



# FCC RADIO TEST REPORT

**FCC ID** : UZ7MC27BJ  
**Equipment** : Mobile computer  
**Brand Name** : Zebra  
**Model Name** : MC27BJ  
**Applicant** : Zebra Technologies Corporation  
1 Zebra Plaza, Holtsville, NY 11742  
**Manufacturer** : Zebra Technologies Corporation  
1 Zebra Plaza, Holtsville, NY 11742  
**Standard** : FCC Part 15 Subpart C §15.247

The product was received on Jul. 30, 2020 and testing was started from Aug. 04, 2020 and completed on Sep. 29, 2020. We, SPORTON INTERNATIONAL INC., EMC & Wireless Communications Laboratory, 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 variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

*Louis Wu*

Approved by: Louis Wu

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



## Table of Contents

|                                                                 |           |
|-----------------------------------------------------------------|-----------|
| <b>History of this test report.....</b>                         | <b>3</b>  |
| <b>Summary of Test Result.....</b>                              | <b>4</b>  |
| <b>1 General Description .....</b>                              | <b>5</b>  |
| 1.1 Product Feature of Equipment Under Test.....                | 5         |
| 1.2 Product Specification of Equipment Under Test.....          | 6         |
| 1.3 Modification of EUT .....                                   | 6         |
| 1.4 Testing Location .....                                      | 7         |
| 1.5 Applicable Standards.....                                   | 7         |
| <b>2 Test Configuration of Equipment Under Test .....</b>       | <b>8</b>  |
| 2.1 Carrier Frequency and Channel .....                         | 8         |
| 2.2 Test Mode.....                                              | 8         |
| 2.3 Connection Diagram of Test System.....                      | 12        |
| 2.4 EUT Operation Test Setup .....                              | 12        |
| <b>3 Test Result .....</b>                                      | <b>13</b> |
| 3.1 Output Power Measurement.....                               | 13        |
| 3.2 Radiated Band Edges and Spurious Emission Measurement ..... | 16        |
| 3.3 Antenna Requirements.....                                   | 20        |
| <b>4 List of Measuring Equipment.....</b>                       | <b>21</b> |
| <b>5 Uncertainty of Evaluation .....</b>                        | <b>22</b> |
| <b>Appendix A. Radiated Spurious Emission</b>                   |           |
| <b>Appendix B. Radiated Spurious Emission Plots</b>             |           |
| <b>Appendix C. Duty Cycle Plots</b>                             |           |
| <b>Appendix D. Setup Photographs</b>                            |           |
| <b>Appendix E. Original Report</b>                              |           |



## History OF THIS TEST REPORT

| Report No.   | Version | Description                                                                                                                                                                                                                                                                                                                                                            | Issued Date   |
|--------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| FR052913-03C | 01      | This is a variant report for MC27BJ (FCC ID: UZ7MC27BJ), and the differences between this model name and MC27AK (FCC ID: UZ7MC27AK) are NFC, camera and WWAN support band. All the test cases were performed on original report which can be referred to Sporton Report Number FR052917-01C as appendix E. Based on the original report, the test cases were verified. | Oct. 30, 2020 |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |
|              |         |                                                                                                                                                                                                                                                                                                                                                                        |               |

## Summary of Test Result

| Report Clause | Ref Std. Clause    | Test Items                                         | Result (PASS/FAIL) | Remark                              |
|---------------|--------------------|----------------------------------------------------|--------------------|-------------------------------------|
| -             | 15.247(a)(2)       | 6dB Bandwidth                                      | Not Required       | -                                   |
| -             | 2.1049             | 99% Occupied Bandwidth                             | Not Required       | -                                   |
| 3.1           | 15.247(b)          | Power Output Measurement                           | Pass               | -                                   |
| -             | 15.247(e)          | Power Spectral Density                             | Not Required       | -                                   |
| -             | 15.247(d)          | Conducted Band Edges                               | Not Required       | -                                   |
|               |                    | Conducted Spurious Emission                        | Not Required       | -                                   |
| 3.2           | 15.247(d)          | Radiated Band Edges and Radiated Spurious Emission | Pass               | Under limit 6.13 dB at 2483.520 MHz |
| -             | 15.207             | AC Conducted Emission                              | Not Required       | -                                   |
| 3.3           | 15.203 & 15.247(b) | Antenna Requirement                                | Pass               | -                                   |

**Note:** Not required means after assessing, test items are not necessary to carry out.

### Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

### Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

**Reviewed by: Wii Chang**

**Report Producer: Celery Wei**

# 1 General Description

## 1.1 Product Feature of Equipment Under Test

| Product Feature                 |                                                                                                                 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Equipment                       | Mobile computer                                                                                                 |
| Brand Name                      | Zebra                                                                                                           |
| Model Name                      | MC27BJ                                                                                                          |
| FCC ID                          | UZ7MC27BJ                                                                                                       |
| EUT supports Radios application | GSM/EGPRS/WCDMA/HSPA/LTE/GNSS<br>WLAN 11a/b/g/n HT20/HT40<br>WLAN 11ac VHT20/VHT40/VHT80<br>Bluetooth BR/EDR/LE |
| HW Version                      | EV                                                                                                              |
| SW Version                      | 10-11-31.00-QG-U00-PRD-HEL-04                                                                                   |
| OS Version                      | Android 10                                                                                                      |
| MFD                             | 02JUN20                                                                                                         |
| EUT Stage                       | Engineering Sample                                                                                              |

**Remark:** The above EUT's information was declared by manufacturer.

| Specification of Accessories            |            |       |             |                  |
|-----------------------------------------|------------|-------|-------------|------------------|
| AC Adapter                              | Brand Name | Zebra | Part Number | PWR-WUA5V12W0US  |
| Battery                                 | Brand Name | Zebra | Part Number | BT-000418-10     |
| USB Cable<br>(TypeA plug to TypeC plug) | Brand Name | Zebra | Part Number | CBL-TC2X-USBC-01 |
| Trigger Handle                          | Brand Name | Zebra | Part Number | TRG-MC2X-SNP1-01 |
| Holster                                 | Brand Name | Zebra | Part Number | SG-MC2X-HLSTR-01 |
| Holster                                 | Brand Name | Zebra | Part Number | SG-MC3021212-01R |

## 1.2 Product Specification of Equipment Under Test

| Product Specification subjective to this standard |                                                                                                                                                                                                                                  |
|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tx/Rx Channel Frequency Range</b>              | 2412 MHz ~ 2462 MHz                                                                                                                                                                                                              |
| <b>Maximum (Peak) Output Power to antenna</b>     | 802.11b : 23.02 dBm (0.2004 W)<br>802.11g : 23.86 dBm (0.2432 W)<br>802.11n HT20 : 24.19 dBm (0.2624 W)<br>802.11n HT40 : 22.67 dBm (0.1849 W)<br>802.11ac VHT20 : 24.09 dBm (0.2564 W)<br>802.11ac VHT40 : 22.65 dBm (0.1841 W) |
| <b>Maximum (Average) Output Power to antenna</b>  | 802.11b : 21.20 dBm (0.1318 W)<br>802.11g : 20.30 dBm (0.1072 W)<br>802.11n HT20 : 20.60 dBm (0.1148 W)<br>802.11n HT40 : 16.70 dBm (0.0468 W)<br>802.11ac VHT20 : 20.50 dBm (0.1122 W)<br>802.11ac VHT40 : 16.60 dBm (0.0457 W) |
| <b>Antenna Type / Gain</b>                        | PIFA Antenna with gain 2.31 dBi                                                                                                                                                                                                  |
| <b>Type of Modulation</b>                         | 802.11b : DSSS (DBPSK / DQPSK / CCK)<br>802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)<br>802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)                                                                                  |

## 1.3 Modification of EUT

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



## 1.4 Testing Location

|                           |                                                                                                                       |           |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------|
| <b>Test Site</b>          | SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory                                                   |           |
| <b>Test Site Location</b> | No.52, Huaya 1st Rd., Guishan Dist.,<br>Taoyuan 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>                                                                                               |           |
|                           | TH05-HY                                                                                                               | 03CH07-HY |

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

FCC designation No.: TW1190

## 1.5 Applicable Standards

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

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05r02
- ♦ FCC KDB 414788 D01 Radiated Test Site v01r01.
- ♦ 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. The TAF code is not including all the FCC KDB listed without accreditation.
3. 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: radiation 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 and Channel

| Frequency Band  | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|-----------------|---------|-------------|---------|-------------|
| 2400-2483.5 MHz | 1       | 2412        | 7       | 2442        |
|                 | 2       | 2417        | 8       | 2447        |
|                 | 3       | 2422        | 9       | 2452        |
|                 | 4       | 2427        | 10      | 2457        |
|                 | 5       | 2432        | 11      | 2462        |
|                 | 6       | 2437        |         |             |

### 2.2 Test Mode

Final test modes are considering the modulation and worse data rates as below table.

| Modulation     | Data Rate |
|----------------|-----------|
| 802.11b        | 1 Mbps    |
| 802.11g        | 6 Mbps    |
| 802.11n HT20   | MCS0      |
| 802.11n HT40   | MCS0      |
| 802.11ac VHT20 | MCS0      |
| 802.11ac VHT40 | MCS0      |

| Ch. #  | 2400-2483.5 MHz |         |                |
|--------|-----------------|---------|----------------|
|        | 802.11b         | 802.11g | 802.11ac VHT40 |
| Low    | -               | -       | -              |
| Middle | -               | -       | -              |
| High   | 11              | 11      | 09             |

**Remark:** For radiation spurious emission, the final modulation and the worst data rate was reference the max RF conducted power.



