



# FCC RF Test Report

**APPLICANT** : Motorola Mobility, LLC  
**EQUIPMENT** : Mobile Cellular Phone  
**BRAND NAME** : Motorola  
**MODEL NAME** : 10721, 12822  
**FCC ID** : IHDT56WB3  
**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 Mar. 31, 2017 and testing was completed on May 07, 2017. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager



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FCC ID : IHDT56WB3

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### SUMMARY OF TEST RESULT

| Report Section | FCC Rule           | Description                            | Limit   | Result | Remark  |
|----------------|--------------------|--|---|--------|---|
| 3.1            | 15.407(a)          | Maximum Conducted Output Power         | $\leq 24$ dBm<br>(depend on band)                 | Pass   | -   |
| 3.2            | 15.407(b)          | Unwanted Emissions                     | $\leq -17, -27$ dBm<br>(depend on band)&15.209(a) | Pass   | Under limit<br>0.13 dB at<br>5146.640 MHz and<br>5350.080 MHz |
| 3.3            | 15.407(c)          | Automatically Discontinue Transmission | Discontinue Transmission                          | Pass   | -   |
| 3.4            | 15.203 & 15.407(a) | Antenna Requirement                    | N/A   | Pass   | -   |



# 1 General Description

## 1.1 Applicant

**Motorola Mobility, LLC**

222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States

## 1.2 Manufacturer

**Motorola Mobility, LLC**

222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States

## 1.3 Product Feature of Equipment Under Test

| Product Feature                 |  |
|---------------------------------|--|
| Equipment                       | Mobile Cellular Phone  |
| Brand Name                      | Motorola   |
| Model Name                      | 10721, 12822   |
| FCC ID                          | IHDT56WB3  |
| IMEI Code                       | 353312080019096  |
| EUT supports Radios application | CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE/NFC<br>WLAN 11b/g/n HT20<br>WLAN 11a/n HT20/HT40<br>WLAN 11ac VHT20/VHT40/VHT80<br>Bluetooth BR/EDR/LE |
| HW Version                      | DVT2   |
| EUT Stage                       | Identical Prototype  |

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report. All the test cases were performed on original report which can be referred to Sporton Report Number FR733129E.



| Accessory List   |                         |
|------------------|-------------------------|
| AC Adapter 1     | Brand Name : Motorola   |
|                  | Model Name : SPN5970A   |
| AC Adapter 2     | Brand Name : Motorola   |
|                  | Model Name : SPN5993A   |
| AC Adapter 3     | Brand Name : Motorola   |
|                  | Model Name : SPN5978A   |
| Battery 1        | Brand Name : Motorola   |
|                  | Model Name : SNN5986A   |
| Battery 2        | Brand Name : Motorola   |
|                  | Model Name : SNN5897A   |
| Earphone         | Brand Name : Motorola   |
|                  | Model Name : SH38C16618 |
| USB Cable        | Brand Name : Motorola   |
|                  | Model Name : SKN6473A   |
| USB-C Data Cable | Brand Name : Motorola   |
|                  | Model Name : SKN6474A   |



### 1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification |   |
|---|---|
| <b>Tx/Rx Frequency Range</b>            | 5180 MHz ~ 5240 MHz<br>5260 MHz ~ 5320 MHz<br>5500 MHz ~ 5720 MHz   |
| <b>Maximum Output Power to Antenna</b>  | <p><b>&lt;Ant. 1&gt;</b><br/> <b>&lt;5180 MHz ~ 5240 MHz&gt;</b><br/>           802.11a : 17.73 dBm / 0.0593 W<br/>           802.11n HT20 : 17.66 dBm / 0.0583 W<br/>           802.11n HT40 : 17.05 dBm / 0.0507 W<br/>           802.11ac VHT20 : 17.79 dBm / 0.0601 W<br/>           802.11ac VHT40 : 17.40 dBm / 0.0550 W<br/>           802.11ac VHT80 : 15.12 dBm / 0.0325 W<br/> <b>&lt;5260 MHz ~ 5320 MHz&gt;</b><br/>           802.11a : 17.77 dBm / 0.0598 W<br/>           802.11n HT20 : 17.85 dBm / 0.0610 W<br/>           802.11n HT40 : 16.84 dBm / 0.0483 W<br/>           802.11ac VHT20 : 17.80 dBm / 0.0603 W<br/>           802.11ac VHT40 : 17.19 dBm / 0.0524 W<br/>           802.11ac VHT80 : 13.78 dBm / 0.0239 W<br/> <b>&lt;5500 MHz ~ 5700 MHz &gt;</b><br/>           802.11a : 17.81 dBm / 0.0604 W<br/>           802.11n HT20 : 17.90 dBm / 0.0617 W<br/>           802.11n HT40 : 17.42 dBm / 0.0552 W<br/>           802.11ac VHT20 : 17.88 dBm / 0.0614 W<br/>           802.11ac VHT40 : 17.53 dBm / 0.0566 W<br/>           802.11ac VHT80 : 17.83 dBm / 0.0607 W<br/> <b>&lt;Ant. 2&gt;</b><br/> <b>&lt;5180 MHz ~ 5240 MHz&gt;</b><br/>           802.11a : 17.67 dBm / 0.0585 W<br/>           802.11n HT20 : 17.52 dBm / 0.0565 W<br/>           802.11n HT40 : 16.70 dBm / 0.0468 W<br/>           802.11ac VHT20 : 17.60 dBm / 0.0575 W<br/>           802.11ac VHT40 : 17.30 dBm / 0.0537 W<br/>           802.11ac VHT80 : 15.18 dBm / 0.0330 W<br/> <b>&lt;5260 MHz ~ 5320 MHz&gt;</b><br/>           802.11a : 17.73 dBm / 0.0593 W<br/>           802.11n HT20 : 17.63 dBm / 0.0579 W<br/>           802.11n HT40 : 16.59 dBm / 0.0456 W<br/>           802.11ac VHT20 : 17.68 dBm / 0.0586 W<br/>           802.11ac VHT40 : 17.01 dBm / 0.0502 W<br/>           802.11ac VHT80 : 13.73 dBm / 0.0236 W<br/> <b>&lt;5500 MHz ~ 5700 MHz &gt;</b><br/>           802.11a : 17.77 dBm / 0.0598 W<br/>           802.11n HT20 : 17.67 dBm / 0.0585 W<br/>           802.11n HT40 : 17.19 dBm / 0.0524 W<br/>           802.11ac VHT20 : 17.80 dBm / 0.0603 W<br/>           802.11ac VHT40 : 17.35 dBm / 0.0543 W<br/>           802.11ac VHT80 : 17.53 dBm / 0.0566 W</p> |



| Standards-related Product Specification                            |   |
|--|---|
| <p><b>Maximum Output Power to Antenna</b></p>                      | <p><b>MIMO &lt;Ant. 1 + 2&gt;</b><br/> <b>&lt;5180 MHz ~ 5240 MHz&gt;</b><br/>           802.11a : 20.74 dBm / 0.1186 W<br/>           802.11n HT20 : 20.62 dBm / 0.1153 W<br/>           802.11n HT40 : 19.93 dBm / 0.0984 W<br/>           802.11ac VHT20 : 20.72 dBm / 0.1180 W<br/>           802.11ac VHT40 : 20.43 dBm / 0.1104 W<br/>           802.11ac VHT80 : 18.33 dBm / 0.0681 W<br/> <b>&lt;5260 MHz ~ 5320 MHz&gt;</b><br/>           802.11a : 20.78 dBm / 0.1197 W<br/>           802.11n HT20 : 20.76 dBm / 0.1191 W<br/>           802.11n HT40 : 19.78 dBm / 0.0951 W<br/>           802.11ac VHT20 : 20.76 dBm / 0.1191 W<br/>           802.11ac VHT40 : 20.16 dBm / 0.1038 W<br/>           802.11ac VHT80 : 16.73 dBm / 0.0471 W<br/> <b>&lt;5500 MHz ~ 5700 MHz &gt;</b><br/>           802.11a : 20.84 dBm / 0.1213 W<br/>           802.11n HT20 : 20.81 dBm / 0.1205 W<br/>           802.11n HT40 : 20.48 dBm / 0.1117 W<br/>           802.11ac VHT20 : 20.91 dBm / 0.1233 W<br/>           802.11ac VHT40 : 20.55 dBm / 0.1135 W<br/>           802.11ac VHT80 : 20.73 dBm / 0.1183 W</p> |
| <p><b>Maximum Output Power to Antenna for Straddle Channel</b></p> | <p><b>&lt;Ant. 1&gt;</b><br/>           802.11a : 17.77 dBm / 0.0598 W<br/>           802.11n HT20 : 17.90 dBm / 0.0617 W<br/>           802.11n HT40 : 17.10 dBm / 0.0513 W<br/>           802.11ac VHT20 : 17.78 dBm / 0.0600 W<br/>           802.11ac VHT40 : 17.16 dBm / 0.0520 W<br/>           802.11ac VHT80 : 17.90 dBm / 0.0617 W<br/> <b>&lt;Ant. 2&gt;</b><br/>           802.11a : 17.67 dBm / 0.0585 W<br/>           802.11n HT20 : 17.68 dBm / 0.0586 W<br/>           802.11n HT40 : 16.80 dBm / 0.0479 W<br/>           802.11ac VHT20 : 17.72 dBm / 0.0592 W<br/>           802.11ac VHT40 : 16.60 dBm / 0.0457 W<br/>           802.11ac VHT80 : 17.65 dBm / 0.0582 W<br/> <b>MIMO &lt;Ant. 1 + 2&gt;</b><br/>           802.11a : 20.74 dBm / 0.1186 W<br/>           802.11n HT20 : 20.68 dBm / 0.1169 W<br/>           802.11n HT40 : 19.94 dBm / 0.0986 W<br/>           802.11ac VHT20 : 20.61 dBm / 0.1151 W<br/>           802.11ac VHT40 : 19.86 dBm / 0.0968 W<br/>           802.11ac VHT80 : 20.91 dBm / 0.1233 W</p>  |



| Standards-related Product Specification |   |        |  |        |        |               |   |   |                    |   |   |
|---|---|--------|--|--------|--------|---------------|---|---|--------------------|---|---|
| Antenna Gain / Gain                     | <p>&lt;Ant. 1&gt;<br/>                     &lt;5150 MHz ~ 5250 MHz&gt;<br/>                     Fixed Internal Antenna type with gain -3.70 dBi<br/>                     &lt;5250 MHz ~ 5350 MHz&gt;<br/>                     Fixed Internal Antenna type with gain -2.40 dBi<br/>                     &lt;5470 MHz ~ 5725 MHz&gt;<br/>                     Fixed Internal Antenna type with gain -2.40 dBi<br/>                     &lt;Ant. 2&gt;<br/>                     &lt;5150 MHz ~ 5250 MHz&gt;<br/>                     Fixed Internal Antenna type with gain -3.30 dBi<br/>                     &lt;5250 MHz ~ 5350 MHz&gt;<br/>                     Fixed Internal Antenna type with gain -3.10 dBi<br/>                     &lt;5470 MHz ~ 5725 MHz&gt;<br/>                     Fixed Internal Antenna type with gain -3.50 dBi</p> |        |  |        |        |               |   |   |                    |   |   |
| Type of Modulation                      | 802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)<br>802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)  |        |  |        |        |               |   |   |                    |   |   |
| Antenna Function Description            | <table border="1"> <thead> <tr> <th></th> <th>Ant. 1</th> <th>Ant. 2</th> </tr> </thead> <tbody> <tr> <td>802.11 a/n/ac</td> <td>V</td> <td>V</td> </tr> <tr> <td>802.11 a/n/ac MIMO</td> <td>V</td> <td>V</td> </tr> </tbody> </table>   |        |  | Ant. 1 | Ant. 2 | 802.11 a/n/ac | V | V | 802.11 a/n/ac MIMO | V | V |
|   | Ant. 1  | Ant. 2 |  |        |        |               |   |   |                    |   |   |
| 802.11 a/n/ac                           | V   | V      |  |        |        |               |   |   |                    |   |   |
| 802.11 a/n/ac MIMO                      | V   | V      |  |        |        |               |   |   |                    |   |   |

