

# Variant FCC RF Test Report

APPLICANT : DELL Inc.  
EQUIPMENT : Tablet PC  
BRAND NAME : Dell  
MODEL NAME : T02D; T02D003  
TYPE NAME : T02D003  
FCC ID : E2K-T02D003  
STANDARD : FCC Part 15 Subpart E §15.407  
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

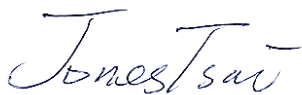
This is a variant report which is only valid together with the original test report. The product was received on Jul. 09, 2014 and testing was completed on Oct. 11, 2014. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and the testing has shown the tested sample to be in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.



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Reviewed by: Joseph Lin / Supervisor



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Approved by: Jones Tsai / Manager



**SPORTON INTERNATIONAL (KUNSHAN) INC.**  
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## TABLE OF CONTENTS

|                                                              |    |
|--------------------------------------------------------------|----|
| REVISION HISTORY .....                                       | 3  |
| SUMMARY OF TEST RESULT .....                                 | 4  |
| 1 GENERAL DESCRIPTION .....                                  | 5  |
| 1.1 Applicant .....                                          | 5  |
| 1.2 Manufacturer .....                                       | 5  |
| 1.3 Feature of Equipment Under Test .....                    | 5  |
| 1.4 Product Specification of Equipment Under Test .....      | 6  |
| 1.5 Modification of EUT .....                                | 6  |
| 1.6 Testing Location .....                                   | 7  |
| 1.7 Applicable Standards .....                               | 7  |
| 2 TEST CONFIGURATION OF EQUIPMENT UNDER TEST .....           | 8  |
| 2.1 Carrier Frequency Channel .....                          | 9  |
| 2.2 Pre-Scanned RF Power .....                               | 10 |
| 2.3 Test Mode .....                                          | 12 |
| 2.4 Connection Diagram of Test System .....                  | 15 |
| 2.5 Support Unit used in test configuration and system ..... | 16 |
| 2.6 EUT Operation Test Setup .....                           | 16 |
| 2.7 Measurement Results Explanation Example .....            | 16 |
| 3 TEST RESULT .....                                          | 17 |
| 3.1 26dB & 99% Occupied Bandwidth Measurement .....          | 17 |
| 3.2 Maximum Conducted Output Power Measurement .....         | 25 |
| 3.3 Power Spectral Density Measurement .....                 | 31 |
| 3.4 Peak Excursion Ratio Measurement .....                   | 36 |
| 3.5 Unwanted Radiated Emission Measurement .....             | 39 |
| 3.6 Frequency Stability Measurement .....                    | 54 |
| 3.7 Automatically Discontinue Transmission .....             | 56 |
| 3.8 Antenna Requirements .....                               | 57 |
| 4 LIST OF MEASURING EQUIPMENT .....                          | 58 |
| 5 UNCERTAINTY OF EVALUATION .....                            | 59 |
| APPENDIX A. SETUP PHOTOGRAPHS                                |    |
| APPENDIX B. PRODUCT EQUALITY DECLARATION                     |    |



## REVISION HISTORY

| REPORT NO.   | VERSION | DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                       | ISSUED DATE   |
|--------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| FR431806-02D | Rev. 01 | This is a variant report for T02D; T02D003. The product equality declaration could be referred to Appendix B. Since 5GHz band 1/2 has power reduced, then all the conducted test items were verified for these bands. Based on the similarity between two models, only the worst cases of radiated spurious emission for all bands from original test report (Sporton Report Number FR431806D) were verified for the differences. | Oct. 23, 2014 |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |

## SUMMARY OF TEST RESULT

| Report Section | FCC Rule              | IC Rule         | Description                            | Limit                                             | Result | Remark                                    |
|----------------|-----------------------|-----------------|----------------------------------------|---------------------------------------------------|--------|-------------------------------------------|
| 3.1            | 15.403(i)             | RSS-210<br>A9.2 | 26dB & 99% Bandwidth                   | -                                                 | Pass   | -                                         |
| 3.2            | 15.407(a)             | RSS-210<br>A9.2 | Maximum Conducted Output Power         | $\leq 17, 24, 30$ dBm<br>(depend on band)         | Pass   | -                                         |
| 3.3            | 15.407(a)             | RSS-210<br>A9.2 | Power Spectral Density                 | $\leq 4, 11, 17$ dBm<br>(depend on band)          | Pass   | -                                         |
| 3.4            | 15.407(a)(6)          | RSS-210<br>A9.3 | Peak Excursion Ratio                   | $\leq 13$ dB                                      | Pass   | -                                         |
| 3.5            | 15.407(b)             | RSS-210<br>A9.3 | Unwanted Emissions                     | $\leq -17, -27$ dBm<br>(depend on band)&15.209(a) | Pass   | Under limit<br>4.17 dB at<br>5350.150 MHz |
| 3.6            | 15.407(g)             | -               | Frequency Stability                    | Within Operation Band                             | Pass   | -                                         |
| 3.7            | 15.407(c)             | RSS-210<br>A9.4 | Automatically Discontinue Transmission | Discontinue Transmission                          | Pass   | -                                         |
| 3.8            | 15.203 &<br>15.407(a) | RSS-210<br>A9.2 | Antenna Requirement                    | N/A                                               | Pass   | -                                         |

# 1 General Description

## 1.1 Applicant

DELL Inc.

One Dell Way, Round Rock, Texas 78682, United States

## 1.2 Manufacturer

DELL Inc.

One Dell Way, Round Rock, Texas 78682, United States

## 1.3 Feature of Equipment Under Test

| Product Feature & Specification |                                                                                                         |
|---------------------------------|---------------------------------------------------------------------------------------------------------|
| Equipment                       | Tablet PC                                                                                               |
| Brand Name                      | Dell                                                                                                    |
| Model Name                      | T02D; T02D003                                                                                           |
| Type Name                       | T02D003                                                                                                 |
| FCC ID                          | E2K-T02D003                                                                                             |
| EUT supports Radios application | 802.11a/b/g/n (HT20 / HT40)<br>802.11ac (VHT20/VHT40/VHT80)<br>Bluetooth v3.0 + EDR / Bluetooth v4.0 LE |
| HW Version                      | MP                                                                                                      |
| SW Version                      | YTP802A110830                                                                                           |
| EUT Stage                       | Identical Prototype                                                                                     |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

## 1.4 Product Specification of Equipment Under Test

| Product Specification subjective to this standard |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tx/Rx Frequency Range</b>                      | 5180 MHz ~ 5240 MHz<br>5260 MHz ~ 5320 MHz<br>5500 MHz ~ 5580 MHz<br>5660 MHz ~ 5700 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Maximum Output Power to Antenna</b>            | <b>&lt;5180 MHz ~ 5240 MHz&gt;</b><br>802.11a : 7.30 dBm / 0.0054 W<br>802.11n HT20 : 7.86 dBm / 0.0061 W<br>802.11n HT40 : 8.29 dBm / 0.0067 W<br>802.11ac VHT20 : 8.10 dBm / 0.0065 W<br>802.11ac VHT40 : 8.20 dBm / 0.0066 W<br>802.11ac VHT80 : 8.15 dBm / 0.0065 W<br><b>&lt;5260 MHz ~ 5320 MHz&gt;</b><br>802.11a : 8.44 dBm / 0.0070 W<br>802.11n HT20 : 8.43 dBm / 0.0070 W<br>802.11n HT40 : 8.68 dBm / 0.0074 W<br>802.11ac VHT20 : 8.66 dBm / 0.0073 W<br>802.11ac VHT40 : 8.60 dBm / 0.0072 W<br>802.11ac VHT80 : 8.00 dBm / 0.0063 W |
| <b>99% Occupied Bandwidth</b>                     | <b>&lt;5180 MHz ~ 5240 MHz&gt;</b><br>802.11a : 18.30 MHz<br>802.11n HT20 : 18.95 MHz<br>802.11n HT40 : 36.70 MHz<br>802.11ac VHT20 : 18.95 MHz<br>802.11ac VHT40 : 36.70 MHz<br>802.11ac VHT80 : 75.84 MHz<br><b>&lt;5260 MHz ~ 5320 MHz&gt;</b><br>802.11a : 18.30 MHz<br>802.11n HT20 : 19.00 MHz<br>802.11n HT40 : 36.60 MHz<br>802.11ac VHT20 : 19.10 MHz<br>802.11ac VHT40 : 36.80 MHz<br>802.11ac VHT80 : 75.84 MHz                                                                                                                         |
| <b>Antenna Type</b>                               | IFA Antenna with gain<br><b>&lt;5180 MHz ~ 5240 MHz&gt;</b><br>3.3 dBi<br><b>&lt;5260 MHz ~ 5320 MHz&gt;</b><br>4.5 dBi                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Type of Modulation</b>                         | 802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)<br>802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

## 1.6 Testing Location

|                    |                                                            |           |                         |
|--------------------|------------------------------------------------------------|-----------|-------------------------|
| Test Site          | SPORTON INTERNATIONAL (KUNSHAN) INC.                       |           |                         |
| Test Site Location | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P.R.C. |           |                         |
|                    | TEL: +86-0512-5790-0158<br>FAX: +86-0512-5790-0958         |           |                         |
| Test Site No.      | Sporton Site No.                                           |           | FCC/IC Registration No. |
|                    | TH01-KS                                                    | 03CH01-KS | 149928/4086E-1          |

**Note:** The test site complies with ANSI C63.4 2003 requirement.

## 1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 644545 D01 Guidance for IEEE 802.11ac and Pre-ac Device Emissions Testing v01r02.
- FCC KDB 789033 D01 General UNII Test Procedures v01r03
- ANSI C63.4-2003

**Remark:**

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



## **2 Test Configuration of Equipment Under Test**

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Z plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

## 2.1 Carrier Frequency Channel

| Frequency Band                       | Channel   | Freq.<br>(MHz) | Channel   | Freq.<br>(MHz) |
|--------------------------------------|-----------|----------------|-----------|----------------|
| 5150-5250 MHz<br>Band 1<br>(U-NII-1) | 36        | 5180           | 44        | 5220           |
|                                      | <b>38</b> | <b>5190</b>    | <b>46</b> | <b>5230</b>    |
|                                      | 40        | 5200           | 48        | 5240           |
|                                      | 42        | 5210           |           |                |

| Frequency Band                        | Channel   | Freq.<br>(MHz) | Channel   | Freq.<br>(MHz) |
|---------------------------------------|-----------|----------------|-----------|----------------|
| 5250-5350 MHz<br>Band 2<br>(U-NII-2A) | 52        | 5260           | 60        | 5300           |
|                                       | <b>54</b> | <b>5270</b>    | <b>62</b> | <b>5310</b>    |
|                                       | 56        | 5280           | 64        | 5320           |
|                                       | 58        | 5290           |           |                |

| Frequency Band                                                | Channel    | Freq.<br>(MHz) | Channel    | Freq.<br>(MHz) |
|---------------------------------------------------------------|------------|----------------|------------|----------------|
| 5470-5600 MHz<br>and<br>5650-5725 MHz<br>Band 3<br>(U-NII-2C) | 100        | 5500           | 112        | 5560           |
|                                                               | <b>102</b> | <b>5510</b>    | 116        | 5580           |
|                                                               | 104        | 5520           | 132        | 5660           |
|                                                               | 106        | 5530           | <b>134</b> | <b>5670</b>    |
|                                                               | 108        | 5540           | 136        | 5680           |
|                                                               | <b>110</b> | <b>5550</b>    | 140        | 5700           |

**Note:** The above Frequency and Channel in boldface were 802.11n HT40.

## 2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

| Channel | Frequency | 5GHz 802.11a RF Power (dBm) |           |            |            |            |            |            |            |
|---------|-----------|-----------------------------|-----------|------------|------------|------------|------------|------------|------------|
|         |           | OFDM Data Rate              |           |            |            |            |            |            |            |
|         |           | 6M<br>bps                   | 9M<br>bps | 12M<br>bps | 18M<br>bps | 24M<br>bps | 36M<br>bps | 48M<br>bps | 54M<br>bps |
| CH 36   | 5180 MHz  | 7.30                        | 7.28      | 7.27       | 7.21       | 7.02       | 6.99       | 7.24       | 7.21       |
| CH 44   | 5220 MHz  | 7.15                        | 7.09      | 7.10       | 7.14       | 7.12       | 7.08       | 7.11       | 7.06       |
| CH 48   | 5240 MHz  | 7.11                        | 7.06      | 7.08       | 7.09       | 7.01       | 6.96       | 7.07       | 7.10       |
| CH 52   | 5260 MHz  | 8.44                        | 8.37      | 8.32       | 8.40       | 8.31       | 7.99       | 8.29       | 8.11       |
| CH 60   | 5300 MHz  | 8.17                        | 8.14      | 8.12       | 8.15       | 7.96       | 7.99       | 8.11       | 8.06       |
| CH 64   | 5320 MHz  | 7.88                        | 7.85      | 7.83       | 7.81       | 7.87       | 7.75       | 7.84       | 7.79       |

| Channel | Frequency | 5GHz 802.11a/n HT20 RF Power (dBm) |      |      |      |      |      |      |      |
|---------|-----------|------------------------------------|------|------|------|------|------|------|------|
|         |           | OFDM Data Rate                     |      |      |      |      |      |      |      |
|         |           | MCS0                               | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| CH 36   | 5180 MHz  | 7.86                               | 7.72 | 7.82 | 7.59 | 7.69 | 7.66 | 7.55 | 7.68 |
| CH 44   | 5220 MHz  | 7.70                               | 7.60 | 7.54 | 7.44 | 7.50 | 7.39 | 7.48 | 7.47 |
| CH 48   | 5240 MHz  | 7.48                               | 7.42 | 7.27 | 7.28 | 7.21 | 7.25 | 7.24 | 7.28 |
| CH 52   | 5260 MHz  | 8.43                               | 8.37 | 8.39 | 8.30 | 8.23 | 8.23 | 8.26 | 8.38 |
| CH 60   | 5300 MHz  | 8.39                               | 8.30 | 8.37 | 8.32 | 8.24 | 8.24 | 8.16 | 8.23 |
| CH 64   | 5320 MHz  | 8.29                               | 8.23 | 8.08 | 8.11 | 8.03 | 8.05 | 8.06 | 8.13 |