| 802.11b RF Peak Output Power (dBm) |                    |                 |
|------------------------------------|--------------------|-----------------|
| Power vs. Channel                  |                    |                 |
| Channel                            | Frequency<br>(MHz) | Data Rate (bps) |
|                                    |                    | 1M              |
| CH 01                              | 2412               | 23.02           |
| CH 06                              | 2437               | 22.92           |
| CH 11                              | 2462               | 22.99           |

| 802.11g RF Peak Output Power (dBm) |                    |                 |
|------------------------------------|--------------------|-----------------|
| Power vs. Channel                  |                    |                 |
| Channel                            | Frequency<br>(MHz) | Data Rate (bps) |
|                                    |                    | 6M              |
| CH 01                              | 2412               | 22.36           |
| CH 06                              | 2437               | 23.86           |
| CH 11                              | 2462               | 22.03           |

| 802.11n HT20 RF Peak Output Power (dBm) |                    |           |
|-----------------------------------------|--------------------|-----------|
| Power vs. Channel                       |                    |           |
| Channel                                 | Frequency<br>(MHz) | MCS Index |
|                                         |                    | MCS 0     |
| CH 01                                   | 2412               | 21.46     |
| CH 06                                   | 2437               | 24.19     |
| CH 11                                   | 2462               | 21.59     |

| 802.11n HT40 RF Peak Output Power (dBm) |                    |           |
|-----------------------------------------|--------------------|-----------|
| Power vs. Channel                       |                    |           |
| Channel                                 | Frequency<br>(MHz) | MCS Index |
|                                         |                    | MCS 0     |
| CH 03                                   | 2422               | 19.55     |
| CH 06                                   | 2437               | 22.67     |
| CH 09                                   | 2452               | 21.85     |



| 802.11ac VHT20 RF Peak Output Power (dBm) |                    |              |
|-------------------------------------------|--------------------|--------------|
| Power vs. Channel                         |                    |              |
| Channel                                   | Frequency<br>(MHz) | MCS Index    |
|                                           |                    | MCS 0        |
| CH 01                                     | 2412               | 21.45        |
| CH 06                                     | 2437               | <b>24.09</b> |
| CH 11                                     | 2462               | 21.58        |

| 802.11ac VHT40 RF Peak Output Power (dBm) |                    |              |
|-------------------------------------------|--------------------|--------------|
| Power vs. Channel                         |                    |              |
| Channel                                   | Frequency<br>(MHz) | MCS Index    |
|                                           |                    | MCS 0        |
| CH 03                                     | 2422               | 19.53        |
| CH 06                                     | 2437               | <b>22.65</b> |
| CH 09                                     | 2452               | 21.85        |

| 802.11b RF Avg Output Power (dBm) |                    |                 |
|-----------------------------------|--------------------|-----------------|
| Power vs. Channel                 |                    |                 |
| Channel                           | Frequency<br>(MHz) | Data Rate (bps) |
|                                   |                    | 1M              |
| CH 01                             | 2412               | <b>21.20</b>    |
| CH 06                             | 2437               | 21.10           |
| CH 11                             | 2462               | 21.10           |

| 802.11g RF Avg Output Power (dBm) |                    |                 |
|-----------------------------------|--------------------|-----------------|
| Power vs. Channel                 |                    |                 |
| Channel                           | Frequency<br>(MHz) | Data Rate (bps) |
|                                   |                    | 6M              |
| CH 01                             | 2412               | 18.30           |
| CH 06                             | 2437               | <b>20.30</b>    |
| CH 11                             | 2462               | 17.80           |



| 802.11n HT20 RF Avg Output Power (dBm) |                    |              |
|----------------------------------------|--------------------|--------------|
| Power vs. Channel                      |                    |              |
| Channel                                | Frequency<br>(MHz) | MCS Index    |
|                                        |                    | MCS 0        |
| CH 01                                  | 2412               | 17.10        |
| CH 06                                  | 2437               | <b>20.60</b> |
| CH 11                                  | 2462               | 17.20        |

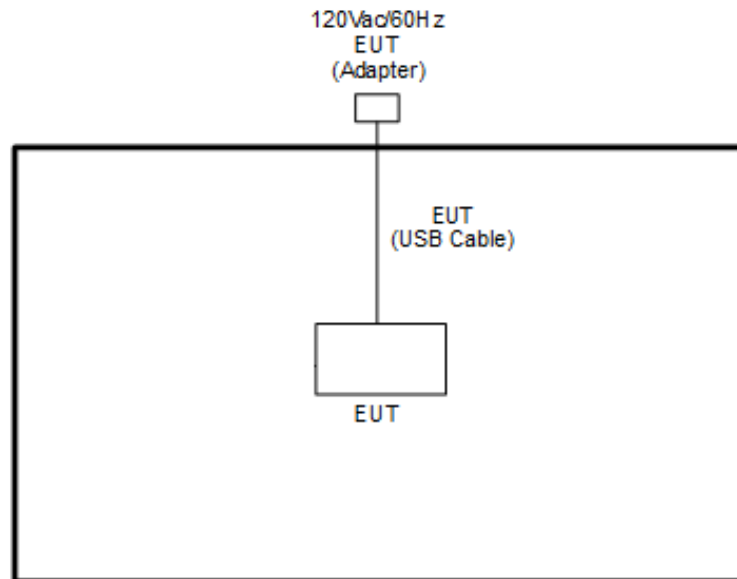
| 802.11n HT40 RF Avg Output Power (dBm) |                    |              |
|----------------------------------------|--------------------|--------------|
| Power vs. Channel                      |                    |              |
| Channel                                | Frequency<br>(MHz) | MCS Index    |
|                                        |                    | MCS 0        |
| CH 03                                  | 2422               | 14.10        |
| CH 06                                  | 2437               | <b>16.70</b> |
| CH 09                                  | 2452               | 16.10        |

| 802.11ac VHT20 RF Avg Output Power (dBm) |                    |              |
|------------------------------------------|--------------------|--------------|
| Power vs. Channel                        |                    |              |
| Channel                                  | Frequency<br>(MHz) | MCS Index    |
|                                          |                    | MCS 0        |
| CH 01                                    | 2412               | 17.00        |
| CH 06                                    | 2437               | <b>20.50</b> |
| CH 11                                    | 2462               | 17.10        |

| 802.11ac VHT40 RF Avg Output Power (dBm) |                    |              |
|------------------------------------------|--------------------|--------------|
| Power vs. Channel                        |                    |              |
| Channel                                  | Frequency<br>(MHz) | MCS Index    |
|                                          |                    | MCS 0        |
| CH 03                                    | 2422               | 14.00        |
| CH 06                                    | 2437               | <b>16.60</b> |
| CH 09                                    | 2452               | 16.10        |

## 2.3 Connection Diagram of Test System

<WLAN Tx Mode>



## 2.4 EUT Operation Test Setup

The RF test items, utility “QRCT v4.0.00067.0” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

### 3 Test Result

#### 3.1 Output Power Measurement

##### 3.1.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for output power is 30dBm. If transmitting antenna with directional gain greater than 6dBi is used, the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

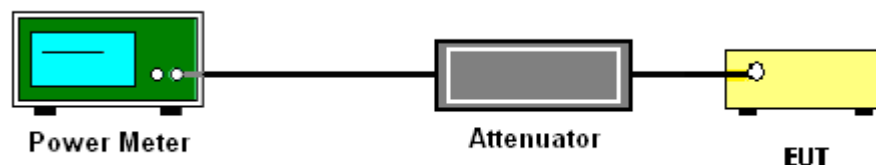
##### 3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

##### 3.1.3 Test Procedures

1. For Peak Power, the testing follows ANSI C63.10 Section 11.9.1.3 PKPM1
2. For Average Power, the testing follows ANSI C63.10 Section 11.9.2.3.2 Method AVGPM-G
3. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Measure the conducted output power and record the results in the test report.

##### 3.1.4 Test Setup





## 3.1.5 Test Result of Peak Output Power

|                 |                        |                     |            |
|-----------------|------------------------|---------------------|------------|
| Test Engineer : | Ryan Lin and Tommy Lee | Temperature :       | 21.2~24.1℃ |
|                 |                        | Relative Humidity : | 47.2~57.8% |