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

### 1.5 Modification of EUT

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



### 1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

|                           |  |
|---------------------------|--|
| <b>Test Site</b>          | SPORTON INTERNATIONAL INC.   |
| <b>Test Site Location</b> | No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park,<br>Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.<br>TEL: +886-3-327-3456<br>FAX: +886-3-328-4978 |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b><br>TH05-HY   |

**Note:** The test site complies with ANSI C63.4 2014 requirement.

|                           |  |
|---------------------------|--|
| <b>Test Site</b>          | SPORTON INTERNATIONAL INC.   |
| <b>Test Site Location</b> | No.58, Aly. 75, Ln. 564, Wenhua 3rd Rd. Guishan Dist,<br>Taoyuan City, Taiwan (R.O.C.)<br>TEL: +886-3-327-0868<br>FAX: +886-3-327-0855 |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b><br>03CH11-HY   |

**Note:** The test site complies with ANSI C63.4 2014 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 789033 D02 General UNII Test Procedures New Rules v01r04.
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01
- ♦ ANSI C63.10-2013

**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 (X plane) were recorded in this report.

### 2.1 Carrier Frequency Channel

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

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

| Frequency Band                        | Channel          | Freq. (MHz) | Channel | Freq. (MHz) |
|---------------------------------------|------------------|-------------|---------|-------------|
| 5470-5725 MHz<br>Band 3<br>(U-NII-2C) | 100              | 5500        | 112     | 5560        |
|                                       | 102*             | 5510        | 116     | 5580        |
|                                       | 104              | 5520        | 132     | 5660        |
|                                       | 106 <sup>#</sup> | 5530        | 134*    | 5670        |
|                                       | 108              | 5540        | 136     | 5680        |
|                                       | 110*             | 5550        | 140     | 5720        |



| Frequency Band | Channel          | Freq. (MHz) | Channel | Freq. (MHz) |
|----------------|------------------|-------------|---------|-------------|
| TDWR Channel   | 118*             | 5590        | 124     | 5620        |
|                | 120              | 5600        | 126*    | 5630        |
|                | 122 <sup>#</sup> | 5610        | 128     | 5640        |

| Frequency Band   | Channel          | Freq. (MHz) | Channel | Freq. (MHz) |
|------------------|------------------|-------------|---------|-------------|
| Straddle Channel | 138 <sup>#</sup> | 5690        | 144     | 5720        |
|                  | 142*             | 5710        |         |             |

Note:

1. The above Frequency and Channel in "\*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "<sup>#</sup>" were 802.11ac VHT80.

## 2.2 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

### MIMO Antenna

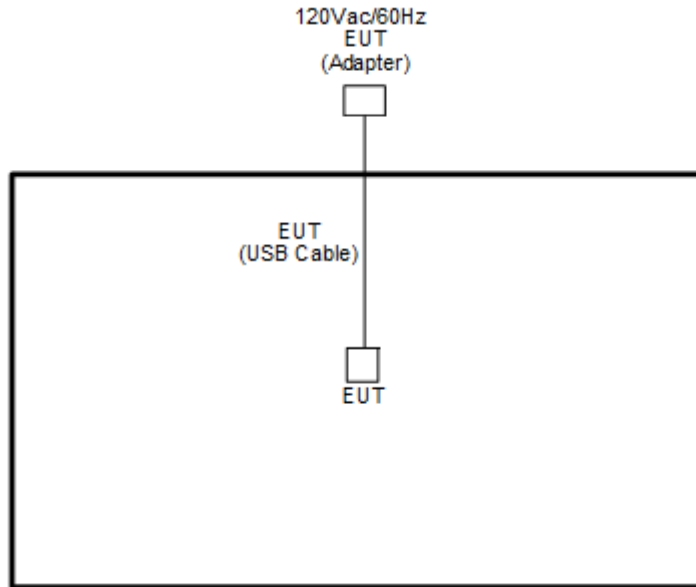
| Modulation     | Data Rate |
|----------------|-----------|
| 802.11n HT40   | MCS0      |
| 802.11ac VHT80 | MCS0      |

Remark: All the radiated test cases were performance with Adapter 1 and Battery 2.

| Ch. #    |        | Band I : 5150-5250 MHz | Band II : 5250-5350 MHz | Band III : 5470-5725MHz |
|----------|--------|------------------------|-------------------------|-------------------------|
|          |        | 802.11n HT40           | 802.11n HT40            | 802.11ac VHT80          |
| L        | Low    | 38                     | -                       | -                       |
| M        | Middle | -                      | -                       | 106                     |
| H        | High   | -                      | 62                      | -                       |
| Straddle |        | -                      | -                       | -                       |

## 2.3 Connection Diagram of Test System

<WLAN Tx Mode>



## 2.4 EUT Operation Test Setup

The RF test items, programmed RF utility, "QRCT" installed in the notebook make the EUT provide functions like channel selection and power level for continuous transmitting and receiving signals.



### 3 Test Result

#### 3.1 Maximum Conducted Output Power Measurement

##### 3.1.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

For the 5.25–5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm 10 log B, where B is the 26 dB emission bandwidth in megahertz.

For Straddle Channel, U-NII procedures and limits were applied for operations in the frequency band in accordance with FCC KDB 644545 D03.

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.

Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

##### 3.1.2 Measuring Instruments

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

### 3.1.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04.

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

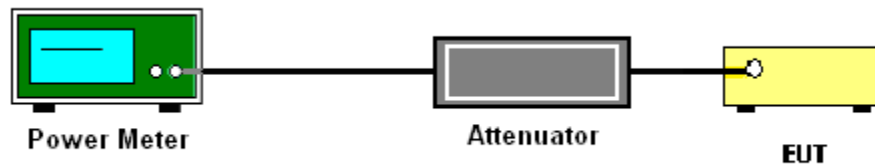
1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor,  $10 \log(1/x)$ , where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

For straddle channel, the testing follows Method SA-3 (RMS detection with max hold) of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04.

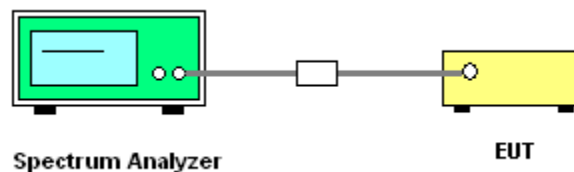
Compute power by integrating the spectrum across the 99% occupied bandwidth of the signal using the instrument's band power measurement function.

### 3.1.4 Test Setup

For normal channel:



For straddle channel:



### 3.1.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



### 3.2 Unwanted Radiated Emission Measurement

This section is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement.

#### 3.2.1 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 5470-5725MHz band: all emissions outside of the 5470-5725MHz band shall not exceed an EIRP of -27 dBm/MHz.

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

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

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

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



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

(3) KDB789033 D02 v01r04 G)2)c)

- (i) Sections 15.407(b)(1) to (b)(3) specify the unwanted emission limits for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.<sup>3</sup>
- (ii) Section 15.407(b)(4) specifies the unwanted emission limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). The emission limits are in terms of a Peak detector. An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the devices using the alternative limit.<sup>4</sup>

**Note 3:** An out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz peak emission limit.

**Note 4:** Only devices with antenna gains of 10 dBi or less may be approved using the emission limits specified in Section 15.247(d) till March 2, 2018; all other devices operating in this band must use the mask specified in Section 15.407(b)(4)(i).

### 3.2.2 Measuring Instruments

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



### **3.2.3 Test Procedures**

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r04. Section G) 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

- RBW = 1 MHz
- VBW  $\geq$  3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

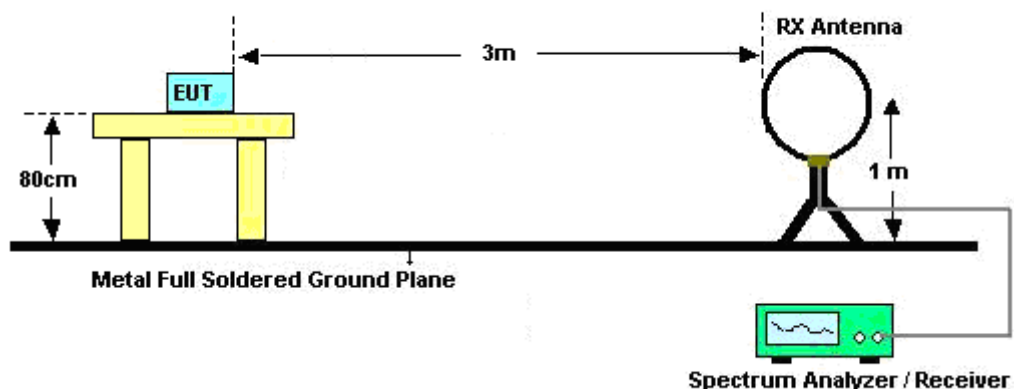
(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

- 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.

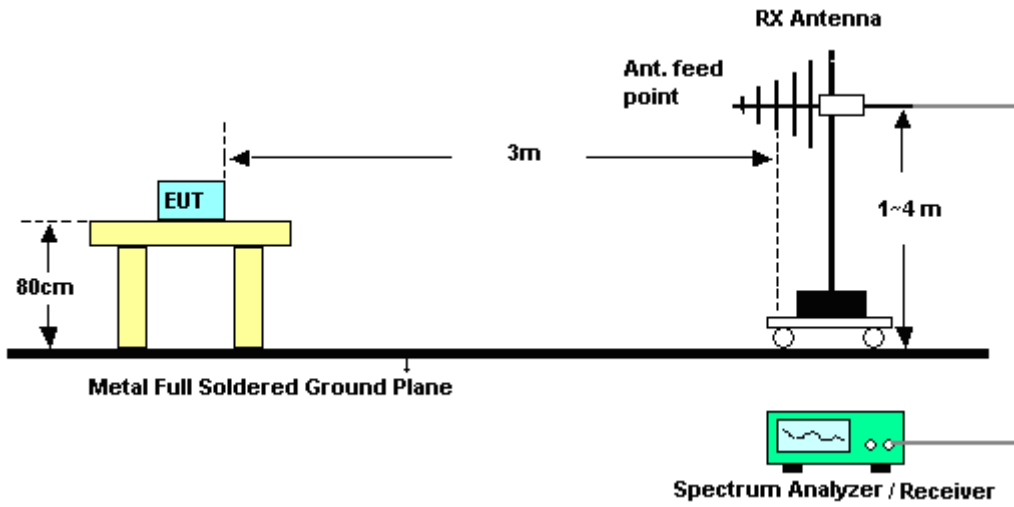
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband 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.