| Channel | Frequency | 5GHz 802.11a/n HT40 RF Power (dBm) |      |      |      |      |      |      |      |
|---------|-----------|------------------------------------|------|------|------|------|------|------|------|
|         |           | OFDM Data Rate                     |      |      |      |      |      |      |      |
|         |           | MCS0                               | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 |
| CH 38   | 5190 MHz  | 8.29                               | 8.23 | 8.11 | 8.17 | 8.04 | 8.00 | 8.03 | 8.09 |
| CH 46   | 5230 MHz  | 7.95                               | 7.94 | 7.91 | 7.92 | 7.83 | 7.78 | 7.81 | 7.76 |
| CH 54   | 5270 MHz  | 8.68                               | 8.62 | 8.58 | 8.60 | 8.65 | 8.59 | 8.63 | 8.61 |
| CH 62   | 5310 MHz  | 8.64                               | 8.59 | 8.61 | 8.55 | 8.53 | 8.50 | 8.52 | 8.48 |

| Channel | Frequency | 5GHz 802.11ac VHT20 RF Power (dBm) |      |      |      |      |      |      |      |      |
|---------|-----------|------------------------------------|------|------|------|------|------|------|------|------|
|         |           | OFDM Data Rate                     |      |      |      |      |      |      |      |      |
|         |           | MCS0                               | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 |
| CH 36   | 5180 MHz  | 8.10                               | 7.98 | 7.88 | 7.93 | 7.90 | 7.89 | 8.00 | 7.95 | 7.90 |
| CH 44   | 5220 MHz  | 7.92                               | 7.80 | 7.83 | 7.89 | 7.76 | 7.81 | 7.72 | 7.73 | 7.69 |
| CH 48   | 5240 MHz  | 7.76                               | 7.58 | 7.65 | 7.50 | 7.41 | 7.48 | 7.53 | 7.53 | 7.56 |
| CH 52   | 5260 MHz  | 8.66                               | 8.51 | 8.52 | 8.60 | 8.42 | 8.41 | 8.50 | 8.51 | 8.53 |
| CH 60   | 5300 MHz  | 8.60                               | 8.53 | 8.52 | 8.43 | 8.45 | 8.49 | 8.48 | 8.50 | 8.34 |
| CH 64   | 5320 MHz  | 8.29                               | 8.22 | 8.16 | 8.27 | 8.01 | 8.12 | 7.94 | 7.90 | 7.84 |

| Channel | Frequency | 5GHz 802.11ac VHT40 RF Power (dBm) |      |      |      |      |      |      |      |      |      |
|---------|-----------|------------------------------------|------|------|------|------|------|------|------|------|------|
|         |           | OFDM Data Rate                     |      |      |      |      |      |      |      |      |      |
|         |           | MCS0                               | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9 |
| CH 38   | 5190 MHz  | 8.20                               | 8.08 | 8.02 | 7.94 | 8.10 | 7.93 | 7.97 | 7.86 | 7.84 | 7.96 |
| CH 46   | 5230 MHz  | 7.94                               | 7.91 | 7.88 | 7.76 | 7.85 | 7.83 | 7.87 | 7.78 | 7.75 | 7.80 |
| CH 54   | 5270 MHz  | 8.60                               | 8.54 | 8.48 | 8.54 | 8.53 | 8.59 | 8.50 | 8.54 | 8.40 | 8.36 |
| CH 62   | 5310 MHz  | 8.51                               | 8.43 | 7.41 | 8.38 | 8.46 | 8.35 | 8.35 | 8.35 | 8.26 | 8.27 |

| Channel | Frequency | 5GHz 802.11ac VHT80 RF Power (dBm) |      |      |      |      |      |      |      |      |      |
|---------|-----------|------------------------------------|------|------|------|------|------|------|------|------|------|
|         |           | OFDM Data Rate                     |      |      |      |      |      |      |      |      |      |
|         |           | MCS0                               | MCS1 | MCS2 | MCS3 | MCS4 | MCS5 | MCS6 | MCS7 | MCS8 | MCS9 |
| Ch 042  | 5210MHz   | 8.15                               | 7.66 | 7.72 | 8.02 | 8.06 | 8.14 | 8.01 | 8.10 | 8.13 | 8.11 |
| Ch 058  | 5290MHz   | 8.00                               | 7.95 | 7.92 | 7.90 | 7.91 | 7.94 | 7.89 | 7.87 | 7.90 | 7.86 |

## 2.3 Test Mode

Final results of test modes, data rates and test channels are shown as following table.

| Test Cases       |                                              |                |           |              |
|------------------|----------------------------------------------|----------------|-----------|--------------|
| Conducted<br>TCs | Test Items                                   | Mode           | Data rate | Test Channel |
|                  | 26dB and 99% BW<br>Power Spectral<br>Density | 802.11a        | 6 Mbps    | L/M/H        |
|                  |                                              | 802.11n HT20   | MCS0      | L/M/H        |
|                  |                                              | 802.11n HT40   | MCS0      | L/M/H        |
|                  |                                              | 802.11ac VHT20 | MCS0      | L/M/H        |
|                  |                                              | 802.11ac VHT40 | MCS0      | L/M/H        |
|                  |                                              | 802.11ac VHT80 | MCS0      | M            |
|                  | 20dB Occupied<br>Bandwidth                   | 802.11a        | 6 Mbps    | H            |
|                  |                                              | 802.11n HT20   | MCS0      | H            |
|                  |                                              | 802.11n HT40   | MCS0      | H            |
|                  |                                              | 802.11ac VHT20 | MCS0      | H            |
|                  |                                              | 802.11ac VHT40 | MCS0      | H            |
|                  |                                              | 802.11ac VHT80 | MCS0      | H            |
|                  | Output Power                                 | 802.11a        | 6 Mbps    | L/M/H        |
|                  |                                              | 802.11n HT20   | MCS0      | L/M/H        |
|                  |                                              | 802.11n HT40   | MCS0      | L/M/H        |
|                  |                                              | 802.11ac VHT20 | MCS0      | L/M/H        |
|                  |                                              | 802.11ac VHT40 | MCS0      | L/M/H        |
|                  |                                              | 802.11ac VHT80 | MCS0      | M            |
|                  | Peak Excursion                               | 802.11a        | 6 Mbps    | L            |
|                  |                                              | 802.11n HT20   | MCS0      | L            |
|                  |                                              | 802.11n HT40   | MCS0      | L            |
|                  |                                              | 802.11ac VHT20 | MCS0      | L            |
|                  |                                              | 802.11ac VHT40 | MCS0      | L            |
|                  |                                              | 802.11ac VHT80 | MCS0      | L            |
|                  | Frequency Stability                          | 802.11a        | 6 Mbps    | L/H          |



| Test Cases      |                               |                |        |   |
|-----------------|-------------------------------|----------------|--------|---|
| Radiated<br>TCs | Radiated Band Edge            | 802.11a        | 6 Mbps | H |
|                 |                               | 802.11n HT20   | MCS0   | H |
|                 |                               | 802.11n HT40   | MCS0   | H |
|                 |                               | 802.11ac VHT20 | MCS0   | L |
|                 |                               | 802.11ac VHT40 | MCS0   | H |
|                 |                               | 802.11ac VHT80 | MCS0   | M |
|                 | Radiated Spurious<br>Emission | 802.11a        | 6 Mbps | H |
|                 |                               | 802.11n HT20   | MCS0   | H |
|                 |                               | 802.11n HT40   | MCS0   | H |
|                 |                               | 802.11ac VHT20 | MCS0   | L |
|                 |                               | 802.11ac VHT40 | MCS0   | H |
|                 |                               | 802.11ac VHT80 | MCS0   | M |

| Ch. # |        | Band I : 5150-5250<br>MHz | Band II : 5250-5350<br>MHz | Band III : 5470-5600 MHz and<br>5650-5725MHz |
|-------|--------|---------------------------|----------------------------|----------------------------------------------|
|       |        | 802.11a                   | 802.11a                    | 802.11a                                      |
| L     | Low    | 36                        | 52                         | 100                                          |
| M     | Middle | 44                        | 60                         | 116                                          |
| H     | High   | 48                        | 64                         | 140                                          |

| Ch. # |        | Band I : 5150-5250<br>MHz | Band II : 5250-5350<br>MHz | Band III : 5470-5600 MHz and<br>5650-5725MHz |
|-------|--------|---------------------------|----------------------------|----------------------------------------------|
|       |        | 802.11n HT20              | 802.11n HT20               | 802.11n HT20                                 |
| L     | Low    | 36                        | 52                         | 100                                          |
| M     | Middle | 44                        | 60                         | 116                                          |
| H     | High   | 48                        | 64                         | 140                                          |

| Ch. # |        | Band I : 5150-5250<br>MHz | Band II : 5250-5350<br>MHz | Band III : 5470-5600 MHz and<br>5650-5725MHz |
|-------|--------|---------------------------|----------------------------|----------------------------------------------|
|       |        | 802.11n HT40              | 802.11n HT40               | 802.11n HT40                                 |
| L     | Low    | 38                        | 54                         | 102                                          |
| M     | Middle | -                         | -                          | 110                                          |
| H     | High   | 46                        | 62                         | 134                                          |

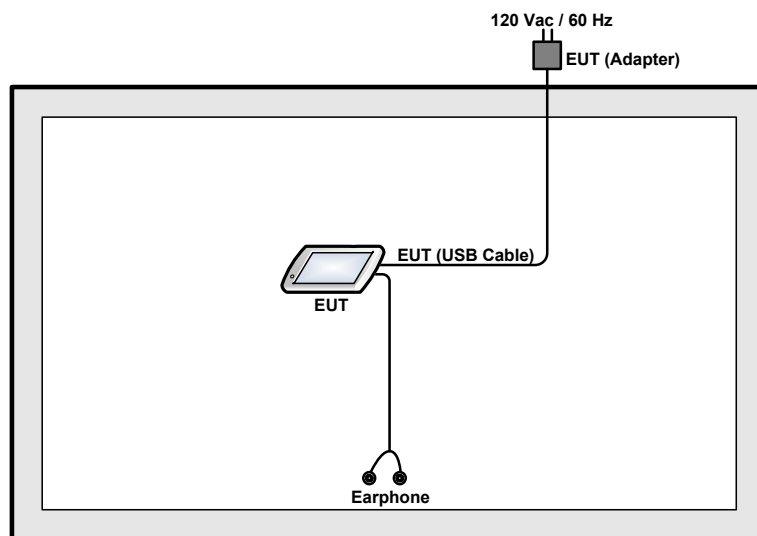
| Ch. # |        | Band I : 5150-5250<br>MHz | Band II : 5250-5350<br>MHz | Band III : 5470-5600 MHz and<br>5650-5725MHz |
|-------|--------|---------------------------|----------------------------|----------------------------------------------|
|       |        | 802.11ac VHT20            | 802.11ac VHT20             | 802.11ac VHT20                               |
| L     | Low    | 36                        | 52                         | 100                                          |
| M     | Middle | 44                        | 60                         | 116                                          |
| H     | High   | 48                        | 64                         | 140                                          |

| Ch. # |        | Band I : 5150-5250<br>MHz | Band II : 5250-5350<br>MHz | Band III : 5470-5600 MHz and<br>5650-5725MHz |
|-------|--------|---------------------------|----------------------------|----------------------------------------------|
|       |        | 802.11ac VHT40            | 802.11ac VHT40             | 802.11ac VHT40                               |
| L     | Low    | 38                        | 54                         | 102                                          |
| M     | Middle | -                         | -                          | 110                                          |
| H     | High   | 46                        | 62                         | 134                                          |

| Ch. # |        | Band I : 5150-5250<br>MHz | Band II : 5250-5350<br>MHz | Band III : 5470-5600 MHz<br>and 5650-5725MHz |
|-------|--------|---------------------------|----------------------------|----------------------------------------------|
|       |        | 802.11ac VHT80            | 802.11ac VHT80             | 802.11ac VHT80                               |
| L     | Low    | -                         | -                          | -                                            |
| M     | Middle | 42                        | 58                         | 106                                          |
| H     | High   | -                         | -                          | -                                            |

## 2.4 Connection Diagram of Test System

< Radiated Emission Mode >



## 2.5 Support Unit used in test configuration and system

| Item | Equipment | Trade Name | Model Name | FCC ID | Data Cable | Power Cord |
|------|-----------|------------|------------|--------|------------|------------|
| 1.   | Earphone  | Lenovo     | SH100      | N/A    | N/A        | N/A        |

## 2.6 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit/receive.

## 2.7 Measurement Results Explanation Example

**For all conducted test items:**

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuator factor between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example :

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

*Offset = RF cable loss + attenuator factor.*

Following shows an offset computation example with cable loss 8 dB and 10dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 8 + 10 = 18 \text{ (dB)}\end{aligned}$$

### 3 Test Result

#### 3.1 26dB & 99% Occupied Bandwidth Measurement

##### 3.1.1 Description of 26dB & 99% Occupied Bandwidth

There is no restriction limits for bandwidth. The maximum conducted output power can be limited by measured emission bandwidth (B).

For the band 5150-5250 MHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW (17dBm) or 4 dBm + 10log B.

For the bands 5250-5350 MHz, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log B.

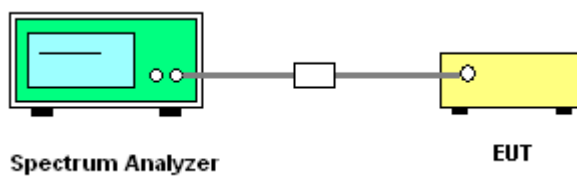
##### 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

##### 3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r03.  
Section D) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.  
Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW)  $\geq 3 * RBW$ .
8. Measure and record the results in the test report.

