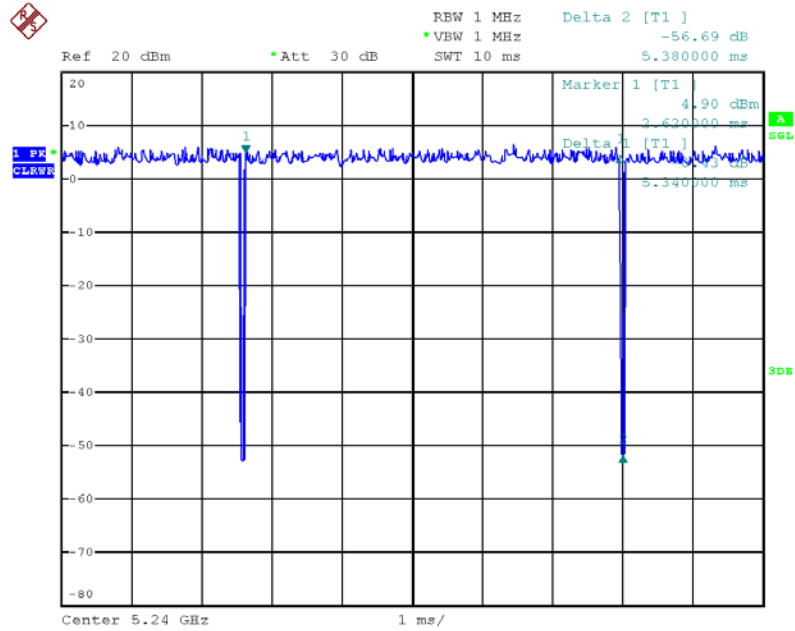
Date: 5.SEP.2013 18:11:00

#### IEEE 802.11n MCS0 HT40



Date: 5.SEP.2013 18:07:36

# IEEE 802.11a

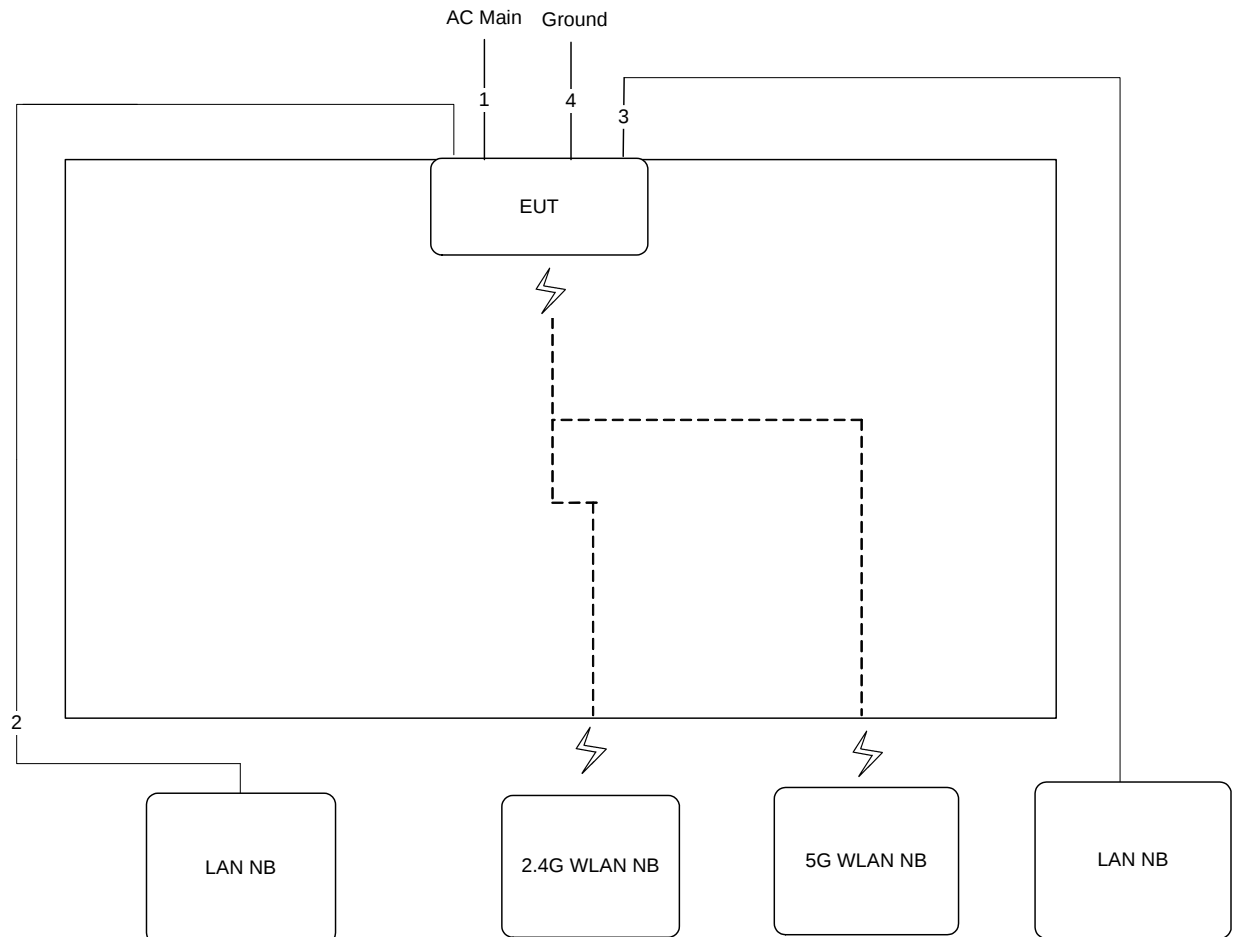


Date: 5.SEP.2013 18:12:03

### 3.12. Test Configurations

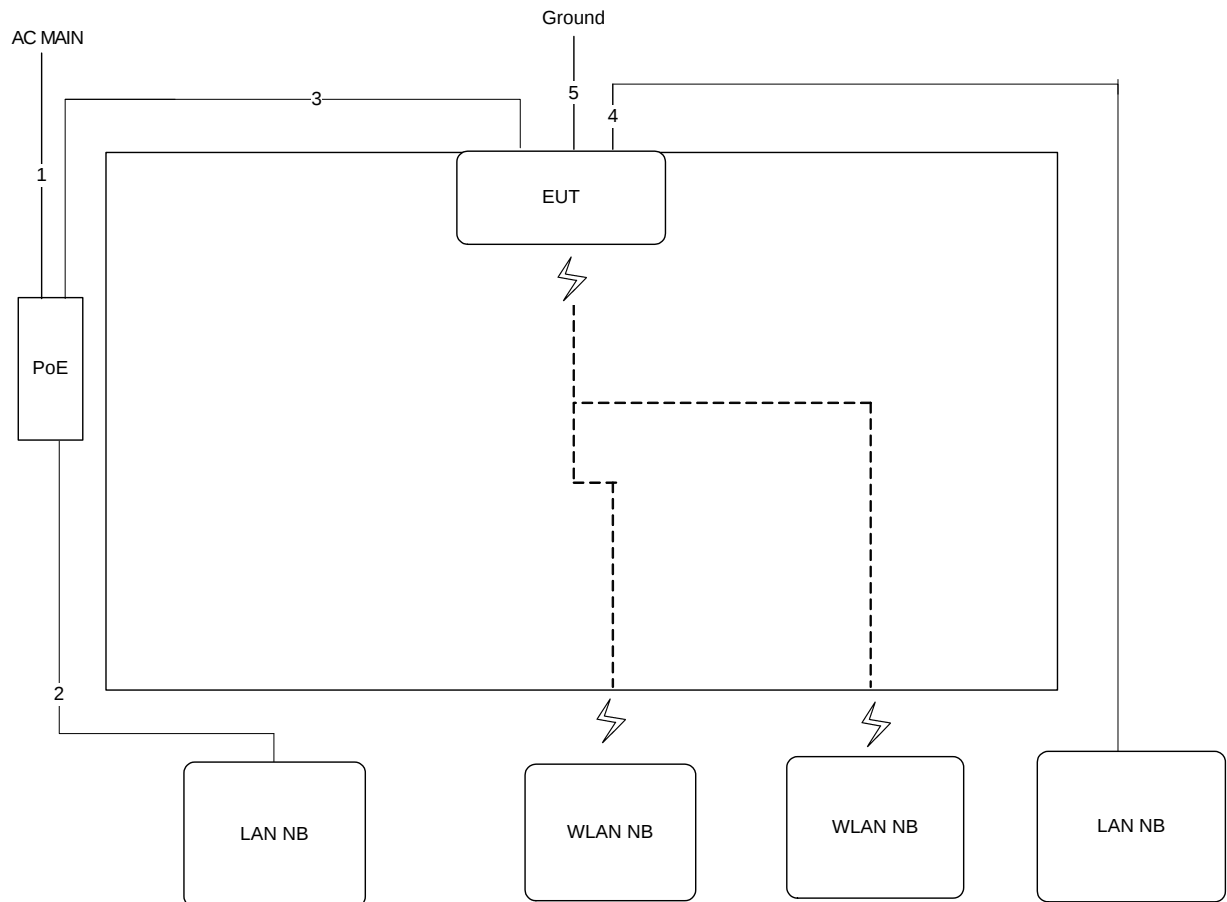
#### 3.12.1. Radiation Emissions Test Configuration