### 3.2.4 Test Setup

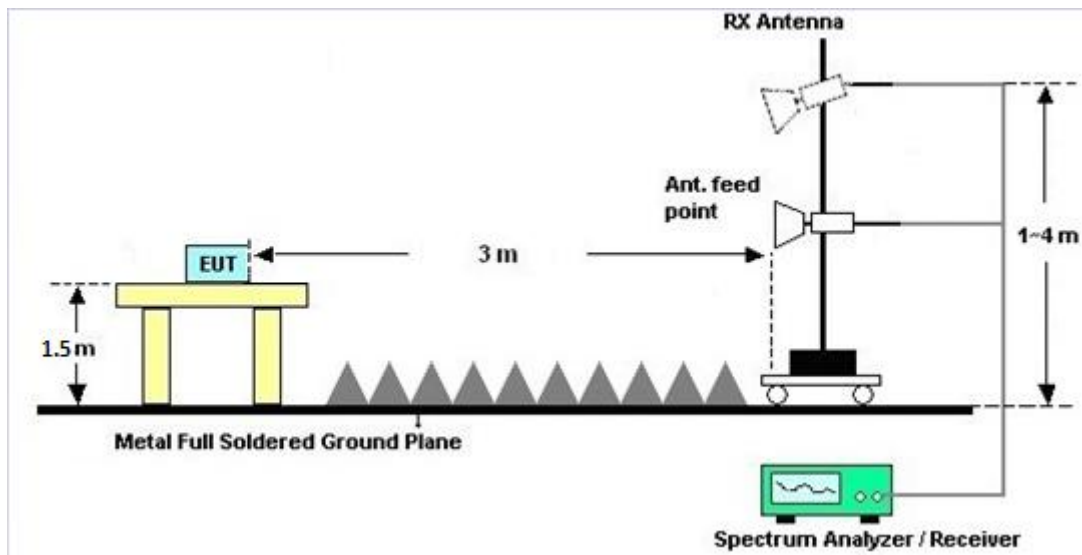
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz





### **3.2.5 Test Results of Radiated Spurious 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 was not reported.

### **3.2.6 Test Result of Radiated Spurious at Band Edges**

Please refer to Appendix B and C.

### **3.2.7 Duty Cycle**

Please refer to Appendix D.

### **3.2.8 Test Result of Radiated Spurious Emissions (30MHz ~ 10th Harmonic)**

Please refer to Appendix B and C.



### **3.3 Automatically Discontinue Transmission**

#### **3.3.1 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.

#### **3.3.2 Measuring Instruments**

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

#### **3.3.3 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.



### 3.4 Antenna Requirements

#### 3.4.1 Standard Applicable

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.

#### 3.4.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

#### 3.4.3 Antenna Gain

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain =  $G_{ANT}$  + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain =  $10 \log(N_{ANT}/N_{SS}=1)$  dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ .

Directional gain may be calculated by using the formulas applicable to equal gain antennas with  $G_{ANT}$  set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain  $G_{ANT}$  is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

|          | Ant 1 | Ant 2 | DG for Power | DG for PSD | Power Limit Reduction | PSD Limit Reduction |
|----------|-------|-------|--------------|------------|-----------------------|---------------------|
|          | (dBi) | (dBi) | (dBi)        | (dBi)      | (dB)                  | (dB)                |
| Band I   | -3.70 | -3.30 | -3.30        | -0.49      | 0.00                  | 0.00                |
| Band II  | -2.40 | -3.10 | -2.40        | 0.27       | 0.00                  | 0.00                |
| Band III | -2.40 | -3.50 | -2.40        | 0.08       | 0.00                  | 0.00                |

Power limit reduction = Composite gain – 6dBi, ( min = 0 )

PSD limit reduction = Composite gain + PSD Array gain – 6dBi, ( min = 0 )



## 4 List of Measuring Equipments

| Instrument           | Manufacturer    | Model No.                  | Serial No.      | Characteristics | Calibration Date | Test Date                     | Due Date      | Remark                   |
|----------------------|-----------------|----------------------------|-----------------|-----------------|------------------|-------------------------------|---------------|--------------------------|
| Power Meter          | Anritsu         | ML2495A                    | 0932001         | 300MHz~40GHz    | Sep. 29, 2016    | May 04, 2017~<br>May 05, 2017 | Sep. 28, 2017 | Conducted<br>(TH05-HY)   |
| Power Sensor         | Anritsu         | MA2411B                    | 0846202         | 300MHz~40GHz    | Sep. 29, 2016    | May 04, 2017~<br>May 05, 2017 | Sep. 28, 2017 | Conducted<br>(TH05-HY)   |
| Amplifier            | SONOMA          | 310N                       | 187312          | 9kHz~1GHz       | Nov. 10, 2016    | May 05, 2017~<br>May 07, 2017 | Nov. 09, 2017 | Radiation<br>(03CH11-HY) |
| Loop Antenna         | Rohde & Schwarz | HFH2-Z2                    | 100315          | 9 kHz~30 MHz    | Sep. 02, 2015    | May 05, 2017~<br>May 07, 2017 | Sep. 01, 2017 | Radiation<br>(03CH11-HY) |
| Bilog Antenna        | TESEQ           | CBL 6111D                  | 35414           | 30MHz~1GHz      | Oct. 15, 2016    | May 05, 2017~<br>May 07, 2017 | Oct. 14, 2017 | Radiation<br>(03CH11-HY) |
| Horn Antenna         | SCHWARZBECK     | BBHA 9120 D                | 9120D-1326      | 1GHz ~ 18GHz    | Oct. 07, 2016    | May 05, 2017~<br>May 07, 2017 | Oct. 06, 2017 | Radiation<br>(03CH11-HY) |
| Preamplifier         | Keysight        | 83017A                     | MY53270080      | 1GHz~26.5GHz    | Nov. 10, 2016    | May 05, 2017~<br>May 07, 2017 | Nov. 09, 2017 | Radiation<br>(03CH11-HY) |
| Spectrum Analyzer    | Keysight        | N9010A                     | MY54200486      | 10Hz ~ 44GHz    | Oct. 12, 2016    | May 05, 2017~<br>May 07, 2017 | Oct. 11, 2017 | Radiation<br>(03CH11-HY) |
| Antenna Mast         | EMEC            | AM-BS-4500-B               | N/A             | 1~4m            | N/A              | May 05, 2017~<br>May 07, 2017 | N/A           | Radiation<br>(03CH11-HY) |
| Turn Table           | EMEC            | TT 2000                    | N/A             | 0~360 Degree    | N/A              | May 05, 2017~<br>May 07, 2017 | N/A           | Radiation<br>(03CH11-HY) |
| Preamplifier         | MITEQ           | AMF-7D-0010<br>1800-30-10P | 1815698         | 1GHz~18GHz      | Dec. 01, 2016    | May 05, 2017~<br>May 07, 2017 | Nov. 30, 2017 | Radiation<br>(03CH11-HY) |
| SHF-EHF Horn Antenna | SCHWARZBECK     | BBHA 9170                  | BBHA917058<br>4 | 18GHz- 40GHz    | Nov. 08, 2016    | May 05, 2017~<br>May 07, 2017 | Nov. 07, 2017 | Radiation<br>(03CH11-HY) |
| Preamplifier         | MITEQ           | TTA0204                    | 1872107         | 2GHz~40GHz      | Feb. 15, 2017    | May 05, 2017~<br>May 07, 2017 | Feb. 14, 2018 | Radiation<br>(03CH11-HY) |



## 5 Uncertainty of Evaluation

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

|   |     |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 5.2 |
|---|-----|

### Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

|   |     |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 5.5 |
|---|-----|

### Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

|   |     |
|---|-----|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 5.2 |
|---|-----|

**Appendix A. Test Result of Conducted Test Items**

|                |                   |                    |       |    |
|----------------|-------------------|--------------------|-------|----|
| Test Engineer: | Shiming Liu       | Temperature:       | 21~25 | °C |
| Test Date:     | 2017/5/4~2017/5/5 | Relative Humidity: | 51~54 | %  |