### 3.1.4 Test Setup



**3.1.5 Test Result of 26dB & 99% Occupied Bandwidth Plots**

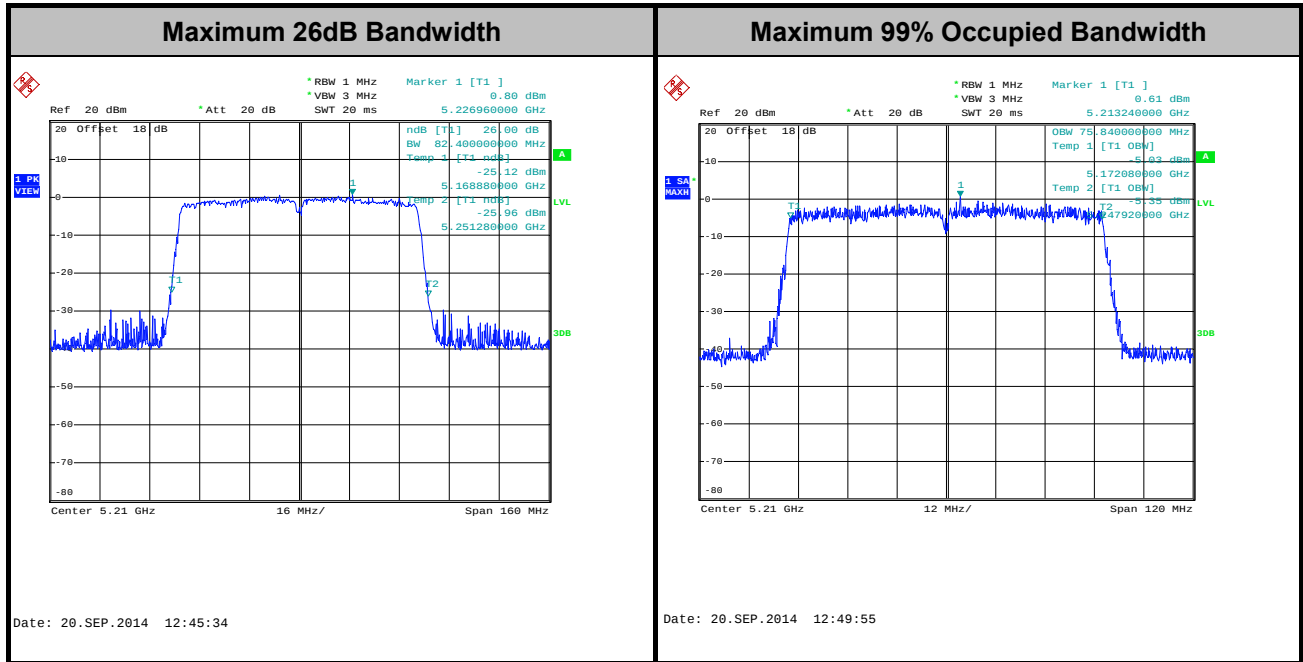
|                        |             |                            |         |
|------------------------|-------------|----------------------------|---------|
| <b>Test Band :</b>     | 5GHz band 1 | <b>Temperature :</b>       | 24~25°C |
| <b>Test Engineer :</b> | Issac Song  | <b>Relative Humidity :</b> | 49~51%  |

| Mod.  | Data Rate | N <sub>TX</sub> | Channel | Freq.<br>(MHz) | 99%<br>Bandwidth<br>(MHz) | 26dB<br>Bandwidth<br>(MHz) | IC 99%<br>Bandwidth<br>EIRP Limit<br>(dBm) | FCC 26dB<br>Bandwidth<br>Power Limit<br>(dBm) |
|-------|-----------|-----------------|---------|----------------|---------------------------|----------------------------|--------------------------------------------|-----------------------------------------------|
| 11a   | 6Mbps     | 1               | 36      | 5180           | 18.10                     | 23.10                      | 22.58                                      | 16.99                                         |
| 11a   | 6Mbps     | 1               | 44      | 5220           | 18.30                     | 23.05                      | 22.62                                      | 16.99                                         |
| 11a   | 6Mbps     | 1               | 48      | 5240           | 18.25                     | 22.90                      | 22.61                                      | 16.99                                         |
| HT20  | MCS0      | 1               | 36      | 5180           | 18.95                     | 23.30                      | 22.78                                      | 16.99                                         |
| HT20  | MCS0      | 1               | 44      | 5220           | 18.90                     | 23.30                      | 22.76                                      | 16.99                                         |
| HT20  | MCS0      | 1               | 48      | 5240           | 18.95                     | 23.25                      | 22.78                                      | 16.99                                         |
| HT40  | MCS0      | 1               | 38      | 5190           | 36.70                     | 41.49                      | 23.01                                      | 16.99                                         |
| HT40  | MCS0      | 1               | 46      | 5230           | 36.70                     | 41.49                      | 23.01                                      | 16.99                                         |
| VHT20 | MCS0      | 1               | 36      | 5180           | 18.95                     | 23.40                      | 22.78                                      | 16.99                                         |
| VHT20 | MCS0      | 1               | 44      | 5220           | 18.85                     | 23.25                      | 22.75                                      | 16.99                                         |
| VHT20 | MCS0      | 1               | 48      | 5240           | 18.80                     | 23.30                      | 22.74                                      | 16.99                                         |
| VHT40 | MCS0      | 1               | 38      | 5190           | 36.60                     | 41.58                      | 23.01                                      | 16.99                                         |
| VHT40 | MCS0      | 1               | 46      | 5230           | 36.70                     | 41.40                      | 23.01                                      | 16.99                                         |
| VHT80 | MCS0      | 1               | 42      | 5210           | 75.84                     | 82.40                      | 23.01                                      | 16.99                                         |



|                        |             |                            |        |
|------------------------|-------------|----------------------------|--------|
| <b>Test Band :</b>     | 5GHz band 2 | <b>Temperature :</b>       | 24~25℃ |
| <b>Test Engineer :</b> | Issac Song  | <b>Relative Humidity :</b> | 49~51% |

| Mod.  | Data Rate | N <sub>TX</sub> | Channel | Freq.<br>(MHz) | 99%<br>Bandwidth<br>(MHz) | 26dB<br>Bandwidth<br>(MHz) | IC 99%<br>Bandwidth<br>EIRP Limit<br>(dBm) | FCC 26dB<br>Bandwidth<br>Power Limit<br>(dBm) |
|-------|-----------|-----------------|---------|----------------|---------------------------|----------------------------|--------------------------------------------|-----------------------------------------------|
| 11a   | 6Mbps     | 1               | 52      | 5260           | 18.15                     | 23.10                      | 29.59                                      | 23.98                                         |
| 11a   | 6Mbps     | 1               | 60      | 5300           | 18.30                     | 23.15                      | 29.62                                      | 23.98                                         |
| 11a   | 6Mbps     | 1               | 64      | 5320           | 18.05                     | 23.00                      | 29.56                                      | 23.98                                         |
| HT20  | MCS0      | 1               | 52      | 5260           | 18.90                     | 23.35                      | 29.76                                      | 23.98                                         |
| HT20  | MCS0      | 1               | 60      | 5300           | 19.00                     | 23.30                      | 29.79                                      | 23.98                                         |
| HT20  | MCS0      | 1               | 64      | 5320           | 18.95                     | 23.50                      | 29.78                                      | 23.98                                         |
| HT40  | MCS0      | 1               | 54      | 5270           | 36.60                     | 41.40                      | 30.00                                      | 23.98                                         |
| HT40  | MCS0      | 1               | 62      | 5310           | 36.60                     | 41.76                      | 30.00                                      | 23.98                                         |
| VHT20 | MCS0      | 1               | 52      | 5260           | 19.00                     | 23.35                      | 29.79                                      | 23.98                                         |
| VHT20 | MCS0      | 1               | 60      | 5300           | 18.90                     | 23.45                      | 29.76                                      | 23.98                                         |
| VHT20 | MCS0      | 1               | 64      | 5320           | 19.10                     | 23.30                      | 29.81                                      | 23.98                                         |
| VHT40 | MCS0      | 1               | 54      | 5270           | 36.60                     | 41.40                      | 30.00                                      | 23.98                                         |
| VHT40 | MCS0      | 1               | 62      | 5310           | 36.80                     | 41.67                      | 30.00                                      | 23.98                                         |
| VHT80 | MCS0      | 1               | 58      | 5290           | 75.84                     | 82.40                      | 30.00                                      | 23.98                                         |



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.

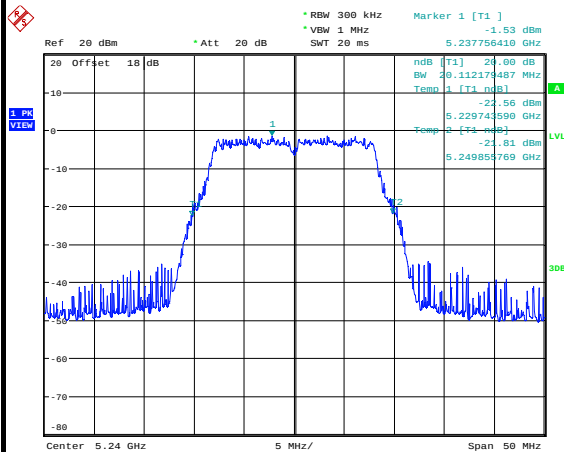
**3.1.6 Test Result of 20dB Occupied Bandwidth**

| Mod.  | Data Rate | N <sub>TX</sub> | Channel | Freq. (MHz) | 20dB Bandwidth (MHz) | 20dB Bandwidth Upper Frequency (FH) (MHz) | Upper Limit Line (MHz) | Pass/Fail |
|-------|-----------|-----------------|---------|-------------|----------------------|-------------------------------------------|------------------------|-----------|
| 11a   | 6Mbps     | 1               | 48      | 5240        | 20.11                | 5249.86                                   | 5250                   | Pass      |
| HT20  | MCS0      | 1               | 48      | 5240        | 20.11                | 5249.86                                   |                        | Pass      |
| HT40  | MCS0      | 1               | 46      | 5230        | 39.81                | 5249.90                                   |                        | Pass      |
| VHT20 | MCS0      | 1               | 48      | 5240        | 19.87                | 5249.94                                   |                        | Pass      |
| VHT40 | MCS0      | 1               | 46      | 5230        | 39.81                | 5249.90                                   |                        | Pass      |
| VHT80 | MCS0      | 1               | 42      | 5210        | 79.42                | 5249.81                                   |                        | Pass      |



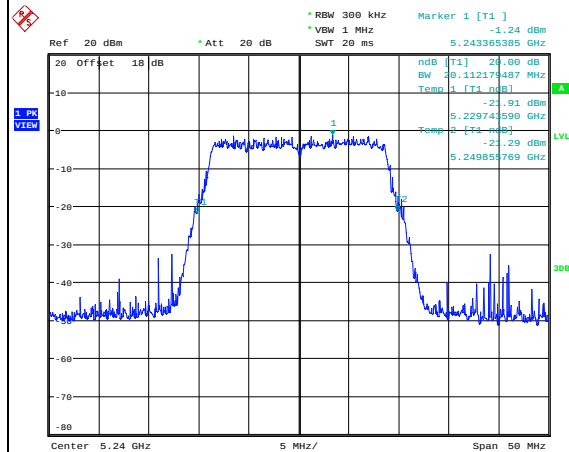
## 20dB Occupied Bandwidth

## 802.11a CH48 5240MHz



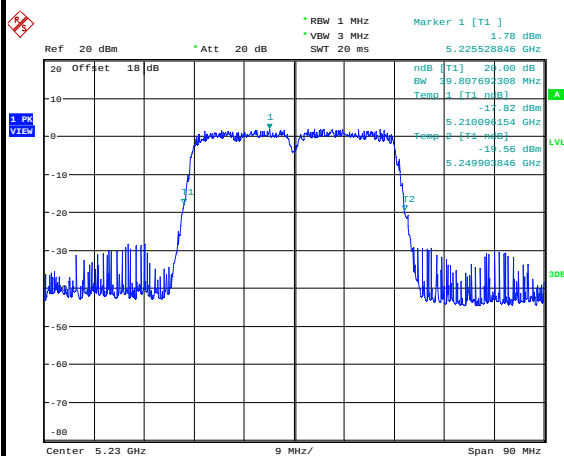
Date: 11.OCT.2014 10:49:32

## 802.11n HT20 CH48 5240MHz



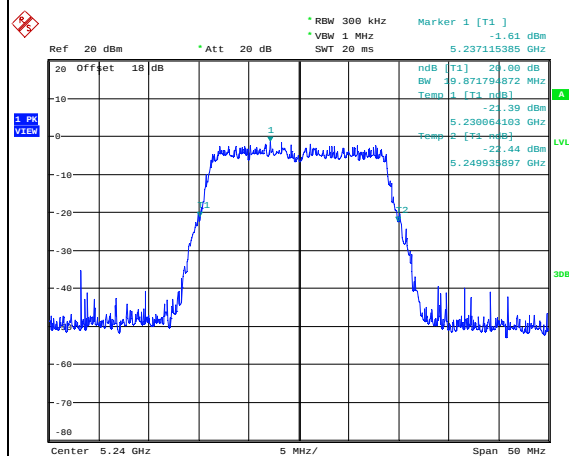
Date: 11.OCT.2014 11:00:18

## 802.11n HT40 CH46 5230MHz



Date: 11.OCT.2014 11:13:14

## 802.11ac VHT20 CH48 5240MHz

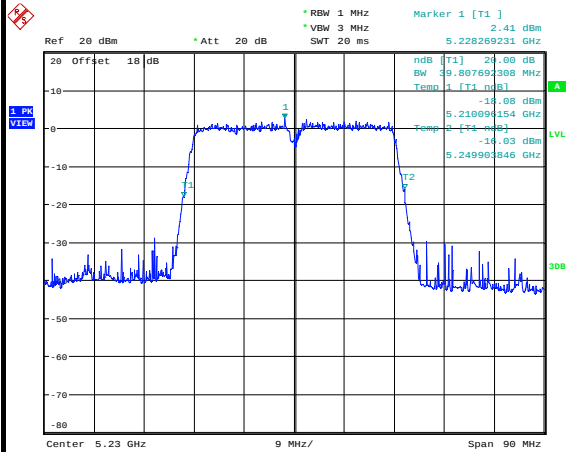


Date: 11.OCT.2014 11:17:50



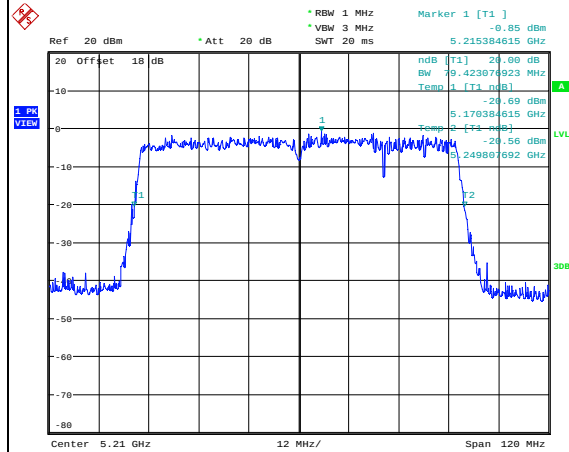
20dB Occupied Bandwidth

802.11ac VHT40 CH46 5230MHz



Date: 11.OCT.2014 11:34:53

802.11ac VHT80 CH42 5210MHz



Date: 11.OCT.2014 11:37:44

## 3.2 Maximum Conducted Output Power Measurement

### 3.2.1 Limit of Maximum Conducted Output Power

For the band 5150-5250 MHz, the maximum conducted output power 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 1-MHz. If transmitting antenna directional gain is greater than 6 dBi, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the bands 5250-5350 MHz, bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or  $11 \text{ dBm} + 10\log B$ , where B is the 26 dB emissions bandwidth in 1-MHz. If transmitting antenna directional gain is greater than 6 dBi, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

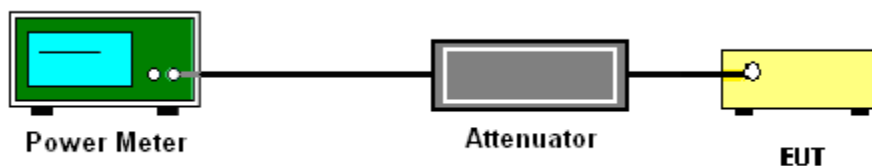
### 3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D01 General UNII Test Procedures v01r03.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor,  $10 \log(1/x)$ , where x is the duty cycle.