| 2.4GHz Band Single Antenna |           |     |     |             |                            |      |     |                             |      |          |      |                  |      |                        |      |            |
|----------------------------|-----------|-----|-----|-------------|----------------------------|------|-----|-----------------------------|------|----------|------|------------------|------|------------------------|------|------------|
| Mod.                       | Data Rate | NTX | CH. | Freq. (MHz) | Peak Conducted Power (dBm) |      |     | Conducted Power Limit (dBm) |      | DG (dBi) |      | EIRP Power (dBm) |      | EIRP Power Limit (dBm) |      | Pass /Fail |
|                            |           |     |     |             | Ant1                       | Ant2 | SUM | Ant1                        | Ant2 | Ant1     | Ant2 | Ant1             | Ant2 | Ant1                   | Ant2 |            |
| 11b                        | 1Mbps     | 1   | 1   | 2412        | 23.02                      | -    | -   | 30.00                       | -    | 2.31     | -    | 25.33            | -    | 36.00                  | -    | Pass       |
| 11b                        | 1Mbps     | 1   | 6   | 2437        | 22.92                      | -    |     | 30.00                       | -    | 2.31     | -    | 25.23            | -    | 36.00                  | -    | Pass       |
| 11b                        | 1Mbps     | 1   | 11  | 2462        | 22.99                      | -    |     | 30.00                       | -    | 2.31     | -    | 25.30            | -    | 36.00                  | -    | Pass       |
| 11g                        | 6Mbps     | 1   | 1   | 2412        | 22.36                      | -    |     | 30.00                       | -    | 2.31     | -    | 24.67            | -    | 36.00                  | -    | Pass       |
| 11g                        | 6Mbps     | 1   | 6   | 2437        | 23.86                      | -    |     | 30.00                       | -    | 2.31     | -    | 26.17            | -    | 36.00                  | -    | Pass       |
| 11g                        | 6Mbps     | 1   | 11  | 2462        | 22.03                      | -    |     | 30.00                       | -    | 2.31     | -    | 24.34            | -    | 36.00                  | -    | Pass       |
| HT20                       | MCS0      | 1   | 1   | 2412        | 21.46                      | -    |     | 30.00                       | -    | 2.31     | -    | 23.77            | -    | 36.00                  | -    | Pass       |
| HT20                       | MCS0      | 1   | 6   | 2437        | 24.19                      | -    |     | 30.00                       | -    | 2.31     | -    | 26.50            | -    | 36.00                  | -    | Pass       |
| HT20                       | MCS0      | 1   | 11  | 2462        | 21.59                      | -    |     | 30.00                       | -    | 2.31     | -    | 23.90            | -    | 36.00                  | -    | Pass       |
| HT40                       | MCS0      | 1   | 3   | 2422        | 19.55                      | -    |     | 30.00                       | -    | 2.31     | -    | 21.86            | -    | 36.00                  | -    | Pass       |
| HT40                       | MCS0      | 1   | 6   | 2437        | 22.67                      | -    |     | 30.00                       | -    | 2.31     | -    | 24.98            | -    | 36.00                  | -    | Pass       |
| HT40                       | MCS0      | 1   | 9   | 2452        | 21.85                      | -    |     | 30.00                       | -    | 2.31     | -    | 24.16            | -    | 36.00                  | -    | Pass       |
| VHT20                      | MCS0      | 1   | 1   | 2412        | 21.45                      | -    |     | 30.00                       | -    | 2.31     | -    | 23.76            | -    | 36.00                  | -    | Pass       |
| VHT20                      | MCS0      | 1   | 6   | 2437        | 24.09                      | -    |     | 30.00                       | -    | 2.31     | -    | 26.40            | -    | 36.00                  | -    | Pass       |
| VHT20                      | MCS0      | 1   | 11  | 2462        | 21.58                      | -    |     | 30.00                       | -    | 2.31     | -    | 23.89            | -    | 36.00                  | -    | Pass       |
| VHT40                      | MCS0      | 1   | 3   | 2422        | 19.53                      | -    |     | 30.00                       | -    | 2.31     | -    | 21.84            | -    | 36.00                  | -    | Pass       |
| VHT40                      | MCS0      | 1   | 6   | 2437        | 22.65                      | -    |     | 30.00                       | -    | 2.31     | -    | 24.96            | -    | 36.00                  | -    | Pass       |
| VHT40                      | MCS0      | 1   | 9   | 2452        | 21.85                      | -    |     | 30.00                       | -    | 2.31     | -    | 24.16            | -    | 36.00                  | -    | Pass       |



## 3.1.6 Test Result of Average Output Power (Reporting Only)

|                 |                        |                     |            |
|-----------------|------------------------|---------------------|------------|
| Test Engineer : | Ryan Lin and Tommy Lee | Temperature :       | 21.2~24.1℃ |
|                 |                        | Relative Humidity : | 47.2~57.8% |

| 2.4GHz Band Single Antenna |           |                 |     |             |                               |      |     |          |      |                  |      |
|----------------------------|-----------|-----------------|-----|-------------|-------------------------------|------|-----|----------|------|------------------|------|
| Mod.                       | Data Rate | N <sub>TX</sub> | CH. | Freq. (MHz) | Average Conducted Power (dBm) |      |     | DG (dBi) |      | EIRP Power (dBm) |      |
|                            |           |                 |     |             | Ant1                          | Ant2 | SUM | Ant1     | Ant2 | Ant1             | Ant2 |
| 11b                        | 1Mbps     | 1               | 1   | 2412        | 21.20                         | -    | -   | 2.31     | -    | 23.51            | -    |
| 11b                        | 1Mbps     | 1               | 6   | 2437        | 21.10                         | -    |     | 2.31     | -    | 23.41            | -    |
| 11b                        | 1Mbps     | 1               | 11  | 2462        | 21.10                         | -    |     | 2.31     | -    | 23.41            | -    |
| 11g                        | 6Mbps     | 1               | 1   | 2412        | 18.30                         | -    |     | 2.31     | -    | 20.61            | -    |
| 11g                        | 6Mbps     | 1               | 6   | 2437        | 20.30                         | -    |     | 2.31     | -    | 22.61            | -    |
| 11g                        | 6Mbps     | 1               | 11  | 2462        | 17.80                         | -    |     | 2.31     | -    | 20.11            | -    |
| HT20                       | MCS0      | 1               | 1   | 2412        | 17.10                         | -    |     | 2.31     | -    | 19.41            | -    |
| HT20                       | MCS0      | 1               | 6   | 2437        | 20.60                         | -    |     | 2.31     | -    | 22.91            | -    |
| HT20                       | MCS0      | 1               | 11  | 2462        | 17.20                         | -    |     | 2.31     | -    | 19.51            | -    |
| HT40                       | MCS0      | 1               | 3   | 2422        | 14.10                         | -    |     | 2.31     | -    | 16.41            | -    |
| HT40                       | MCS0      | 1               | 6   | 2437        | 16.70                         | -    |     | 2.31     | -    | 19.01            | -    |
| HT40                       | MCS0      | 1               | 9   | 2452        | 16.10                         | -    |     | 2.31     | -    | 18.41            | -    |
| VHT20                      | MCS0      | 1               | 1   | 2412        | 17.00                         | -    |     | 2.31     | -    | 19.31            | -    |
| VHT20                      | MCS0      | 1               | 6   | 2437        | 20.50                         | -    |     | 2.31     | -    | 22.81            | -    |
| VHT20                      | MCS0      | 1               | 11  | 2462        | 17.10                         | -    |     | 2.31     | -    | 19.41            | -    |
| VHT40                      | MCS0      | 1               | 3   | 2422        | 14.00                         | -    |     | 2.31     | -    | 16.31            | -    |
| VHT40                      | MCS0      | 1               | 6   | 2437        | 16.60                         | -    |     | 2.31     | -    | 18.91            | -    |
| VHT40                      | MCS0      | 1               | 9   | 2452        | 16.10                         | -    |     | 2.31     | -    | 18.41            | -    |



## **3.2 Radiated Band Edges and Spurious Emission Measurement**

### **3.2.1 Limit of Radiated band edge and Spurious Emission Measurement**

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

| <b>Frequency<br/>(MHz)</b> | <b>Field Strength<br/>(microvolts/meter)</b> | <b>Measurement Distance<br/>(meters)</b> |
|----------------------------|----------------------------------------------|------------------------------------------|
| 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                                        |

### **3.2.2 Measuring Instruments**

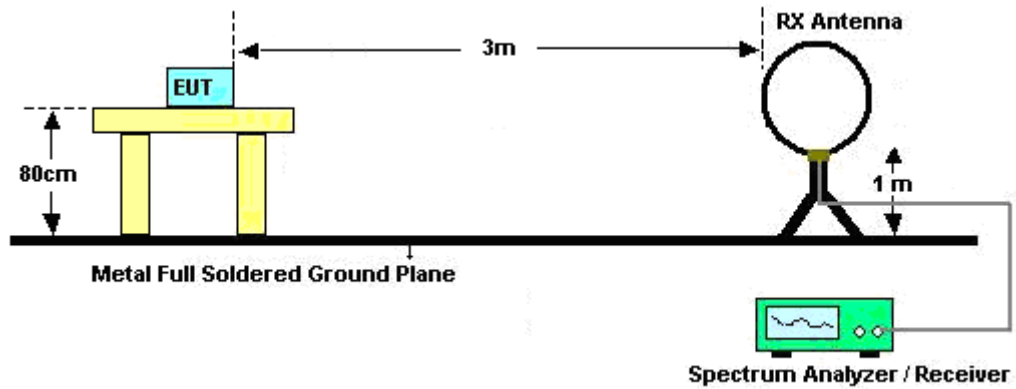
See list of measuring equipment of this test report.

### 3.2.3 Test Procedures

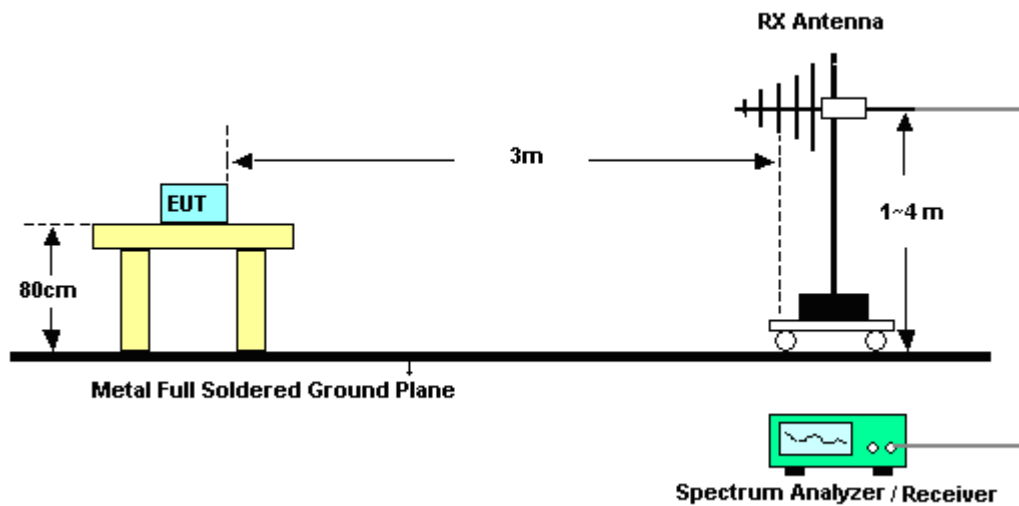
1. The testing follows the ANSI C63.10 Section 11.12.1 Radiated emission measurements.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. 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.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
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.
8. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1$  GHz;  $VBW \geq RBW$ ; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \geq 1$  GHz for peak measurement.  
For average measurement:
    - $VBW = 10$  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.