**TEST RESULTS DATA**  
**Average Power Table**

| FCC Band I |           |     |     |             |                  |       |                               |       |       |                                 |       |          |       |           |
|------------|-----------|-----|-----|-------------|------------------|-------|-------------------------------|-------|-------|---------------------------------|-------|----------|-------|-----------|
| Mod.       | Data Rate | NTX | CH. | Freq. (MHz) | Duty Factor (dB) |       | Average Conducted Power (dBm) |       |       | FCC Conducted Power Limit (dBm) |       | DG (dBi) |       | Pass/Fail |
|            |           |     |     |             | Ant 1            | Ant 2 | Ant 1                         | Ant 2 | SUM   | Ant 1                           | Ant 2 | Ant 1    | Ant 2 |           |
| 11a        | 6Mbps     | 1   | 36  | 5180        | 0.17             | 0.27  | 17.73                         | 17.67 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| 11a        | 6Mbps     | 1   | 44  | 5220        | 0.17             | 0.27  | 17.71                         | 17.65 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| 11a        | 6Mbps     | 1   | 48  | 5240        | 0.17             | 0.27  | 17.69                         | 17.60 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| HT20       | MCS0      | 1   | 36  | 5180        | 0.20             | 0.18  | 17.66                         | 17.52 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| HT20       | MCS0      | 1   | 44  | 5220        | 0.20             | 0.18  | 17.63                         | 17.51 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| HT20       | MCS0      | 1   | 48  | 5240        | 0.20             | 0.18  | 17.61                         | 17.50 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| HT40       | MCS0      | 1   | 38  | 5190        | 0.37             | 0.29  | 17.03                         | 16.66 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| HT40       | MCS0      | 1   | 46  | 5230        | 0.37             | 0.29  | 17.05                         | 16.70 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| VHT20      | MCS0      | 1   | 36  | 5180        | 0.18             | 0.18  | 17.79                         | 17.60 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| VHT20      | MCS0      | 1   | 44  | 5220        | 0.18             | 0.18  | 17.74                         | 17.58 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| VHT20      | MCS0      | 1   | 48  | 5240        | 0.18             | 0.18  | 17.61                         | 17.53 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| VHT40      | MCS0      | 1   | 38  | 5190        | 0.33             | 0.37  | 17.35                         | 17.02 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| VHT40      | MCS0      | 1   | 46  | 5230        | 0.33             | 0.37  | 17.40                         | 17.30 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| VHT80      | MCS0      | 1   | 42  | 5210        | 0.63             | 0.63  | 15.12                         | 15.18 |       | 21.00                           | 21.00 | -3.70    | -3.30 | Pass      |
| 11a        | 6Mbps     | 2   | 36  | 5180        | 0.17             | 0.17  | 17.77                         | 17.68 | 20.74 | 21.00                           |       | -3.30    |       | Pass      |
| 11a        | 6Mbps     | 2   | 44  | 5220        | 0.17             | 0.17  | 17.72                         | 17.67 | 20.71 | 21.00                           |       | -3.30    |       | Pass      |
| 11a        | 6Mbps     | 2   | 48  | 5240        | 0.17             | 0.17  | 17.70                         | 17.62 | 20.67 | 21.00                           |       | -3.30    |       | Pass      |
| HT20       | MCS0      | 2   | 36  | 5180        | 0.18             | 0.18  | 17.68                         | 17.54 | 20.62 | 21.00                           |       | -3.30    |       | Pass      |
| HT20       | MCS0      | 2   | 44  | 5220        | 0.18             | 0.18  | 17.65                         | 17.52 | 20.60 | 21.00                           |       | -3.30    |       | Pass      |
| HT20       | MCS0      | 2   | 48  | 5240        | 0.18             | 0.18  | 17.63                         | 17.51 | 20.58 | 21.00                           |       | -3.30    |       | Pass      |
| HT40       | MCS0      | 2   | 38  | 5190        | 0.37             | 0.33  | 17.04                         | 16.67 | 19.87 | 21.00                           |       | -3.30    |       | Pass      |
| HT40       | MCS0      | 2   | 46  | 5230        | 0.37             | 0.33  | 17.10                         | 16.74 | 19.93 | 21.00                           |       | -3.30    |       | Pass      |
| VHT20      | MCS0      | 2   | 36  | 5180        | 0.18             | 0.18  | 17.80                         | 17.61 | 20.72 | 21.00                           |       | -3.30    |       | Pass      |
| VHT20      | MCS0      | 2   | 44  | 5220        | 0.18             | 0.18  | 17.76                         | 17.59 | 20.69 | 21.00                           |       | -3.30    |       | Pass      |
| VHT20      | MCS0      | 2   | 48  | 5240        | 0.18             | 0.18  | 17.67                         | 17.54 | 20.62 | 21.00                           |       | -3.30    |       | Pass      |
| VHT40      | MCS0      | 2   | 38  | 5190        | 0.33             | 0.29  | 17.43                         | 16.84 | 20.15 | 21.00                           |       | -3.30    |       | Pass      |
| VHT40      | MCS0      | 2   | 46  | 5230        | 0.33             | 0.29  | 17.49                         | 17.34 | 20.43 | 21.00                           |       | -3.30    |       | Pass      |
| VHT80      | MCS0      | 2   | 42  | 5210        | 0.70             | 0.63  | 15.40                         | 15.23 | 18.33 | 21.00                           |       | -3.30    |       | Pass      |

**TEST RESULTS DATA**  
**Average Power Table**

| FCC Band II |           |     |     |             |                  |       |                               |       |       |                                 |       |          |       |                        |           |
|-------------|-----------|-----|-----|-------------|------------------|-------|-------------------------------|-------|-------|---------------------------------|-------|----------|-------|------------------------|-----------|
| Mod.        | Data Rate | NTX | CH. | Freq. (MHz) | Duty Factor (dB) |       | Average Conducted Power (dBm) |       |       | FCC Conducted Power Limit (dBm) |       | DG (dBi) |       | EIRP Power Limit (dBm) | Pass/Fail |
|             |           |     |     |             | Ant 1            | Ant 2 | Ant 1                         | Ant 2 | SUM   | Ant 1                           | Ant 2 | Ant 1    | Ant 2 |                        |           |
| 11a         | 6Mbps     | 1   | 52  | 5260        | 0.17             | 0.27  | 17.67                         | 17.57 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| 11a         | 6Mbps     | 1   | 60  | 5300        | 0.17             | 0.27  | 17.70                         | 17.68 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| 11a         | 6Mbps     | 1   | 64  | 5320        | 0.17             | 0.27  | 17.77                         | 17.73 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| HT20        | MCS0      | 1   | 52  | 5260        | 0.20             | 0.18  | 17.60                         | 17.58 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| HT20        | MCS0      | 1   | 60  | 5300        | 0.20             | 0.18  | 17.64                         | 17.61 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| HT20        | MCS0      | 1   | 64  | 5320        | 0.20             | 0.18  | 17.85                         | 17.63 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| HT40        | MCS0      | 1   | 54  | 5270        | 0.37             | 0.29  | 16.84                         | 16.59 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| HT40        | MCS0      | 1   | 62  | 5310        | 0.37             | 0.29  | 15.22                         | 15.13 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| VHT20       | MCS0      | 1   | 52  | 5260        | 0.18             | 0.18  | 17.65                         | 17.59 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| VHT20       | MCS0      | 1   | 60  | 5300        | 0.18             | 0.18  | 17.68                         | 17.61 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| VHT20       | MCS0      | 1   | 64  | 5320        | 0.18             | 0.18  | 17.80                         | 17.68 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| VHT40       | MCS0      | 1   | 54  | 5270        | 0.33             | 0.37  | 17.19                         | 17.01 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| VHT40       | MCS0      | 1   | 62  | 5310        | 0.33             | 0.37  | 15.22                         | 15.17 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| VHT80       | MCS0      | 1   | 58  | 5290        | 0.63             | 0.63  | 13.78                         | 13.73 |       |                                 | -2.40 | -3.10    | 30    | Pass                   |           |
| 11a         | 6Mbps     | 2   | 52  | 5260        | 0.17             | 0.17  | 17.69                         | 17.58 | 20.65 |                                 | -2.40 |          | 30    | Pass                   |           |
| 11a         | 6Mbps     | 2   | 60  | 5300        | 0.17             | 0.17  | 17.71                         | 17.67 | 20.70 |                                 | -2.40 |          | 30    | Pass                   |           |
| 11a         | 6Mbps     | 2   | 64  | 5320        | 0.17             | 0.17  | 17.79                         | 17.74 | 20.78 |                                 | -2.40 |          | 30    | Pass                   |           |
| HT20        | MCS0      | 2   | 52  | 5260        | 0.18             | 0.18  | 17.66                         | 17.59 | 20.64 |                                 | -2.40 |          | 30    | Pass                   |           |
| HT20        | MCS0      | 2   | 60  | 5300        | 0.18             | 0.18  | 17.71                         | 17.62 | 20.68 |                                 | -2.40 |          | 30    | Pass                   |           |
| HT20        | MCS0      | 2   | 64  | 5320        | 0.18             | 0.18  | 17.86                         | 17.64 | 20.76 |                                 | -2.40 |          | 30    | Pass                   |           |
| HT40        | MCS0      | 2   | 54  | 5270        | 0.37             | 0.33  | 16.93                         | 16.60 | 19.78 |                                 | -2.40 |          | 30    | Pass                   |           |
| HT40        | MCS0      | 2   | 62  | 5310        | 0.37             | 0.33  | 15.27                         | 15.14 | 18.22 |                                 | -2.40 |          | 30    | Pass                   |           |
| VHT20       | MCS0      | 2   | 52  | 5260        | 0.18             | 0.18  | 17.68                         | 17.60 | 20.65 |                                 | -2.40 |          | 30    | Pass                   |           |
| VHT20       | MCS0      | 2   | 60  | 5300        | 0.18             | 0.18  | 17.69                         | 17.63 | 20.67 |                                 | -2.40 |          | 30    | Pass                   |           |
| VHT20       | MCS0      | 2   | 64  | 5320        | 0.18             | 0.18  | 17.81                         | 17.69 | 20.76 |                                 | -2.40 |          | 30    | Pass                   |           |
| VHT40       | MCS0      | 2   | 54  | 5270        | 0.33             | 0.29  | 17.25                         | 17.04 | 20.16 |                                 | -2.40 |          | 30    | Pass                   |           |
| VHT40       | MCS0      | 2   | 62  | 5310        | 0.33             | 0.29  | 15.33                         | 15.19 | 18.27 |                                 | -2.40 |          | 30    | Pass                   |           |
| VHT80       | MCS0      | 2   | 58  | 5290        | 0.70             | 0.63  | 13.90                         | 13.53 | 16.73 |                                 | -2.40 |          | 30    | Pass                   |           |