### 3.2.4 Test Setup



**3.2.5 Test Result of Maximum Conducted Output Power**

|                        |             |                            |         |
|------------------------|-------------|----------------------------|---------|
| <b>Test Band :</b>     | 5GHz band 1 | <b>Temperature :</b>       | 24~25°C |
| <b>Test Engineer :</b> | Issac Song  | <b>Relative Humidity :</b> | 49~51%  |

| Mod.  | Data Rate | N <sub>TX</sub> | Channel | Freq. (MHz) | Duty Factor (dB) | Average Conducted Power (dBm) | FCC Conducted Power Limit (dBm) | DG (dBi) | - | Pass/Fail |
|-------|-----------|-----------------|---------|-------------|------------------|-------------------------------|---------------------------------|----------|---|-----------|
| 11a   | 6Mbps     | 1               | 36      | 5180        | 0.29             | 7.30                          | 16.99                           | 3.30     | - | Pass      |
| 11a   | 6Mbps     | 1               | 44      | 5220        | 0.29             | 7.15                          | 16.99                           | 3.30     |   | Pass      |
| 11a   | 6Mbps     | 1               | 48      | 5240        | 0.29             | 7.11                          | 16.99                           | 3.30     |   | Pass      |
| HT20  | MCS0      | 1               | 36      | 5180        | 0.31             | 7.86                          | 16.99                           | 3.30     |   | Pass      |
| HT20  | MCS0      | 1               | 44      | 5220        | 0.31             | 7.70                          | 16.99                           | 3.30     |   | Pass      |
| HT20  | MCS0      | 1               | 48      | 5240        | 0.31             | 7.48                          | 16.99                           | 3.30     |   | Pass      |
| HT40  | MCS0      | 1               | 38      | 5190        | 0.57             | 8.29                          | 16.99                           | 3.30     |   | Pass      |
| HT40  | MCS0      | 1               | 46      | 5230        | 0.57             | 7.95                          | 16.99                           | 3.30     |   | Pass      |
| VHT20 | MCS0      | 1               | 36      | 5180        | 0.34             | 8.10                          | 16.99                           | 3.30     |   | Pass      |
| VHT20 | MCS0      | 1               | 44      | 5220        | 0.34             | 7.92                          | 16.99                           | 3.30     |   | Pass      |
| VHT20 | MCS0      | 1               | 48      | 5240        | 0.34             | 7.76                          | 16.99                           | 3.30     |   | Pass      |
| VHT40 | MCS0      | 1               | 38      | 5190        | 0.63             | 8.20                          | 16.99                           | 3.30     |   | Pass      |
| VHT40 | MCS0      | 1               | 46      | 5230        | 0.63             | 7.94                          | 16.99                           | 3.30     |   | Pass      |
| VHT80 | MCS0      | 1               | 42      | 5210        | 1.18             | 8.15                          | 16.99                           | 3.30     |   | Pass      |

| Mod.  | Data Rate | N <sub>TX</sub> | Channel | Freq. (MHz) | Duty Factor (dB) | Average Conducted Power (dBm) | IC Conducted Power Limit (dBm) | DG (dBi) | EIRP Power Limit (dBm) | Pass/Fail |
|-------|-----------|-----------------|---------|-------------|------------------|-------------------------------|--------------------------------|----------|------------------------|-----------|
| 11a   | 6Mbps     | 1               | 36      | 5180        | 0.29             | 7.30                          | 19.28                          | 3.30     | 22.58                  | Pass      |
| 11a   | 6Mbps     | 1               | 44      | 5220        | 0.29             | 7.15                          | 19.32                          | 3.30     | 22.62                  | Pass      |
| 11a   | 6Mbps     | 1               | 48      | 5240        | 0.29             | 7.11                          | 19.31                          | 3.30     | 22.61                  | Pass      |
| HT20  | MCS0      | 1               | 36      | 5180        | 0.31             | 7.86                          | 19.48                          | 3.30     | 22.78                  | Pass      |
| HT20  | MCS0      | 1               | 44      | 5220        | 0.31             | 7.70                          | 19.46                          | 3.30     | 22.76                  | Pass      |
| HT20  | MCS0      | 1               | 48      | 5240        | 0.31             | 7.48                          | 19.48                          | 3.30     | 22.78                  | Pass      |
| HT40  | MCS0      | 1               | 38      | 5190        | 0.57             | 8.29                          | 19.71                          | 3.30     | 23.01                  | Pass      |
| HT40  | MCS0      | 1               | 46      | 5230        | 0.57             | 7.95                          | 19.71                          | 3.30     | 23.01                  | Pass      |
| VHT20 | MCS0      | 1               | 36      | 5180        | 0.34             | 8.10                          | 19.48                          | 3.30     | 22.78                  | Pass      |
| VHT20 | MCS0      | 1               | 44      | 5220        | 0.34             | 7.92                          | 19.45                          | 3.30     | 22.75                  | Pass      |
| VHT20 | MCS0      | 1               | 48      | 5240        | 0.34             | 7.76                          | 19.44                          | 3.30     | 22.74                  | Pass      |
| VHT40 | MCS0      | 1               | 38      | 5190        | 0.63             | 8.20                          | 19.71                          | 3.30     | 23.01                  | Pass      |
| VHT40 | MCS0      | 1               | 46      | 5230        | 0.63             | 7.94                          | 19.71                          | 3.30     | 23.01                  | Pass      |
| VHT80 | MCS0      | 1               | 42      | 5210        | 1.18             | 8.15                          | 19.71                          | 3.30     | 23.01                  | Pass      |

**Note:**

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. For the band 5150-5250 MHz, the maximum average conducted output power shall not exceed lesser of 50 mW (17dBm) or 4 dBm + 10log (B), where B is 26dB BW for FCC.
3. For the band 5150-5250 MHz, the maximum average EIRP output power shall not exceed lesser of 200 mW (23dBm) or 10 dBm + 10log (B), where B is 99%OBW for IC.



|                        |             |                            |         |
|------------------------|-------------|----------------------------|---------|
| <b>Test Band :</b>     | 5GHz band 2 | <b>Temperature :</b>       | 24~25°C |
| <b>Test Engineer :</b> | Issac Song  | <b>Relative Humidity :</b> | 49~51%  |

| Mod.  | Data Rate | N <sub>TX</sub> | Channel | Freq.<br>(MHz) | Duty<br>Factor<br>(dB) | Average<br>Conducted<br>Power<br>(dBm) | FCC<br>Conducted<br>Power Limit<br>(dBm) | DG<br>(dBi) | - | Pass/Fail |
|-------|-----------|-----------------|---------|----------------|------------------------|----------------------------------------|------------------------------------------|-------------|---|-----------|
| 11a   | 6Mbps     | 1               | 52      | 5260           | 0.29                   | 8.44                                   | 23.98                                    | 4.50        | - | Pass      |
| 11a   | 6Mbps     | 1               | 60      | 5300           | 0.29                   | 8.17                                   | 23.98                                    | 4.50        |   | Pass      |
| 11a   | 6Mbps     | 1               | 64      | 5320           | 0.29                   | 7.88                                   | 23.98                                    | 4.50        |   | Pass      |
| HT20  | MCS0      | 1               | 52      | 5260           | 0.31                   | 8.43                                   | 23.98                                    | 4.50        |   | Pass      |
| HT20  | MCS0      | 1               | 60      | 5300           | 0.31                   | 8.39                                   | 23.98                                    | 4.50        |   | Pass      |
| HT20  | MCS0      | 1               | 64      | 5320           | 0.31                   | 8.29                                   | 23.98                                    | 4.50        |   | Pass      |
| HT40  | MCS0      | 1               | 54      | 5270           | 0.57                   | 8.68                                   | 23.98                                    | 4.50        |   | Pass      |
| HT40  | MCS0      | 1               | 62      | 5310           | 0.57                   | 8.64                                   | 23.98                                    | 4.50        |   | Pass      |
| VHT20 | MCS0      | 1               | 52      | 5260           | 0.34                   | 8.66                                   | 23.98                                    | 4.50        |   | Pass      |
| VHT20 | MCS0      | 1               | 60      | 5300           | 0.34                   | 8.60                                   | 23.98                                    | 4.50        |   | Pass      |
| VHT20 | MCS0      | 1               | 64      | 5320           | 0.34                   | 8.29                                   | 23.98                                    | 4.50        |   | Pass      |
| VHT40 | MCS0      | 1               | 54      | 5270           | 0.63                   | 8.60                                   | 23.98                                    | 4.50        |   | Pass      |
| VHT40 | MCS0      | 1               | 62      | 5310           | 0.63                   | 8.51                                   | 23.98                                    | 4.50        |   | Pass      |
| VHT80 | MCS0      | 1               | 58      | 5290           | 1.18                   | 8.00                                   | 23.98                                    | 4.50        |   | Pass      |

| Mod.  | Data Rate | N <sub>TX</sub> | Channel | Freq. (MHz) | Duty Factor (dB) | Average Conducted Power (dBm) | IC Conducted Power Limit (dBm) | DG (dBi) | EIRP Power Limit (dBm) | Pass/Fail |
|-------|-----------|-----------------|---------|-------------|------------------|-------------------------------|--------------------------------|----------|------------------------|-----------|
| 11a   | 6Mbps     | 1               | 52      | 5260        | 0.29             | 8.44                          | 23.59                          | 4.50     | 29.59                  | Pass      |
| 11a   | 6Mbps     | 1               | 60      | 5300        | 0.29             | 8.17                          | 23.62                          | 4.50     | 29.62                  | Pass      |
| 11a   | 6Mbps     | 1               | 64      | 5320        | 0.29             | 7.88                          | 23.56                          | 4.50     | 29.56                  | Pass      |
| HT20  | MCS0      | 1               | 52      | 5260        | 0.31             | 8.43                          | 23.76                          | 4.50     | 29.76                  | Pass      |
| HT20  | MCS0      | 1               | 60      | 5300        | 0.31             | 8.39                          | 23.79                          | 4.50     | 29.79                  | Pass      |
| HT20  | MCS0      | 1               | 64      | 5320        | 0.31             | 8.29                          | 23.78                          | 4.50     | 29.78                  | Pass      |
| HT40  | MCS0      | 1               | 54      | 5270        | 0.57             | 8.68                          | 23.98                          | 4.50     | 30.00                  | Pass      |
| HT40  | MCS0      | 1               | 62      | 5310        | 0.57             | 8.64                          | 23.98                          | 4.50     | 30.00                  | Pass      |
| VHT20 | MCS0      | 1               | 52      | 5260        | 0.34             | 8.66                          | 23.79                          | 4.50     | 29.79                  | Pass      |
| VHT20 | MCS0      | 1               | 60      | 5300        | 0.34             | 8.60                          | 23.76                          | 4.50     | 29.76                  | Pass      |
| VHT20 | MCS0      | 1               | 64      | 5320        | 0.34             | 8.29                          | 23.81                          | 4.50     | 29.81                  | Pass      |
| VHT40 | MCS0      | 1               | 54      | 5270        | 0.63             | 8.60                          | 23.98                          | 4.50     | 30.00                  | Pass      |
| VHT40 | MCS0      | 1               | 62      | 5310        | 0.63             | 8.51                          | 23.98                          | 4.50     | 30.00                  | Pass      |
| VHT80 | MCS0      | 1               | 58      | 5290        | 1.18             | 8.00                          | 23.98                          | 4.50     | 30.00                  | Pass      |

**Note:**

1. Final Output Power equals to Measured Output Power adds the duty factor.
2. For the 5250-5350 MHz and 5470-5600 MHz and 5650-5725 MHz bands, the maximum conducted output power shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10log (B), where B is 26dB BW for FCC and 99% OBW for IC.

### 3.3 Power Spectral Density Measurement

#### 3.3.1 Limit of Power Spectral Density

For the band 5150-5250 MHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band.

For the bands 5250-5350 MHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band.

If transmitting antenna directional gain is greater than 6 dBi, 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.

#### 3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.3.3 Test Procedures

The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r03.

Section F) Peak power spectral density (PPSD).

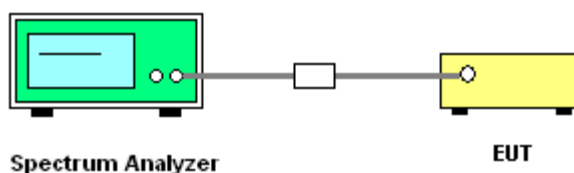
Note: Though the rule refers to “peak power spectral density”, the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission.