### 3.2.4 Test Setup

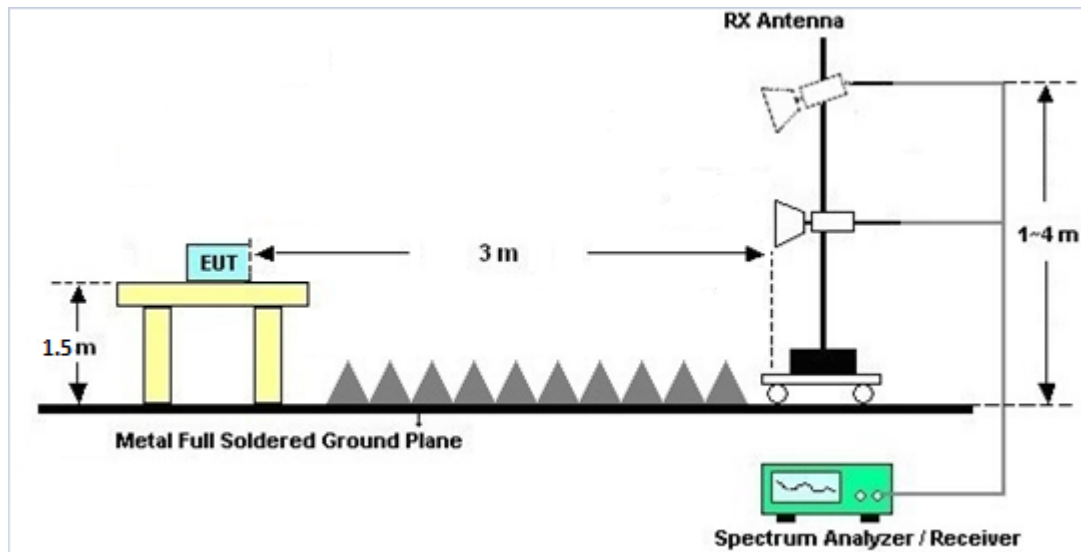
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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.

There is a comparison data of both open-field test site and alternative test site - semi-Anechoic chamber according to 414788 D01 Radiated Test Site v01r01, and the result came out very similar.

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

Please refer to Appendix A and B.

### 3.2.7 Duty Cycle

Please refer to Appendix C.

### 3.2.8 Test Result of Radiated Spurious Emission (30MHz ~ 10<sup>th</sup> Harmonic)

Please refer to Appendix A and B.



### **3.3 Antenna Requirements**

#### **3.3.1 Standard Applicable**

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached Antenna or of an Antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

#### **3.3.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.

#### **3.3.3 Antenna Gain**

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



## 4 List of Measuring Equipment

| Instrument                | Brand Name      | Model No.                         | Serial No.                            | Characteristics | Calibration Date | Test Date                       | Due Date      | Remark                   |
|---------------------------|-----------------|-----------------------------------|---------------------------------------|-----------------|------------------|---------------------------------|---------------|--------------------------|
| Hygrometer                | Testo           | 608-H1                            | 34893241                              | N/A             | Mar. 02, 2020    | Aug. 04, 2020~<br>Aug. 31, 2020 | Mar. 01, 2021 | Conducted<br>(TH05-HY)   |
| Power Sensor              | DARE            | RPR3006W                          | 16I00054S<br>NO10                     | 10MHz~6GHz      | Dec. 23, 2019    | Aug. 04, 2020~<br>Aug. 31, 2020 | Dec. 22, 2020 | Conducted<br>(TH05-HY)   |
| Signal Analyzer           | Rohde & Schwarz | FSV40                             | 101397                                | 10Hz~40GHz      | Nov. 15, 2019    | Aug. 04, 2020~<br>Aug. 31, 2020 | Nov. 14, 2020 | Conducted<br>(TH05-HY)   |
| Switch Box & RF Cable     | EM Electronics  | EMSW18SE                          | SW200302                              | N/A             | Mar. 17, 2020    | Aug. 04, 2020~<br>Aug. 31, 2020 | Mar. 16, 2021 | Conducted<br>(TH05-HY)   |
| Loop Antenna              | Rohde & Schwarz | HFH2-Z2                           | 100315                                | 9 kHz~30 MHz    | Dec. 26, 2019    | Sep. 22, 2020~<br>Sep. 29, 2020 | Dec. 25, 2020 | Radiation<br>(03CH07-HY) |
| Bilog Antenna             | TESEQ           | CBL 6111D &<br>00800N1D01<br>N-06 | 35419 & 03                            | 30MHz~1GHz      | Apr. 29, 2020    | Sep. 22, 2020~<br>Sep. 29, 2020 | Apr. 28, 2021 | Radiation<br>(03CH07-HY) |
| Double Ridge Horn Antenna | ESCO            | 3117                              | 00075962                              | 1GHz ~ 18GHz    | Dec. 06, 2019    | Sep. 22, 2020~<br>Sep. 29, 2020 | Dec. 05, 2020 | Radiation<br>(03CH07-HY) |
| SHF-EHF Horn Antenna      | SCHWARZBECK     | BBHA 9170                         | BBHA9170<br>584                       | 18GHz~40GHz     | Dec. 10, 2019    | Sep. 22, 2020~<br>Sep. 29, 2020 | Dec. 09, 2020 | Radiation<br>(03CH07-HY) |
| EMI Test Receiver         | Agilent         | N9038A(MX<br>E)                   | MY5329005<br>3                        | 20Hz~26.5GHz    | May 21, 2020     | Sep. 22, 2020~<br>Sep. 29, 2020 | May 20, 2021  | Radiation<br>(03CH07-HY) |
| Spectrum Analyzer         | Agilent         | N9030A                            | MY5235027<br>6                        | 3Hz~44GHz       | Jun. 09, 2020    | Sep. 22, 2020~<br>Sep. 29, 2020 | Jun. 08, 2021 | Radiation<br>(03CH07-HY) |
| Preamplifier              | COM-POWER       | PA-103A                           | 161241                                | 10MHz~1GHz      | May 19, 2020     | Sep. 22, 2020~<br>Sep. 29, 2020 | May 18, 2021  | Radiation<br>(03CH07-HY) |
| Preamplifier              | MITEQ           | AMF-7D-001<br>01800-30-10<br>P    | 1590075                               | 1GHz~18GHz      | Apr. 23, 2020    | Sep. 22, 2020~<br>Sep. 29, 2020 | Apr. 22, 2021 | Radiation<br>(03CH07-HY) |
| Preamplifier              | Agilent         | 8449B                             | 3008A0236<br>2                        | 1GHz~26.5GHz    | Nov. 01, 2019    | Sep. 22, 2020~<br>Sep. 29, 2020 | Oct. 31, 2020 | Radiation<br>(03CH07-HY) |
| Preamplifier              | EMEC            | EM18G40G                          | 060715                                | 18GHz~40GHz     | Dec. 13, 2019    | Sep. 22, 2020~<br>Sep. 29, 2020 | Dec. 12, 2020 | Radiation<br>(03CH07-HY) |
| RF Cable                  | HUBER + SUHNER  | SUCOFLEX<br>102                   | MY2858/2,8<br>01606/2                 | 18GHz~40GHz     | Feb. 25, 2020    | Sep. 22, 2020~<br>Sep. 29, 2020 | Feb. 24, 2021 | Radiation<br>(03CH07-HY) |
| RF Cable                  | HUBER + SUHNER  | SUCOFLEX<br>104                   | MY24971/4,<br>MY28655/4               | 9kHz~30MHz      | Feb. 25, 2020    | Sep. 22, 2020~<br>Sep. 29, 2020 | Feb. 24, 2021 | Radiation<br>(03CH07-HY) |
| RF Cable                  | HUBER + SUHNER  | SUCOFLEX<br>104                   | MY28655/4,<br>MY24971/4,<br>MY15682/4 | 30MHz~1GHz      | Feb. 25, 2020    | Sep. 22, 2020~<br>Sep. 29, 2020 | Feb. 24, 2021 | Radiation<br>(03CH07-HY) |
| RF Cable                  | HUBER + SUHNER  | SUCOFLEX<br>104                   | MY28655/4,<br>MY24971/4,<br>MY15682/4 | 1GHz~18GHz      | Feb. 25, 2020    | Sep. 22, 2020~<br>Sep. 29, 2020 | Feb. 24, 2021 | Radiation<br>(03CH07-HY) |
| Antenna Mast              | Max-Full        | MFA520BS                          | N/A                                   | 1m~4m           | N/A              | Sep. 22, 2020~<br>Sep. 29, 2020 | N/A           | Radiation<br>(03CH07-HY) |
| Turn Table                | ChainTek        | Chaintek<br>3000                  | N/A                                   | 0~360 Degree    | N/A              | Sep. 22, 2020~<br>Sep. 29, 2020 | N/A           | Radiation<br>(03CH07-HY) |
| USB Data Logger           | TECPEL          | TR-32                             | HE17XB24<br>95                        | N/A             | N/A              | Sep. 22, 2020~<br>Sep. 29, 2020 | N/A           | Radiation<br>(03CH07-HY) |
| Software                  | Audix           | E3<br>6.2009-8-24                 | N/A                                   | N/A             | N/A              | Sep. 22, 2020~<br>Sep. 29, 2020 | N/A           | Radiation<br>(03CH07-HY) |

## 5 Uncertainty of Evaluation

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

|                                                                            |     |
|----------------------------------------------------------------------------|-----|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 4.7 |
|----------------------------------------------------------------------------|-----|

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

|                                                                            |     |
|----------------------------------------------------------------------------|-----|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 5.3 |
|----------------------------------------------------------------------------|-----|

