



# FCC RF Test Report

**APPLICANT** : Motorola Mobility LLC  
**EQUIPMENT** : Mobile Cellular Phone  
**BRAND NAME** : Motorola  
**FCC ID** : IHDT56XE1  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DTS) Digital Transmission System

This is partial report. The product was received on Mar. 07, 2018 and testing was completed on Apr. 04, 2018. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

This report contains data that were produced under subcontract by Laboratory SPORTON INTERNATIONAL INC.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Approved by: James Huang / Manager

**Sporton International (Kunshan) Inc.**

**No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China**



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## SUMMARY OF TEST RESULT

| Report Section | FCC Rule           | Description  | Limit                 | Result | Remark                              |
|----------------|--------------------|--|-----------------------|--------|-------------------------------------|
| 3.1            | 15.247(d)          | Radiated Band Edges and Radiated Spurious Emission | 15.209(a) & 15.247(d) | Pass   | Under limit 3.21 dB at 2483.620 MHz |
| 3.2            | 15.203 & 15.247(b) | Antenna Requirement                                | N/A                   | Pass   | -                                   |



# 1 General Description

## 1.1 Applicant

Motorola Mobility LLC  
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

## 1.2 Manufacturer

Motorola Mobility LLC  
222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

## 1.3 Product Feature of Equipment Under Test

| Product Feature                 |   |
|---------------------------------|---|
| Equipment                       | Mobile Cellular Phone   |
| Brand Name                      | Motorola  |
| FCC ID                          | IHDT56XE1   |
| IMEI Code                       | 351886090021889   |
| EUT supports Radios application | CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE/GNSS/NFC<br>WLAN 11b/g/n HT20<br>WLAN 11a/n HT20/HT40<br>WLAN 11ac VHT20/VHT40/VHT80<br>Bluetooth BR/EDR/LE |
| HW Version                      | DVT2  |
| EUT Stage                       | Identical Prototype   |

**Remark:**

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This is a variant report by adding WPC Back Cover. All the test cases were performed on original report which can be referred to Sporton Report Number FR811821E. Based on the original report, only worst case was verified.

| Accessory List |                       |
|----------------|-----------------------|
| WPC Cover      | Brand Name : Motorola |
|                | Model Name : MD100W   |



### 1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification |  |
|---|--|
| Tx/Rx Channel Frequency Range           | 2412 MHz ~ 2462 MHz  |
| Antenna Type / Gain                     | Loop Antenna with gain -5.00 dBi   |
| Type of Modulation                      | 802.11b : DSSS (DBPSK / DQPSK / CCK)<br>802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) |

### 1.5 Modification of EUT

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



### 1.6 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

|                           |   |                                       |
|---------------------------|---|---------------------------------------|
| <b>Test Site</b>          | Sporton International (Kunshan) Inc.  |                                       |
| <b>Test Site Location</b> | No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China<br>TEL : +86-512-57900158<br>FAX : +86-512-57900958 |                                       |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>   | <b>FCC Test Firm Registration No.</b> |
|                           | 03CH03-KS   | 630927                                |

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

### 1.7 Applicable Standards

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

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- ANSI C63.10-2013

**Remark:**

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



## 2 Test Configuration of Equipment Under Test

- a. 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).

### 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

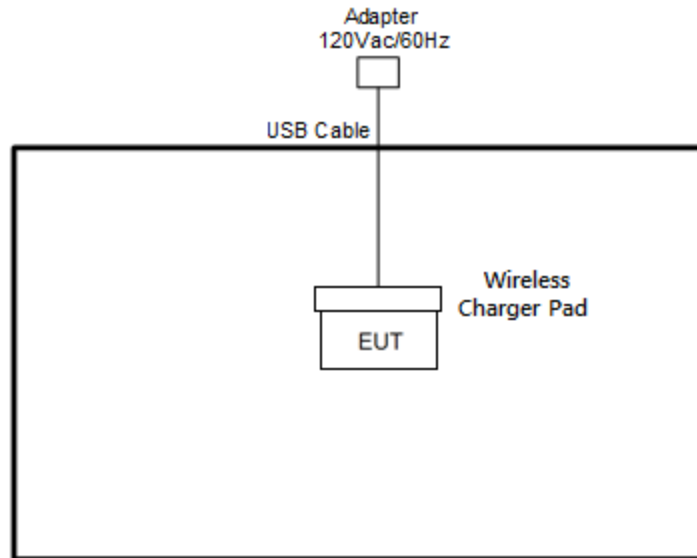
Final test modes are considering the modulation and worse data rates as below table.