#### # Method SA-2 #

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. The testing follows Method SA-2 of FCC KDB 789033 D01 General UNII Test Procedures v01r03.
  - Measure the duty cycle.
  - Set span to encompass the entire emission bandwidth (EBW) of the signal.
  - Set RBW = 1 MHz.
  - Set VBW  $\geq$  3 MHz.
  - Number of points in sweep  $\geq$  2 Span / RBW.
  - Sweep time = auto.
  - Detector = RMS
  - Trace average at least 100 traces in power averaging mode.
  - Add  $10 \log(1/x)$ , where  $x$  is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add  $10 \log(1/0.25) = 6$  dB if the duty cycle is 25 percent.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

### 3.3.4 Test Setup



### 3.3.5 Test Result of Power Spectral Density

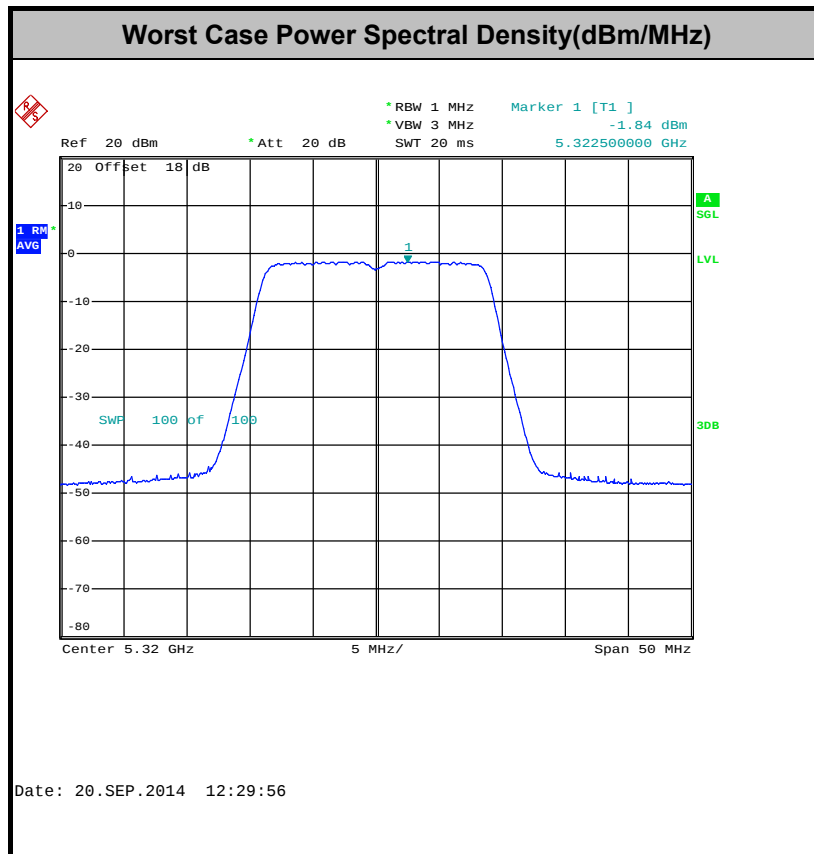
|                        |             |                            |         |
|------------------------|-------------|----------------------------|---------|
| <b>Test Band :</b>     | 5GHz band 1 | <b>Temperature :</b>       | 24~25°C |
| <b>Test Engineer :</b> | Issac Song  | <b>Relative Humidity :</b> | 49~51%  |

| Mod.  | Data Rate | N <sub>TX</sub> | CH | Freq.<br>(MHz) | Duty<br>Factor<br>(dB) | Average<br>Power<br>Density<br>(dBm/MHz) | Average<br>PSD<br>Limit<br>(dBm) | DG<br>(dBi) | Pass/Fail |
|-------|-----------|-----------------|----|----------------|------------------------|------------------------------------------|----------------------------------|-------------|-----------|
| 11a   | 6Mbps     | 1               | 36 | 5180           | 0.29                   | -2.76                                    | 4.00                             | 3.30        | Pass      |
| 11a   | 6Mbps     | 1               | 44 | 5220           | 0.29                   | -2.30                                    | 4.00                             | 3.30        | Pass      |
| 11a   | 6Mbps     | 1               | 48 | 5240           | 0.29                   | -2.20                                    | 4.00                             | 3.30        | Pass      |
| HT20  | MCS0      | 1               | 36 | 5180           | 0.31                   | -3.06                                    | 4.00                             | 3.30        | Pass      |
| HT20  | MCS0      | 1               | 44 | 5220           | 0.31                   | -2.39                                    | 4.00                             | 3.30        | Pass      |
| HT20  | MCS0      | 1               | 48 | 5240           | 0.31                   | -2.45                                    | 4.00                             | 3.30        | Pass      |
| HT40  | MCS0      | 1               | 38 | 5190           | 0.57                   | -5.45                                    | 4.00                             | 3.30        | Pass      |
| HT40  | MCS0      | 1               | 46 | 5230           | 0.57                   | -5.25                                    | 4.00                             | 3.30        | Pass      |
| VHT20 | MCS0      | 1               | 36 | 5180           | 0.34                   | -2.88                                    | 4.00                             | 3.30        | Pass      |
| VHT20 | MCS0      | 1               | 44 | 5220           | 0.34                   | -2.66                                    | 4.00                             | 3.30        | Pass      |
| VHT20 | MCS0      | 1               | 48 | 5240           | 0.34                   | -2.14                                    | 4.00                             | 3.30        | Pass      |
| VHT40 | MCS0      | 1               | 38 | 5190           | 0.63                   | -5.21                                    | 4.00                             | 3.30        | Pass      |
| VHT40 | MCS0      | 1               | 46 | 5230           | 0.63                   | -4.97                                    | 4.00                             | 3.30        | Pass      |
| VHT80 | MCS0      | 1               | 42 | 5210           | 1.18                   | -8.41                                    | 4.00                             | 3.30        | Pass      |



|                        |             |                            |        |
|------------------------|-------------|----------------------------|--------|
| <b>Test Band :</b>     | 5GHz band 2 | <b>Temperature :</b>       | 24~25℃ |
| <b>Test Engineer :</b> | Issac Song  | <b>Relative Humidity :</b> | 49~51% |

| Mod.  | Data Rate | N <sub>TX</sub> | CH | Freq.<br>(MHz) | Duty<br>Factor<br>(dB) | Average<br>Power<br>Density<br>(dBm/MHz) | Average<br>PSD<br>Limit<br>(dBm) | DG<br>(dBi) | Pass/Fail |
|-------|-----------|-----------------|----|----------------|------------------------|------------------------------------------|----------------------------------|-------------|-----------|
| 11a   | 6Mbps     | 1               | 52 | 5260           | 0.29                   | -1.80                                    | 11.00                            | 4.50        | Pass      |
| 11a   | 6Mbps     | 1               | 60 | 5300           | 0.29                   | -1.94                                    | 11.00                            | 4.50        | Pass      |
| 11a   | 6Mbps     | 1               | 64 | 5320           | 0.29                   | -1.58                                    | 11.00                            | 4.50        | Pass      |
| HT20  | MCS0      | 1               | 52 | 5260           | 0.31                   | -2.15                                    | 11.00                            | 4.50        | Pass      |
| HT20  | MCS0      | 1               | 60 | 5300           | 0.31                   | -2.01                                    | 11.00                            | 4.50        | Pass      |
| HT20  | MCS0      | 1               | 64 | 5320           | 0.31                   | -1.68                                    | 11.00                            | 4.50        | Pass      |
| HT40  | MCS0      | 1               | 54 | 5270           | 0.57                   | -4.54                                    | 11.00                            | 4.50        | Pass      |
| HT40  | MCS0      | 1               | 62 | 5310           | 0.57                   | -4.28                                    | 11.00                            | 4.50        | Pass      |
| VHT20 | MCS0      | 1               | 52 | 5260           | 0.34                   | -2.02                                    | 11.00                            | 4.50        | Pass      |
| VHT20 | MCS0      | 1               | 60 | 5300           | 0.34                   | -1.92                                    | 11.00                            | 4.50        | Pass      |
| VHT20 | MCS0      | 1               | 64 | 5320           | 0.34                   | -1.50                                    | 11.00                            | 4.50        | Pass      |
| VHT40 | MCS0      | 1               | 54 | 5270           | 0.63                   | -4.51                                    | 11.00                            | 4.50        | Pass      |
| VHT40 | MCS0      | 1               | 62 | 5310           | 0.63                   | -4.09                                    | 11.00                            | 4.50        | Pass      |
| VHT80 | MCS0      | 1               | 58 | 5290           | 1.18                   | -7.25                                    | 11.00                            | 4.50        | Pass      |



**Note:** Average Power Density (dB) = Measured value+ Duty Factor

### 3.4 Peak Excursion Ratio Measurement

#### 3.4.1 Limit of Peak Excursion Ratio

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

#### 3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

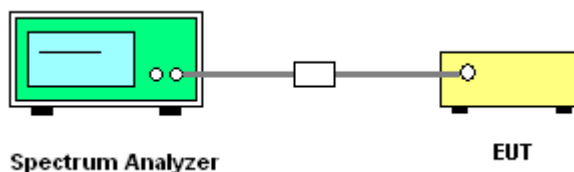
#### 3.4.3 Test Procedures

The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r03.

Section G) Peak excursion measurement

1. The transmitter output is connected to the spectrum analyzer.
2. Set the spectrum analyzer span to view the entire emission bandwidth.
3. Find the maximum of the peak-max-hold spectrum.
  - \*Set RBW = 1MHz.
  - \*Set VBW  $\geq$  3MHz.
  - \*Detector = peak.
  - \*Trace mode = max-hold.
  - \*Allow the sweeps to continue until the trace stabilizes.
  - \*Use the peak search function to find the peak of the spectrum.
4. Use the procedure found under section 3.3 to measure the PPSP.
5. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSP.

#### 3.4.4 Test Setup



### 3.4.5 Test Result of Peak Excursion Ratio

|                        |             |                            |         |
|------------------------|-------------|----------------------------|---------|
| <b>Test Band :</b>     | 5GHz band 1 | <b>Temperature :</b>       | 24~25°C |
| <b>Test Engineer :</b> | Issac Song  | <b>Relative Humidity :</b> | 49~51%  |

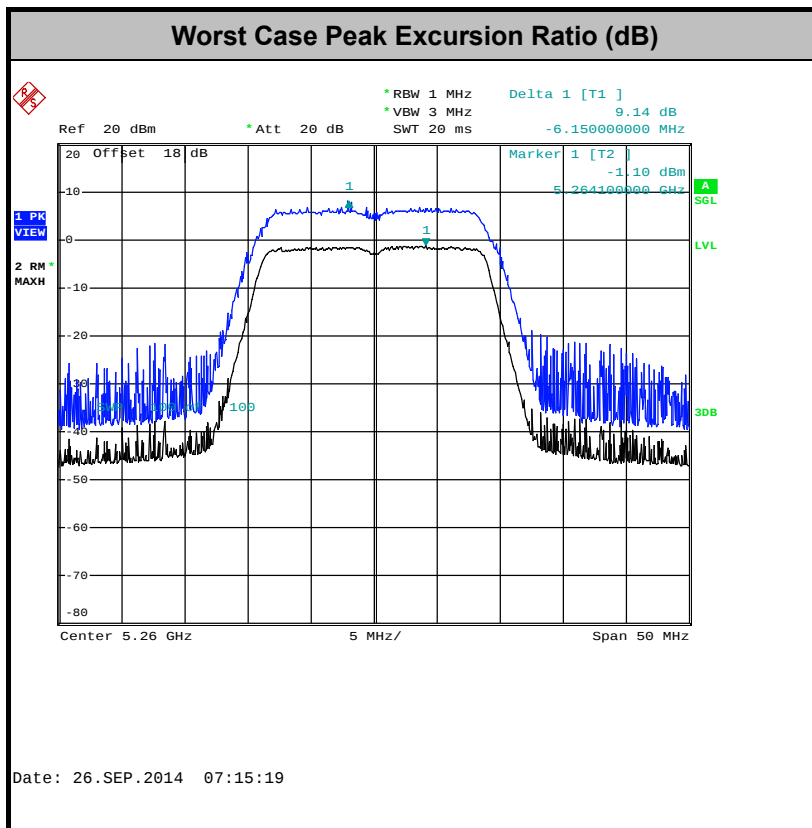
| Mod.  | Data Rate | N <sub>TX</sub> | Ch. | Freq. (MHz) | Peak Excursion Ratio (dB) |      |       |       |        | Max. Limits (dB) | Pass/Fail |
|-------|-----------|-----------------|-----|-------------|---------------------------|------|-------|-------|--------|------------------|-----------|
|       |           |                 |     |             | BPSK                      | QPSK | 16QAM | 64QAM | 256QAM |                  |           |
| 11a   | 6Mbps     | 1               | 36  | 5180        | 7.45                      | 7.19 | 6.59  | 5.38  | -      | 13               | Pass      |
| HT20  | MCS0      | 1               | 36  | 5180        | 8.24                      | 7.91 | 7.35  | 6.07  | -      | 13               | Pass      |
| HT40  | MCS0      | 1               | 38  | 5190        | 8.46                      | 7.89 | 6.61  | 5.80  | -      | 13               | Pass      |
| VHT20 | MCS0      | 1               | 36  | 5180        | 7.79                      | 8.24 | 7.17  | 6.60  | 5.59   | 13               | Pass      |
| VHT40 | MCS0      | 1               | 38  | 5190        | 7.64                      | 7.52 | 6.47  | 5.16  | 5.57   | 13               | Pass      |
| VHT80 | MCS0      | 1               | 42  | 5210        | 6.74                      | 6.83 | 5.50  | 4.61  | 3.70   | 13               | Pass      |

**Note:** All modulation measured based on the minimum data rate setting.

|                        |             |                            |         |
|------------------------|-------------|----------------------------|---------|
| <b>Test Band :</b>     | 5GHz band 2 | <b>Temperature :</b>       | 24~25°C |
| <b>Test Engineer :</b> | Issac Song  | <b>Relative Humidity :</b> | 49~51%  |

| Mod.  | Data Rate | N <sub>TX</sub> | Ch. | Freq. (MHz) | Peak Excursion Ratio (dB) |      |       |       |        | Max. Limits (dB) | Pass/Fail |
|-------|-----------|-----------------|-----|-------------|---------------------------|------|-------|-------|--------|------------------|-----------|
|       |           |                 |     |             | BPSK                      | QPSK | 16QAM | 64QAM | 256QAM |                  |           |
| 11a   | 6Mbps     | 1               | 52  | 5260        | 7.39                      | 6.97 | 6.43  | 5.39  | -      | 13               | Pass      |
| HT20  | MCS0      | 1               | 52  | 5260        | 8.83                      | 8.73 | 7.44  | 6.60  | -      | 13               | Pass      |
| HT40  | MCS0      | 1               | 54  | 5270        | 8.30                      | 7.69 | 6.51  | 5.41  | -      | 13               | Pass      |
| VHT20 | MCS0      | 1               | 52  | 5260        | 8.16                      | 8.21 | 7.91  | 6.73  | 5.43   | 13               | Pass      |
| VHT40 | MCS0      | 1               | 54  | 5270        | 7.36                      | 7.20 | 7.83  | 5.46  | 5.36   | 13               | Pass      |
| VHT80 | MCS0      | 1               | 58  | 5290        | 7.16                      | 6.83 | 5.39  | 4.63  | 3.99   | 13               | Pass      |

**Note:** All modulation measured based on the minimum data rate setting.



Note: Peak Excursion Ratio (dB) = Peak – (Average + Duty Cycle Offset)

Duty Cycle Offset: 0.31dB

### 3.5 Unwanted Radiated Emission Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part 15.205.

#### 3.5.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27dBm/MHz.

For transmitters operating in the 5250-5350 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band must meet all applicable technical requirements for operation in the 5150-5250 MHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5150-5250 MHz band.