**TEST RESULTS DATA**  
**Average Power Table**

| FCC Band III |           |     |     |             |                  |       |                               |       |       |                                 |       |          |       |                        |           |
|--------------|-----------|-----|-----|-------------|------------------|-------|-------------------------------|-------|-------|---------------------------------|-------|----------|-------|------------------------|-----------|
| Mod.         | Data Rate | NTX | CH. | Freq. (MHz) | Duty Factor (dB) |       | Average Conducted Power (dBm) |       |       | FCC Conducted Power Limit (dBm) |       | DG (dBi) |       | EIRP Power Limit (dBm) | Pass/Fail |
|              |           |     |     |             | Ant 1            | Ant 2 | Ant 1                         | Ant 2 | SUM   | Ant 1                           | Ant 2 | Ant 1    | Ant 2 |                        |           |
| 11a          | 6Mbps     | 1   | 100 | 5500        | 0.17             | 0.27  | 17.81                         | 17.77 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| 11a          | 6Mbps     | 1   | 116 | 5580        | 0.17             | 0.27  | 17.79                         | 17.66 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| 11a          | 6Mbps     | 1   | 140 | 5700        | 0.17             | 0.27  | 17.52                         | 17.24 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| HT20         | MCS0      | 1   | 100 | 5500        | 0.20             | 0.18  | 17.90                         | 17.67 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| HT20         | MCS0      | 1   | 116 | 5580        | 0.20             | 0.18  | 17.75                         | 17.62 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| HT20         | MCS0      | 1   | 140 | 5700        | 0.20             | 0.18  | 16.90                         | 16.73 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| HT40         | MCS0      | 1   | 102 | 5510        | 0.37             | 0.29  | 17.42                         | 17.19 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| HT40         | MCS0      | 1   | 110 | 5550        | 0.37             | 0.29  | 17.37                         | 17.14 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| HT40         | MCS0      | 1   | 134 | 5670        | 0.37             | 0.29  | 17.11                         | 17.00 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| VHT20        | MCS0      | 1   | 100 | 5500        | 0.18             | 0.18  | 17.88                         | 17.80 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| VHT20        | MCS0      | 1   | 116 | 5580        | 0.18             | 0.18  | 17.78                         | 17.73 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| VHT20        | MCS0      | 1   | 140 | 5700        | 0.18             | 0.18  | 16.40                         | 16.36 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| VHT40        | MCS0      | 1   | 102 | 5510        | 0.33             | 0.37  | 17.53                         | 17.35 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| VHT40        | MCS0      | 1   | 110 | 5550        | 0.33             | 0.37  | 17.45                         | 17.23 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| VHT40        | MCS0      | 1   | 134 | 5670        | 0.33             | 0.37  | 17.16                         | 17.13 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| VHT80        | MCS0      | 1   | 106 | 5530        | 0.63             | 0.63  | 15.13                         | 15.06 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| VHT80        | MCS0      | 1   | 122 | 5610        | 0.63             | 0.63  | 17.83                         | 17.53 |       |                                 |       | -2.40    | -3.50 | 30                     | Pass      |
| 11a          | 6Mbps     | 2   | 100 | 5500        | 0.17             | 0.17  | 17.87                         | 17.78 | 20.84 |                                 |       | -2.40    |       | 30                     | Pass      |
| 11a          | 6Mbps     | 2   | 116 | 5580        | 0.17             | 0.17  | 17.80                         | 17.72 | 20.77 |                                 |       | -2.40    |       | 30                     | Pass      |
| 11a          | 6Mbps     | 2   | 140 | 5700        | 0.17             | 0.17  | 17.53                         | 17.26 | 20.41 |                                 |       | -2.40    |       | 30                     | Pass      |
| HT20         | MCS0      | 2   | 100 | 5500        | 0.18             | 0.18  | 17.91                         | 17.68 | 20.81 |                                 |       | -2.40    |       | 30                     | Pass      |
| HT20         | MCS0      | 2   | 116 | 5580        | 0.18             | 0.18  | 17.78                         | 17.71 | 20.76 |                                 |       | -2.40    |       | 30                     | Pass      |
| HT20         | MCS0      | 2   | 140 | 5700        | 0.18             | 0.18  | 17.03                         | 16.75 | 19.91 |                                 |       | -2.40    |       | 30                     | Pass      |
| HT40         | MCS0      | 2   | 102 | 5510        | 0.37             | 0.33  | 17.57                         | 17.36 | 20.48 |                                 |       | -2.40    |       | 30                     | Pass      |
| HT40         | MCS0      | 2   | 110 | 5550        | 0.37             | 0.33  | 17.55                         | 17.15 | 20.37 |                                 |       | -2.40    |       | 30                     | Pass      |
| HT40         | MCS0      | 2   | 134 | 5670        | 0.37             | 0.33  | 17.39                         | 17.13 | 20.27 |                                 |       | -2.40    |       | 30                     | Pass      |
| VHT20        | MCS0      | 2   | 100 | 5500        | 0.18             | 0.18  | 17.98                         | 17.81 | 20.91 |                                 |       | -2.40    |       | 30                     | Pass      |
| VHT20        | MCS0      | 2   | 116 | 5580        | 0.18             | 0.18  | 17.83                         | 17.74 | 20.80 |                                 |       | -2.40    |       | 30                     | Pass      |
| VHT20        | MCS0      | 2   | 140 | 5700        | 0.18             | 0.18  | 16.68                         | 16.36 | 19.54 |                                 |       | -2.40    |       | 30                     | Pass      |
| VHT40        | MCS0      | 2   | 102 | 5510        | 0.33             | 0.29  | 17.71                         | 17.37 | 20.55 |                                 |       | -2.40    |       | 30                     | Pass      |
| VHT40        | MCS0      | 2   | 110 | 5550        | 0.33             | 0.29  | 17.53                         | 17.24 | 20.40 |                                 |       | -2.40    |       | 30                     | Pass      |
| VHT40        | MCS0      | 2   | 134 | 5670        | 0.33             | 0.29  | 17.28                         | 17.14 | 20.22 |                                 |       | -2.40    |       | 30                     | Pass      |
| VHT80        | MCS0      | 2   | 106 | 5530        | 0.70             | 0.63  | 15.45                         | 15.17 | 18.32 |                                 |       | -2.40    |       | 30                     | Pass      |
| VHT80        | MCS0      | 2   | 122 | 5610        | 0.70             | 0.63  | 17.85                         | 17.58 | 20.73 |                                 |       | -2.40    |       | 30                     | Pass      |

**TEST RESULTS DATA**  
**Average Power Table**

| FCC Straddle Channel |           |     |     |             |                  |       |                               |       |       |                                 |       |          |       |           |
|----------------------|-----------|-----|-----|-------------|------------------|-------|-------------------------------|-------|-------|---------------------------------|-------|----------|-------|-----------|
| Mod.                 | Data Rate | NTX | CH. | Freq. (MHz) | Duty Factor (dB) |       | Average Conducted Power (dBm) |       |       | FCC Conducted Power Limit (dBm) |       | DG (dBi) |       | Pass/Fail |
|                      |           |     |     |             | Ant 1            | Ant 2 | Ant 1                         | Ant 2 | SUM   | Ant 1                           | Ant 2 | Ant 1    | Ant 2 |           |
| 11a                  | 6Mbps     | 1   | 144 | 5720        | 0.17             | 0.27  | 17.77                         | 17.67 |       | -                               | -     | -2.40    | -3.50 | -         |
| HT20                 | MCS0      | 1   | 144 | 5720        | 0.20             | 0.18  | 17.90                         | 17.68 |       | -                               | -     | -2.40    | -3.50 | -         |
| HT40                 | MCS0      | 1   | 142 | 5710        | 0.37             | 0.29  | 17.10                         | 16.80 |       | -                               | -     | -2.40    | -3.50 | -         |
| VHT20                | MCS0      | 1   | 144 | 5720        | 0.18             | 0.18  | 17.78                         | 17.72 |       | -                               | -     | -2.40    | -3.50 | -         |
| VHT40                | MCS0      | 1   | 142 | 5710        | 0.33             | 0.37  | 17.16                         | 16.60 |       | -                               | -     | -2.40    | -3.50 | -         |
| VHT80                | MCS0      | 1   | 138 | 5690        | 0.63             | 0.63  | 17.90                         | 17.65 |       | -                               | -     | -2.40    | -3.50 | -         |
| 11a                  | 6Mbps     | 2   | 144 | 5720        | 0.17             | 0.17  | 17.78                         | 17.68 | 20.74 | -                               | -     | -2.40    | -     | -         |
| HT20                 | MCS0      | 2   | 144 | 5720        | 0.18             | 0.18  | 17.68                         | 17.65 | 20.68 | -                               | -     | -2.40    | -     | -         |
| HT40                 | MCS0      | 2   | 142 | 5710        | 0.37             | 0.33  | 17.06                         | 16.80 | 19.94 | -                               | -     | -2.40    | -     | -         |
| VHT20                | MCS0      | 2   | 144 | 5720        | 0.18             | 0.18  | 17.69                         | 17.50 | 20.61 | -                               | -     | -2.40    | -     | -         |
| VHT40                | MCS0      | 2   | 142 | 5710        | 0.33             | 0.29  | 17.00                         | 16.70 | 19.86 | -                               | -     | -2.40    | -     | -         |
| VHT80                | MCS0      | 2   | 138 | 5690        | 0.70             | 0.63  | 18.00                         | 17.80 | 20.91 | -                               | -     | -2.40    | -     | -         |



### Appendix B. Radiated Spurious Emission

|                 |                                    |                     |         |
|-----------------|------------------------------------|---------------------|---------|
| Test Engineer : | J.C. Liang, Jacky Hung, and Kan Wu | Temperature :       | 18~22°C |
|                 |                                    | Relative Humidity : | 55~58%  |

#### Band 1 - 5150~5250MHz

#### WIFI 802.11n HT40 (Band Edge @ 3m)

| WIFI Ant.                  | Note  | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. ( P/A ) | Pol. ( H/V ) |
|----------------------------|---|-------------------|------------------|-------------------|-----------------------|---------------------|-------------------------|-------------------|----------------------|----------------|-------------------|-------------------|--------------|
| 802.11n HT40 CH 38 5190MHz |   | 5144.04           | 62.8             | -11.2             | 74                    | 54.73               | 32.05                   | 9.05              | 33.03                | 100            | 122               | P                 | H            |
|                            |   | 5146.64           | 53.87            | -0.13             | 54                    | 45.8                | 32.05                   | 9.05              | 33.03                | 100            | 122               | P                 | H            |
|                            | *   | 5190              | 104.41           | -                 | -                     | 96.28               | 32.08                   | 9.08              | 33.03                | 100            | 122               | P                 | H            |
|                            | *   | 5190              | 96.09            | -                 | -                     | 87.96               | 32.08                   | 9.08              | 33.03                | 100            | 122               | A                 | H            |
|                            |   | 5438.64           | 49.52            | -24.48            | 74                    | 40.94               | 32.33                   | 9.27              | 33.02                | 100            | 122               | P                 | H            |
|                            |   | 5459.76           | 41.25            | -12.75            | 54                    | 32.63               | 32.35                   | 9.29              | 33.02                | 100            | 122               | A                 | H            |
|                            |   | 5146.38           | 61.3             | -12.7             | 74                    | 53.23               | 32.05                   | 9.05              | 33.03                | 309            | 65                | P                 | V            |
|                            |   | 5149.5            | 50.07            | -3.93             | 54                    | 42                  | 32.05                   | 9.05              | 33.03                | 309            | 65                | A                 | V            |
|                            | *   | 5190              | 102.43           | -                 | -                     | 94.3                | 32.08                   | 9.08              | 33.03                | 309            | 65                | P                 | V            |
|                            | *   | 5190              | 94.45            | -                 | -                     | 86.32               | 32.08                   | 9.08              | 33.03                | 309            | 65                | A                 | V            |
|                            |   | 5395.04           | 49.22            | -24.78            | 74                    | 40.72               | 32.3                    | 9.22              | 33.02                | 309            | 65                | P                 | V            |
|                            | 5453  | 40.81             | -13.19           | 54                | 32.19                 | 32.35               | 9.29                    | 33.02             | 309                  | 65             | A                 | V                 |              |
| Remark                     | <ol style="list-style-type: none"> <li>No other spurious found.</li> <li>All results are PASS against Peak and Average limit line.</li> </ol> |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   |              |



Band 1 5150~5250MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1+2, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for 802.11n HT40 CH 38 5190MHz and a Remark section.