Test Configuration: 30MHz~1GHz / Test Mode: Mode 1



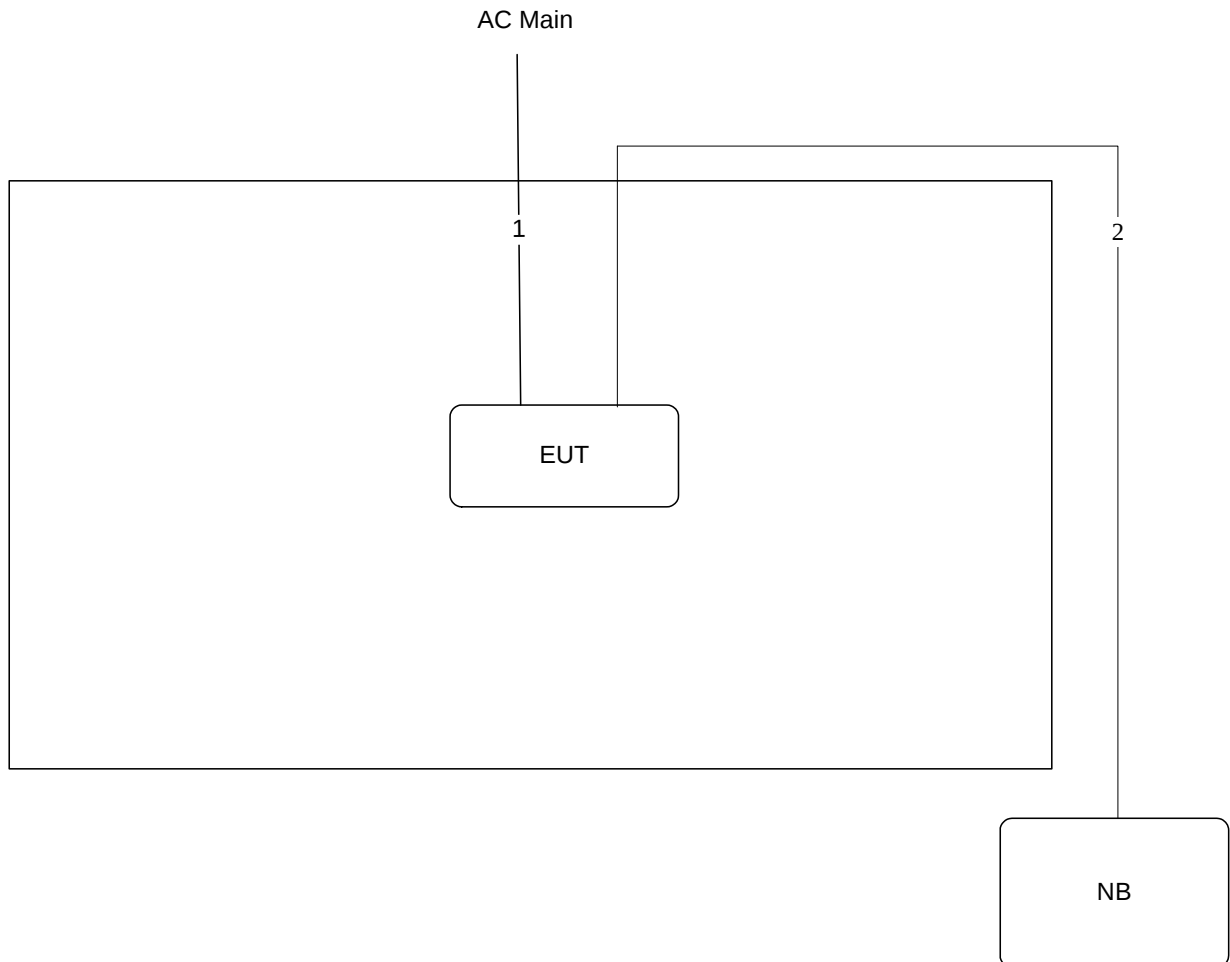
| Item | Connection   | Shielded | Length |
|------|--------------|----------|--------|
| 1    | Power cable  | No       | 1.8m   |
| 2    | RJ-45 cable  | No       | 10m    |
| 3    | RJ-45 cable  | No       | 10m    |
| 4    | Ground cable | No       | 1.5m   |

## Test Mode: Mode 3



| Item | Connection   | Shielded | Length |
|------|--------------|----------|--------|
| 1    | Power cable  | No       | 1.8m   |
| 2    | RJ-45 cable  | No       | 10m    |
| 3    | RJ-45 cable  | No       | 1m     |
| 4    | RJ-45 cable  | No       | 10m    |
| 5    | Ground cable | No       | 1.5m   |

## Test Configuration: above 1GHz



| Item | Connection  | Shielded | Length |
|------|-------------|----------|--------|
| 1    | Power cable | No       | 1.8m   |
| 2    | RJ-45 cable | No       | 10m    |

## 4. TEST RESULT

### 4.1. Maximum Conducted Output Power Measurement

#### 4.1.1. Limit

For the band 5.15~5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or  $4 \text{ dBm} + 10\log B$ , where B is the 26 dB emissions bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 4.1.2. Measuring Instruments and Setting

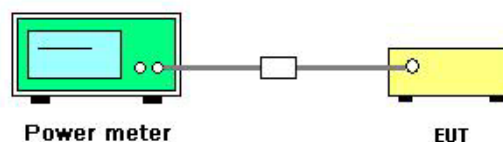
Please refer to section 5 of equipments list in this report. The following table is the setting of the power meter.

| Power Meter Parameter | Setting                                                    |
|-----------------------|------------------------------------------------------------|
| Bandwidth             | 50MHz bandwidth is greater than the EUT emission bandwidth |
| Detector              | AVERAGE                                                    |

#### 4.1.3. Test Procedures

1. The transmitter output (antenna port) was connected to the power meter.
2. Test was performed in accordance with KDB 789033 D01 v01r03 for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E, section (E) Maximum conducted output power =>(3) Method PM (Measurement using an RF average power meter) Multiple antenna systems was performed in accordance with KDB 662911 D01 v02r01 Emissions Testing of Transmitters with Multiple Outputs in the Same Band.
3. When measuring maximum conducted output power with multiple antenna systems, add every result of the values by mathematic formula.

#### 4.1.4. Test Setup Layout



#### 4.1.5. Test Deviation

There is no deviation with the original standard.

#### 4.1.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

#### 4.1.7. Test Result of Maximum Conducted Output Power

|               |               |                |              |
|---------------|---------------|----------------|--------------|
| Temperature   | 22°C          | Humidity       | 58%          |
| Test Engineer | Wen Chao      | Configurations | IEEE 802.11n |
| Test Date     | Feb. 15, 2014 |                |              |

##### Configuration IEEE 802.11n MCS0 HT20

| Channel | Frequency | Conducted Power (dBm) |         |         |       | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|---------|---------|-------|------------------|----------|
|         |           | Chain 4               | Chain 5 | Chain 6 | Total |                  |          |
| 36      | 5180 MHz  | 11.57                 | 10.83   | 10.83   | 15.86 | 17.00            | Complies |
| 40      | 5200 MHz  | 11.02                 | 10.73   | 11.21   | 15.76 | 17.00            | Complies |
| 48      | 5240 MHz  | 10.42                 | 10.32   | 10.65   | 15.24 | 17.00            | Complies |

##### Configuration IEEE 802.11n MCS0 HT40

| Channel | Frequency | Conducted Power (dBm) |         |         |       | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|---------|---------|-------|------------------|----------|
|         |           | Chain 4               | Chain 5 | Chain 6 | Total |                  |          |
| 38      | 5190 MHz  | 12.41                 | 11.51   | 12.12   | 16.80 | 17.00            | Complies |
| 46      | 5230 MHz  | 12.49                 | 11.49   | 12.16   | 16.84 | 17.00            | Complies |

|               |               |                |              |
|---------------|---------------|----------------|--------------|
| Temperature   | 22°C          | Humidity       | 58%          |
| Test Engineer | Wen Chao      | Configurations | IEEE 802.11a |
| Test Date     | Feb. 15, 2014 |                |              |

#### Configuration IEEE 802.11a

| Channel | Frequency | Conducted Power (dBm) |         |         |       | Max. Limit (dBm) | Result   |
|---------|-----------|-----------------------|---------|---------|-------|------------------|----------|
|         |           | Chain 4               | Chain 5 | Chain 6 | Total |                  |          |
| 36      | 5180 MHz  | 11.17                 | 10.27   | 10.56   | 15.45 | 17.00            | Complies |
| 40      | 5200 MHz  | 10.69                 | 10.17   | 10.78   | 15.33 | 17.00            | Complies |
| 48      | 5240 MHz  | 10.01                 | 9.72    | 10.19   | 14.75 | 17.00            | Complies |

## 4.2. Radiated Emissions Measurement

### 4.2.1. 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 a -27dBm peak limit or average 54dBuV/m and peak 74dBuV/m limits. 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<br>(MHz) | Field Strength<br>(micorvolts/meter) | Measurement Distance<br>(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                                |

### 4.2.2. 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)     | 1 MHz / 3MHz for Peak, 1 MHz / 10Hz for Average |
| RBW / VBW (Emission in non-restricted band) | 1 MHz / 3MHz for peak                           |

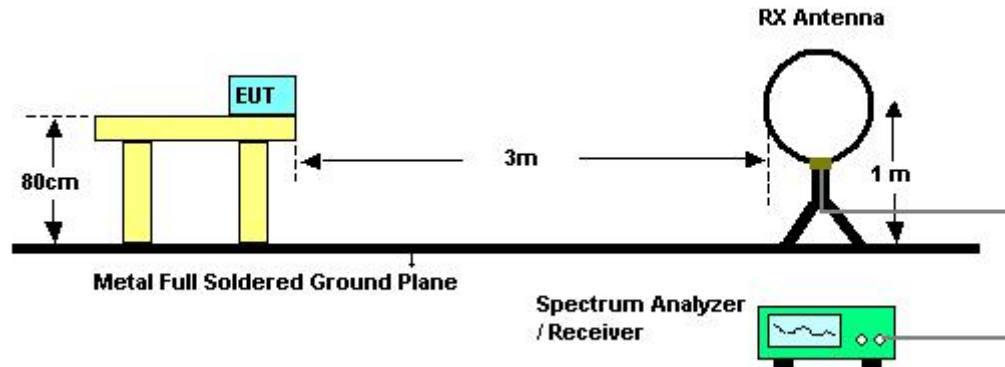
| Receiver Parameter     | Setting                           |
|------------------------|-----------------------------------|
| Attenuation            | Auto                              |
| Start ~ Stop Frequency | 9kHz~150kHz / RBW 200Hz for QP    |
| Start ~ Stop Frequency | 150kHz~30MHz / RBW 9kHz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

#### 4.2.3. Test Procedures

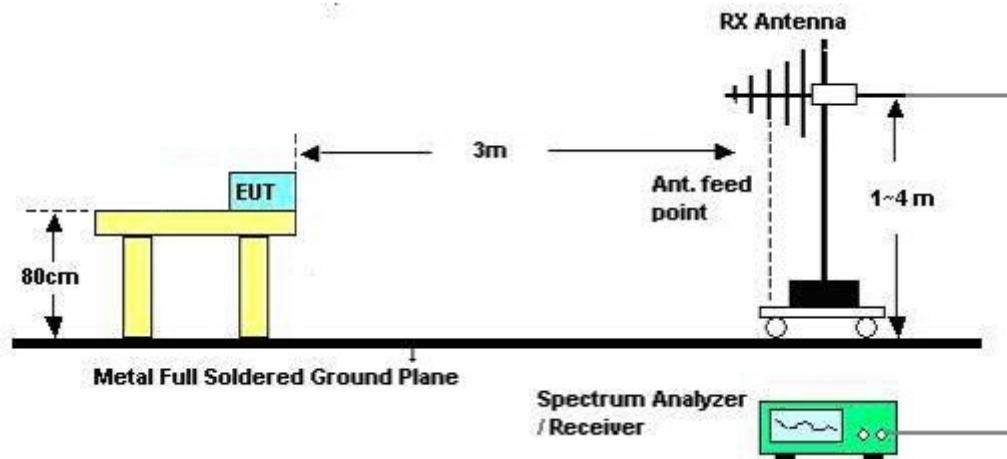
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting 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 RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.
8. 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.
9. 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.
10. 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.