For transmitters operating in the 5470-5600 MHz and 5650-5725MHz band: all emissions outside of the 5470-5600 MHz and 5650-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part 15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

| Frequency<br>(MHz) | Field Strength<br>(microvolts/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                                |

**Note:** The following formula is used to convert the EIRP to field strength.

$$E = \frac{1000000\sqrt{30P}}{3} \quad \mu\text{V/m, where P is the eirp (Watts)}$$

| EIRP (dBm) | Field Strength at 3m (dBμV/m) |
|------------|-------------------------------|
| -17        | 78.3                          |
| - 27       | 68.3                          |



- (3) KDB789033 v01r03 H)2)c(i) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.

### **3.5.2 Measuring Instruments**

The measuring equipment is listed in the section 4 of this test report.

### 3.5.3 Test Procedures

1. The testing follows FCC KDB 789033 D01 General UNII Test Procedures v01r03.

Section H) Unwanted emissions measurement.

(1) Procedure for Unwanted Emissions Measurements Below 1000MHz

- RBW = 120 kHz
- VBW = 300 kHz
- Detector = Peak
- Trace mode = max hold

(2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

- The setting follows the H) 5) of FCC KDB 789033.
- RBW = 1 MHz
- VBW  $\geq$  3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

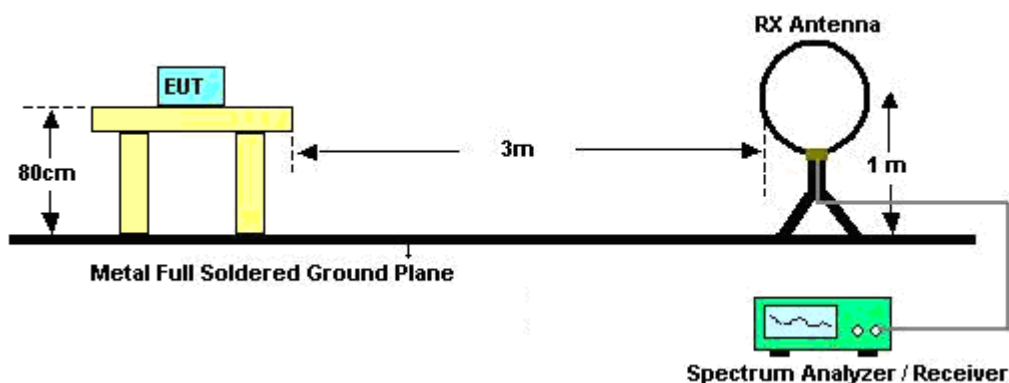
- The setting follows H) 6) of FCC KDB 789033.
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW  $\geq$  1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

| Band          | Duty Cycle(%) | T(ms) | 1/T(kHz) | VBW Setting |
|---------------|---------------|-------|----------|-------------|
| 802.11a       | 93.46         | 1.430 | 0.699    | 1kHz        |
| 802.11n HT20  | 93.01         | 1.330 | 0.752    | 1kHz        |
| 802.11n HT40  | 87.71         | 0.671 | 1.490    | 3kHz        |
| 802.11n VHT20 | 92.54         | 1.340 | 0.746    | 1kHz        |
| 802.11n VHT40 | 86.49         | 0.666 | 1.502    | 3kHz        |
| 802.11n VHT80 | 76.15         | 0.332 | 3.012    | 10kHz       |

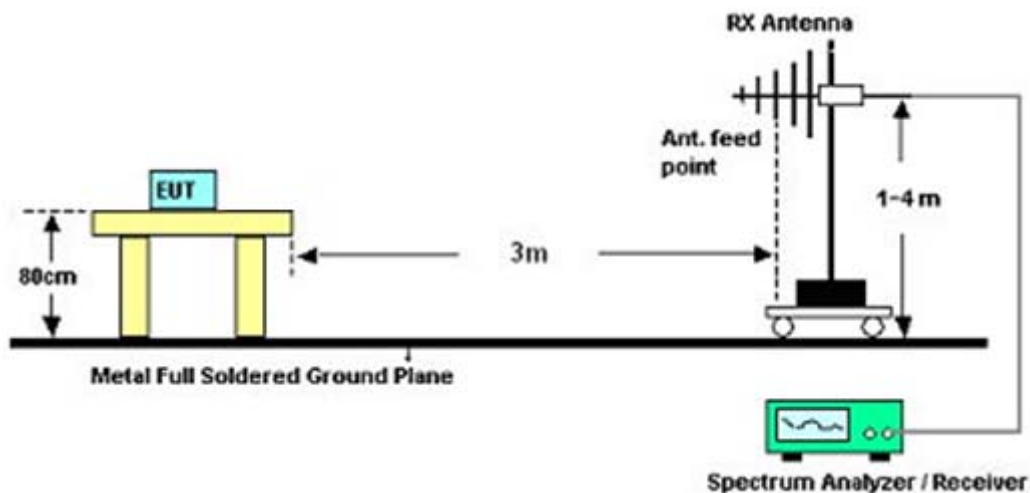
2. The EUT was placed on a rotatable table top 0.8 meter above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

### 3.5.4 Test Setup

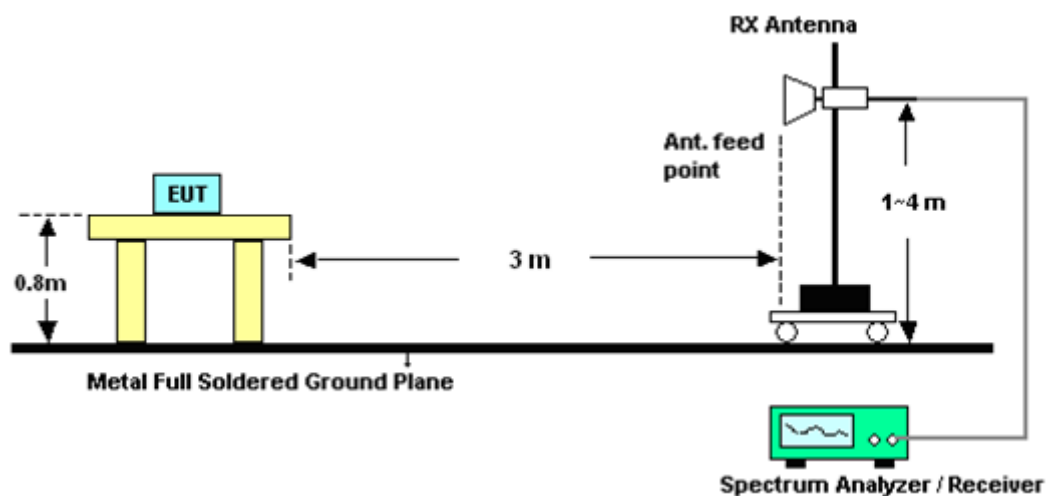
**For radiated emissions below 30MHz**



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.5.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

### 3.5.6 Test Result

#### 3.5.6.1 Test Result of Radiated Band Edges

|                        |          |                            |         |
|------------------------|----------|----------------------------|---------|
| <b>Test Mode :</b>     | 802.11a  | <b>Temperature :</b>       | 22~23°C |
| <b>Test Channel :</b>  | 140      | <b>Relative Humidity :</b> | 42~43%  |
| <b>Test Engineer :</b> | Star Wei |                            |         |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5725.16                       | 61.19               | -12.81                  | 74                          | 53.72                     | 35.52                       | 5.65                    | 33.7                       | 100                  | 107                     | Peak    |
| 5725.4                        | 42.1                | -11.9                   | 54                          | 34.63                     | 35.52                       | 5.65                    | 33.7                       | 100                  | 107                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5725                        | 61.71               | -12.29                  | 74                          | 54.24                     | 35.52                       | 5.65                    | 33.7                       | 100                  | 85                      | Peak    |
| 5729.4                      | 42.6                | -11.4                   | 54                          | 35.13                     | 35.52                       | 5.65                    | 33.7                       | 100                  | 85                      | Average |

|                        |              |                            |         |
|------------------------|--------------|----------------------------|---------|
| <b>Test Mode :</b>     | 802.11n HT20 | <b>Temperature :</b>       | 22~23°C |
| <b>Test Channel :</b>  | 140          | <b>Relative Humidity :</b> | 42~43%  |
| <b>Test Engineer :</b> | Star Wei     |                            |         |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5725.4                        | 67.3                | -6.7                    | 74                          | 59.83                     | 35.52                       | 5.65                    | 33.7                       | 100                  | 286                     | Peak    |
| 5725.8                        | 42.91               | -11.09                  | 54                          | 35.44                     | 35.52                       | 5.65                    | 33.7                       | 100                  | 286                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5725.32                     | 69.09               | -4.91                   | 74                          | 61.62                     | 35.52                       | 5.65                    | 33.7                       | 100                  | 271                     | Peak    |
| 5725.16                     | 42.33               | -11.67                  | 54                          | 34.86                     | 35.52                       | 5.65                    | 33.7                       | 100                  | 271                     | Average |



|                 |              |                     |         |
|-----------------|--------------|---------------------|---------|
| Test Mode :     | 802.11n HT40 | Temperature :       | 22~23°C |
| Test Channel :  | 62           | Relative Humidity : | 42~43%  |
| Test Engineer : | Star Wei     |                     |         |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                         |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5350.25                       | 69.71               | -4.29                   | 74                          | 62.67                   | 35.32                       | 5.45                    | 33.73                      | 100                  | 298                     | Peak    |
| 5350.05                       | 46.7                | -7.3                    | 54                          | 39.66                   | 35.32                       | 5.45                    | 33.73                      | 100                  | 298                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                         |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5350.6                      | 67.71               | -6.29                   | 74                          | 60.67                   | 35.32                       | 5.45                    | 33.73                      | 100                  | 156                     | Peak    |
| 5350                        | 45.5                | -8.5                    | 54                          | 38.46                   | 35.32                       | 5.45                    | 33.73                      | 100                  | 156                     | Average |

|                 |                |                     |         |
|-----------------|----------------|---------------------|---------|
| Test Mode :     | 802.11ac VHT20 | Temperature :       | 22~23°C |
| Test Channel :  | 36             | Relative Humidity : | 42~43%  |
| Test Engineer : | Star Wei       |                     |         |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                         |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5149.6                        | 62.89               | -11.11                  | 74                          | 56.03                   | 35.25                       | 5.38                    | 33.77                      | 100                  | 287                     | Peak    |
| 5106.05                       | 41.72               | -12.28                  | 54                          | 34.89                   | 35.23                       | 5.38                    | 33.78                      | 100                  | 287                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                         |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5149.85                     | 63.91               | -10.09                  | 74                          | 57.05                   | 35.25                       | 5.38                    | 33.77                      | 100                  | 125                     | Peak    |
| 5106.55                     | 42.21               | -11.79                  | 54                          | 35.38                   | 35.23                       | 5.38                    | 33.78                      | 100                  | 125                     | Average |



|                 |                |                     |         |
|-----------------|----------------|---------------------|---------|
| Test Mode :     | 802.11ac VHT40 | Temperature :       | 22~23°C |
| Test Channel :  | 62             | Relative Humidity : | 42~43%  |
| Test Engineer : | Star Wei       |                     |         |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5350.75                       | 67.47               | -6.53                   | 74                          | 60.43                     | 35.32                       | 5.45                    | 33.73                      | 100                  | 294                     | Peak    |
| 5353.4                        | 45.47               | -8.53                   | 54                          | 38.43                     | 35.32                       | 5.45                    | 33.73                      | 100                  | 294                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5352.45                     | 66.78               | -7.22                   | 74                          | 59.74                     | 35.32                       | 5.45                    | 33.73                      | 100                  | 147                     | Peak    |
| 5350.3                      | 45.75               | -8.25                   | 54                          | 38.71                     | 35.32                       | 5.45                    | 33.73                      | 100                  | 146                     | Average |

|                 |                |                     |         |
|-----------------|----------------|---------------------|---------|
| Test Mode :     | 802.11ac VHT80 | Temperature :       | 22~23°C |
| Test Channel :  | 58             | Relative Humidity : | 42~43%  |
| Test Engineer : | Star Wei       |                     |         |

| ANTENNA POLARITY : HORIZONTAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-------------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )          | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5148.8                        | 52.15               | -21.85                  | 74                          | 45.29                     | 35.25                       | 5.38                    | 33.77                      | 100                  | 154                     | Peak    |
| 5119.85                       | 40.51               | -13.49                  | 54                          | 33.68                     | 35.23                       | 5.38                    | 33.78                      | 100                  | 154                     | Average |
| 5353.45                       | 69.33               | -4.67                   | 74                          | 62.29                     | 35.32                       | 5.45                    | 33.73                      | 100                  | 294                     | Peak    |
| 5358.75                       | 48.5                | -5.5                    | 54                          | 41.46                     | 35.32                       | 5.45                    | 33.73                      | 100                  | 294                     | Average |

| ANTENNA POLARITY : VERTICAL |                     |                         |                             |                           |                             |                         |                            |                      |                         |         |
|-----------------------------|---------------------|-------------------------|-----------------------------|---------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| Frequency<br>( MHz )        | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
| 5133.15                     | 53.16               | -20.84                  | 74                          | 46.32                     | 35.24                       | 5.38                    | 33.78                      | 100                  | 0                       | Peak    |
| 5137.7                      | 40.88               | -13.12                  | 54                          | 34.04                     | 35.24                       | 5.38                    | 33.78                      | 100                  | 0                       | Average |
| 5350.15                     | 69.83               | -4.17                   | 74                          | 62.79                     | 35.32                       | 5.45                    | 33.73                      | 100                  | 149                     | Peak    |
| 5350.7                      | 48.54               | -5.46                   | 54                          | 41.5                      | 35.32                       | 5.45                    | 33.73                      | 100                  | 149                     | Average |