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

|                                                                            |     |
|----------------------------------------------------------------------------|-----|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 5.0 |
|----------------------------------------------------------------------------|-----|



## Appendix A. Radiated Spurious Emission

|                 |                                   |                     |         |
|-----------------|-----------------------------------|---------------------|---------|
| Test Engineer : | Jesse Wang, Stan Hsieh and Ken Wu | Temperature :       | 22~23°C |
|                 |                                   | Relative Humidity : | 51~58%  |

## 2.4GHz 2400~2483.5MHz

## WIFI 802.11b (Band Edge @ 3m)

| WIFI                        | Note                                                                                        | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Path   | Preamp | Ant    | Table   | Peak    | Pol.    |
|-----------------------------|---------------------------------------------------------------------------------------------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant.                        |                                                                                             |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
| 1                           |                                                                                             | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| 802.11b<br>CH 11<br>2462MHz | *                                                                                           | 2462      | 110.38     | -      | -          | 95.54    | 32.03    | 18.09  | 35.28  | 124    | 83      | P       | H       |
|                             | *                                                                                           | 2462      | 107.09     | -      | -          | 92.25    | 32.03    | 18.09  | 35.28  | 124    | 83      | A       | H       |
|                             |                                                                                             | 2483.96   | 54.6       | -19.4  | 74         | 39.7     | 32.07    | 18.12  | 35.29  | 124    | 83      | P       | H       |
|                             |                                                                                             | 2483.52   | 46.84      | -7.16  | 54         | 31.94    | 32.07    | 18.12  | 35.29  | 124    | 83      | A       | H       |
|                             |                                                                                             |           |            |        |            |          |          |        |        |        |         |         | H       |
|                             |                                                                                             |           |            |        |            |          |          |        |        |        |         |         | H       |
|                             | *                                                                                           | 2462      | 104.89     | -      | -          | 90.05    | 32.03    | 18.09  | 35.28  | 162    | 0       | P       | V       |
|                             | *                                                                                           | 2462      | 101.64     | -      | -          | 86.8     | 32.03    | 18.09  | 35.28  | 162    | 0       | A       | V       |
|                             |                                                                                             | 2497.4    | 53.7       | -20.3  | 74         | 38.76    | 32.1     | 18.12  | 35.3   | 162    | 0       | P       | V       |
|                             |                                                                                             | 2483.52   | 43.71      | -10.29 | 54         | 28.81    | 32.07    | 18.12  | 35.29  | 162    | 0       | A       | V       |
|                             |                                                                                             |           |            |        |            |          |          |        |        |        |         |         | V       |
|                             |                                                                                             |           |            |        |            |          |          |        |        |        |         |         | V       |
| Remark                      | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |           |            |        |            |          |          |        |        |        |         |         |         |



**2.4GHz 2400~2483.5MHz**  
**WIFI 802.11b (Harmonic @ 3m)**

| WIFI<br>Ant.<br>1                    | Note                                                                                        | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Path<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|--------------------------------------|---------------------------------------------------------------------------------------------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| <b>802.11b<br/>CH 11<br/>2462MHz</b> |                                                                                             | 4924                 | 40.71               | -33.29                  | 74                          | 52.99                     | 34.23                         | 12.13                  | 58.64                      | 100                  | 0                       | P                       | H               |
|                                      |                                                                                             | 7386                 | 45.63               | -28.37                  | 74                          | 52.93                     | 35.6                          | 14.64                  | 57.54                      | 100                  | 0                       | P                       | H               |
|                                      |                                                                                             |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|                                      |                                                                                             |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|                                      |                                                                                             | 4924                 | 40.52               | -33.48                  | 74                          | 52.8                      | 34.23                         | 12.13                  | 58.64                      | 100                  | 0                       | P                       | V               |
|                                      |                                                                                             | 7386                 | 47.58               | -26.42                  | 74                          | 54.88                     | 35.6                          | 14.64                  | 57.54                      | 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. |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         |                 |



2.4GHz 2400~2483.5MHz  
WIFI 802.11g (Band Edge @ 3m)

| WIFI<br>Ant.<br>1           | Note                                                                                        | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Path<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|-----------------------------|---------------------------------------------------------------------------------------------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| 802.11g<br>CH 11<br>2462MHz | *                                                                                           | 2462                 | 108.73              | -                       | -                           | 93.89                     | 32.03                         | 18.09                  | 35.28                      | 107                  | 83                      | P                       | H               |
|                             | *                                                                                           | 2462                 | 100.96              | -                       | -                           | 86.12                     | 32.03                         | 18.09                  | 35.28                      | 107                  | 83                      | A                       | H               |
|                             |                                                                                             | 2484.24              | 58.91               | -15.09                  | 74                          | 44.01                     | 32.07                         | 18.12                  | 35.29                      | 107                  | 83                      | P                       | H               |
|                             |                                                                                             | 2483.52              | 47.87               | -6.13                   | 54                          | 32.97                     | 32.07                         | 18.12                  | 35.29                      | 107                  | 83                      | A                       | H               |
|                             |                                                                                             |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|                             |                                                                                             |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|                             | *                                                                                           | 2462                 | 103.48              | -                       | -                           | 88.64                     | 32.03                         | 8.09                   | 35.28                      | 162                  | 0                       | P                       | V               |
|                             | *                                                                                           | 2462                 | 95.6                | -                       | -                           | 80.76                     | 32.03                         | 8.09                   | 35.28                      | 162                  | 0                       | A                       | V               |
|                             |                                                                                             | 2483.88              | 53.77               | -20.23                  | 74                          | 38.87                     | 32.07                         | 8.12                   | 35.29                      | 162                  | 0                       | P                       | V               |
|                             |                                                                                             | 2483.52              | 43.81               | -10.19                  | 54                          | 28.91                     | 32.07                         | 8.12                   | 35.29                      | 162                  | 0                       | A                       | V               |
|                             |                                                                                             |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | V               |
|                             |                                                                                             |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | V               |
| Remark                      | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         |                 |



**2.4GHz 2400~2483.5MHz**  
**WIFI 802.11g (Harmonic @ 3m)**

| WIFI<br>Ant.<br>1                    | Note                                                                                        | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Path<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|--------------------------------------|---------------------------------------------------------------------------------------------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| <b>802.11g<br/>CH 11<br/>2462MHz</b> |                                                                                             | 4924                 | 41.94               | -32.06                  | 74                          | 54.22                     | 34.23                         | 12.13                  | 58.64                      | 100                  | 0                       | P                       | H               |
|                                      |                                                                                             | 7386                 | 41.29               | -32.71                  | 74                          | 48.59                     | 35.6                          | 14.64                  | 57.54                      | 100                  | 0                       | P                       | H               |
|                                      |                                                                                             |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|                                      |                                                                                             |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|                                      |                                                                                             | 4924                 | 40.15               | -33.85                  | 74                          | 52.43                     | 34.23                         | 12.94                  | 58.64                      | 100                  | 0                       | P                       | V               |
|                                      |                                                                                             | 7386                 | 41.71               | -32.29                  | 74                          | 49.01                     | 35.6                          | 15.52                  | 57.54                      | 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. |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         |                 |



**2.4GHz 2400~2483.5MHz**  
**WIFI 802.11ac VHT40 (Band Edge @ 3m)**

| WIFI<br>Ant.<br>1                                                 | Note                                                                                        | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Path<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| <b>802.11ac</b><br><b>VHT40</b><br><b>CH 09</b><br><b>2452MHz</b> |                                                                                             | 2386.05              | 52.76               | -21.24                  | 74                          | 38.21                     | 31.8                          | 17.98                  | 35.23                      | 100                  | 84                      | P                       | H               |
|                                                                   |                                                                                             | 2349.45              | 43.73               | -10.27                  | 54                          | 29.14                     | 31.9                          | 17.9                   | 35.21                      | 100                  | 84                      | A                       | H               |
|                                                                   | *                                                                                           | 2452                 | 101.43              | -                       | -                           | 86.62                     | 32                            | 18.08                  | 35.27                      | 100                  | 84                      | P                       | H               |
|                                                                   | *                                                                                           | 2452                 | 93.65               | -                       | -                           | 78.84                     | 32                            | 18.08                  | 35.27                      | 100                  | 84                      | A                       | H               |
|                                                                   |                                                                                             | 2483.71              | 55.13               | -18.87                  | 74                          | 40.23                     | 32.07                         | 18.12                  | 35.29                      | 100                  | 84                      | P                       | H               |
|                                                                   |                                                                                             | 2484.16              | 46.53               | -7.47                   | 54                          | 31.63                     | 32.07                         | 18.12                  | 35.29                      | 100                  | 84                      | A                       | H               |
|                                                                   |                                                                                             | 2355.9               | 53.52               | -20.48                  | 74                          | 38.95                     | 31.87                         | 17.91                  | 35.21                      | 100                  | 143                     | P                       | V               |
|                                                                   |                                                                                             | 2316.6               | 43.77               | -10.23                  | 54                          | 29.29                     | 31.83                         | 17.84                  | 35.19                      | 100                  | 143                     | A                       | V               |
|                                                                   | *                                                                                           | 2452                 | 97.6                | -                       | -                           | 82.79                     | 32                            | 18.08                  | 35.27                      | 100                  | 143                     | P                       | V               |
|                                                                   | *                                                                                           | 2452                 | 89.64               | -                       | -                           | 74.83                     | 32                            | 18.08                  | 35.27                      | 100                  | 143                     | A                       | V               |
|                                                                   |                                                                                             | 2485.96              | 54.13               | -19.87                  | 74                          | 39.23                     | 32.07                         | 18.12                  | 35.29                      | 100                  | 143                     | P                       | V               |
|                                                                   |                                                                                             | 2484.7               | 45.27               | -8.73                   | 54                          | 30.37                     | 32.07                         | 18.12                  | 35.29                      | 100                  | 143                     | A                       | V               |
| <b>Remark</b>                                                     | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         |                 |