#### 4.2.4. Test Setup Layout

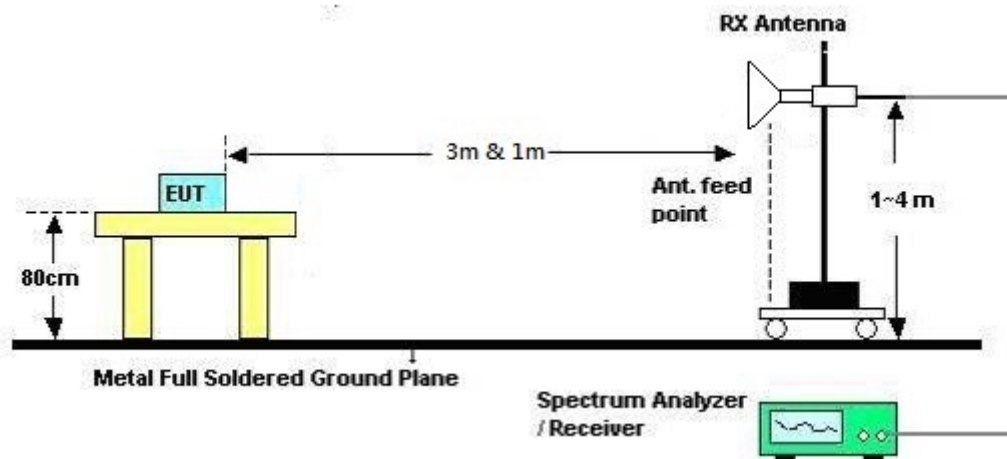
For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



For Radiated Emissions: Above 1GHz



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

|               |               |                |             |
|---------------|---------------|----------------|-------------|
| Temperature   | 24°C          | Humidity       | 53%         |
| Test Engineer | Nick Peng     | Configurations | Normal Link |
| Test Date     | Feb. 14, 2014 | Test Mode      | Mode 1      |

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

Note:

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

Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);

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

|               |               |                |             |
|---------------|---------------|----------------|-------------|
| Temperature   | 24°C          | Humidity       | 53%         |
| Test Engineer | Nick Peng     | Configurations | Normal Link |
| Test Date     | Feb. 24, 2014 | Test Mode      | Mode 3      |

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

Note:

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

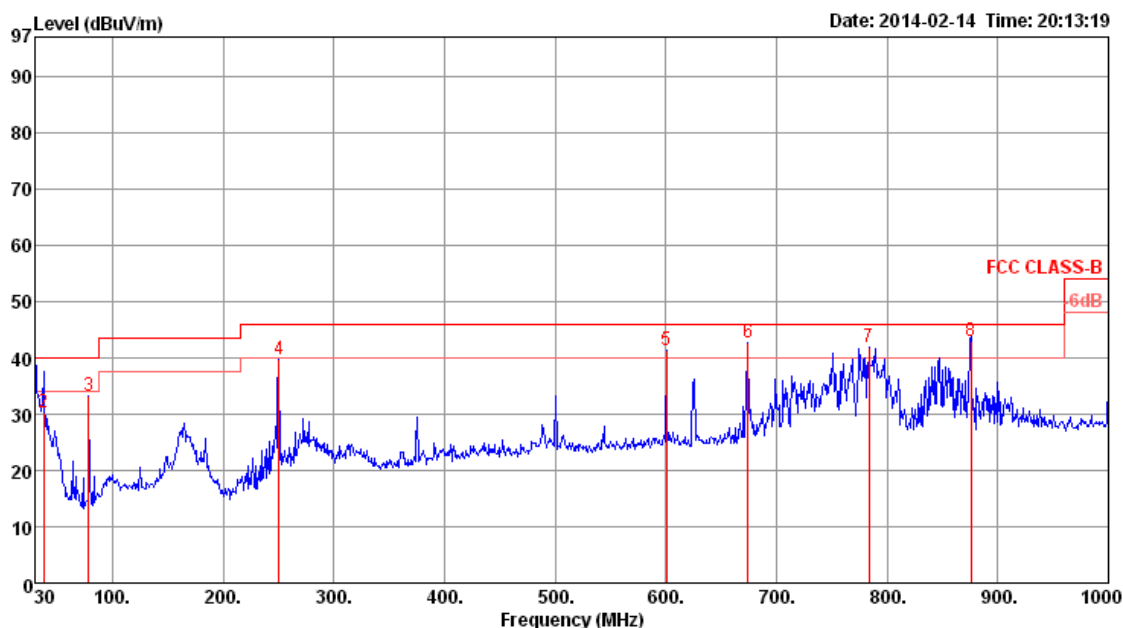
Distance extrapolation factor =  $40 \log (\text{specific distance} / \text{test distance})$  (dB);

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

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

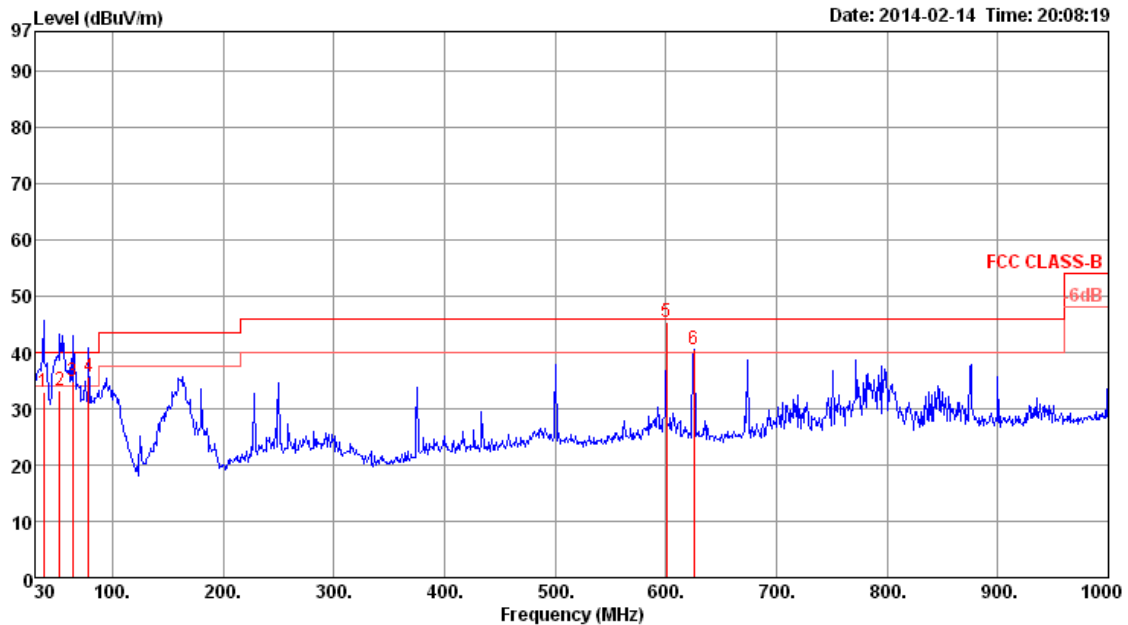
|               |           |                |             |
|---------------|-----------|----------------|-------------|
| Temperature   | 24°C      | Humidity       | 53%         |
| Test Engineer | Nick Peng | Configurations | Normal Link |
| Test Mode     | Mode 1    |                |             |

##### Horizontal



|   | Freq   | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Antenna Factor | Preamp Factor | Remark | A/Pos | T/Pos | Pol/Phase  |
|---|--------|--------|------------|------------|------------|------------|----------------|---------------|--------|-------|-------|------------|
|   | MHz    | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB/m           | dB            |        | cm    | deg   |            |
| 1 | 30.00  | 32.80  | 40.00      | -7.20      | 41.23      | 0.61       | 18.76          | 27.80         | QP     | 100   | 312   | HORIZONTAL |
| 2 | 37.76  | 30.29  | 40.00      | -9.71      | 43.11      | 0.68       | 14.30          | 27.80         | QP     | 133   | 0     | HORIZONTAL |
| 3 | 78.50  | 33.13  | 40.00      | -6.87      | 52.79      | 0.96       | 7.07           | 27.69         | Peak   | 100   | 0     | HORIZONTAL |
| 4 | 250.19 | 39.60  | 46.00      | -6.40      | 52.05      | 1.78       | 12.77          | 27.00         | Peak   | 100   | 0     | HORIZONTAL |
| 5 | 600.36 | 41.26  | 46.00      | -4.74      | 47.78      | 2.81       | 18.77          | 28.10         | Peak   | 100   | 0     | HORIZONTAL |
| 6 | 674.08 | 42.58  | 46.00      | -3.42      | 48.56      | 3.04       | 19.01          | 28.03         | Peak   | 100   | 0     | HORIZONTAL |
| 7 | 783.69 | 41.81  | 46.00      | -4.19      | 46.61      | 3.21       | 19.66          | 27.67         | Peak   | 100   | 0     | HORIZONTAL |
| 8 | 875.84 | 42.97  | 46.00      | -3.03      | 46.61      | 3.46       | 20.35          | 27.45         | QP     | 100   | 154   | HORIZONTAL |