**3.5.6.2 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)**

|                        |                                                                                                                                                      |                            |            |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11a                                                                                                                                              | <b>Temperature :</b>       | 22~23°C    |
| <b>Test Channel :</b>  | 140                                                                                                                                                  | <b>Relative Humidity :</b> | 42~43%     |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                             | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 5700 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5700                 | 104.06              | -                       | -                           | 96.64                   | 35.5                        | 5.62                    | 33.7                       | 100                  | 106                     | Peak    |
| 5700                 | 93.26               | -                       | -                           | 85.84                   | 35.5                        | 5.62                    | 33.7                       | 100                  | 106                     | Average |
| 11400                | 35.73               | -38.27                  | 74                          | 56.86                   | 4.13                        | 8.74                    | 34                         | 100                  | 154                     | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11a                                                                                                                                              | <b>Temperature :</b>       | 22~23°C  |
| <b>Test Channel :</b>  | 140                                                                                                                                                  | <b>Relative Humidity :</b> | 42~43%   |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                             | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 5700 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5700                 | 105.75              | -                       | -                           | 98.33                   | 35.5                        | 5.62                    | 33.7                       | 100                  | 92                      | Peak    |
| 5700                 | 94.45               | -                       | -                           | 87.03                   | 35.5                        | 5.62                    | 33.7                       | 100                  | 92                      | Average |
| 11400                | 35.35               | -38.65                  | 74                          | 56.48                   | 4.13                        | 8.74                    | 34                         | 145                  | 263                     | Peak    |

|                        |                                                                                                                                                      |                            |            |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11n HT20                                                                                                                                         | <b>Temperature :</b>       | 22~23°C    |
| <b>Test Channel :</b>  | 140                                                                                                                                                  | <b>Relative Humidity :</b> | 42~43%     |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                             | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 5700 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5700                 | 105.82              | -                       | -                           | 98.4                    | 35.5                        | 5.62                    | 33.7                       | 100                  | 290                     | Peak    |
| 5700                 | 93.1                | -                       | -                           | 85.68                   | 35.5                        | 5.62                    | 33.7                       | 100                  | 290                     | Average |
| 11400                | 34.73               | -39.27                  | 74                          | 55.86                   | 4.13                        | 8.74                    | 34                         | 145                  | 221                     | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11n HT20                                                                                                                                         | <b>Temperature :</b>       | 22~23°C  |
| <b>Test Channel :</b>  | 140                                                                                                                                                  | <b>Relative Humidity :</b> | 42~43%   |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                             | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 5700 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5700                 | 104.78              | -                       | -                           | 97.36                   | 35.5                        | 5.62                    | 33.7                       | 100                  | 265                     | Peak    |
| 5700                 | 93.38               | -                       | -                           | 85.96                   | 35.5                        | 5.62                    | 33.7                       | 100                  | 265                     | Average |
| 11400                | 35.19               | -38.81                  | 74                          | 56.32                   | 4.13                        | 8.74                    | 34                         | 100                  | 102                     | Peak    |

|                        |                                                                                                                                                      |                            |            |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11n HT40                                                                                                                                         | <b>Temperature :</b>       | 22~23°C    |
| <b>Test Channel :</b>  | 62                                                                                                                                                   | <b>Relative Humidity :</b> | 42~43%     |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                             | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 5310 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5310                 | 102.97              | -                       | -                           | 95.95                   | 35.31                       | 5.44                    | 33.73                      | 100                  | 292                     | Peak    |
| 5310                 | 91                  | -                       | -                           | 83.98                   | 35.31                       | 5.44                    | 33.73                      | 100                  | 292                     | Average |
| 10620                | 32.89               | -41.11                  | 74                          | 57.67                   | 1.68                        | 7.86                    | 34.32                      | 100                  | 121                     | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11n HT40                                                                                                                                         | <b>Temperature :</b>       | 22~23°C  |
| <b>Test Channel :</b>  | 62                                                                                                                                                   | <b>Relative Humidity :</b> | 42~43%   |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                             | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 5310 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5310                 | 99.91               | -                       | -                           | 92.89                   | 35.31                       | 5.44                    | 33.73                      | 100                  | 140                     | Peak    |
| 5310                 | 89.07               | -                       | -                           | 82.05                   | 35.31                       | 5.44                    | 33.73                      | 100                  | 140                     | Average |
| 10620                | 31.59               | -42.41                  | 74                          | 56.37                   | 1.68                        | 7.86                    | 34.32                      | 112                  | 1452                    | Peak    |

|                        |                                                                                                                                                                   |                            |            |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11ac VHT20                                                                                                                                                    | <b>Temperature :</b>       | 22~23°C    |
| <b>Test Channel :</b>  | 36                                                                                                                                                                | <b>Relative Humidity :</b> | 42~43%     |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 5180 MHz is fundamental signal which can be ignored.<br>2. 10359 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5180                 | 104.3               | -                       | -                           | 97.42                   | 35.26                       | 5.39                    | 33.77                      | 100                  | 289                     | Peak    |
| 5180                 | 93.24               | -                       | -                           | 86.36                   | 35.26                       | 5.39                    | 33.77                      | 100                  | 289                     | Average |
| 10359                | 32.4                | -41.6                   | 74                          | 57.71                   | 1.46                        | 7.72                    | 34.49                      | 145                  | 221                     | Peak    |

|                        |                                                                                                                                                                   |                            |          |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11ac VHT20                                                                                                                                                    | <b>Temperature :</b>       | 22~23°C  |
| <b>Test Channel :</b>  | 36                                                                                                                                                                | <b>Relative Humidity :</b> | 42~43%   |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 5180 MHz is fundamental signal which can be ignored.<br>2. 10359 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5180                 | 105.47              | -                       | -                           | 98.59                   | 35.26                       | 5.39                    | 33.77                      | 100                  | 132                     | Peak    |
| 5180                 | 93.9                | -                       | -                           | 87.02                   | 35.26                       | 5.39                    | 33.77                      | 100                  | 132                     | Average |
| 10359                | 32.1                | -41.9                   | 74                          | 57.41                   | 1.46                        | 7.72                    | 34.49                      | 132                  | 221                     | Peak    |

|                        |                                                                                                                                                      |                            |            |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11ac VHT40                                                                                                                                       | <b>Temperature :</b>       | 22~23°C    |
| <b>Test Channel :</b>  | 62                                                                                                                                                   | <b>Relative Humidity :</b> | 42~43%     |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                             | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 5310 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5310                 | 99.92               | -                       | -                           | 92.9                    | 35.31                       | 5.44                    | 33.73                      | 100                  | 293                     | Peak    |
| 5310                 | 89.18               | -                       | -                           | 82.16                   | 35.31                       | 5.44                    | 33.73                      | 100                  | 293                     | Average |
| 10620                | 33.12               | -40.88                  | 74                          | 57.9                    | 1.68                        | 7.86                    | 34.32                      | 100                  | 145                     | Peak    |

|                        |                                                                                                                                                      |                            |          |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11ac VHT40                                                                                                                                       | <b>Temperature :</b>       | 22~23°C  |
| <b>Test Channel :</b>  | 62                                                                                                                                                   | <b>Relative Humidity :</b> | 42~43%   |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                             | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 5310 MHz is fundamental signal which can be ignored.<br>2. Average measurement was not performed if peak level went lower than the average limit. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 5310                 | 101.57              | -                       | -                           | 94.55                   | 35.31                       | 5.44                    | 33.73                      | 100                  | 146                     | Peak    |
| 5310                 | 90.06               | -                       | -                           | 83.04                   | 35.31                       | 5.44                    | 33.73                      | 100                  | 146                     | Average |
| 10620                | 31.42               | -42.58                  | 74                          | 56.2                    | 1.68                        | 7.86                    | 34.32                      | 112                  | 132                     | Peak    |

|                        |                                                                                                                                                                   |                            |            |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|------------|
| <b>Test Mode :</b>     | 802.11ac VHT80                                                                                                                                                    | <b>Temperature :</b>       | 22~23°C    |
| <b>Test Channel :</b>  | 58                                                                                                                                                                | <b>Relative Humidity :</b> | 42~43%     |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                                          | <b>Polarization :</b>      | Horizontal |
| <b>Remark :</b>        | 1. 5290 MHz is fundamental signal which can be ignored.<br>2. 10581 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209. |                            |            |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 92.08                | 28.61               | -14.89                  | 43.5                        | 52                      | 9.35                        | 0.88                    | 33.62                      | 112                  | 148                     | Peak    |
| 175.5                | 22.56               | -20.94                  | 43.5                        | 46.12                   | 8.8                         | 1.21                    | 33.57                      | -                    | -                       | Peak    |
| 320.03               | 18.43               | -27.57                  | 46                          | 36.62                   | 13.55                       | 1.63                    | 33.37                      | -                    | -                       | Peak    |
| 477.17               | 21.35               | -24.65                  | 46                          | 35.71                   | 16.8                        | 2                       | 33.16                      | -                    | -                       | Peak    |
| 698.33               | 18.56               | -27.44                  | 46                          | 29.77                   | 19.29                       | 2.38                    | 32.88                      | -                    | -                       | Peak    |
| 872.93               | 19.55               | -26.45                  | 46                          | 28.99                   | 20.48                       | 2.68                    | 32.6                       | -                    | -                       | Peak    |
| 5290                 | 98.64               | -                       | -                           | 91.65                   | 35.3                        | 5.43                    | 33.74                      | 100                  | 280                     | Peak    |
| 5290                 | 88.48               | -                       | -                           | 81.49                   | 35.3                        | 5.43                    | 33.74                      | 100                  | 280                     | Average |
| 10581                | 31.22               | -42.78                  | 74                          | 56.08                   | 1.64                        | 7.84                    | 34.34                      | 100                  | 115                     | Peak    |

|                        |                                                                                                                                                                   |                            |          |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|----------|
| <b>Test Mode :</b>     | 802.11ac VHT80                                                                                                                                                    | <b>Temperature :</b>       | 22~23°C  |
| <b>Test Channel :</b>  | 58                                                                                                                                                                | <b>Relative Humidity :</b> | 42~43%   |
| <b>Test Engineer :</b> | Star Wei                                                                                                                                                          | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | 1. 5290 MHz is fundamental signal which can be ignored.<br>2. 10581 MHz is not within a restricted band and satisfies both the average and peak limits of 15.209. |                            |          |

| Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>(dBμV) | Antenna<br>Factor<br>( dB ) | Cable<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Remark  |
|----------------------|---------------------|-------------------------|-----------------------------|-------------------------|-----------------------------|-------------------------|----------------------------|----------------------|-------------------------|---------|
| 55.22                | 28.31               | -11.69                  | 40                          | 55                      | 6.2                         | 0.69                    | 33.58                      | 100                  | 145                     | Peak    |
| 139.61               | 24.96               | -18.54                  | 43.5                        | 46.57                   | 10.9                        | 1.08                    | 33.59                      | -                    | -                       | Peak    |
| 238.55               | 20.56               | -25.44                  | 46                          | 41.13                   | 11.46                       | 1.43                    | 33.46                      | -                    | -                       | Peak    |
| 477.17               | 21.56               | -24.44                  | 46                          | 35.92                   | 16.8                        | 2                       | 33.16                      | -                    | -                       | Peak    |
| 760.41               | 21.47               | -24.53                  | 46                          | 31.82                   | 19.89                       | 2.51                    | 32.75                      | -                    | -                       | Peak    |
| 951.5                | 23.41               | -30.59                  | 54                          | 32.3                    | 20.74                       | 2.81                    | 32.44                      | -                    | -                       | Peak    |
| 5290                 | 100                 | -                       | -                           | 93.01                   | 35.3                        | 5.43                    | 33.74                      | 100                  | 146                     | Peak    |
| 5290                 | 88.74               | -                       | -                           | 81.75                   | 35.3                        | 5.43                    | 33.74                      | 100                  | 146                     | Average |
| 10581                | 31.91               | -42.09                  | 74                          | 56.77                   | 1.64                        | 7.84                    | 34.34                      | 133                  | 69                      | Peak    |

## 3.6 Frequency Stability Measurement

### 3.6.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

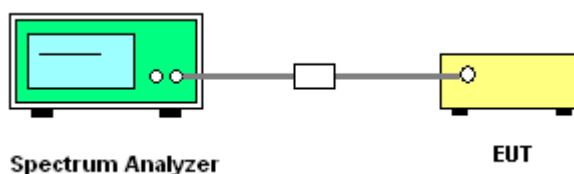
### 3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

### 3.6.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

### 3.6.4 Test Setup



### 3.6.5 Test Result of Frequency Stability

|                    |               |                        |            |
|--------------------|---------------|------------------------|------------|
| <b>Test Band :</b> | 5GHz band 1,2 | <b>Test Engineer :</b> | Issac Song |
|--------------------|---------------|------------------------|------------|

| Mod. | Data Rate | NTX | Channel | Freq. (MHz) | Center Frequency (MHz) | Frequency Deviation (MHz) | Frequency Stability (ppm) | Temperature (°C) | Voltage (V) |
|------|-----------|-----|---------|-------------|------------------------|---------------------------|---------------------------|------------------|-------------|
| 11a  | 6Mbps     | 1   | 36      | 5180        | 5180.000               | 0.000                     | 0.00                      | 20               | 3.6         |
| 11a  | 6Mbps     | 1   | 36      | 5180        | 5180.000               | 0.000                     | 0.00                      | 20               | 4.2         |
| 11a  | 6Mbps     | 1   | 36      | 5180        | 5180.000               | 0.000                     | 0.00                      | 20               | 3.8         |
| 11a  | 6Mbps     | 1   | 36      | 5180        | 5180.000               | 0.000                     | 0.00                      | -10              | 3.8         |
| 11a  | 6Mbps     | 1   | 36      | 5180        | 5180.000               | 0.000                     | 0.00                      | 55               | 3.8         |

| Mod. | Data Rate | NTX | Channel | Freq. (MHz) | Center Frequency (MHz) | Frequency Deviation (MHz) | Frequency Stability (ppm) | Temperature (°C) | Voltage (V) |
|------|-----------|-----|---------|-------------|------------------------|---------------------------|---------------------------|------------------|-------------|
| 11a  | 6Mbps     | 1   | 64      | 5320        | 5320.000               | 0.000                     | 0.00                      | 20               | 3.6         |
| 11a  | 6Mbps     | 1   | 64      | 5320        | 5320.000               | 0.000                     | 0.00                      | 20               | 4.2         |
| 11a  | 6Mbps     | 1   | 64      | 5320        | 5320.000               | 0.000                     | 0.00                      | 20               | 3.8         |
| 11a  | 6Mbps     | 1   | 64      | 5320        | 5320.000               | 0.000                     | 0.00                      | -10              | 3.8         |
| 11a  | 6Mbps     | 1   | 64      | 5320        | 5320.000               | 0.000                     | 0.00                      | 55               | 3.8         |

**Note:**

- Center Frequency = (Low Frequency + High Frequency) / 2.
- The frequency band 5180-5240MHz which was verified by testing against other standard is less than 20 ppm which is sufficient to maintain the signal within the 5150-5250MHz band.