| Modulation   | Data Rate |
|--------------|-----------|
| 802.11n HT20 | MCS0      |

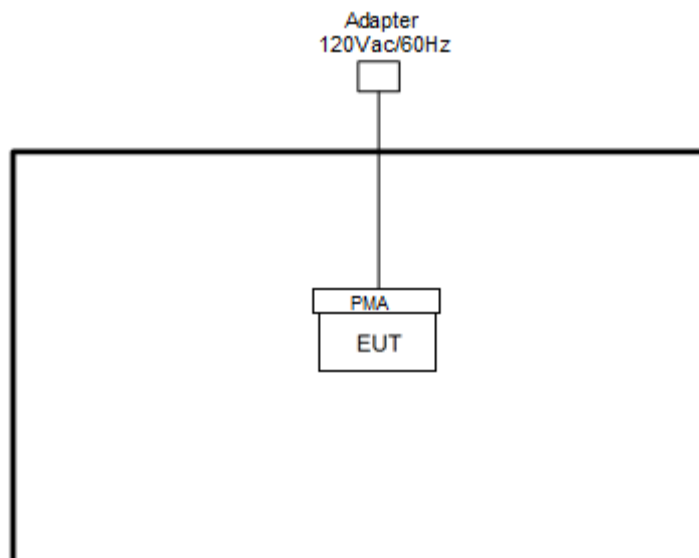


## 2.3 Connection Diagram of Test System

<WLAN Tx with WPC Charging Mode>



<WLAN Tx with PMA Charging Mode>





## 2.4 Support Unit used in test configuration and system

| Item | Equipment        | Trade Name | Model Name | FCC ID  | Data Cable | Power Cord |
|------|------------------|------------|------------|---------|------------|------------|
| 1.   | LG Charging pad  | LG         | WCD-110    | FCC DoC | N/A        | N/A        |
| 2.   | PMA Charging pad | Moto       | kinxie     | FCC DoC | N/A        | N/A        |
| 3.   | USB Cable        | N/A        | N/A        | N/A     | N/A        | N/A        |
| 4.   | Adapter          | N/A        | N/A        | N/A     | N/A        | N/A        |

## 2.5 EUT Operation Test Setup

The RF test items, utility “QRCT” 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 Radiated Band Edges and Spurious Emission Measurement