## Vertical



|   | Freq   | Level  | Limit  | Over  | Read  | Cable | Antenna | Preamp |        | A/Pos | T/Pos | Pol/Phase |
|---|--------|--------|--------|-------|-------|-------|---------|--------|--------|-------|-------|-----------|
|   | MHz    | dBuV/m | dBuV/m | dB    | dBuV  | dB    | dB/m    | dB     | Remark | cm    | deg   |           |
| 1 | 37.76  | 32.87  | 40.00  | -7.13 | 45.69 | 0.68  | 14.30   | 27.80  | QP     | 100   | 173   | VERTICAL  |
| 2 | 52.31  | 33.33  | 40.00  | -6.67 | 52.08 | 0.86  | 8.18    | 27.79  | QP     | 100   | 136   | VERTICAL  |
| 3 | 63.95  | 34.89  | 40.00  | -5.11 | 54.98 | 0.93  | 6.72    | 27.74  | QP     | 100   | 196   | VERTICAL  |
| 4 | 78.50  | 35.74  | 40.00  | -4.26 | 55.40 | 0.96  | 7.07    | 27.69  | QP     | 100   | 179   | VERTICAL  |
| 5 | 600.36 | 45.40  | 46.00  | -0.60 | 51.92 | 2.81  | 18.77   | 28.10  | QP     | 100   | 170   | VERTICAL  |
| 6 | 625.58 | 40.44  | 46.00  | -5.56 | 46.76 | 2.90  | 18.85   | 28.07  | Peak   | 400   | 0     | VERTICAL  |

## Note:

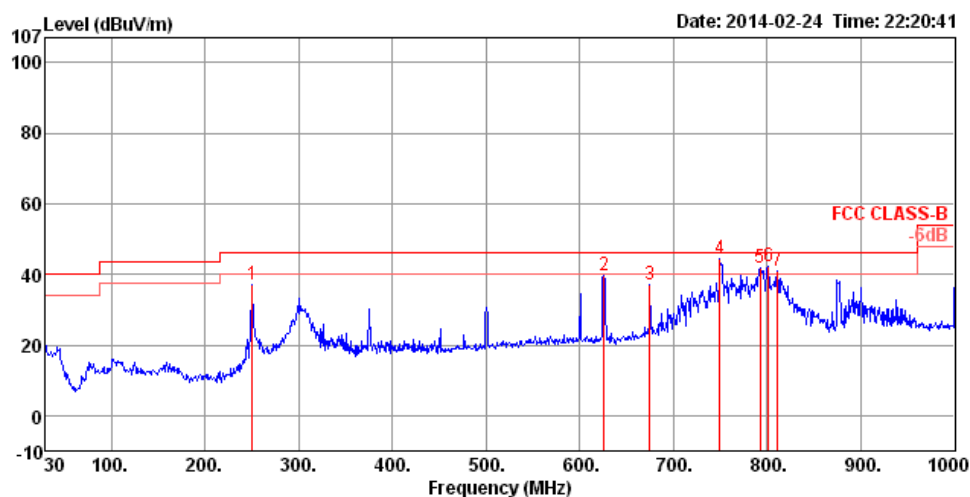
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

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

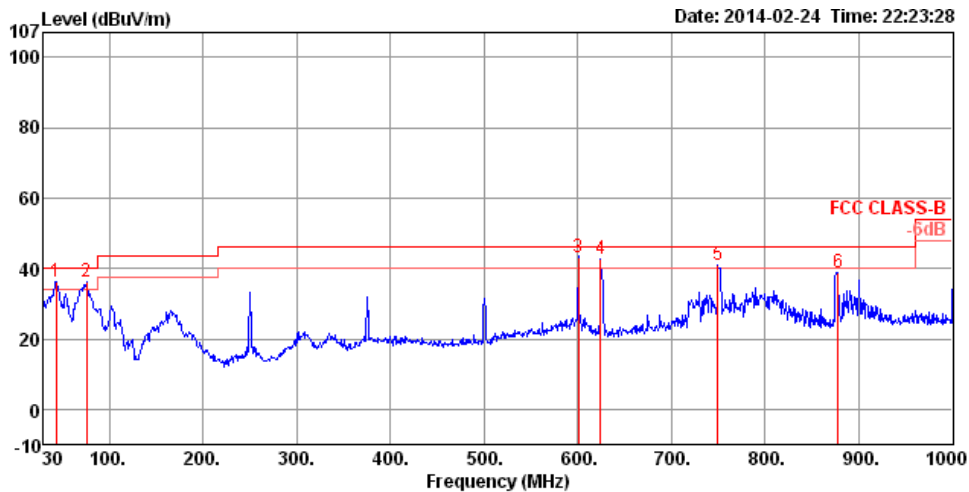
|               |           |                |             |
|---------------|-----------|----------------|-------------|
| Temperature   | 24°C      | Humidity       | 53%         |
| Test Engineer | Nick Peng | Configurations | Normal Link |
| Test Mode     | Mode 3    |                |             |

### Horizontal



|   | Freq   | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | A/Pos | T/Pos | Pol/Phase | Remark          |
|---|--------|--------|--------|-------|-------|--------------|--------|-------|-------|-----------|-----------------|
|   | MHz    | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | dB    | cm    | deg       |                 |
| 1 | 250.19 | 36.91  | 46.00  | -9.09 | 54.59 | 1.90         | 11.91  | 31.49 | 125   | 248       | HORIZONTAL Peak |
| 2 | 625.58 | 39.57  | 46.00  | -6.43 | 49.17 | 3.19         | 18.62  | 31.41 | 150   | 266       | HORIZONTAL Peak |
| 3 | 675.05 | 36.92  | 46.00  | -9.08 | 46.17 | 3.33         | 18.78  | 31.36 | 125   | 209       | HORIZONTAL Peak |
| 4 | 749.74 | 44.54  | 46.00  | -1.46 | 52.69 | 3.53         | 19.69  | 31.37 | 132   | 359       | HORIZONTAL QP   |
| 5 | 792.42 | 41.64  | 46.00  | -4.36 | 49.55 | 3.65         | 19.74  | 31.30 | 125   | 360       | HORIZONTAL Peak |
| 6 | 801.15 | 42.06  | 46.00  | -3.94 | 49.86 | 3.67         | 19.80  | 31.27 | 150   | 357       | HORIZONTAL Peak |
| 7 | 810.85 | 41.07  | 46.00  | -4.93 | 48.44 | 3.69         | 20.17  | 31.23 | 125   | 6         | HORIZONTAL Peak |

### Vertical



|   | Freq   | Level  | Limit  | Over  | Read  | CableAntenna | Preamp | A/Pos | T/Pos | Pol/Phase | Remark        |
|---|--------|--------|--------|-------|-------|--------------|--------|-------|-------|-----------|---------------|
|   | MHz    | dBuV/m | dBuV/m | dB    | dBuV  | dB           | dB/m   | dB    | cm    | deg       |               |
| 1 | 43.58  | 36.28  | 40.00  | -3.72 | 57.09 | 0.78         | 10.25  | 31.84 | 100   | 239       | VERTICAL Peak |
| 2 | 75.59  | 36.34  | 40.00  | -3.66 | 60.89 | 1.02         | 6.11   | 31.68 | 125   | 246       | VERTICAL Peak |
| 3 | 600.36 | 42.93  | 46.00  | -3.07 | 52.60 | 3.12         | 18.45  | 31.24 | 100   | 352       | VERTICAL QP   |
| 4 | 624.61 | 42.51  | 46.00  | -3.49 | 52.12 | 3.18         | 18.61  | 31.40 | 100   | 84        | VERTICAL Peak |
| 5 | 749.74 | 40.98  | 46.00  | -5.02 | 49.13 | 3.53         | 19.69  | 31.37 | 100   | 288       | VERTICAL Peak |
| 6 | 877.78 | 38.84  | 46.00  | -7.16 | 45.81 | 3.91         | 20.26  | 31.14 | 150   | 32        | VERTICAL Peak |

### 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.

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

|               |               |                |                                                               |
|---------------|---------------|----------------|---------------------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                           |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11n MCS0 HT20 CH 36 /<br>Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                               |

##### Horizontal

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Preamp |       |         | T/Pos | A/Pos | Pol/Phase  |
|---|----------|--------|--------|--------|-------|-------|--------|-------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB     | dB/m  | Remark  | deg   | cm    |            |
| 1 | 4960.02  | 57.50  | 74.00  | -16.50 | 55.08 | 4.23  | 34.64  | 2.42  | Peak    | 231   | 100   | HORIZONTAL |
| 2 | 4960.03  | 51.76  | 54.00  | -2.24  | 49.34 | 4.23  | 34.64  | 2.42  | Average | 231   | 100   | HORIZONTAL |
| 3 | 5439.62  | 62.38  | 74.00  | -11.62 | 58.88 | 4.53  | 34.62  | 3.50  | Peak    | 211   | 163   | HORIZONTAL |
| 4 | 5439.95  | 53.55  | 54.00  | -0.45  | 50.05 | 4.53  | 34.62  | 3.50  | Average | 231   | 163   | HORIZONTAL |
| 5 | 15540.88 | 41.94  | 54.00  | -12.06 | 30.39 | 7.85  | 34.79  | 11.55 | Average | 231   | 100   | HORIZONTAL |
| 6 | 15540.92 | 55.09  | 74.00  | -18.91 | 43.54 | 7.85  | 34.79  | 11.55 | Peak    | 231   | 100   | HORIZONTAL |