**Band 2 - 5250~5350MHz**

**WIFI 802.11n HT40 (Band Edge @ 3m)**

| WIFI                                | Note  | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Cable  | Preamp | Ant    | Table   | Peak    | Pol.    |
|-------------------------------------|---|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant.                                |   |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
| 1+2                                 |   | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| 802.11n<br>HT40<br>CH 62<br>5310MHz |   | 5075.14   | 49.23      | -24.77 | 74         | 41.3     | 31.98    | 8.99   | 33.04  | 107    | 121     | P       | H       |
|                                     |   | 5122.06   | 41.79      | -12.21 | 54         | 33.78    | 32.02    | 9.02   | 33.03  | 107    | 121     | A       | H       |
|                                     | *   | 5310      | 104.28     | -      | -          | 95.93    | 32.22    | 9.16   | 33.03  | 107    | 121     | P       | H       |
|                                     | *   | 5310      | 95.35      | -      | -          | 87       | 32.22    | 9.16   | 33.03  | 107    | 121     | A       | H       |
|                                     |   | 5351.28   | 63.15      | -10.85 | 74         | 54.74    | 32.25    | 9.19   | 33.03  | 107    | 121     | P       | H       |
|                                     |   | 5350.08   | 53.87      | -0.13  | 54         | 45.46    | 32.25    | 9.19   | 33.03  | 107    | 121     | A       | H       |
|                                     |   | 5075.14   | 50.03      | -23.97 | 74         | 42.1     | 31.98    | 8.99   | 33.04  | 312    | 92      | P       | V       |
|                                     |   | 5074.46   | 41.67      | -12.33 | 54         | 33.74    | 31.98    | 8.99   | 33.04  | 312    | 92      | A       | V       |
|                                     | *   | 5310      | 102.72     | -      | -          | 94.37    | 32.22    | 9.16   | 33.03  | 312    | 92      | P       | V       |
|                                     | *   | 5310      | 95.02      | -      | -          | 86.67    | 32.22    | 9.16   | 33.03  | 312    | 92      | A       | V       |
|                                     |   | 5360.64   | 60.51      | -13.49 | 74         | 52.07    | 32.27    | 9.2    | 33.03  | 312    | 92      | P       | V       |
|                                     |   | 5352.48   | 52.15      | -1.85  | 54         | 43.74    | 32.25    | 9.19   | 33.03  | 312    | 92      | A       | V       |
| <b>Remark</b>                       | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |           |            |        |            |          |          |        |        |        |         |         |         |



**Band 2 5250~5350MHz**  
**WIFI 802.11n HT40 (Harmonic @ 3m)**

| WIFI Ant. 1+2      | Note  | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |
|--------------------|---|-------------------|------------------|-------------------|-----------------------|-------------------|-------------------------|-------------------|----------------------|----------------|-------------------|-----------------|------------|
| 802.11n HT40 CH 62 |   | 10620             | 44.8             | -29.2             | 74                    | 55.81             | 38.74                   | 15.13             | 65.18                | 100            | 0                 | P               | H          |
|                    |   | 15930             | 42.75            | -31.25            | 74                    | 52.14             | 36.15                   | 19.04             | 64.85                | 100            | 0                 | P               | H          |
|                    |   |                   |                  |                   |                       |                   |                         |                   |                      |                |                   |                 | H          |
|                    |   |                   |                  |                   |                       |                   |                         |                   |                      |                |                   |                 | H          |
| 5310MHz            |   | 10620             | 49.26            | -24.74            | 74                    | 60.27             | 38.74                   | 15.13             | 65.18                | 100            | 0                 | P               | V          |
|                    |   | 15930             | 45.85            | -28.15            | 74                    | 55.24             | 36.15                   | 19.04             | 64.85                | 100            | 0                 | P               | V          |
|                    |   |                   |                  |                   |                       |                   |                         |                   |                      |                |                   |                 | V          |
|                    |   |                   |                  |                   |                       |                   |                         |                   |                      |                |                   |                 | V          |
| <b>Remark</b>      | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |                   |                  |                   |                       |                   |                         |                   |                      |                |                   |                 |            |



**Band 3 - 5470~5725MHz**

**WIFI 802.11ac VHT80 (Band Edge @ 3m)**

| WIFI                                   | Note  | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Cable  | Preamp | Ant    | Table   | Peak    | Pol.    |
|--|---|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant.                                   |   |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
| 1+2                                    |   | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| 802.11ac<br>VHT80<br>CH 106<br>5530MHz |   | 5454.88   | 62.09      | -11.91 | 74         | 53.47    | 32.35    | 9.29   | 33.02  | 101    | 214     | P       | H       |
|  |   | 5467.84   | 65.05      | -3.15  | 68.2       | 56.39    | 32.37    | 9.31   | 33.02  | 101    | 214     | P       | H       |
|  |   | 5448.4    | 53.36      | -0.64  | 54         | 44.74    | 32.35    | 9.29   | 33.02  | 101    | 214     | A       | H       |
|  | *   | 5530      | 101.83     | -      | -          | 93.05    | 32.44    | 9.39   | 33.05  | 101    | 214     | P       | H       |
|  | *   | 5530      | 92.79      | -      | -          | 84.01    | 32.44    | 9.39   | 33.05  | 101    | 214     | A       | H       |
|  |   | 5741.375  | 50.79      | -17.41 | 68.2       | 41.09    | 32.98    | 9.87   | 33.15  | 101    | 214     | P       | H       |
|  |   | 5452.96   | 61.13      | -12.87 | 74         | 52.51    | 32.35    | 9.29   | 33.02  | 323    | 84      | P       | V       |
|  |   | 5469.52   | 61.46      | -6.74  | 68.2       | 52.8     | 32.37    | 9.31   | 33.02  | 323    | 84      | P       | V       |
|  |   | 5452.24   | 51.6       | -2.4   | 54         | 42.98    | 32.35    | 9.29   | 33.02  | 323    | 84      | A       | V       |
|  | *   | 5530      | 100.23     | -      | -          | 91.45    | 32.44    | 9.39   | 33.05  | 323    | 84      | P       | V       |
|  | *   | 5530      | 91.73      | -      | -          | 82.95    | 32.44    | 9.39   | 33.05  | 323    | 84      | A       | V       |
|  |   | 5756.95   | 51.69      | -16.51 | 68.2       | 41.91    | 33.02    | 9.92   | 33.16  | 323    | 84      | P       | V       |
| <b>Remark</b>                          | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |           |            |        |            |          |          |        |        |        |         |         |         |



Band 3 5470~5725MHz

WIFI 802.11ac VHT80 (Harmonic @ 3m)

| WIFI Ant. 1+2                 | Note  | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level (dBμV) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. (P/A) | Pol. (H/V) |   |
|-------------------------------|---|-------------------|------------------|-------------------|-----------------------|-------------------|-------------------------|-------------------|----------------------|----------------|-------------------|-----------------|------------|---|
| 802.11ac VHT80 CH 106 5530MHz |   | 11060             | 45.81            | -28.19            | 74                    | 56.11             | 39.11                   | 15.44             | 65.14                | 100            | 0                 | P               | H          |   |
|                               |   | 16590             | 46.08            | -22.12            | 68.2                  | 53.51             | 37.76                   | 19.52             | 65.01                | 100            | 0                 | P               | H          |   |
|                               |   |                   |                  |                   |                       |                   |                         |                   |                      |                |                   |                 | H          |   |
|                               |   |                   |                  |                   |                       |                   |                         |                   |                      |                |                   |                 | H          |   |
|                               |   |                   | 11060            | 47.55             | -26.45                | 74                | 58.14                   | 39.11             | 15.44                | 65.14          | 100               | 0               | P          | V |
|                               |   |                   | 16590            | 45.19             | -23.01                | 68.2              | 52.62                   | 37.76             | 19.52                | 65.01          | 100               | 0               | P          | V |
|                               |   |                   |                  |                   |                       |                   |                         |                   |                      |                |                   |                 |            | V |
|                               |   |                   |                  |                   |                       |                   |                         |                   |                      |                |                   |                 |            | V |
| Remark                        | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |                   |                  |                   |                       |                   |                         |                   |                      |                |                   |                 |            |   |



**Emission below 1GHz**  
**WIFI 802.11n HT40 (LF @ 3m)**

| WIFI                  | Note   | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Cable  | Preamp | Ant    | Table   | Peak    | Pol.    |   |
|-----------------------|--|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|---|
| Ant.                  |  |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |   |
| 1+2                   |  | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |   |
| 802.11n<br>HT40<br>LF |  | 67.8      | 30.59      | -9.41  | 40         | 49.88    | 12.12    | 1.06   | 32.49  | 100    | 0       | P       | H       |   |
|                       |  | 194.7     | 23.92      | -19.58 | 43.5       | 39.68    | 14.84    | 1.72   | 32.39  |        |         | P       | H       |   |
|                       |  | 264.9     | 25.69      | -20.31 | 46         | 36.41    | 19.54    | 2.04   | 32.38  |        |         | P       | H       |   |
|                       |  | 783.7     | 31.08      | -14.92 | 46         | 31.33    | 28.33    | 3.5    | 32.23  |        |         | P       | H       |   |
|                       |  | 879.6     | 31.8       | -14.2  | 46         | 30.45    | 29.22    | 3.73   | 31.76  |        |         | P       | H       |   |
|                       |  | 947.5     | 32.9       | -13.1  | 46         | 29.45    | 30.69    | 3.82   | 31.23  |        |         | P       | H       |   |
|                       |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                       |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                       |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                       |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                       |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                       |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                       |  |           | 30         | 35.16  | -4.84      | 40       | 42.59    | 24.36  | 0.68   | 32.5   | 100     | 0       | P       | V |
|                       |  |           | 45.93      | 30.16  | -9.84      | 40       | 45.48    | 16.23  | 0.94   | 32.49  |         |         | P       | V |
|                       |  |           | 165.27     | 20.31  | -23.19     | 43.5     | 34.97    | 15.97  | 1.69   | 32.42  |         |         | P       | V |
|                       |  |           | 556.9      | 27.27  | -18.73     | 46       | 30.64    | 25.99  | 2.98   | 32.43  |         |         | P       | V |
|                       |  |           | 789.3      | 30.96  | -15.04     | 46       | 31.21    | 28.31  | 3.5    | 32.21  |         |         | P       | V |
|                       |  |           | 927.2      | 32.55  | -13.45     | 46       | 30.12    | 29.86  | 3.81   | 31.41  |         |         | P       | V |
|                       |  |           |            |        |            |          |          |        |        |        |         |         |         | V |
|                       |  |           |            |        |            |          |          |        |        |        |         |         |         | V |
|                       |  |           |            |        |            |          |          |        |        |        |         |         | V       |   |
|                       |  |           |            |        |            |          |          |        |        |        |         |         | V       |   |
|                       |  |           |            |        |            |          |          |        |        |        |         |         | V       |   |
|                       |  |           |            |        |            |          |          |        |        |        |         |         | V       |   |
| <b>Remark</b>         | 1. No other spurious found.<br>2. All results are PASS against limit line. |           |            |        |            |          |          |        |        |        |         |         |         |   |



**Note symbol**

|     |  |
|-----|--|
| *   | <b>Fundamental Frequency</b> which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency. |
| !   | Test result is <b>over limit</b> line.   |
| P/A | <b>Peak</b> or <b>Average</b>  |
| H/V | <b>Horizontal</b> or <b>Vertical</b>   |



A calculation example for radiated spurious emission is shown as below:

| WIFI    | Note | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Cable  | Preamp | Ant    | Table   | Peak    | Pol.    |
|---------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant.    |      |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
| 1+2     |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| 802.11b |      | 2390      | 55.45      | -18.55 | 74         | 54.51    | 32.22    | 4.58   | 35.86  | 103    | 308     | P       | H       |
| CH 01   |      |           |            |        |            |          |          |        |        |        |         |         |         |
| 2412MHz |      | 2390      | 43.54      | -10.46 | 54         | 42.6     | 32.22    | 4.58   | 35.86  | 103    | 308     | A       | H       |

- Level(dBμV/m) =  
Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

- Level(dBμV/m)  
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)  
= 55.45 (dBμV/m)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

- Level(dBμV/m)  
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)  
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)  
= 43.54 (dBμV/m)
- Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 43.54(dBμV/m) – 54(dBμV/m)  
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is “PASS”.