**2.4GHz 2400~2483.5MHz****WIFI 802.11ac VHT40 (Harmonic @ 3m)**

| WIFI<br>Ant.<br>1                     | Note                                                                                        | Frequency<br>( MHz ) | Level<br>( dBμV/m ) | Over<br>Limit<br>( dB ) | Limit<br>Line<br>( dBμV/m ) | Read<br>Level<br>( dBμV ) | Antenna<br>Factor<br>( dB/m ) | Path<br>Loss<br>( dB ) | Preamp<br>Factor<br>( dB ) | Ant<br>Pos<br>( cm ) | Table<br>Pos<br>( deg ) | Peak<br>Avg.<br>( P/A ) | Pol.<br>( H/V ) |
|---------------------------------------|---------------------------------------------------------------------------------------------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| 802.11ac<br>VHT40<br>CH 09<br>2452MHz |                                                                                             | 4904                 | 39.91               | -34.09                  | 74                          | 52.32                     | 34.17                         | 12.11                  | 58.69                      | 100                  | 0                       | P                       | H               |
|                                       |                                                                                             | 7356                 | 41.11               | -32.89                  | 74                          | 48.51                     | 35.5                          | 14.61                  | 57.51                      | 100                  | 0                       | P                       | H               |
|                                       |                                                                                             |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|                                       |                                                                                             |                      |                     |                         |                             |                           |                               |                        |                            |                      |                         |                         | H               |
|                                       |                                                                                             | 4904                 | 40.44               | -33.56                  | 74                          | 52.85                     | 34.17                         | 12.11                  | 58.69                      | 100                  | 0                       | P                       | V               |
|                                       |                                                                                             | 7356                 | 40.29               | -33.71                  | 74                          | 47.69                     | 35.5                          | 14.61                  | 57.51                      | 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

## 2.4GHz WIFI 802.11ac VHT40 (LF)

| WIFI                              | Note                                                                       | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Path   | Preamp | Ant    | Table   | Peak    | Pol.    |
|-----------------------------------|----------------------------------------------------------------------------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant.                              |                                                                            |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
| 1                                 |                                                                            | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| 2.4GHz<br>802.11ac<br>VHT40<br>LF |                                                                            | 31.62     | 21.98      | -18.02 | 40         | 27.47    | 23.57    | 0.95   | 30.01  | -      | -       | P       | H       |
|                                   |                                                                            | 125.31    | 29.43      | -14.07 | 43.5       | 40.05    | 17.46    | 1.88   | 29.96  | -      | -       | P       | H       |
|                                   |                                                                            | 149.61    | 25.58      | -17.92 | 43.5       | 36.33    | 17.15    | 2.05   | 29.95  | -      | -       | P       | H       |
|                                   |                                                                            | 738.9     | 30.3       | -15.7  | 46         | 27.74    | 27.54    | 4.61   | 29.59  | -      | -       | P       | H       |
|                                   |                                                                            | 851.6     | 32.21      | -13.79 | 46         | 27.69    | 28.76    | 4.97   | 29.21  | -      | -       | P       | H       |
|                                   |                                                                            | 954.5     | 33.04      | -12.96 | 46         | 25.96    | 30.48    | 5.27   | 28.67  | 100    | 0       | P       | H       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | H       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | H       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | H       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | H       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | H       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | H       |
|                                   |                                                                            | 30        | 31.54      | -8.46  | 40         | 36.3     | 24.32    | 0.93   | 30.01  | 100    | 0       | P       | V       |
|                                   |                                                                            | 39.99     | 26.74      | -13.26 | 40         | 36.27    | 19.4     | 1.07   | 30     | -      | -       | P       | V       |
|                                   |                                                                            | 61.86     | 24.99      | -15.01 | 40         | 41.93    | 11.73    | 1.32   | 29.99  | -      | -       | P       | V       |
|                                   |                                                                            | 783       | 30.05      | -15.95 | 46         | 26.95    | 27.81    | 4.78   | 29.49  | -      | -       | P       | V       |
|                                   |                                                                            | 875.4     | 32.1       | -13.9  | 46         | 27.32    | 28.84    | 5.04   | 29.1   | -      | -       | P       | V       |
|                                   |                                                                            | 953.8     | 33.86      | -12.14 | 46         | 26.85    | 30.42    | 5.27   | 28.68  | -      | -       | P       | V       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | V       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | V       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | V       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | V       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | V       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | V       |
|                                   |                                                                            |           |            |        |            |          |          |        |        |        |         |         | V       |
| Remark                            | 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>H</b> orizontal or <b>V</b> ertical                                                                                                                   |

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

| WIFI    | Note | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Path   | Preamp | Ant    | Table   | Peak    | Pol.    |
|---------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant.    |      |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
| 1       |      | ( 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       |

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =  
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

1. Level(dBμV/m)  
= Antenna Factor(dB/m) + Path 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)
2. Over Limit(dB)  
= Level(dBμV/m) – Limit Line(dBμV/m)  
= 55.45(dBμV/m) – 74(dBμV/m)  
= -18.55(dB)

**For Average Limit @ 2390MHz:**

1. Level(dBμV/m)  
= Antenna Factor(dB/m) + Path 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)
2. 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 B. Radiated Spurious Emission Plots

|                 |                                   |                     |         |
|-----------------|-----------------------------------|---------------------|---------|
| Test Engineer : | Jesse Wang, Stan Hsieh and Ken Wu | Temperature :       | 22~23°C |
|                 |                                   | Relative Humidity : | 51~58%  |

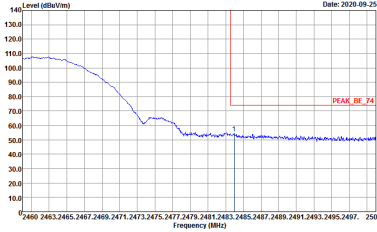
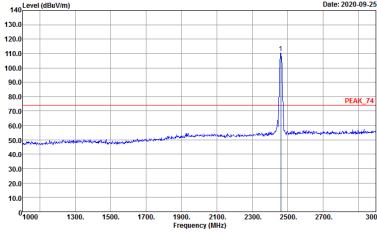
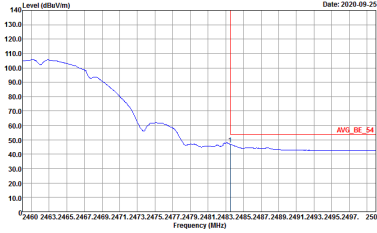
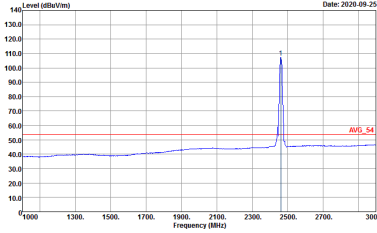
### Note symbol

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

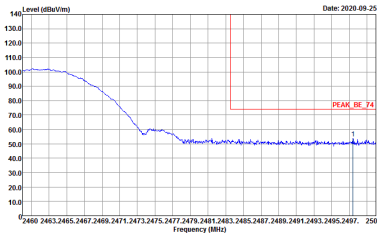
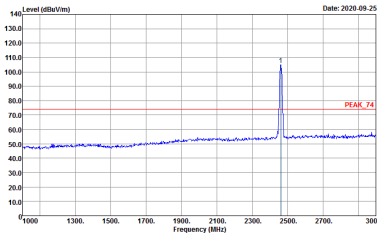
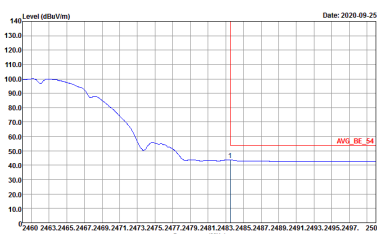
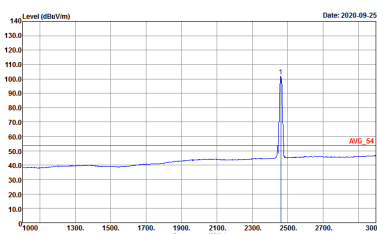


## 2.4GHz 2400~2483.5MHz

## WIFI 802.11b (Band Edge @ 3m)

| WIFI<br>ANT | 2.4GHz 2400~2483.5MHz Band Edge @ 3m<br>802.11b CH11 2462MHz                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                       |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1           | Horizontal                                                                                                                                                                                                                                                                              | Fundamental                                                                                                                                                                                                                                                                           |
| Peak        |  <p>Site : 03CH07-HY<br/>Condition : PEAK_BE_74 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>Date: 2020-09-25</p> |  <p>Site : 03CH07-HY<br/>Condition : PEAK_74 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>Date: 2020-09-25</p> |
| Avg.        |  <p>Site : 03CH07-HY<br/>Condition : AVG_BE_54 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:0.0100kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>Date: 2020-09-25</p>  |  <p>Site : 03CH07-HY<br/>Condition : AVG_54 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:0.0100kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>Date: 2020-09-25</p>  |