##### Vertical

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Preamp |       |         | T/Pos | A/Pos | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|--------|-------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB     | dB/m  | Remark  | deg   | cm    |           |
| 1 | 4959.95  | 52.35  | 74.00  | -21.65 | 49.93 | 4.23  | 34.64  | 2.42  | Peak    | 216   | 100   | VERTICAL  |
| 2 | 4960.00  | 45.68  | 54.00  | -8.32  | 43.26 | 4.23  | 34.64  | 2.42  | Average | 216   | 100   | VERTICAL  |
| 3 | 5440.07  | 57.76  | 74.00  | -16.24 | 54.26 | 4.53  | 34.62  | 3.50  | Peak    | 213   | 100   | VERTICAL  |
| 4 | 5440.08  | 49.02  | 54.00  | -4.98  | 45.52 | 4.53  | 34.62  | 3.50  | Average | 213   | 100   | VERTICAL  |
| 5 | 15540.64 | 55.41  | 74.00  | -18.59 | 43.86 | 7.85  | 34.79  | 11.55 | Peak    | 94    | 100   | VERTICAL  |
| 6 | 15540.86 | 41.93  | 54.00  | -12.07 | 30.38 | 7.85  | 34.79  | 11.55 | Average | 94    | 100   | VERTICAL  |

|               |               |                |                                                               |
|---------------|---------------|----------------|---------------------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                           |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11n MCS0 HT20 CH 40 /<br>Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                               |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Preamplifier Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|---------------------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB                  | dB/m   |         | deg   | cm    |            |
| 1 | 4960.02  | 50.70  | 54.00      | -3.30      | 48.28      | 4.23       | 34.64               | 2.42   | Average | 231   | 103   | HORIZONTAL |
| 2 | 4960.08  | 56.59  | 74.00      | -17.41     | 54.17      | 4.23       | 34.64               | 2.42   | Peak    | 231   | 103   | HORIZONTAL |
| 3 | 5439.97  | 60.18  | 74.00      | -13.82     | 56.68      | 4.53       | 34.62               | 3.50   | Peak    | 214   | 114   | HORIZONTAL |
| 4 | 5440.00  | 53.31  | 54.00      | -0.69      | 49.81      | 4.53       | 34.62               | 3.50   | Average | 214   | 114   | HORIZONTAL |
| 5 | 15599.08 | 42.22  | 54.00      | -11.78     | 30.72      | 7.88       | 34.86               | 11.50  | Average | 98    | 100   | HORIZONTAL |
| 6 | 15599.47 | 55.33  | 74.00      | -18.67     | 43.83      | 7.88       | 34.86               | 11.50  | Peak    | 98    | 100   | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Preamplifier Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|---------------------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB                  | dB/m   |         | deg   | cm    |           |
| 1 | 4959.98  | 50.95  | 74.00      | -23.05     | 48.53      | 4.23       | 34.64               | 2.42   | Peak    | 216   | 100   | VERTICAL  |
| 2 | 4959.98  | 43.81  | 54.00      | -10.19     | 41.39      | 4.23       | 34.64               | 2.42   | Average | 216   | 100   | VERTICAL  |
| 3 | 5440.03  | 48.59  | 54.00      | -5.41      | 45.09      | 4.53       | 34.62               | 3.50   | Average | 213   | 100   | VERTICAL  |
| 4 | 5440.05  | 57.42  | 74.00      | -16.58     | 53.92      | 4.53       | 34.62               | 3.50   | Peak    | 213   | 100   | VERTICAL  |
| 5 | 15599.02 | 41.98  | 54.00      | -12.02     | 30.48      | 7.88       | 34.86               | 11.50  | Average | 110   | 100   | VERTICAL  |
| 6 | 15599.46 | 54.94  | 74.00      | -19.06     | 43.44      | 7.88       | 34.86               | 11.50  | Peak    | 110   | 100   | VERTICAL  |

|               |               |                |                                                               |
|---------------|---------------|----------------|---------------------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                           |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11n MCS0 HT20 CH 48 /<br>Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                               |

### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Preamplifier Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|---------------------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB                  | dB/m   |         | deg   | cm    |            |
| 1 | 4959.98  | 51.13  | 54.00      | -2.87      | 48.71      | 4.23       | 34.64               | 2.42   | Average | 232   | 102   | HORIZONTAL |
| 2 | 4959.99  | 55.95  | 74.00      | -18.05     | 53.53      | 4.23       | 34.64               | 2.42   | Peak    | 232   | 102   | HORIZONTAL |
| 3 | 5440.02  | 61.49  | 74.00      | -12.51     | 57.99      | 4.53       | 34.62               | 3.50   | Peak    | 214   | 162   | HORIZONTAL |
| 4 | 5440.02  | 52.87  | 54.00      | -1.13      | 49.37      | 4.53       | 34.62               | 3.50   | Average | 214   | 162   | HORIZONTAL |
| 5 | 15719.51 | 41.79  | 54.00      | -12.21     | 30.35      | 7.92       | 34.94               | 11.44  | Average | 89    | 100   | HORIZONTAL |
| 6 | 15719.74 | 55.07  | 74.00      | -18.93     | 43.63      | 7.92       | 34.94               | 11.44  | Peak    | 89    | 100   | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Preamplifier Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|---------------------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB                  | dB/m   |         | deg   | cm    |           |
| 1 | 4960.00  | 43.39  | 54.00      | -10.61     | 40.97      | 4.23       | 34.64               | 2.42   | Average | 217   | 100   | VERTICAL  |
| 2 | 4960.03  | 50.47  | 74.00      | -23.53     | 48.05      | 4.23       | 34.64               | 2.42   | Peak    | 217   | 100   | VERTICAL  |
| 3 | 5439.93  | 57.53  | 74.00      | -16.47     | 54.03      | 4.53       | 34.62               | 3.50   | Peak    | 214   | 100   | VERTICAL  |
| 4 | 5440.07  | 48.66  | 54.00      | -5.34      | 45.16      | 4.53       | 34.62               | 3.50   | Average | 214   | 100   | VERTICAL  |
| 5 | 15719.86 | 41.58  | 54.00      | -12.42     | 30.14      | 7.92       | 34.94               | 11.44  | Average | 113   | 100   | VERTICAL  |
| 6 | 15720.76 | 55.28  | 74.00      | -18.72     | 43.84      | 7.92       | 34.94               | 11.44  | Peak    | 113   | 100   | VERTICAL  |

|               |               |                |                                                               |
|---------------|---------------|----------------|---------------------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                           |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11n MCS0 HT40 CH 38 /<br>Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                               |

### Horizontal

|   | Freq     | Level  | Limit<br>Line | Over<br>Limit | Read<br>Level | Cable<br>Loss | Preamp<br>Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase  |
|---|----------|--------|---------------|---------------|---------------|---------------|------------------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m        | dB            | dBuV          | dB            | dB               | dB/m   |         | deg   | cm    |            |
| 1 | 4959.91  | 57.24  | 74.00         | -16.76        | 54.82         | 4.23          | 34.64            | 2.42   | Peak    | 232   | 103   | HORIZONTAL |
| 2 | 4960.01  | 52.36  | 54.00         | -1.64         | 49.94         | 4.23          | 34.64            | 2.42   | Average | 232   | 103   | HORIZONTAL |
| 3 | 5439.98  | 53.49  | 54.00         | -0.51         | 49.99         | 4.53          | 34.62            | 3.50   | Average | 225   | 113   | HORIZONTAL |
| 4 | 5440.00  | 62.45  | 74.00         | -11.55        | 58.95         | 4.53          | 34.62            | 3.50   | Peak    | 225   | 113   | HORIZONTAL |
| 5 | 15570.21 | 42.23  | 54.00         | -11.77        | 30.69         | 7.86          | 34.81            | 11.54  | Average | 137   | 100   | HORIZONTAL |
| 6 | 15570.66 | 54.65  | 74.00         | -19.35        | 43.11         | 7.86          | 34.81            | 11.54  | Peak    | 137   | 100   | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit<br>Line | Over<br>Limit | Read<br>Level | Cable<br>Loss | Preamp<br>Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase |
|---|----------|--------|---------------|---------------|---------------|---------------|------------------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m        | dB            | dBuV          | dB            | dB               | dB/m   |         | deg   | cm    |           |
| 1 | 4959.91  | 52.97  | 74.00         | -21.03        | 50.55         | 4.23          | 34.64            | 2.42   | Peak    | 215   | 100   | VERTICAL  |
| 2 | 4960.02  | 46.64  | 54.00         | -7.36         | 44.22         | 4.23          | 34.64            | 2.42   | Average | 215   | 100   | VERTICAL  |
| 3 | 5440.02  | 57.95  | 74.00         | -16.05        | 54.45         | 4.53          | 34.62            | 3.50   | Peak    | 217   | 100   | VERTICAL  |
| 4 | 5440.05  | 50.33  | 54.00         | -3.67         | 46.83         | 4.53          | 34.62            | 3.50   | Average | 217   | 100   | VERTICAL  |
| 5 | 15570.33 | 54.62  | 74.00         | -19.38        | 43.08         | 7.86          | 34.81            | 11.54  | Peak    | 101   | 100   | VERTICAL  |
| 6 | 15570.96 | 42.10  | 54.00         | -11.90        | 30.56         | 7.86          | 34.81            | 11.54  | Average | 101   | 100   | VERTICAL  |

|               |               |                |                                                               |
|---------------|---------------|----------------|---------------------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                           |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11n MCS0 HT40 CH 46 /<br>Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                               |

#### Horizontal

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Preamp | Factor | Remark  | T/Pos | A/Pos | Pol/Phase  |
|---|----------|--------|--------|--------|-------|-------|--------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB     | dB/m   |         | deg   | cm    |            |
| 1 | 4959.99  | 51.61  | 54.00  | -2.39  | 49.19 | 4.23  | 34.64  | 2.42   | Average | 231   | 103   | HORIZONTAL |
| 2 | 4960.00  | 58.21  | 74.00  | -15.79 | 55.79 | 4.23  | 34.64  | 2.42   | Peak    | 231   | 103   | HORIZONTAL |
| 3 | 5440.01  | 61.18  | 74.00  | -12.82 | 57.68 | 4.53  | 34.62  | 3.50   | Peak    | 219   | 168   | HORIZONTAL |
| 4 | 5440.06  | 52.03  | 54.00  | -1.97  | 48.53 | 4.53  | 34.62  | 3.50   | Average | 219   | 168   | HORIZONTAL |
| 5 | 15689.96 | 54.94  | 74.00  | -19.06 | 43.50 | 7.90  | 34.92  | 11.44  | Peak    | 124   | 100   | HORIZONTAL |
| 6 | 15690.39 | 41.86  | 54.00  | -12.14 | 30.42 | 7.90  | 34.92  | 11.44  | Average | 124   | 100   | HORIZONTAL |

#### Vertical

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Preamp | Factor | Remark  | T/Pos | A/Pos | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|--------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB     | dB/m   |         | deg   | cm    |           |
| 1 | 4959.81  | 52.70  | 74.00  | -21.30 | 50.28 | 4.23  | 34.64  | 2.42   | Peak    | 215   | 100   | VERTICAL  |
| 2 | 4959.98  | 45.91  | 54.00  | -8.09  | 43.49 | 4.23  | 34.64  | 2.42   | Average | 215   | 100   | VERTICAL  |
| 3 | 5439.98  | 47.66  | 54.00  | -6.34  | 44.16 | 4.53  | 34.62  | 3.50   | Average | 213   | 100   | VERTICAL  |
| 4 | 5440.06  | 57.54  | 74.00  | -16.46 | 54.04 | 4.53  | 34.62  | 3.50   | Peak    | 213   | 100   | VERTICAL  |
| 5 | 15690.02 | 42.35  | 54.00  | -11.65 | 30.91 | 7.90  | 34.92  | 11.44  | Average | 138   | 100   | VERTICAL  |
| 6 | 15690.54 | 54.94  | 74.00  | -19.06 | 43.50 | 7.90  | 34.92  | 11.44  | Peak    | 138   | 100   | VERTICAL  |

|               |               |                |                                                     |
|---------------|---------------|----------------|-----------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                 |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11a CH 36 /<br>Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                     |