## Appendix C. Radiated Spurious Emission

|                 |                                    |                     |         |
|-----------------|------------------------------------|---------------------|---------|
| Test Engineer : | J.C. Liang, Jacky Hung, and Kan Wu | Temperature :       | 18~22°C |
|                 |                                    | Relative Humidity : | 55~58%  |

### Note symbol

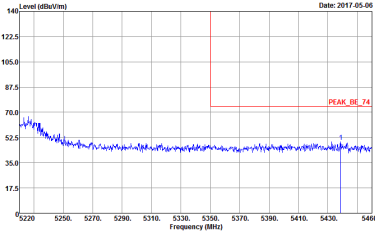
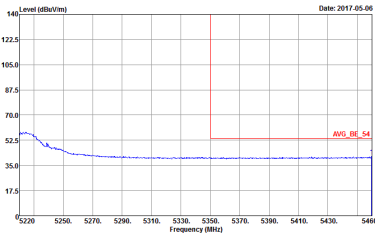
|    |                       |
|----|-----------------------|
| -L | Low channel location  |
| -R | High channel location |



Band 1 - 5150~5250MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

Table with 2 columns (WIFI, ANT) and 2 rows (1+2, Peak, Avg.). It contains spectral analysis plots for Horizontal and Fundamental signals, and a 'Left blank' plot. Each plot includes technical details like Site, Condition, Detector, Project, and Setting.

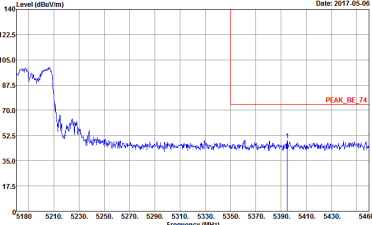



| WIFI               | Band 1 5150~5250MHz Band Edge @ 3m  |                   |
|--------------------|---|-------------------|
| ANT                | 802.11n HT40 CH38 5190MHz - R   |                   |
| 1+2                | Horizontal  | Fundamental       |
| <p><b>Peak</b></p> |  <p>Site : 03CH11-HY<br/>           Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL<br/>           RBW:1000.000kHz VBW:3000.000kHz SWF:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16</p> | <p>Left blank</p> |
| <p><b>Avg.</b></p> |  <p>Site : 03CH11-HY<br/>           Condition : AVG_BE_54 3m HORN 91200-HF HORIZONTAL<br/>           RBW:1000.000kHz VBW:3.000kHz SWF:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16</p>   | <p>Left blank</p> |



| WIFI | Band 1 5150~5250MHz Band Edge @ 3m  |  |
|------|---|--|
| ANT  | 802.11n HT40 CH38 5190MHz - L   |  |
| 1+2  | Vertical  | Fundamental  |
| Peak | <p>Site : 03CH11-HY<br/>           Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000KHz VBW:3000.000KHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16</p> | <p>Site : 03CH11-HY<br/>           Condition : PEAK_74 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000KHz VBW:3000.000KHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16</p> |
| Avg. | <p>Site : 03CH11-HY<br/>           Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000KHz VBW:3.000KHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16</p>     | Left blank   |



| WIFI               | Band 1 5150~5250MHz Band Edge @ 3m  |                   |
|--------------------|---|-------------------|
| ANT                | 802.11n HT40 CH38 5190MHz - R   |                   |
| 1+2                | Vertical  | Fundamental       |
| <p><b>Peak</b></p> |  <p>Site : 03CH11-HY<br/>           Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000kHz VBW:3000.000kHz SWF:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16</p> | <p>Left blank</p> |
| <p><b>Avg.</b></p> |  <p>Site : 03CH11-HY<br/>           Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000kHz VBW:3.000kHz SWF:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16</p>   | <p>Left blank</p> |



**Band 1 - 5150~5250MHz**  
**WIFI 802.11n HT40 (Harmonic @ 3m)**

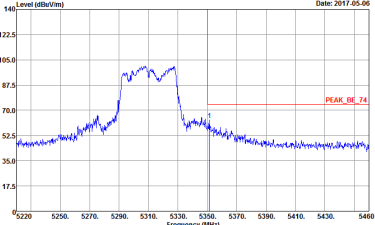
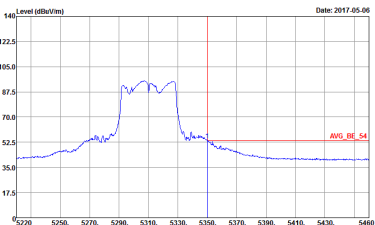
| WIFI                       | Band 1 5150~5250MHz Harmonic @ 3m  |  |
|----------------------------|--|--|
| ANT                        | 802.11n HT40 CH38 5190MHz  |  |
| 1+2                        | Horizontal   | Vertical   |
| <b>Peak</b><br><b>Avg.</b> | <p>Site : 03CH11-1FY<br/>Condition : PEAK_74 3m 9170 5HF HORM_150809 HORIZONTAL<br/>Detector : Peak<br/>Project : 733129-06<br/>Setting : 16</p> | <p>Site : 03CH11-1FY<br/>Condition : PEAK_74 3m 9170 5HF HORM_150809 VERTICAL<br/>Detector : Peak<br/>Project : 733129-06<br/>Setting : 16</p> |



**Band 2 - 5250~5350MHz**  
**WIFI 802.11n HT40 (Band Edge @ 3m)**

| WIFI                              | Band 2 5250~5350MHz Band Edge @ 3m  |  |
|-----------------------------------|---|--|
| ANT                               | 802.11n HT40 CH62 5310 - L  |  |
| 1+2                               | Horizontal  | Fundamental  |
| <p align="center"><b>Peak</b></p> | <p>Site : 03CH11-HY<br/>           Condition : PEAK_BE_74 3m HORN 9120D-HF HORIZONTAL<br/>           RBW:1000.000KHz VBW:3000.000KHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16.5</p> | <p>Site : 03CH11-HY<br/>           Condition : PEAK_74 3m HORN 9120D-HF HORIZONTAL<br/>           RBW:1000.000KHz VBW:3000.000KHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16.5</p> |
| <p align="center"><b>Avg.</b></p> | <p>Site : 03CH11-HY<br/>           Condition : AVG_BE_54 3m HORN 9120D-HF HORIZONTAL<br/>           RBW:1000.000KHz VBW:3000KHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16.5</p>      | <p align="center"><b>Left blank</b></p>  |



| WIFI               | Band 2 5250~5350MHz Band Edge @ 3m  |                   |
|--------------------|---|-------------------|
| ANT                | 802.11n HT40 CH62 5310 - R  |                   |
| 1+2                | Horizontal  | Fundamental       |
| <p><b>Peak</b></p> |  <p>Site : 03CH11-HY<br/>           Condition : PEAK_BE_74 3m HORN 91200-HF HORIZONTAL<br/>           RBW:1000.000kHz VBW:3000.000kHz SWF:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16.5</p> | <p>Left blank</p> |
| <p><b>Avg.</b></p> |  <p>Site : 03CH11-HY<br/>           Condition : AVG_BE_54 3m HORN 91200-HF HORIZONTAL<br/>           RBW:1000.000kHz VBW:3.000kHz SWF:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16.5</p>   | <p>Left blank</p> |



| WIFI | Band 2 5250~5350MHz Band Edge @ 3m  |  |
|------|---|--|
| ANT  | 802.11n HT40 CH62 5310 - L  |  |
| 1+2  | Vertical  | Fundamental  |
| Peak | <p>Site : 03CH11-HY<br/>           Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000kHz VBW:3000.000kHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16.5</p> | <p>Site : 03CH11-HY<br/>           Condition : PEAK_74 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000kHz VBW:3000.000kHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16.5</p> |
| Avg. | <p>Site : 03CH11-HY<br/>           Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000kHz VBW:3.000kHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16.5</p>     | Left blank   |



| WIFI | Band 2 5250~5350MHz Band Edge @ 3m  |             |
|------|---|-------------|
| ANT  | 802.11n HT40 CH62 5310 - R  |             |
| 1+2  | Vertical  | Fundamental |
| Peak | <p>Site : 03CH11-HY<br/>           Condition : PEAK_BE_74 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000kHz VBW:3000.000kHz SWF:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16.5</p> | Left blank  |
| Avg. | <p>Site : 03CH11-HY<br/>           Condition : AVG_BE_54 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000kHz VBW:3.000kHz SWF:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16.5</p>     | Left blank  |

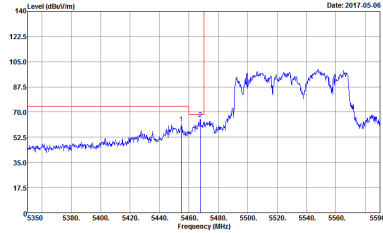
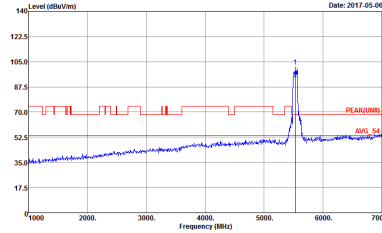
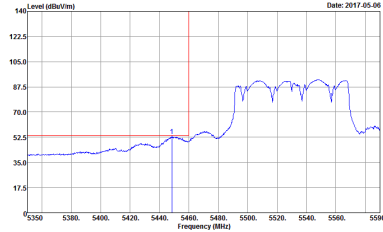


**Band 2 - 5250~5350MHz**  
**WIFI 802.11n HT40 (Harmonic @ 3m)**

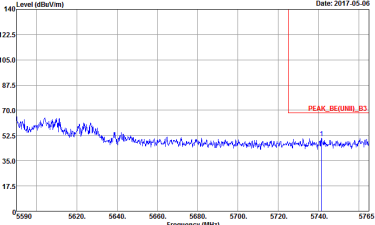
|                            |  |  |
|----------------------------|--|--|
| <b>WIFI</b>                | <b>Band 2 5250~5350MHz Harmonic @ 3m</b>   |  |
| <b>ANT</b>                 | <b>802.11n HT40 CH62 5310</b>  |  |
| <b>1+2</b>                 | <b>Horizontal</b>  | <b>Vertical</b>  |
| <b>Peak</b><br><b>Avg.</b> | <p>Site : 03CH11-1FY<br/>         Condition : PEAK_74 3m 9170 5HF HORM_150809 HORIZONTAL<br/>         Detector : Peak<br/>         Project : 733129-06<br/>         Setting : 16.5</p> | <p>Site : 03CH11-1FY<br/>         Condition : PEAK_74 3m 9170 5HF HORM_150809 VERTICAL<br/>         Detector : Peak<br/>         Project : 733129-06<br/>         Setting : 16.5</p> |