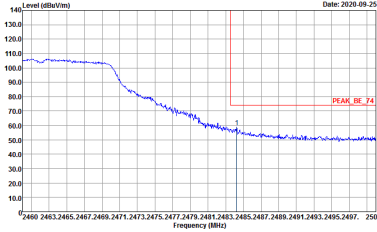
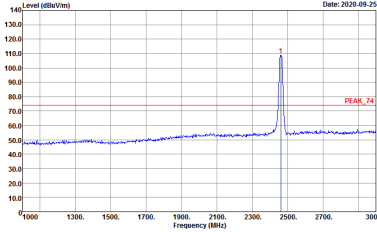
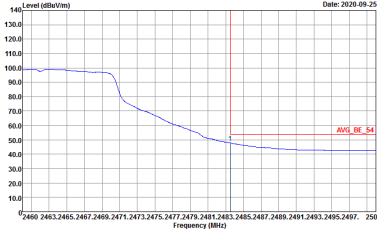
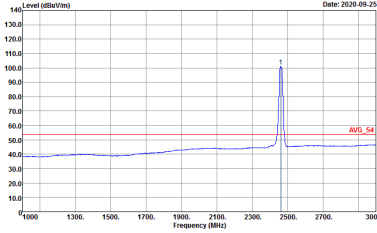


| WIFI | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                                                                                                                                                        |                                                                                                                                                                                                                           |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT  | 802.11b CH11 2462MHz                                                                                                                                                                                                        |                                                                                                                                                                                                                           |
| 1    | Vertical                                                                                                                                                                                                                    | Fundamental                                                                                                                                                                                                               |
| Peak |  <p>Site : 03CH07-HY<br/>Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 12</p>  |  <p>Site : 03CH07-HY<br/>Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 12</p>  |
|      |  <p>Site : 03CH07-HY<br/>Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 12</p> |  <p>Site : 03CH07-HY<br/>Condition : AVG_54 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 12</p> |

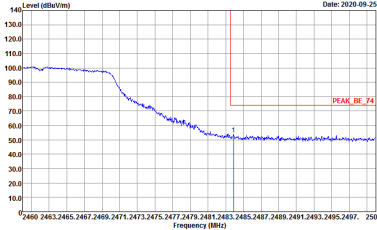
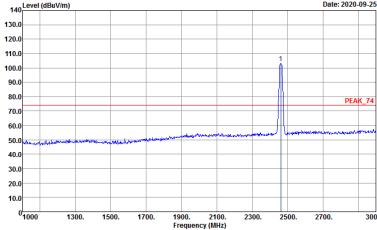
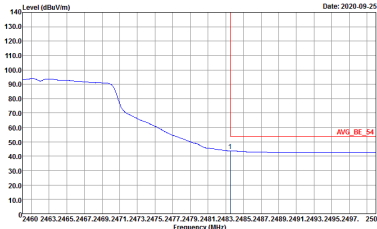
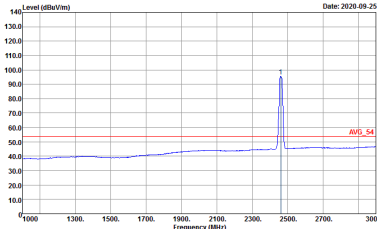


## 2.4GHz 2400~2483.5MHz

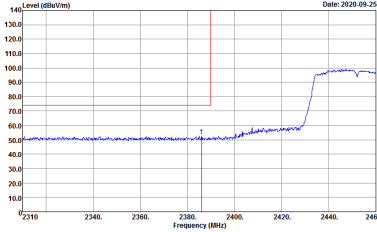
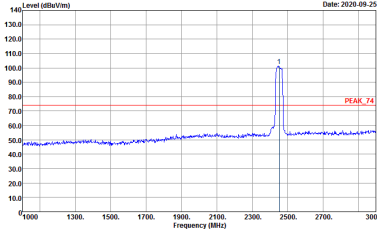
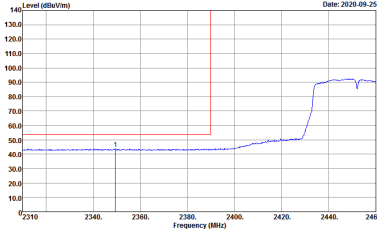
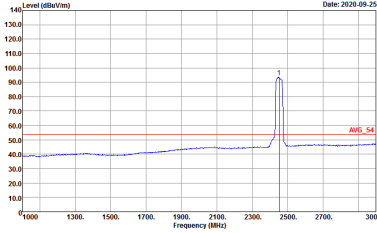
## WIFI 802.11g (Band Edge @ 3m)

| WIFI<br>ANT | 2.4GHz 2400~2483.5MHz Band Edge @ 3m<br>802.11g CH11 2462MHz                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                         |
|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1           | Horizontal                                                                                                                                                                                                                                                                | Fundamental                                                                                                                                                                                                                                                             |
| Peak        |  <p>Site : 03CH07-HY<br/>Condition : PEAK_BE_74 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>15</p> |  <p>Site : 03CH07-HY<br/>Condition : PEAK_74 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>15</p> |
| Avg.        |  <p>Site : 03CH07-HY<br/>Condition : AVG_BE_54 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:0.0100kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>15</p>  |  <p>Site : 03CH07-HY<br/>Condition : AVG_54 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:0.0100kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>15</p>  |

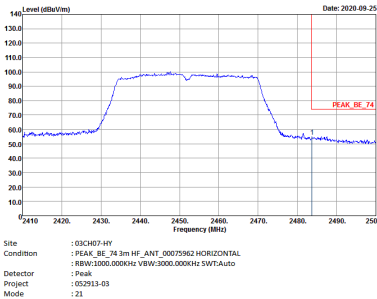
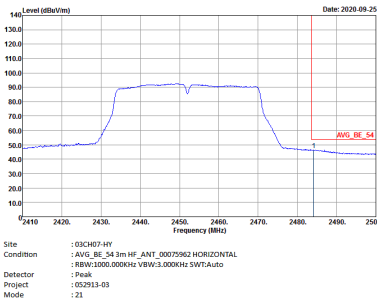


| WIFI | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                                                                                                                                                        |                                                                                                                                                                                                                           |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT  | 802.11g CH11 2462MHz                                                                                                                                                                                                        |                                                                                                                                                                                                                           |
| 1    | Vertical                                                                                                                                                                                                                    | Fundamental                                                                                                                                                                                                               |
| Peak |  <p>Site : 03CH07-HY<br/>Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 15</p>  |  <p>Site : 03CH07-HY<br/>Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 15</p>  |
|      |  <p>Site : 03CH07-HY<br/>Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 15</p> |  <p>Site : 03CH07-HY<br/>Condition : AVG_54 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 15</p> |

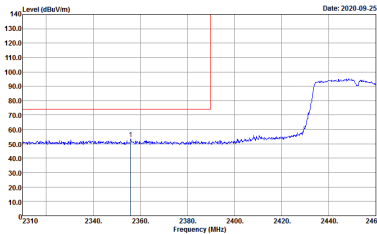
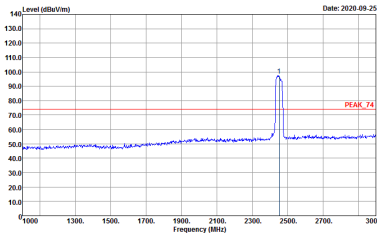
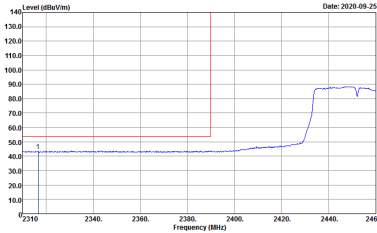
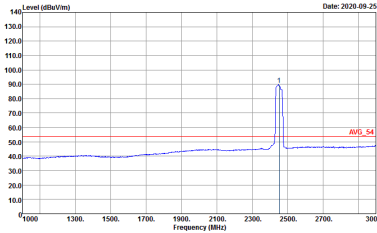
**2.4GHz 2400~2483.5MHz**
**WIFI 802.11ac VHT40 (Band Edge @ 3m)**

| WIFI<br>ANT | 2.4GHz 2400~2483.5MHz Band Edge @ 3m<br>802.11ac VH40 CH09 2452MHz - L                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                       |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1           | Horizontal                                                                                                                                                                                                                                                                              | Fundamental                                                                                                                                                                                                                                                                           |
| Peak        |  <p>Site : 03CH07-HY<br/>Condition : PEAK_BE_74 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>Date: 2020-09-25</p> |  <p>Site : 03CH07-HY<br/>Condition : PEAK_74 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:3000.000kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>Date: 2020-09-25</p> |
| Avg.        |  <p>Site : 03CH07-HY<br/>Condition : AVG_BE_54 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:3.000kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>Date: 2020-09-25</p>   |  <p>Site : 03CH07-HY<br/>Condition : AVG_54 3m HF ANT_00075962 HORIZONTAL<br/>Detector : RBW:1000.000kHz VBW:3.000kHz SWT:Auto<br/>Project : Peak<br/>Mode : 052913-03<br/>Date: 2020-09-25</p>   |

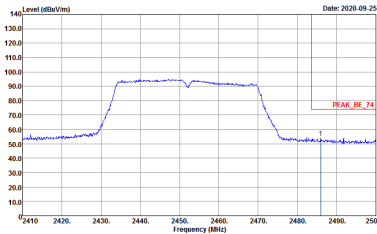
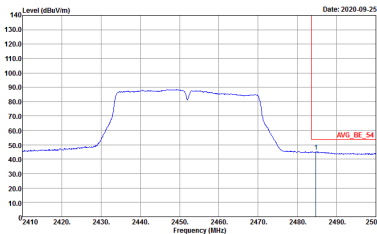


| WIFI | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                |             |
|------|-------------------------------------------------------------------------------------|-------------|
| ANT  | 802.11ac VH40 CH09 2452MHz - R                                                      |             |
| 1    | Horizontal                                                                          | Fundamental |
| Peak |    | Left blank  |
| Avg. |  | Left blank  |



| WIFI | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                                                                                                                                                        |                                                                                                                                                                                                                           |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ANT  | 802.11ac VH40 CH09 2452MHz - L                                                                                                                                                                                              |                                                                                                                                                                                                                           |
| 1    | Vertical                                                                                                                                                                                                                    | Fundamental                                                                                                                                                                                                               |
| Peak |  <p>Site : 03CH07-HY<br/>Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 21</p>  |  <p>Site : 03CH07-HY<br/>Condition : PEAK_74 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 21</p>  |
|      |  <p>Site : 03CH07-HY<br/>Condition : AVG_BE_34 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 21</p> |  <p>Site : 03CH07-HY<br/>Condition : AVG_34 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 21</p> |



| WIFI | 2.4GHz 2400~2483.5MHz Band Edge @ 3m                                                                                                                                                                                        |             |
|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| ANT  | 802.11ac VH40 CH09 2452MHz - R                                                                                                                                                                                              |             |
| 1    | Vertical                                                                                                                                                                                                                    | Fundamental |
| Peak |  <p>Site : 03CH07-HY<br/>Condition : PEAK_BE_74 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 21</p>  | Left blank  |
| Avg. |  <p>Site : 03CH07-HY<br/>Condition : AVG_BE_54 3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 21</p> | Left blank  |