#### Horizontal

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Preamp |       |         | T/Pos | A/Pos | Pol/Phase  |
|---|----------|--------|--------|--------|-------|-------|--------|-------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB     | dB/m  | Remark  | deg   | cm    |            |
| 1 | 4959.95  | 57.79  | 74.00  | -16.21 | 55.37 | 4.23  | 34.64  | 2.42  | Peak    | 232   | 100   | HORIZONTAL |
| 2 | 4960.00  | 52.16  | 54.00  | -1.84  | 49.74 | 4.23  | 34.64  | 2.42  | Average | 232   | 100   | HORIZONTAL |
| 3 | 5439.99  | 53.46  | 54.00  | -0.54  | 49.96 | 4.53  | 34.62  | 3.50  | Average | 218   | 169   | HORIZONTAL |
| 4 | 5440.01  | 61.40  | 74.00  | -12.60 | 57.90 | 4.53  | 34.62  | 3.50  | Peak    | 218   | 169   | HORIZONTAL |
| 5 | 15536.00 | 57.75  | 74.00  | -16.25 | 46.20 | 7.85  | 34.79  | 11.55 | Peak    | 173   | 100   | HORIZONTAL |
| 6 | 15543.64 | 43.44  | 54.00  | -10.56 | 31.88 | 7.86  | 34.79  | 11.56 | Average | 173   | 100   | HORIZONTAL |

#### Vertical

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Preamp |       |         | T/Pos | A/Pos | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|--------|-------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB     | dB/m  | Remark  | deg   | cm    |           |
| 1 | 4959.81  | 51.93  | 74.00  | -22.07 | 49.51 | 4.23  | 34.64  | 2.42  | Peak    | 215   | 100   | VERTICAL  |
| 2 | 4959.98  | 45.50  | 54.00  | -8.50  | 43.08 | 4.23  | 34.64  | 2.42  | Average | 215   | 100   | VERTICAL  |
| 3 | 5439.97  | 47.29  | 54.00  | -6.71  | 43.79 | 4.53  | 34.62  | 3.50  | Average | 217   | 100   | VERTICAL  |
| 4 | 5440.05  | 57.16  | 74.00  | -16.84 | 53.66 | 4.53  | 34.62  | 3.50  | Peak    | 217   | 100   | VERTICAL  |
| 5 | 15537.88 | 53.89  | 74.00  | -20.11 | 42.34 | 7.85  | 34.79  | 11.55 | Peak    | 170   | 100   | VERTICAL  |
| 6 | 15543.48 | 42.08  | 54.00  | -11.92 | 30.53 | 7.85  | 34.79  | 11.55 | Average | 170   | 100   | VERTICAL  |

|               |               |                |                                                     |
|---------------|---------------|----------------|-----------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                 |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11a CH 40 /<br>Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                     |

### Horizontal

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Preamp |       |         | T/Pos | A/Pos | Pol/Phase  |
|---|----------|--------|--------|--------|-------|-------|--------|-------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB     | dB/m  | Remark  | deg   | cm    |            |
| 1 | 4960.01  | 51.70  | 54.00  | -2.30  | 49.28 | 4.23  | 34.64  | 2.42  | Average | 232   | 102   | HORIZONTAL |
| 2 | 4960.13  | 59.66  | 74.00  | -14.34 | 57.24 | 4.23  | 34.64  | 2.42  | Peak    | 232   | 103   | HORIZONTAL |
| 3 | 5439.96  | 61.70  | 74.00  | -12.30 | 58.20 | 4.53  | 34.62  | 3.50  | Peak    | 226   | 112   | HORIZONTAL |
| 4 | 5440.02  | 53.66  | 54.00  | -0.34  | 50.16 | 4.53  | 34.62  | 3.50  | Average | 226   | 112   | HORIZONTAL |
| 5 | 15540.10 | 41.94  | 54.00  | -12.06 | 30.39 | 7.85  | 34.79  | 11.55 | Average | 137   | 100   | HORIZONTAL |
| 6 | 15540.38 | 54.87  | 74.00  | -19.13 | 43.32 | 7.85  | 34.79  | 11.55 | Peak    | 137   | 100   | HORIZONTAL |

### Vertical

|   | Freq     | Level  | Limit  | Over   | Read  | Cable | Preamp |       |         | T/Pos | A/Pos | Pol/Phase |
|---|----------|--------|--------|--------|-------|-------|--------|-------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB     | dB/m  | Remark  | deg   | cm    |           |
| 1 | 4960.02  | 44.87  | 54.00  | -9.13  | 42.45 | 4.23  | 34.64  | 2.42  | Average | 215   | 100   | VERTICAL  |
| 2 | 4960.05  | 51.58  | 74.00  | -22.42 | 49.16 | 4.23  | 34.64  | 2.42  | Peak    | 215   | 100   | VERTICAL  |
| 3 | 5440.01  | 56.06  | 74.00  | -17.94 | 52.56 | 4.53  | 34.62  | 3.50  | Peak    | 216   | 100   | VERTICAL  |
| 4 | 5440.02  | 46.94  | 54.00  | -7.06  | 43.44 | 4.53  | 34.62  | 3.50  | Average | 216   | 100   | VERTICAL  |
| 5 | 15539.93 | 54.35  | 74.00  | -19.65 | 42.80 | 7.85  | 34.79  | 11.55 | Peak    | 114   | 100   | VERTICAL  |
| 6 | 15540.76 | 41.57  | 54.00  | -12.43 | 30.02 | 7.85  | 34.79  | 11.55 | Average | 114   | 100   | VERTICAL  |

|               |               |                |                                                     |
|---------------|---------------|----------------|-----------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                 |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11a CH 48 /<br>Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                     |

#### Horizontal

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Preamp Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase  |
|---|----------|--------|------------|------------|------------|------------|---------------|--------|---------|-------|-------|------------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB            | dB/m   |         | deg   | cm    |            |
| 1 | 4959.95  | 57.35  | 74.00      | -16.65     | 54.93      | 4.23       | 34.64         | 2.42   | Peak    | 231   | 104   | HORIZONTAL |
| 2 | 4960.01  | 51.55  | 54.00      | -2.45      | 49.13      | 4.23       | 34.64         | 2.42   | Average | 231   | 104   | HORIZONTAL |
| 3 | 5439.88  | 62.27  | 74.00      | -11.73     | 58.77      | 4.53       | 34.62         | 3.50   | Peak    | 216   | 160   | HORIZONTAL |
| 4 | 5440.00  | 52.90  | 54.00      | -1.10      | 49.40      | 4.53       | 34.62         | 3.50   | Average | 216   | 160   | HORIZONTAL |
| 5 | 15720.19 | 38.12  | 54.00      | -15.88     | 26.68      | 7.92       | 34.94         | 11.44  | Average | 271   | 103   | HORIZONTAL |
| 6 | 15720.25 | 51.21  | 74.00      | -22.79     | 39.77      | 7.92       | 34.94         | 11.44  | Peak    | 271   | 103   | HORIZONTAL |

#### Vertical

|   | Freq     | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Preamp Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase |
|---|----------|--------|------------|------------|------------|------------|---------------|--------|---------|-------|-------|-----------|
|   | MHz      | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB            | dB/m   |         | deg   | cm    |           |
| 1 | 4959.97  | 52.11  | 74.00      | -21.89     | 49.69      | 4.23       | 34.64         | 2.42   | Peak    | 216   | 100   | VERTICAL  |
| 2 | 4960.00  | 44.99  | 54.00      | -9.01      | 42.57      | 4.23       | 34.64         | 2.42   | Average | 216   | 100   | VERTICAL  |
| 3 | 5440.00  | 57.43  | 74.00      | -16.57     | 53.93      | 4.53       | 34.62         | 3.50   | Peak    | 213   | 100   | VERTICAL  |
| 4 | 5440.03  | 48.63  | 54.00      | -5.37      | 45.13      | 4.53       | 34.62         | 3.50   | Average | 213   | 100   | VERTICAL  |
| 5 | 15719.83 | 41.69  | 54.00      | -12.31     | 30.25      | 7.92       | 34.94         | 11.44  | Average | 298   | 100   | VERTICAL  |
| 6 | 15720.28 | 54.79  | 74.00      | -19.21     | 43.35      | 7.92       | 34.94         | 11.44  | Peak    | 298   | 100   | 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.

### 4.3. Band Edge Emissions Measurement

#### 4.3.1. 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 a -27dBm peak limit or average 54dBuV/m and peak 74dBuV/m limits. 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<br>(MHz) | Field Strength<br>(micorvolts/meter) | Measurement Distance<br>(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                                |

#### 4.3.2. 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 / 10Hz for Average |
| RBW / VBW (Emission in non-restricted band) | 1MHz / 3MHz for Peak                          |

#### 4.3.3. Test Procedures

The test procedure is the same as section 4.2.3, only the frequency range investigated is limited to 100MHz around bandedges.

#### 4.3.4. Test Setup Layout

This test setup layout is the same as that shown in section 4.2.4.