##### 3.1.1 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.

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

##### 3.1.2 Measuring Instruments

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

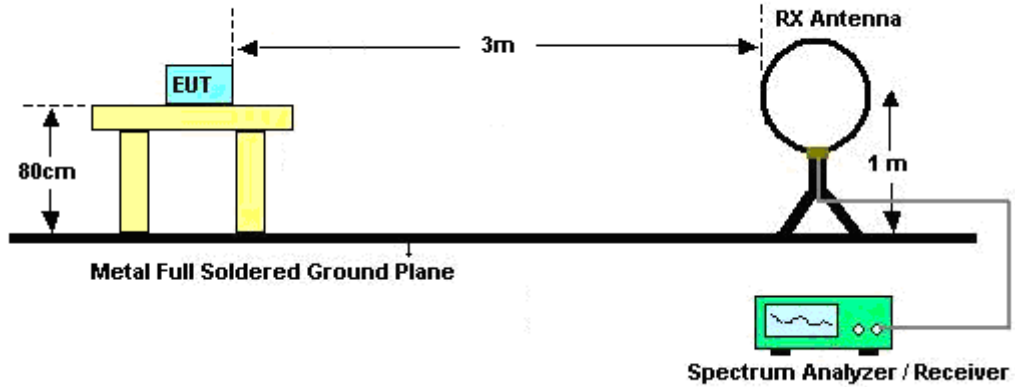


### 3.1.3 Test Procedures

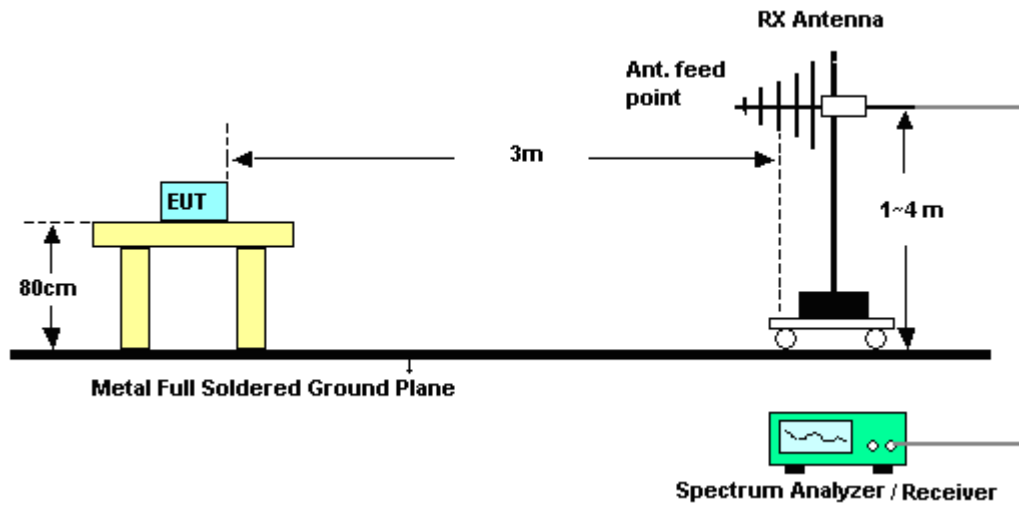
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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.

### 3.1.4 Test Setup

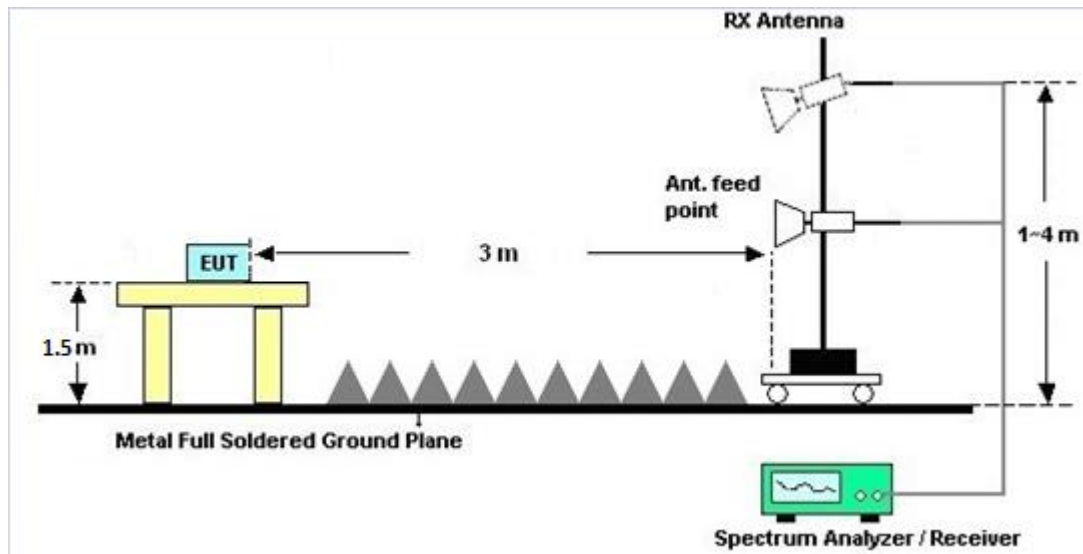
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



### 3.1.5 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 semi-Anechoic chamber, and the result came out very similar.

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

Please refer to Appendix A and B.

### 3.1.7 Duty Cycle

Please refer to Appendix C.

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

Please refer to Appendix A and B.



## **3.2 Antenna Requirements**

### **3.2.1 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.

### **3.2.2 Antenna Anti-Replacement Construction**

An embedded-in antenna design is used.