**Band 3 - 5470~5725MHz**  
**WIFI 802.11ac VHT80 (Band Edge @ 3m)**

| WIFI                              | Band 3 5470~5725MHz Band Edge @ 3m  |   |
|-----------------------------------|---|---|
| ANT                               | 802.11ac VHT80 CH106 5530MHz - L  |   |
| 1+2                               | Horizontal  | Fundamental   |
| <p align="center"><b>Peak</b></p> |  <p>Site : 03CH11-HY<br/>           Condition : PEAK_BE(UNIT)_B3 3m HORN 9120D-HF HORIZONTAL<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16 : 68.2</p>  |  <p>Site : 03CH11-HY<br/>           Condition : PEAK(UNIT) 3m HORN 9120D-HF HORIZONTAL<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16 : 68.2</p> |
| <p align="center"><b>Avg.</b></p> |  <p>Site : 03CH11-HY<br/>           Condition : AVG_BE(UNIT)_B3 3m HORN 9120D-HF HORIZONTAL<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16 : 68.2</p> | <p align="center"><b>Left blank</b></p>   |



| WIFI               | Band 3 5470~5725MHz Band Edge @ 3m  |                   |
|--------------------|---|-------------------|
| ANT                | 802.11ac VHT80 CH106 5530MHz - R  |                   |
| 1+2                | Horizontal  | Fundamental       |
| <p><b>Peak</b></p> |  <p>Site : 03CH11-HY<br/>           Condition : PEAK_BE(UNIT)_B3 3m HORN 91200-HF HORIZONTAL<br/>           Defector : Peak<br/>           Project : 733129-06<br/>           Setting : 16<br/>                     : 68.2</p> | <p>Left blank</p> |
| <p><b>Avg.</b></p> | <p>Left blank</p>   | <p>Left blank</p> |



| WIFI | Band 3 5470~5725MHz Band Edge @ 3m  |   |
|------|---|---|
| ANT  | 802.11ac VHT80 CH106 5530MHz - L  |   |
| 1+2  | Vertical  | Fundamental   |
| Peak | <p>           Site : 03CH11-HY<br/>           Condition : PEAK_BE[UNII]_B3 3m HORN 9120D-HF VERTICAL<br/>           RBW:1000.000KHz VBW:3000.000KHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16<br/>                     : 68.2         </p> | <p>           Site : 03CH11-HY<br/>           Condition : PEAK[UNII] 3m HORN 9120D-HF VERTICAL<br/>           RBW:1000.000KHz VBW:3000.000KHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16<br/>                     : 68.2         </p> |
| Avg. | <p>           Site : 03CH11-HY<br/>           Condition : AVG_BE[UNII]_B3 3m HORN 9120D-HF VERTICAL<br/>           RBW:1000.000KHz VBW:3.000KHz SWT:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16<br/>                     : 68.2         </p>     |   |



| WIFI | Band 3 5470~5725MHz Band Edge @ 3m  |             |
|------|---|-------------|
| ANT  | 802.11ac VHT80 CH106 5530MHz - R  |             |
| 1+2  | Vertical  | Fundamental |
| Peak | <p>Site : 03CH11-HY<br/>           Condition : PEAK_BE(UNIT)_B3 3m HORN 91200-HF VERTICAL<br/>           RBW:1000.000KHz VBW:3000.000KHz SWF:Auto<br/>           Detector : Peak<br/>           Project : 733129-06<br/>           Setting : 16<br/>                     : 68.2</p> | Left blank  |
| Avg. | Left blank  | Left blank  |



Band 3 - 5470~5725MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

Table with 2 columns: Horizontal and Vertical. Each column contains a spectral plot of Level (dBuV/m) vs Frequency (MHz) with associated metadata like Site, Condition, Detector, Project, and Setting.



Emission below 1GHz  
5GHz WIFI 802.11n HT40 (LF)

| WIFI         | 5GHz WIFI   |   |
|--------------|---|---|
| ANT          | 802.11n HT40 LF   |   |
| 1+2          | Horizontal  | Vertical  |
| QP /<br>Peak | <p>Site : 03CH11-4FY<br/>Condition : QP_3m BT-LOG 6111D-LF_ETC HORIZONTAL<br/>Detector : Peak<br/>Project : 733129-06</p> | <p>Site : 03CH11-4FY<br/>Condition : QP_3m BT-LOG 6111D-LF_ETC VERTICAL<br/>Detector : Peak<br/>Project : 733129-06</p> |



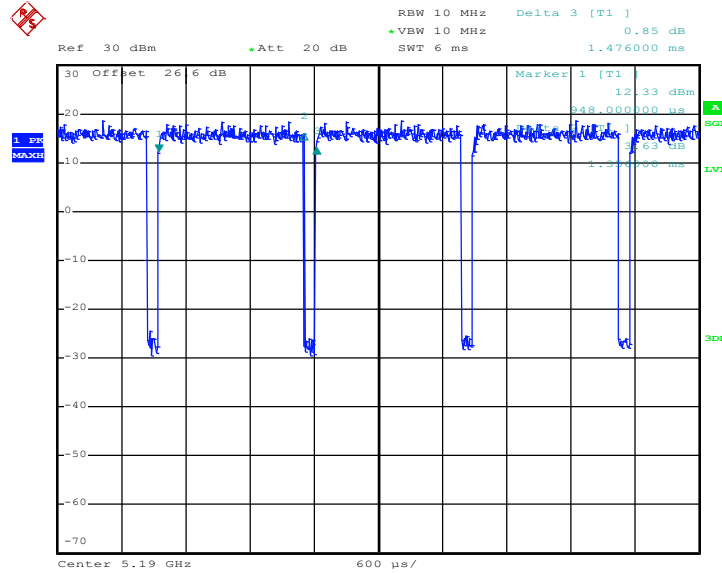
## Appendix D. Duty Cycle Plots

| Antenna | Band                          | Duty Cycle(%) | T(us) | 1/T(kHz) | VBW Setting |
|---------|-------------------------------|---------------|-------|----------|-------------|
| 1+2     | 5GHz 802.11n HT40 for Ant 1   | 91.87         | 1356  | 0.737    | 1kHz        |
| 1+2     | 5GHz 802.11n HT40 for Ant 2   | 92.68         | 1356  | 0.737    | 1kHz        |
| 1+2     | 5GHz 802.11ac VHT80 for Ant 1 | 85.04         | 648   | 1.543    | 3kHz        |
| 1+2     | 5GHz 802.11ac VHT80 for Ant 2 | 86.49         | 653   | 1.531    | 3kHz        |



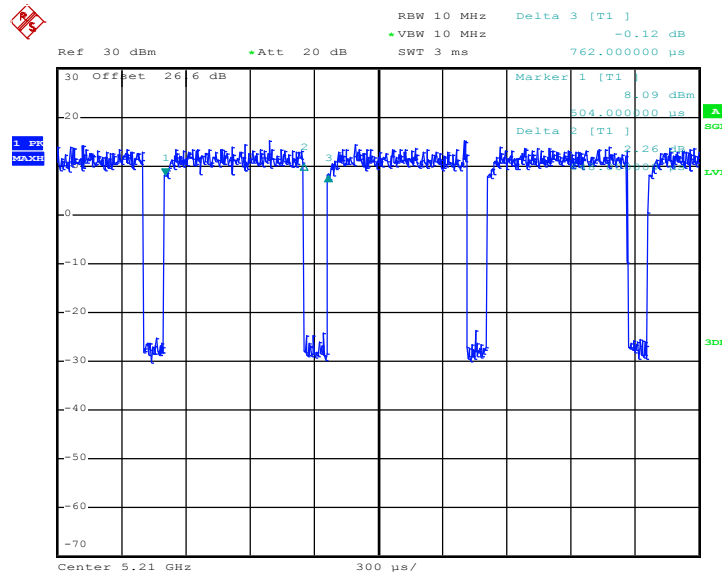
<MIMO Ant. 1>

5GHz 802.11n HT40



Date: 5.MAY.2017 20:04:13

5GHz 802.11ac VHT80

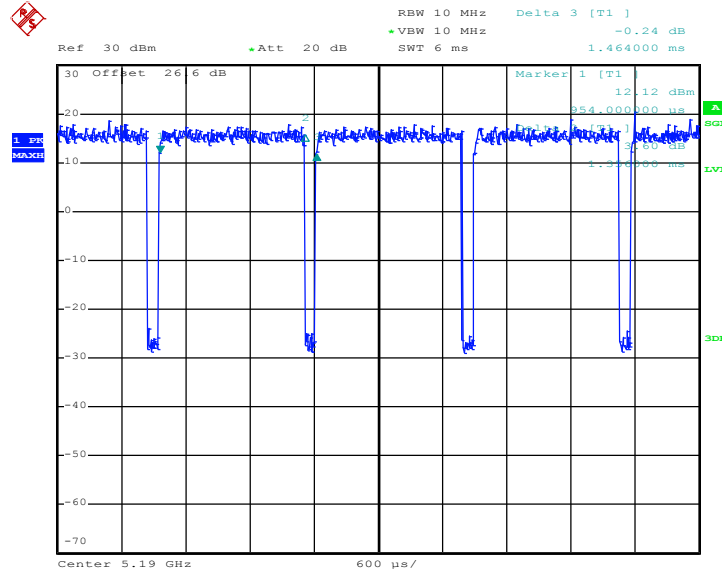


Date: 5.MAY.2017 22:15:08



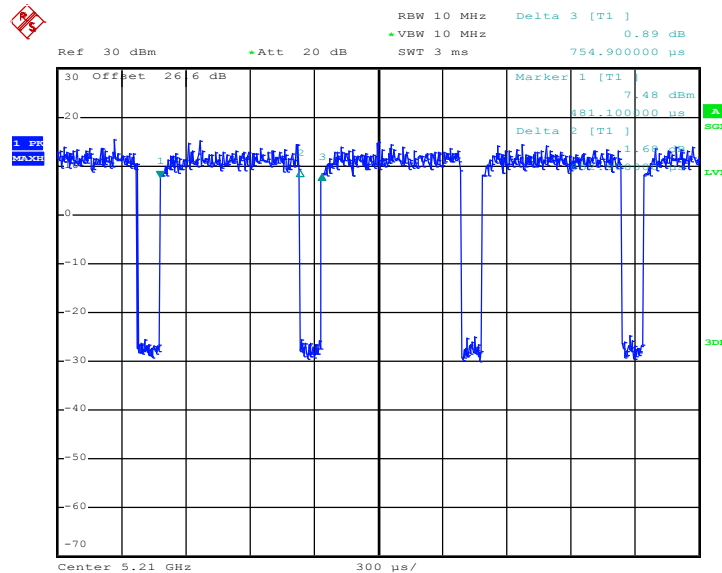
<MIMO Ant. 2>

5GHz 802.11n HT40



Date: 5.MAY.2017 20:05:10

5GHz 802.11ac VHT80



Date: 5.MAY.2017 22:16:43



## **Appendix E. Original Report**

Please refer to Sporton report number FR733129E