#### 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 Band Edge and Fundamental Emissions

|               |               |                |                                                                       |
|---------------|---------------|----------------|-----------------------------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                                   |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11n MCS0 HT20 CH 36, 40, 48<br>/ Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                                       |

##### Channel 36

|   | Freq    | Level  | Limit | Over   | Read  | Cable | Preamp |        |         | T/Pos | A/Pos |            |
|---|---------|--------|-------|--------|-------|-------|--------|--------|---------|-------|-------|------------|
|   | MHz     | dBuV/m | Line  | Limit  | Level | Loss  | Factor | Factor | Remark  | deg   | cm    | Pol/Phase  |
| 1 | 5149.40 | 57.03  | 74.00 | -16.97 | 19.55 | 4.34  | 0.00   | 37.48  | Peak    | 219   | 100   | HORIZONTAL |
| 2 | 5150.00 | 43.92  | 54.00 | -10.08 | 6.44  | 4.34  | 0.00   | 37.48  | Average | 219   | 100   | HORIZONTAL |
| 3 | 5178.40 | 112.08 |       |        | 74.53 | 4.36  | 0.00   | 37.55  | Peak    | 219   | 100   | HORIZONTAL |
| 4 | 5179.00 | 100.63 |       |        | 63.08 | 4.36  | 0.00   | 37.55  | Average | 219   | 100   | HORIZONTAL |

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

##### Channel 40

|   | Freq    | Level  | Limit | Over   | Read  | Cable | Preamp |        |         | T/Pos | A/Pos |            |
|---|---------|--------|-------|--------|-------|-------|--------|--------|---------|-------|-------|------------|
|   | MHz     | dBuV/m | Line  | Limit  | Level | Loss  | Factor | Factor | Remark  | deg   | cm    | Pol/Phase  |
| 1 | 5148.00 | 56.08  | 74.00 | -17.92 | 18.60 | 4.34  | 0.00   | 37.48  | Peak    | 110   | 100   | HORIZONTAL |
| 2 | 5148.80 | 43.61  | 54.00 | -10.39 | 6.13  | 4.34  | 0.00   | 37.48  | Average | 110   | 100   | HORIZONTAL |
| 3 | 5194.40 | 100.91 |       |        | 63.32 | 4.37  | 0.00   | 37.59  | Average | 110   | 100   | HORIZONTAL |
| 4 | 5195.20 | 112.39 |       |        | 74.80 | 4.37  | 0.00   | 37.59  | Peak    | 110   | 100   | HORIZONTAL |

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

##### Channel 48

|   | Freq    | Level  | Limit | Over   | Read  | Cable | Preamp |        |         | T/Pos | A/Pos |            |
|---|---------|--------|-------|--------|-------|-------|--------|--------|---------|-------|-------|------------|
|   | MHz     | dBuV/m | Line  | Limit  | Level | Loss  | Factor | Factor | Remark  | deg   | cm    | Pol/Phase  |
| 1 | 5147.60 | 55.96  | 74.00 | -18.04 | 18.48 | 4.34  | 0.00   | 37.48  | Peak    | 113   | 100   | HORIZONTAL |
| 2 | 5150.00 | 43.56  | 54.00 | -10.44 | 6.08  | 4.34  | 0.00   | 37.48  | Average | 113   | 100   | HORIZONTAL |
| 3 | 5234.60 | 112.13 |       |        | 74.47 | 4.39  | 0.00   | 37.66  | Peak    | 113   | 100   | HORIZONTAL |
| 4 | 5234.60 | 100.87 |       |        | 63.21 | 4.39  | 0.00   | 37.66  | Average | 113   | 100   | HORIZONTAL |
| 5 | 5354.20 | 57.51  | 74.00 | -16.49 | 19.58 | 4.47  | 0.00   | 37.93  | Peak    | 113   | 100   | HORIZONTAL |
| 6 | 5360.80 | 46.83  | 54.00 | -7.17  | 8.86  | 4.48  | 0.00   | 37.97  | Average | 113   | 100   | HORIZONTAL |

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

|               |               |                |                                                                   |
|---------------|---------------|----------------|-------------------------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                               |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11n MCS0 HT40 CH 38, 46 /<br>Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                                   |

#### Channel 38

|   | Freq    | Level  | Limit  | Over   | Read  | Cable | Preamp |       |         | T/Pos | A/Pos | Pol/Phase  |
|---|---------|--------|--------|--------|-------|-------|--------|-------|---------|-------|-------|------------|
|   | MHz     | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB     | dB/m  | Remark  | deg   | cm    |            |
| 1 | 5120.00 | 55.82  | 74.00  | -18.18 | 18.41 | 4.32  | 0.00   | 37.41 | Peak    | 242   | 174   | HORIZONTAL |
| 2 | 5120.00 | 47.20  | 54.00  | -6.80  | 9.79  | 4.32  | 0.00   | 37.41 | Average | 242   | 174   | HORIZONTAL |
| 3 | 5143.20 | 59.04  | 74.00  | -14.96 | 21.56 | 4.34  | 0.00   | 37.48 | Peak    | 242   | 174   | HORIZONTAL |
| 4 | 5143.60 | 44.17  | 54.00  | -9.83  | 6.69  | 4.34  | 0.00   | 37.48 | Average | 242   | 174   | HORIZONTAL |
| 5 | 5200.00 | 98.47  |        |        | 60.88 | 4.37  | 0.00   | 37.59 | Average | 242   | 174   | HORIZONTAL |
| 6 | 5200.80 | 108.15 |        |        | 70.56 | 4.37  | 0.00   | 37.59 | Peak    | 242   | 174   | HORIZONTAL |

Item 5, 6 are the fundamental frequency at 5190 MHz.

#### Channel 46

|   | Freq    | Level  | Limit  | Over   | Read  | Cable | Preamp |       |         | T/Pos | A/Pos | Pol/Phase  |
|---|---------|--------|--------|--------|-------|-------|--------|-------|---------|-------|-------|------------|
|   | MHz     | dBuV/m | dBuV/m | dB     | dBuV  | dB    | dB     | dB/m  | Remark  | deg   | cm    |            |
| 1 | 5146.40 | 56.13  | 74.00  | -17.87 | 18.65 | 4.34  | 0.00   | 37.48 | Peak    | 218   | 100   | HORIZONTAL |
| 2 | 5149.60 | 43.86  | 54.00  | -10.14 | 6.38  | 4.34  | 0.00   | 37.48 | Average | 218   | 100   | HORIZONTAL |
| 3 | 5218.80 | 97.72  |        |        | 60.09 | 4.38  | 0.00   | 37.63 | Average | 218   | 100   | HORIZONTAL |
| 4 | 5224.40 | 109.78 |        |        | 72.15 | 4.38  | 0.00   | 37.63 | Peak    | 218   | 100   | HORIZONTAL |

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

|               |               |                |                                                             |
|---------------|---------------|----------------|-------------------------------------------------------------|
| Temperature   | 24°C          | Humidity       | 53%                                                         |
| Test Engineer | Nick Peng     | Configurations | IEEE 802.11a CH 36, 40, 48 /<br>Chain 4 + Chain 5 + Chain 6 |
| Test Date     | Feb. 10, 2014 |                |                                                             |

#### Channel 36

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Preamp Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase  |
|---|---------|--------|------------|------------|------------|------------|---------------|--------|---------|-------|-------|------------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB            | dB/m   |         | deg   | cm    |            |
| 1 | 5148.00 | 55.99  | 74.00      | -18.01     | 18.51      | 4.34       | 0.00          | 37.48  | Peak    | 218   | 100   | HORIZONTAL |
| 2 | 5150.00 | 43.87  | 54.00      | -10.13     | 6.39       | 4.34       | 0.00          | 37.48  | Average | 218   | 100   | HORIZONTAL |
| 3 | 5182.60 | 102.79 |            |            | 65.24      | 4.36       | 0.00          | 37.55  | Average | 218   | 100   | HORIZONTAL |
| 4 | 5182.80 | 114.95 |            |            | 77.40      | 4.36       | 0.00          | 37.55  | Peak    | 218   | 100   | HORIZONTAL |

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

#### Channel 40

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Preamp Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase  |
|---|---------|--------|------------|------------|------------|------------|---------------|--------|---------|-------|-------|------------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB            | dB/m   |         | deg   | cm    |            |
| 1 | 5119.60 | 46.46  | 54.00      | -7.54      | 9.05       | 4.32       | 0.00          | 37.41  | Average | 218   | 100   | HORIZONTAL |
| 2 | 5120.00 | 55.95  | 74.00      | -18.05     | 18.54      | 4.32       | 0.00          | 37.41  | Peak    | 218   | 100   | HORIZONTAL |
| 3 | 5148.80 | 56.53  | 74.00      | -17.47     | 19.05      | 4.34       | 0.00          | 37.48  | Peak    | 218   | 100   | HORIZONTAL |
| 4 | 5150.00 | 43.55  | 54.00      | -10.45     | 6.07       | 4.34       | 0.00          | 37.48  | Average | 218   | 100   | HORIZONTAL |
| 5 | 5202.00 | 101.23 |            |            | 63.64      | 4.37       | 0.00          | 37.59  | Average | 218   | 100   | HORIZONTAL |
| 6 | 5202.80 | 112.27 |            |            | 74.68      | 4.37       | 0.00          | 37.59  | Peak    | 218   | 100   | HORIZONTAL |

Item 5, 6 are the fundamental frequency at 5200 MHz.

#### Channel 48

|   | Freq    | Level  | Limit Line | Over Limit | Read Level | Cable Loss | Preamp Factor | Factor | Remark  | T/Pos | A/Pos | Pol/Phase  |
|---|---------|--------|------------|------------|------------|------------|---------------|--------|---------|-------|-------|------------|
|   | MHz     | dBuV/m | dBuV/m     | dB         | dBuV       | dB         | dB            | dB/m   |         | deg   | cm    |            |
| 1 | 5148.20 | 56.89  | 74.00      | -17.11     | 19.41      | 4.34       | 0.00          | 37.48  | Peak    | 142   | 100   | HORIZONTAL |
| 2 | 5150.00 | 43.71  | 54.00      | -10.29     | 6.23       | 4.34       | 0.00          | 37.48  | Average | 142   | 100   | HORIZONTAL |
| 3 | 5232.80 | 112.15 |            |            | 74.49      | 4.39       | 0.00          | 37.66  | Peak    | 142   | 100   | HORIZONTAL |
| 4 | 5242.40 | 101.01 |            |            | 63.31      | 4.40       | 0.00          | 37.70  | Average | 142   | 100   | HORIZONTAL |
| 5 | 5353.00 | 58.27  | 74.00      | -15.73     | 20.34      | 4.47       | 0.00          | 37.93  | Peak    | 142   | 100   | HORIZONTAL |
| 6 | 5360.20 | 46.44  | 54.00      | -7.56      | 8.51       | 4.47       | 0.00          | 37.93  | Average | 142   | 100   | HORIZONTAL |

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

Note:

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

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

#### **4.4. Antenna Requirements**

##### **4.4.1. 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.

##### **4.4.2. 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                |
|----------------------------|--------------|---------------|-------------|------------------|------------------|-----------------------|
| BILOG ANTENNA              | Schaffner    | CBL6112D      | 22021       | 20MHz ~ 2GHz     | Apr. 16, 2013    | Radiation (03CH01-CB) |
| Loop Antenna               | Teseq        | HLA 6120      | 24155       | 9 kHz - 30 MHz   | Nov. 05, 2012*   | Radiation (03CH01-CB) |
| Horn Antenna               | EMCO         | 3115          | 00075790    | 750MHz~18GHz     | Nov. 01, 2013    | Radiation (03CH01-CB) |
| Horn Antenna               | SCHWARZBEAK  | BBHA 9170     | BBHA9170252 | 15GHz ~ 40GHz    | Dec. 17, 2013    | Radiation (03CH01-CB) |
| Pre-Amplifier              | Agilent      | 8447D         | 2944A10991  | 0.1MHz ~ 1.3GHz  | Nov. 12, 2013    | Radiation (03CH01-CB) |
| Pre-Amplifier              | Agilent      | 8449B         | 3008A02310  | 1GHz ~ 26.5GHz   | Dec. 16, 2013    | Radiation (03CH01-CB) |
| Pre-Amplifier              | WM           | TF-130N-R1    | 923365      | 26GHz ~ 40GHz    | Oct. 23, 2013    | Radiation (03CH01-CB) |
| Spectrum analyzer          | R&S          | FSP40         | 100019      | 9kHz~40GHz       | Dec. 02, 2013    | Radiation (03CH01-CB) |
| EMI Test Receiver          | Agilent      | N9038A        | MY52260123  | 9kHz ~ 8GHz      | Dec. 12, 2013    | Radiation (03CH01-CB) |
| Turn Table                 | INN CO       | CO 2000       | N/A         | 0 ~ 360 degree   | N.C.R            | Radiation (03CH01-CB) |
| Antenna Mast               | INN CO       | CO2000        | N/A         | 1 m - 4 m        | N.C.R            | Radiation (03CH01-CB) |
| RF Cable-low               | Woken        | Low Cable-1   | N/A         | 30 MHz - 1 GHz   | Nov. 17, 2013    | Radiation (03CH01-CB) |
| RF Cable-high              | Woken        | High Cable-1  | N/A         | 1 GHz - 26.5 GHz | Nov. 17, 2013    | Radiation (03CH01-CB) |
| RF Cable-high              | Woken        | High Cable-2  | N/A         | 1 GHz - 26.5 GHz | Nov. 17, 2013    | Radiation (03CH01-CB) |
| RF Cable-high              | Woken        | High Cable-3  | N/A         | 1 GHz - 40 GHz   | Nov. 17, 2013    | Radiation (03CH01-CB) |
| RF Cable-high              | Woken        | High Cable-4  | N/A         | 1 GHz - 40 GHz   | Nov. 17, 2013    | Radiation (03CH01-CB) |
| Signal analyzer            | R&S          | FSV40         | 100979      | 9kHz~40GHz       | Oct. 08, 2012    | Conducted (TH01-CB)   |
| Signal analyzer            | R&S          | FSV40         | 100979      | 9kHz~40GHz       | Nov. 29, 2013    | Conducted (TH01-CB)   |
| Temp. and Humidity Chamber | Ten Billion  | TTH-D3SP      | TBN-931011  | -30~100 degree   | Jun. 04, 2013    | Conducted (TH01-CB)   |
| RF Cable-high              | Woken        | High Cable-7  | -           | 1 GHz - 26.5 GHz | Nov. 19, 2012    | Conducted (TH01-CB)   |
| RF Cable-high              | Woken        | High Cable-7  | -           | 1 GHz - 26.5 GHz | Nov. 17, 2013    | Conducted (TH01-CB)   |
| RF Cable-high              | Woken        | High Cable-8  | -           | 1 GHz - 26.5 GHz | Nov. 19, 2012    | Conducted (TH01-CB)   |
| RF Cable-high              | Woken        | High Cable-8  | -           | 1 GHz - 26.5 GHz | Nov. 17, 2013    | Conducted (TH01-CB)   |
| RF Cable-high              | Woken        | High Cable-9  | -           | 1 GHz - 26.5 GHz | Nov. 19, 2012    | Conducted (TH01-CB)   |
| RF Cable-high              | Woken        | High Cable-9  | -           | 1 GHz - 26.5 GHz | Nov. 17, 2013    | Conducted (TH01-CB)   |
| RF Cable-high              | Woken        | High Cable-10 | -           | 1 GHz - 26.5 GHz | Nov. 19, 2012    | Conducted (TH01-CB)   |
| RF Cable-high              | Woken        | High Cable-10 | -           | 1 GHz - 26.5 GHz | Nov. 17, 2013    | Conducted (TH01-CB)   |
| RF Cable-high              | Woken        | High Cable-11 | -           | 1 GHz - 26.5 GHz | Nov. 19, 2012    | Conducted (TH01-CB)   |
| RF Cable-high              | Woken        | High Cable-11 | -           | 1 GHz - 26.5 GHz | Nov. 17, 2013    | Conducted (TH01-CB)   |
| Power Sensor               | Anritsu      | MA2411B       | 0917223     | 300MHz~40GHz     | Nov. 28, 2012    | Conducted (TH01-CB)   |
| Power Sensor               | Anritsu      | MA2411B       | 0917223     | 300MHz~40GHz     | Sep. 18, 2013    | Conducted (TH01-CB)   |

| Instrument  | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark              |
|-------------|--------------|-----------|------------|-----------------|------------------|---------------------|
| Power Meter | Anritsu      | ML2495A   | 1035008    | 300MHz~40GHz    | Nov. 27, 2012    | Conducted (TH01-CB) |
| Power Meter | Anritsu      | ML2495A   | 1035008    | 300MHz~40GHz    | Sep. 18, 2013    | 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

### Uncertainty of Radiated Emission Measurement (30MHz ~ 1,000MHz)

| Contribution                                                       | Uncertainty of $x_i$ |      |                            | $u(x_i)$ |
|--------------------------------------------------------------------|----------------------|------|----------------------------|----------|
|                                                                    | Value                | Unit | Probability Distribution k |          |
| Receiver reading                                                   | $\pm 0.173$          | dB   | K=1                        | 0.086    |
| Cable loss                                                         | $\pm 0.174$          | dB   | K=2                        | 0.087    |
| Antenna gain                                                       | $\pm 0.169$          | dB   | K=2                        | 0.084    |
| Site imperfection                                                  | $\pm 0.433$          | dB   | Triangular                 | 0.214    |
| Pre-amplifier gain                                                 | $\pm 0.366$          | dB   | K=2                        | 0.183    |
| Transmitter antenna                                                | $\pm 1.200$          | dB   | Rectangular                | 0.600    |
| Signal generator                                                   | $\pm 0.461$          | dB   | Rectangular                | 0.231    |
| Mismatch                                                           | $\pm 0.080$          | dB   | U-shape                    | 0.040    |
| Spectrum analyzer                                                  | $\pm 0.500$          | dB   | Rectangular                | 0.250    |
| Combined standard uncertainty $U_c(y)$                             |                      |      |                            | 1.778    |
| Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$ |                      |      |                            | 3.555    |

### Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

| Contribution                                                       | Uncertainty of $x_i$ |      |                            | $u(x_i)$ |
|--------------------------------------------------------------------|----------------------|------|----------------------------|----------|
|                                                                    | Value                | Unit | Probability Distribution k |          |
| Receiver reading                                                   | $\pm 0.191$          | dB   | K=1                        | 0.095    |
| Cable loss                                                         | $\pm 0.169$          | dB   | K=2                        | 0.084    |
| Antenna gain                                                       | $\pm 0.191$          | dB   | K=2                        | 0.096    |
| Site imperfection                                                  | $\pm 0.582$          | dB   | Triangular                 | 0.291    |
| Pre-amplifier gain                                                 | $\pm 0.304$          | dB   | K=2                        | 0.152    |
| Transmitter antenna                                                | $\pm 1.200$          | dB   | Rectangular                | 0.600    |
| Signal generator                                                   | $\pm 0.461$          | dB   | Rectangular                | 0.231    |
| Mismatch                                                           | $\pm 0.080$          | dB   | U-shape                    | 0.040    |
| Spectrum analyzer                                                  | $\pm 0.500$          | dB   | Rectangular                | 0.250    |
| Combined standard uncertainty $U_c(y)$                             |                      |      |                            | 1.839    |
| Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$ |                      |      |                            | 3.678    |

### Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

| Contribution                                                       | Uncertainty of $x_i$ |      |                            | $u(x_i)$ |
|--------------------------------------------------------------------|----------------------|------|----------------------------|----------|
|                                                                    | Value                | Unit | Probability Distribution k |          |
| Receiver reading                                                   | $\pm 0.186$          | dB   | K=1                        | 0.093    |
| Cable loss                                                         | $\pm 0.167$          | dB   | K=2                        | 0.083    |
| Antenna gain                                                       | $\pm 0.190$          | dB   | K=2                        | 0.095    |
| Site imperfection                                                  | $\pm 0.488$          | dB   | Triangular                 | 0.244    |
| Pre-amplifier gain                                                 | $\pm 0.269$          | dB   | K=2                        | 0.134    |
| Transmitter antenna                                                | $\pm 1.200$          | dB   | Rectangular                | 0.600    |
| Signal generator                                                   | $\pm 0.461$          | dB   | Rectangular                | 0.231    |
| Mismatch                                                           | $\pm 0.080$          | dB   | U-shape                    | 0.040    |
| Spectrum analyzer                                                  | $\pm 0.500$          | dB   | Rectangular                | 0.250    |
| Combined standard uncertainty $U_c(y)$                             |                      |      |                            | 1.771    |
| Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$ |                      |      |                            | 3.541    |

### Uncertainty of Conducted Emission Measurement

| Contribution                                                       | Uncertainty of $x_i$ |      |                            | $u(x_i)$ |
|--------------------------------------------------------------------|----------------------|------|----------------------------|----------|
|                                                                    | Value                | Unit | Probability Distribution k |          |
| Cable loss                                                         | $\pm 0.038$          | dB   | K=2                        | 0.019    |
| Attenuator                                                         | $\pm 0.047$          | dB   | K=2                        | 0.024    |
| Power Meter specification                                          | $\pm 0.300$          | dB   | Triangular                 | 0.150    |
| Power Sensor specification                                         | $\pm 0.300$          | dB   | Rectangular                | 0.150    |
| Signal generator                                                   | $\pm 0.461$          | dB   | Rectangular                | 0.231    |
| Mismatch                                                           | $\pm 0.080$          | dB   | U-shape                    | 0.040    |
| Spectrum analyzer                                                  | $\pm 0.500$          | dB   | Rectangular                | 0.250    |
| Combined standard uncertainty $U_c(y)$                             |                      |      |                            | 0.863    |
| Measuring uncertainty for a level of confidence of 95% $U=2U_c(y)$ |                      |      |                            | 1.726    |