### **3.2.3 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                | Manufacturer                | Model No.                   | Serial No.  | Characteristics          | Calibration Date | Test Date     | Due Date      | Remark                |
|---------------------------|-----------------------------|-----------------------------|-------------|--------------------------|------------------|---------------|---------------|-----------------------|
| EXA Spectrum Analyzer     | Keysight                    | N9010A                      | MY55150244  | 10Hz-44GHz               | Apr. 18, 2017    | Apr. 04, 2018 | Apr. 17, 2018 | Radiation (03CH03-KS) |
| Bilog Antenna             | TeseQ                       | CBL6112D                    | 35406       | 25MHz-2GHz               | Apr. 22, 2017    | Apr. 04, 2018 | Apr. 21, 2018 | Radiation (03CH03-KS) |
| Double Ridge horn Antenna | ETS-lindgren                | 3117                        | 75959       | 1GHz~18GHz               | Jan. 21, 2018    | Apr. 04, 2018 | Jan. 20, 2019 | Radiation (03CH03-KS) |
| Amplifier                 | com-power                   | PA-103A                     | 161069      | 1MHz<br>~1000MHz / 32 dB | Apr. 18, 2017    | Apr. 04, 2018 | Apr. 17, 2018 | Radiation (03CH03-KS) |
| Amplifier                 | com-power                   | MITEQ                       | 2025788     | 100MHz<br>~1800MHz /     | Apr. 18, 2017    | Apr. 04, 2018 | Apr. 17, 2018 | Radiation (03CH03-KS) |
| Amplifier                 | Agilent                     | 8449B                       | 3008A02370  | 1GHz~26.5GHz             | Oct. 12, 2017    | Apr. 04, 2018 | Oct. 11, 2018 | Radiation (03CH03-KS) |
| RF Cable                  | HUBER+SUHNER                | SUCOFLEX104                 | 03CH01KS003 | 30Mhz-18Ghz              | Jun. 20, 2017    | Apr. 04, 2018 | Jun. 19, 2018 | Radiation (03CH04-KS) |
| RF Cable                  | HUBER+SUHNER                | SUCOFLEX104                 | 03CH01KS004 | 30Mhz-18Ghz              | Jun. 20, 2017    | Apr. 04, 2018 | Jun. 19, 2018 | Radiation (03CH04-KS) |
| High Pass Filter          | Wainwright Instruments Gmbh | WHKX12-2805-3000-18000-40ST | 2           | 3G High Pass             | Jun. 22, 2017    | Apr. 04, 2018 | Jun. 22, 2018 | Radiation (03CH04-KS) |
| Low Pass Filter           | Wainwright Instruments Gmbh | WLK4-1000-1530-8000-40SS    | 2           | 1G Low Pass              | Jun. 22, 2017    | Apr. 04, 2018 | Jun. 22, 2018 | Radiation (03CH04-KS) |





## 5 Uncertainty of Evaluation

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

|   |      |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 4.60 |
|---|------|

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

|   |      |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 4.50 |
|---|------|

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

|   |      |
|---|------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 4.50 |
|---|------|



## Appendix A. Radiated Spurious Emission

|                 |            |                     |         |
|-----------------|------------|---------------------|---------|
| Test Engineer : | Genry Long | Temperature :       | 21~23°C |
|                 |            | Relative Humidity : | 41~43%  |

<LG Charging Mode>

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

| WIFI Ant.                  | Note  | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. ( P/A ) | Pol. ( H/V ) |   |
|----------------------------|---|-------------------|------------------|-------------------|-----------------------|---------------------|-------------------------|-------------------|----------------------|----------------|-------------------|-------------------|--------------|---|
| 802.11n HT20 CH 11 2462MHz | *   | 2464              | 111.57           | -                 | -                     | 108.52              | 32.03                   | 7.69              | 36.67                | 189            | 31                | P                 | H            |   |
|                            | *   | 2462              | 102.68           | -                 | -                     | 99.63               | 32.03                   | 7.69              | 36.67                | 189            | 31                | A                 | H            |   |
|                            |   | 2487.4            | 62.43            | -11.57            | 74                    | 59.3                | 32.09                   | 7.72              | 36.68                | 189            | 31                | P                 | H            |   |
|                            | !   | 2483.62           | 50.79            | -3.21             | 54                    | 47.66               | 32.09                   | 7.72              | 36.68                | 189            | 31                | A                 | H            |   |
|                            |   |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   | H            |   |
|                            |   |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   |              | H |
|                            | *   | 2462              | 111.52           | -                 | -                     | 108.47              | 32.03                   | 7.69              | 36.67                | 368            | 113               | P                 | V            |   |
|                            | *   | 2460              | 103.47           | -                 | -                     | 100.42              | 32.03                   | 7.69              | 36.67                | 368            | 113               | A                 | V            |   |
|                            |   | 2485.48           | 61.09            | -12.91            | 74                    | 57.96               | 32.09                   | 7.72              | 36.68                | 368            | 113               | P                 | V            |   |
|                            | !   | 2483.51           | 50.26            | -3.74             | 54                    | 47.13               | 32.09                   | 7.72              | 36.68                | 368            | 113               | 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 802.11n HT20 (Harmonic @ 3m)