2.4GHz 2400~2483.5MHz

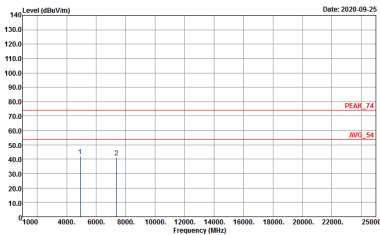
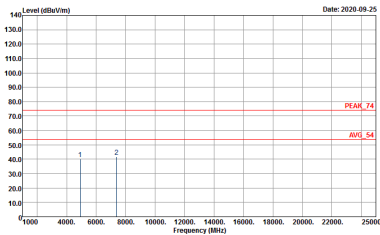
WIFI 802.11b (Harmonic @ 3m)

| WIFI<br>ANT  | 2.4GHz 2400~2483.5MHz Harmonic @ 3m<br>802.11b CH11 2462MHz                                                                                        |                                                                                                                                                  |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Horizontal                                                                                                                                         | Vertical                                                                                                                                         |
| Peak<br>Avg. | <div><p>Site : 03CH07-4H<br/>Condition : PEAK_74.3m HF_ANT_00075962 HORIZONTAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 12</p></div> | <div><p>Site : 03CH07-4H<br/>Condition : PEAK_74.3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 12</p></div> |



2.4GHz 2400~2483.5MHz

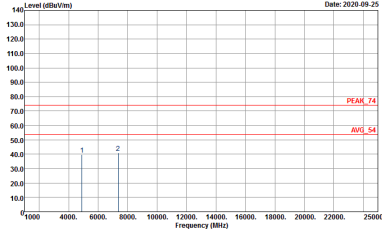
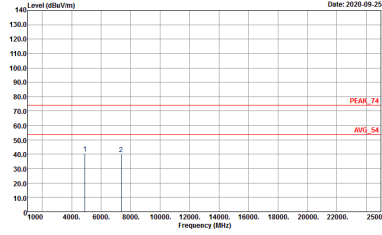
WIFI 802.11g (Harmonic @ 3m)

| WIFI<br>ANT  | 2.4GHz 2400~2483.5MHz Harmonic @ 3m<br>802.11g CH11 2462MHz                                                                                                                                                               |                                                                                                                                                                                                                          |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Horizontal                                                                                                                                                                                                                | Vertical                                                                                                                                                                                                                 |
| Peak<br>Avg. |  <p>Site : 03CH07-4Y<br/>Condition : PEAK_24.3m HF_ANT_00075962 HORIZONTAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 15</p> |  <p>Site : 03CH07-4Y<br/>Condition : PEAK_24.3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 15</p> |



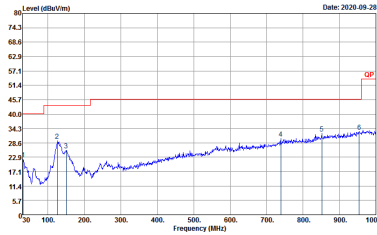
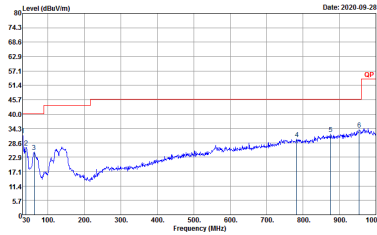
## 2.4GHz 2400~2483.5MHz

## WIFI 802.11ac VHT40 (Harmonic @ 3m)

| WIFI<br>ANT  | 2.4GHz 2400~2483.5MHz Harmonic @ 3m<br>802.11ac VHT40 CH09 2452MHz                                                                                                                                                        |                                                                                                                                                                                                                          |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Horizontal                                                                                                                                                                                                                | Vertical                                                                                                                                                                                                                 |
| Peak<br>Avg. |  <p>Site : 03CH07-4H<br/>Condition : PEAK_24.3m HF_ANT_00075962 HORIZONTAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 21</p> |  <p>Site : 03CH07-4H<br/>Condition : PEAK_24.3m HF_ANT_00075962 VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 21</p> |



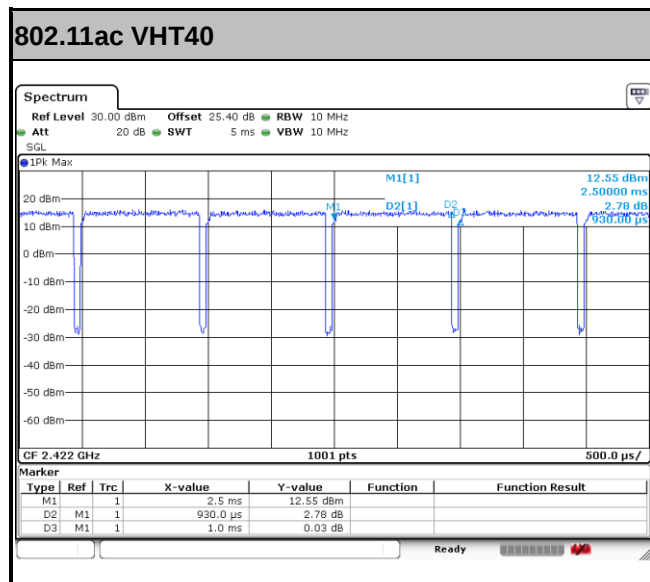
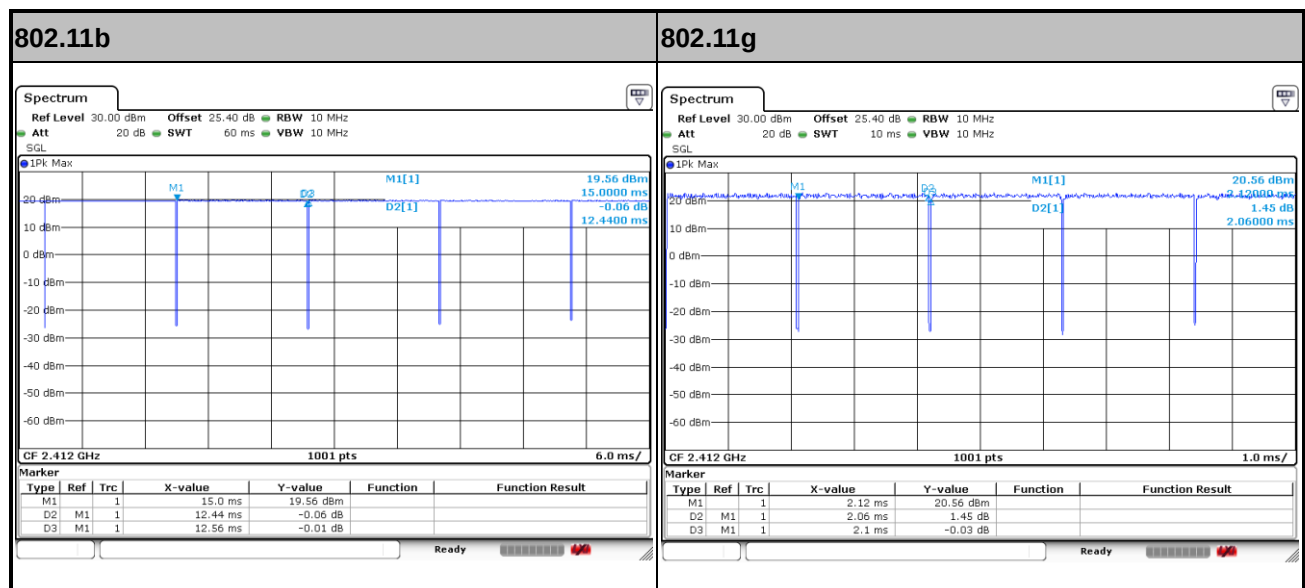
Emission below 1GHz  
2.4GHz WIFI 802.11ac VHT40 (LF)

| WIFI<br>ANT  | 2.4GHz 2400~2483.5MHz<br>802.11ac VHT40 LF                                                                                                                                                                           |                                                                                                                                                                                                                     |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1            | Horizontal                                                                                                                                                                                                           | Vertical                                                                                                                                                                                                            |
| QP /<br>Peak |  <p>Site : 03CH07-HY<br/>Condition : QP 3m LF-ANT-15419(s) HORIZONTAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 24</p> |  <p>Site : 03CH07-HY<br/>Condition : QP 3m LF-ANT-15419(s) VERTICAL<br/>Detector : Peak<br/>Project : 052913-03<br/>Mode : 24</p> |



## Appendix C. Duty Cycle Plots

| Band                  | Duty Cycle(%) | T(us) | 1/T(kHz) | VBW Setting | Duty Factor(dB) |
|-----------------------|---------------|-------|----------|-------------|-----------------|
| 802.11b               | 99.04         | 12440 | 0.08     | 10Hz        | 0.04            |
| 802.11g               | 98.10         | 2060  | 0.49     | 10Hz        | 0.08            |
| 2.4GHz 802.11ac VHT40 | 94.00         | 940   | 1.06     | 3kHz        | 0.27            |





## **Appendix E. Original Report**

Please refer to Sporton report number FR052917-01C as below.