## **3.7 Automatically Discontinue Transmission**

### **3.7.1 Limit of Automatically Discontinue Transmission**

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

### **3.7.2 Measuring Instruments**

The measuring equipment is listed in the section 4 of this test report.

### **3.7.3 Test Result of Automatically Discontinue Transmission**

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

## 3.8 Antenna Requirements

### 3.8.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2), if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit 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.

### 3.8.2 Antenna Anti-Replacement Construction

Non-standard antenna connector is used.

### 3.8.3 Antenna Gain

The antenna gain is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

## 4 List of Measuring Equipment

| Instrument                | Manufacturer | Model No. | Serial No.     | Characteristics | Calibration Date | Test Date                       | Due Date      | Remark                |
|---------------------------|--------------|-----------|----------------|-----------------|------------------|---------------------------------|---------------|-----------------------|
| Spectrum Analyzer         | R&S          | FSP40     | 100319         | 9kHz~40GHz      | Dec. 28, 2013    | Sep. 20, 2014~<br>Oct. 11, 2014 | Dec. 27, 2014 | Conducted (TH01-KS)   |
| Spectrum Analyzer         | R&S          | FSV30     | 101338         | 9kHz~30GHz      | May 04, 2014     | Sep. 20, 2014~<br>Oct. 11, 2014 | May 03, 2015  | Conducted (TH01-KS)   |
| Pulse Power Sensor        | Anritsu      | MA2411B   | 0917070        | 30MHz~40GHz     | Feb. 27, 2014    | Sep. 20, 2014~<br>Oct. 11, 2014 | Feb. 26, 2015 | Conducted (TH01-KS)   |
| Power Meter               | Anritsu      | ML2495A   | 1005002        | 50MHz Bandwidth | Feb. 27, 2014    | Sep. 20, 2014~<br>Oct. 11, 2014 | Feb. 26, 2015 | Conducted (TH01-KS)   |
| Thermal Chamber           | Ten Billion  | TTC-B3S   | TBN-9605<br>02 | -40~+150°C      | Dec. 10, 2013    | Sep. 20, 2014~<br>Oct. 11, 2014 | Dec. 09, 2014 | Conducted (TH01-KS)   |
| EMI Test Receiver         | R&S          | ESCI      | 100534         | 9kHz~3GHz       | Nov. 05, 2013    | Sep. 15, 2014                   | Nov. 04, 2014 | Radiation (03CH01-KS) |
| Spectrum Analyzer         | R&S          | FSP30     | 101399         | 9kHz~30GHz      | May 04, 2014     | Sep. 15, 2014                   | May 03, 2015  | Radiation (03CH01-KS) |
| Spectrum Analyzer         | R&S          | FSP40     | 100319         | 9kHz~40GHz      | Dec. 28, 2013    | Sep. 15, 2014                   | Dec. 27, 2014 | Radiation (03CH01-KS) |
| Loop Antenna              | R&S          | HFH2-Z2   | 100321         | 9kHz~30MHz      | Oct. 09, 2013    | Sep. 15, 2014                   | Oct. 08, 2014 | Radiation (03CH01-KS) |
| Bilog Antenna             | SCHAFFNER    | CBL6112D  | 23182          | 25MHz~2GHz      | Jan. 08, 2014    | Sep. 15, 2014                   | Jan. 07, 2015 | Radiation (03CH01-KS) |
| Double Ridge Horn Antenna | ETS-Lindgren | 3117      | 75959          | 1GHz~18GHz      | Jan. 08, 2014    | Sep. 15, 2014                   | Jan. 07, 2015 | Radiation (03CH01-KS) |
| Active Horn Antenna       | com-power    | AHA-118   | 701030         | 1GHz~18GHz      | Nov. 18, 2013    | Sep. 15, 2014                   | Nov. 17, 2014 | Radiation (03CH01-KS) |
| SHF-EHF Horn              | Schwarzbeck  | BBHA 9170 | BBHA1702<br>49 | 15GHz~40GHz     | Mar. 10, 2014    | Sep. 15, 2014                   | Mar. 09, 2015 | Radiation (03CH01-KS) |
| Amplifier                 | com-power    | PA-103A   | 161073         | 1MHz~1GHz       | May 04, 2014     | Sep. 15, 2014                   | May 03, 2015  | Radiation (03CH01-KS) |
| Amplifier                 | Agilent      | 8449B     | 3008A023<br>71 | 1GHz~26.5GHz    | Dec. 10, 2013    | Sep. 15, 2014                   | Dec. 09, 2014 | Radiation (03CH01-KS) |
| AC Power Source           | Chroma       | 61601     | F1040900<br>04 | N/A             | NCR              | Sep. 15, 2014                   | NCR           | Radiation (03CH01-KS) |
| Turn Table                | MF           | MF7802    | N/A            | 0~360 degree    | NCR              | Sep. 15, 2014                   | NCR           | Radiation (03CH01-KS) |
| Antenna Mast              | MF           | MF7802    | N/A            | 1 m~4 m         | NCR              | Sep. 15, 2014                   | NCR           | Radiation (03CH01-KS) |

## 5 Uncertainty of Evaluation

### Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

|                                                                          |     |
|--------------------------------------------------------------------------|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2U_c(y)$ ) | 2.5 |
|--------------------------------------------------------------------------|-----|



## **Appendix B. Product Equality Declaration**

# Declaration

| Model Information:            |                                                                                |
|-------------------------------|--------------------------------------------------------------------------------|
| Applicant's Name:             | BYD Precision Manufacture Co., Ltd.                                            |
| Applicant's Business Address: | No.3001, Baohe Road, Baolong Industrial, Longgang, Shenzhen, 518116, P.R.China |
| Model Name:                   | T02D                                                                           |
| HW version:                   | MP                                                                             |
| SW version:                   | YTP802A110830                                                                  |

## Description:

We(BYD)declare,

The main differences conducted to 2nd source as below:

1. Add 2<sup>nd</sup> source adapter P/N LA10EUNM130(for EU) & LA10USNM130(for US);
2. Add 2<sup>nd</sup> source LCD P/N T09ADFC08002A;

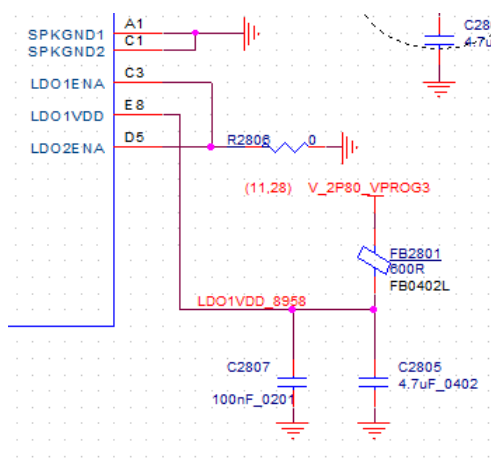
Hardware change history is list below

| Date      | Version | Hardware | Change Note          |
|-----------|---------|----------|----------------------|
| 2014/3/31 | 01      | DVT-B    | Initial version      |
| 2014/6/15 | 02      | MP       | Refer to below part1 |

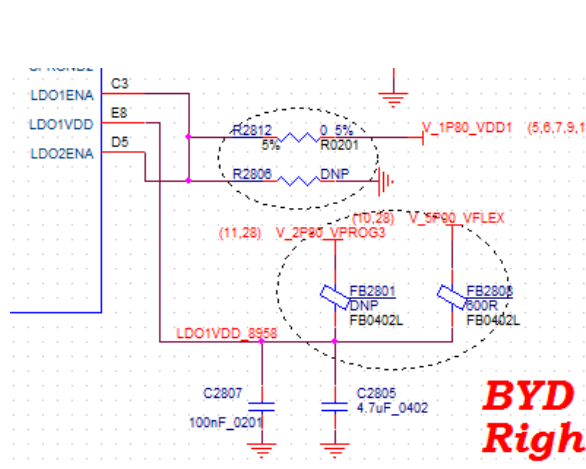
Part1

**1、AVDD1&DCVDD Changed to internal LDO to improve power consumption and resolve earphone detect issue.**

**DVT-B**



**MP**

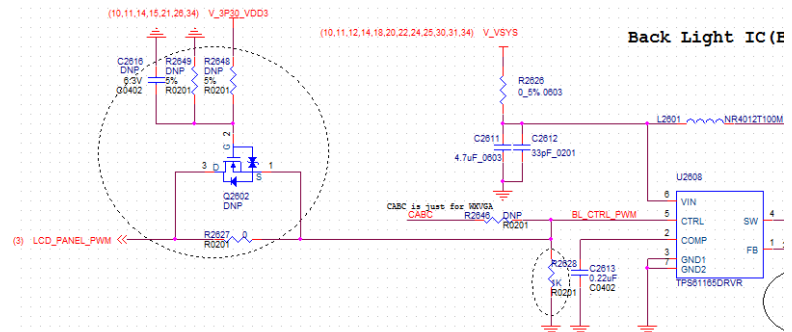
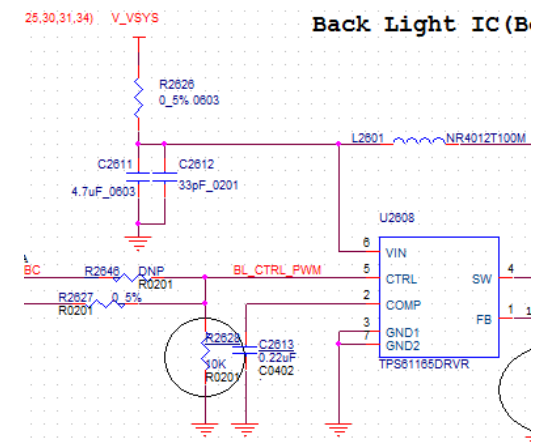


**BYD  
Righ**

2、Change R2628 from 10K to 1K for LCD flicker while power on. And add reserve circuit to avoid LCD flick issue if the current solution is not OK.

DVT-B

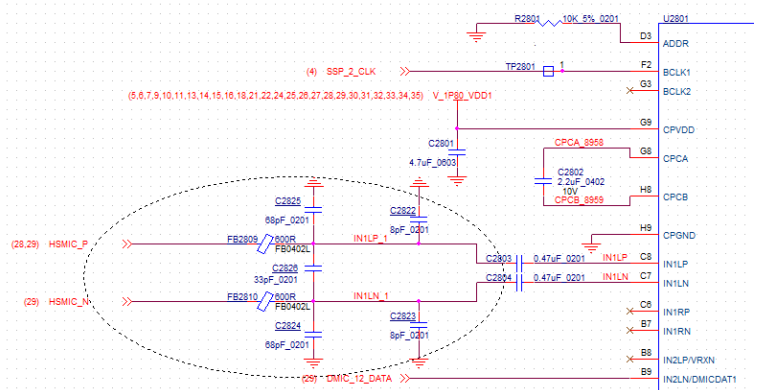
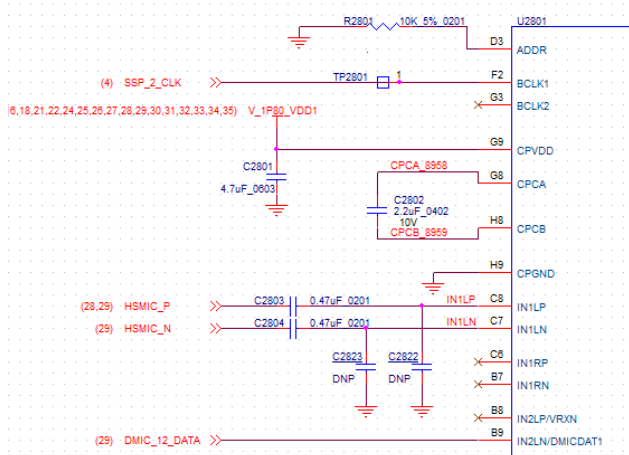
MP



3、ADD C2822,C2823,C2824,C2825,C2826,FB2809,FB2810 to filter TDMA Noise.

DVT-B

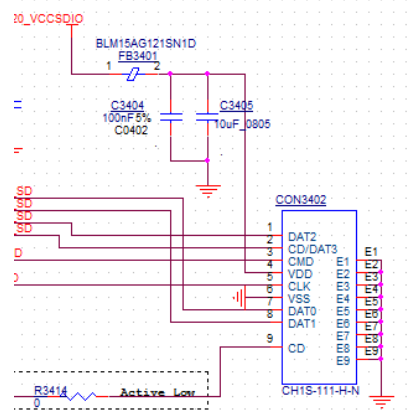
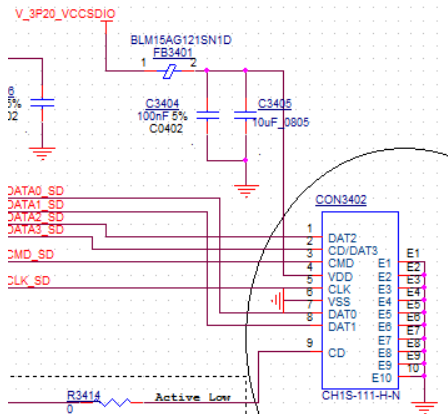
MP



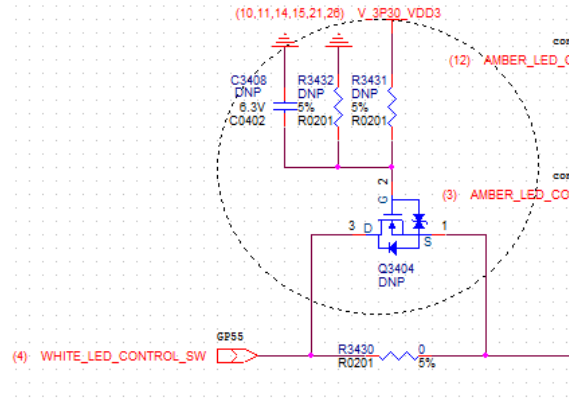
4、Delete pin E10,because this pin is easily short to SD card's frame GND and after del E10 pin it will not influence the reliability.

DVT-B

MP



**MP**



**Issue Date:** 2014/9/12