| WIFI Ant. 1                | Note  | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. ( P/A ) | Pol. ( H/V ) |   |
|----------------------------|---|-------------------|------------------|-------------------|-----------------------|---------------------|-------------------------|-------------------|----------------------|----------------|-------------------|-------------------|--------------|---|
| 802.11n HT20 CH 11 2462MHz |   | 4926              | 41.36            | -32.64            | 74                    | 60.04               | 34.38                   | 11.62             | 64.68                | 200            | 360               | P                 | H            |   |
|                            |   | 7386              | 47.48            | -26.52            | 74                    | 62.72               | 35.84                   | 13.97             | 65.05                | 200            | 360               | P                 | H            |   |
|                            |   |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   | H            |   |
|                            |   |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   | H            |   |
|                            |   |                   | 4926             | 43.21             | -30.79                | 74                  | 61.89                   | 34.38             | 11.62                | 64.68          | 100               | 360               | P            | V |
|                            |   |                   | 7386             | 42.73             | -31.27                | 74                  | 57.97                   | 35.84             | 13.97                | 65.05          | 100               | 360               | P            | V |
|                            |   |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   |              | V |
|                            |   |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   |              | V |
| Remark                     | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   |              |   |





<PMA Charging Mode>

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

| WIFI Ant.                           | Note | Frequency | Level      | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Ant Pos | Table Pos | Peak Avg. | Pol.    |
|-------------------------------------|------|-----------|------------|------------|------------|------------|----------------|------------|---------------|---------|-----------|-----------|---------|
| 1                                   |      | ( MHz )   | ( dBμV/m ) | ( dB )     | ( dBμV/m ) | ( dBμV )   | ( dB/m )       | ( dB )     | ( dB )        | ( cm )  | ( deg )   | ( P/A )   | ( H/V ) |
| 802.11n<br>HT20<br>CH 11<br>2462MHz | *    | 2462      | 110.4      | -          | -          | 107.35     | 32.03          | 7.69       | 36.67         | 138     | 37        | P         | H       |
|                                     | *    | 2464      | 102.15     | -          | -          | 99.1       | 32.03          | 7.69       | 36.67         | 138     | 37        | A         | H       |
|                                     |      | 2488.24   | 60.72      | -13.28     | 74         | 57.52      | 32.14          | 7.74       | 36.68         | 138     | 37        | P         | H       |
|                                     | !    | 2483.62   | 49.85      | -4.15      | 54         | 46.72      | 32.09          | 7.72       | 36.68         | 138     | 37        | A         | H       |
|                                     |      |           |            |            |            |            |                |            |               |         |           |           | H       |
|                                     |      |           |            |            |            |            |                |            |               |         |           |           | H       |
|                                     | *    | 2460      | 110.56     | -          | -          | 107.51     | 32.03          | 7.69       | 36.67         | 331     | 119       | P         | V       |
|                                     | *    | 2464      | 103.13     | -          | -          | 100.08     | 32.03          | 7.69       | 36.67         | 331     | 119       | A         | V       |
|                                     |      | 2483.86   | 60.4       | -13.6      | 74         | 57.27      | 32.09          | 7.72       | 36.68         | 331     | 119       | P         | V       |
|                                     | !    | 2483.74   | 49.54      | -4.46      | 54         | 46.41      | 32.09          | 7.72       | 36.68         | 331     | 119       | A         | 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 802.11n HT20 (Harmonic @ 3m)**

| WIFI Ant. 1                | Note  | Frequency ( MHz ) | Level ( dBμV/m ) | Over Limit ( dB ) | Limit Line ( dBμV/m ) | Read Level ( dBμV ) | Antenna Factor ( dB/m ) | Cable Loss ( dB ) | Preamp Factor ( dB ) | Ant Pos ( cm ) | Table Pos ( deg ) | Peak Avg. ( P/A ) | Pol. ( H/V ) |   |
|----------------------------|---|-------------------|------------------|-------------------|-----------------------|---------------------|-------------------------|-------------------|----------------------|----------------|-------------------|-------------------|--------------|---|
| 802.11n HT20 CH 11 2462MHz |   | 4926              | 42.46            | -31.54            | 74                    | 61.14               | 34.38                   | 11.62             | 64.68                | 100            | 360               | P                 | H            |   |
|                            |   | 7386              | 42.7             | -31.3             | 74                    | 57.94               | 35.84                   | 13.97             | 65.05                | 100            | 360               | P                 | H            |   |
|                            |   |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   | H            |   |
|                            |   |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   | H            |   |
|                            |   |                   | 4926             | 40.77             | -33.23                | 74                  | 59.45                   | 34.38             | 11.62                | 64.68          | 100               | 360               | P            | V |
|                            |   |                   | 7386             | 42.64             | -31.36                | 74                  | 57.88                   | 35.84             | 13.97                | 65.05          | 100               | 360               | P            | V |
|                            |   |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   |              | V |
|                            |   |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   | V            |   |
| <b>Remark</b>              | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |                   |                  |                   |                       |                     |                         |                   |                      |                |                   |                   |              |   |



Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

| WIFI                            | Note   | Frequency | Level      | Over   | Limit      | Read     | Antenna  | Cable  | Preamp | Ant    | Table   | Peak    | Pol.    |   |
|---------------------------------|--|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|---|
| Ant.                            |  |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |   |
| 1                               |  | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |   |
| 2.4GHz<br>802.11n<br>HT20<br>LF |  | 35.82     | 20.61      | -19.39 | 40         | 27.51    | 24.5     | 0.64   | 32.04  | 100    | 31      | P       | H       |   |
|                                 |  | 42.61     | 16.81      | -23.19 | 40         | 26.91    | 21.33    | 0.65   | 32.08  | -      | -       | P       | H       |   |
|                                 |  | 78.5      | 15.27      | -24.73 | 40         | 31.52    | 14.9     | 0.91   | 32.06  | -      | -       | P       | H       |   |
|                                 |  | 445.16    | 23.69      | -22.31 | 46         | 27.39    | 24.69    | 2.17   | 30.56  | -      | -       | P       | H       |   |
|                                 |  | 804.06    | 25.46      | -20.54 | 46         | 24.53    | 26.55    | 2.67   | 28.29  | -      | -       | P       | H       |   |
|                                 |  | 972.84    | 28.73      | -25.27 | 54         | 23.55    | 28.98    | 3.22   | 27.02  | -      | -       | P       | H       |   |
|                                 |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                                 |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                                 |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                                 |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                                 |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                                 |  |           |            |        |            |          |          |        |        |        |         |         |         | H |
|                                 |  |           | 44.55      | 28.8   | -11.2      | 40       | 39.68    | 20.57  | 0.66   | 32.11  | -       | -       | P       | V |
|                                 |  |           | 53.28      | 25.39  | -14.61     | 40       | 42.15    | 14.6   | 0.75   | 32.11  | -       | -       | P       | V |
|                                 |  |           | 82.38      | 29     | -11        | 40       | 44.68    | 15.43  | 0.94   | 32.05  | 100     | 258     | P       | V |
|                                 |  |           | 166.77     | 19.71  | -23.79     | 43.5     | 33.21    | 16.96  | 1.32   | 31.78  | -       | -       | P       | V |
|                                 |  |           | 400.54     | 22.84  | -23.16     | 46       | 25.77    | 25.7   | 2.08   | 30.71  | -       | -       | P       | V |
|                                 |  |           | 928.22     | 28.63  | -17.37     | 46       | 24.71    | 28.06  | 3.16   | 27.3   | -       | -       | P       | 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>Horizontal</b> or <b>Vertical</b>   |





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

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

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

**For Peak Limit @ 2390MHz:**

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

**For Average Limit @ 2390MHz:**

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

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



## Appendix B. Radiated Spurious Emission Plots

|                 |            |                     |         |
|-----------------|------------|---------------------|---------|
| Test Engineer : | Genry Long | Temperature :       | 21~23°C |
|                 |            | Relative Humidity : | 41~43%  |

### Note symbol

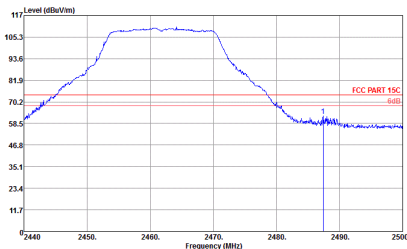
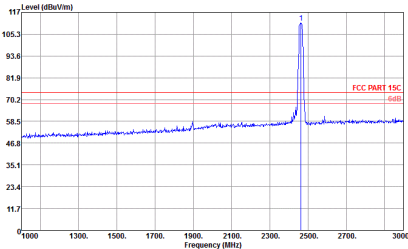
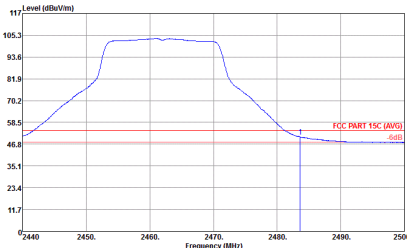
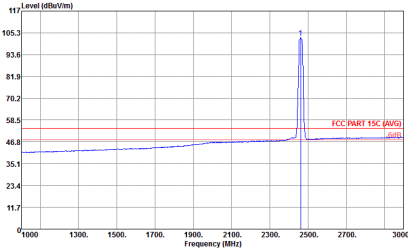
|    |                       |
|----|-----------------------|
| -L | Low channel location  |
| -R | High channel location |



<LG Charging Mode>

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

| WIFI | 2.4GHz 2400~2483.5MHz Band Edge @ 3m  |  |
|------|---|--|
| ANT  | 802.11n HT20 CH11 2462MHz   |  |
| 1    | Horizontal  | Fundamental  |
| Peak |  <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C 3m 96601- HF ANT 180125 HORIZONTAL<br/>RFR:1000.0000Hz YBR:3000.0000Hz SWT:Auto</p>      |  <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C 3m 96601- HF ANT 180125 HORIZONTAL<br/>RFR:1000.0000Hz YBR:3000.0000Hz SWT:Auto</p>      |
| Avg. |  <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C (AVG) 3m 96601- HF ANT 180125 HORIZONTAL<br/>RFR:1000.0000Hz YBR:1.0000Hz SWT:Auto</p> |  <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C (AVG) 3m 96601- HF ANT 180125 HORIZONTAL<br/>RFR:1000.0000Hz YBR:1.0000Hz SWT:Auto</p> |



| WIFI | 2.4GHz 2400~2483.5MHz Fundamental @ 3m  |   |
|------|---|---|
| ANT  | 802.11n HT20 CH11 2462MHz   |   |
| 1    | Vertical  | Fundamental   |
| Peak | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C 3m 06601- HF ANT 180125 VERTICAL<br/>RBW:1000.0000Hz YBR:3000.0000Hz SFT:Auto</p>    | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C 3m 06601- HF ANT 180125 VERTICAL<br/>RBW:1000.0000Hz YBR:3000.0000Hz SFT:Auto</p>    |
| Avg. | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C (AVG) 3m 06601- HF ANT 180125 VERTICAL<br/>RBW:1000.0000Hz YBR:1.0000Hz SFT:Auto</p> | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C (AVG) 3m 06601- HF ANT 180125 VERTICAL<br/>RBW:1000.0000Hz YBR:1.0000Hz SFT:Auto</p> |



2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

|              |   |   |
|--------------|---|---|
| WIFI         | 2.4GHz 2400~2483.5MHz Harmonic @ 3m   |   |
| ANT          | 802.11n HT20 CH11 2462MHz   |   |
| 1            | Horizontal  | Vertical  |
| Peak<br>Avg. | <p>Site Condition : 02C003-ES<br/>: FCC PART 15C 3m 06601- HP ANT 180125 HORIZONTAL<br/>: BW:1000.000MHz VBW:3000.000MHz SFT:Auto</p> | <p>Site Condition : 02C003-ES<br/>: FCC PART 15C 3m 06601- HP ANT 180125 VERTICAL<br/>: BW:1000.000MHz VBW:3000.000MHz SFT:Auto</p> |



Emission below 1GHz
2.4GHz WIFI 802.11n HT20 (LF)

Table with 2 columns: WIFI (2.4GHz 2400~2483.5MHz), ANT (802.11n HT20 LF). Row 1: 1. Horizontal and Vertical plots showing Level (dBuV/m) vs Frequency (MHz) with FCC Part 15C limits. Includes 'QP / Peak' label.



<PMA Charging Mode>

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

| WIFI | 2.4GHz 2400~2483.5MHz Band Edge @ 3m  |   |
|------|---|---|
| ANT  | 802.11n HT20 CH11 2462MHz   |   |
| 1    | Horizontal  | Fundamental   |
| Peak | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C 3m 06601- HF ANT 180125 HORIZONTAL<br/>SFP 1000.000MHz VRF 2000.000dBm SFT Auto</p>    | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C 3m 06601- HF ANT 180125 HORIZONTAL<br/>SFP 1000.000MHz VRF 2000.000dBm SFT Auto</p>    |
| Avg. | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C (AVG) 3m 06601- HF ANT 180125 HORIZONTAL<br/>SFP 1000.000MHz VRF 1.000dBm SFT Auto</p> | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C (AVG) 3m 06601- HF ANT 180125 HORIZONTAL<br/>SFP 1000.000MHz VRF 1.000dBm SFT Auto</p> |



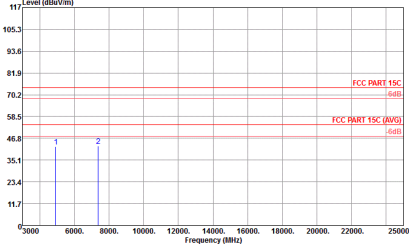
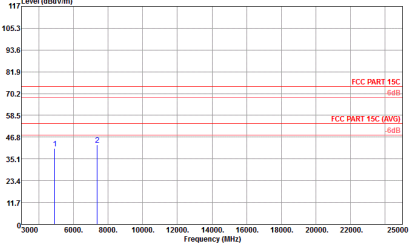
| WIFI | 2.4GHz 2400~2483.5MHz Fundamental @ 3m  |   |
|------|---|---|
| ANT  | 802.11n HT20 CH11 2462MHz   |   |
| 1    | Vertical  | Fundamental   |
| Peak | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C 3m 96601- HF ANT 180125 VERTICAL<br/>: RBW:1000.0000Hz YBW:3000.0000Hz SWT:Auto</p>    | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C 3m 96601- HF ANT 180125 VERTICAL<br/>: RBW:1000.0000Hz YBW:3000.0000Hz SWT:Auto</p>    |
| Avg. | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C (AVG) 3m 96601- HF ANT 180125 VERTICAL<br/>: RBW:1000.0000Hz YBW:1.0000Hz SWT:Auto</p> | <p>Site : 03CR03-ES<br/>Condition : FCC PART 15C (AVG) 3m 96601- HF ANT 180125 VERTICAL<br/>: RBW:1000.0000Hz YBW:1.0000Hz SWT:Auto</p> |





2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

| WIFI                                  | 2.4GHz 2400~2483.5MHz Harmonic @ 3m   |  |
|---------------------------------------|---|--|
| ANT                                   | 802.11n HT20 CH11 2462MHz   |  |
| 1                                     | Horizontal  | Vertical   |
| <p><b>Peak</b></p> <p><b>Avg.</b></p> |  <p>Site Condition : 03CMB3-ES<br/>: FCC PART 15C 3m 96601- RF ANT 180125 HORIZONTAL<br/>: RSP: 1000.000MHz YRF: 3000.000MHz SFT: Auto</p> |  <p>Site Condition : 03CMB3-ES<br/>: FCC PART 15C 3m 96601- RF ANT 180125 VERTICAL<br/>: RSP: 1000.000MHz YRF: 3000.000MHz SFT: Auto</p> |



Emission below 1GHz  
2.4GHz WIFI 802.11n HT20 (LF)

|              |   |   |
|--------------|---|---|
| WIFI         | 2.4GHz 2400~2483.5MHz   |   |
| ANT          | 802.11n HT20 LF   |   |
| 1            | Horizontal  | Vertical  |
| QP /<br>Peak | <p>Site : 02CM03-ES<br/>Condition : FCC PART 15C 3m 02 LF ANT HORIZONTAL<br/>RSP:100.0000Hz YER:300.0000Hz SFT:Auto</p> | <p>Site : 02CM03-ES<br/>Condition : FCC PART 15C 3m 02 LF ANT VERTICAL<br/>RSP:100.0000Hz YER:300.0000Hz SFT:Auto</p> |



## Appendix C. Duty Cycle Plots

| Band                | Duty Cycle(%) | T(us) | 1/T(kHz) | VBW Setting | Duty Factor(dB) |
|---------------------|---------------|-------|----------|-------------|-----------------|
| 2.4GHz 802.11n HT20 | 94.33         | 1.915 | 0.52     | 1KHz        | 0.18            |

### 2.4GHz 802.11n HT20

