



# FCC RF Test Report

**APPLICANT** : Motorola Mobility LLC  
**EQUIPMENT** : Mobile Cellular Phone  
**BRAND NAME** : Motorola  
**MODEL NAME** : 10566  
**FCC ID** : IHDT56WG1  
**STANDARD** : FCC Part 15 Subpart C §15.247  
**CLASSIFICATION** : (DSS) Spread Spectrum Transmitter

The product was received on Mar. 22, 2017 and testing was completed on Apr. 09, 2017. 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.

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.

---

Prepared by: James Huang / Manager



---

Approved by: Jones Tsai / Manager

**Sporton International (KunShan) INC.**  
**No.3-2, Pingxiang Road, Kunshan Development Zone, Jiangsu, China**



## **TABLE OF CONTENTS**

|                                                 |                                                             |           |
|-------------------------------------------------|-------------------------------------------------------------|-----------|
| <b>1</b>                                        | <b>GENERAL DESCRIPTION .....</b>                            | <b>5</b>  |
| 1.1                                             | Applicant .....                                             | 5         |
| 1.2                                             | Manufacturer .....                                          | 5         |
| 1.3                                             | Product Feature of Equipment Under Test .....               | 5         |
| 1.4                                             | Product Specification of Equipment Under Test .....         | 6         |
| 1.5                                             | Specification of Accessory .....                            | 6         |
| 1.6                                             | Modification of EUT .....                                   | 6         |
| 1.7                                             | Testing Location .....                                      | 7         |
| 1.8                                             | Applicable Standards .....                                  | 7         |
| <b>2</b>                                        | <b>TEST CONFIGURATION OF EQUIPMENT UNDER TEST .....</b>     | <b>8</b>  |
| 2.1                                             | Descriptions of Test Mode .....                             | 8         |
| 2.2                                             | Test Mode .....                                             | 8         |
| 2.3                                             | Connection Diagram of Test System .....                     | 9         |
| 2.4                                             | Support Unit used in test configuration and system .....    | 10        |
| 2.5                                             | EUT Operation Test Setup .....                              | 10        |
| <b>3</b>                                        | <b>TEST RESULT .....</b>                                    | <b>11</b> |
| 3.1                                             | Radiated Band Edges and Spurious Emission Measurement ..... | 11        |
| 3.2                                             | AC Conducted Emission Measurement .....                     | 17        |
| 3.3                                             | Antenna Requirements .....                                  | 21        |
| <b>4</b>                                        | <b>LIST OF MEASURING EQUIPMENT .....</b>                    | <b>22</b> |
| <b>5</b>                                        | <b>UNCERTAINTY OF EVALUATION .....</b>                      | <b>23</b> |
| <b>APPENDIX A. RADIATED TEST RESULTS</b>        |                                                             |           |
| <b>APPENDIX B. SETUP PHOTOGRAPHS</b>            |                                                             |           |
| <b>APPENDIX C. PRODUCT EQUALITY DECLARATION</b> |                                                             |           |



## REVISION HISTORY

| REPORT NO.   | VERSION | DESCRIPTION             | ISSUED DATE   |
|--------------|---------|-------------------------|---------------|
| FR710416-02A | Rev. 01 | Initial issue of report | Jun. 21, 2017 |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |
|              |         |                         |               |



## 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<br>8.04 dB at<br>38.730 MHz |
| 3.2            | 15.207                | AC Conducted Emission                              | 15.207(a)             | Pass   | Under limit<br>15.69 dB at<br>0.476 MHz |
| 3.3            | 15.203 &<br>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                        |                                                                                                                                                          |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Equipment</b>                       | Mobile Cellular Phone                                                                                                                                    |
| <b>Brand Name</b>                      | Motorola                                                                                                                                                 |
| <b>Model Name</b>                      | 10566                                                                                                                                                    |
| <b>FCC ID</b>                          | IHDT56WG1                                                                                                                                                |
| <b>EUT supports Radios application</b> | GSM/GPRS/EGPRS/WCDMA/HSPA/<br>HSPA+(16QAM uplink is not supported)/<br>WLAN 2.4GHz 802.11b/g/n HT20/<br>Bluetooth v3.0 + EDR/Bluetooth v4.0/v4.1/v4.2 LE |
| <b>IMEI Code</b>                       | Radiation: 353314080087032/353314080087040<br>Conduction: 353314080084559/353314080084567                                                                |
| <b>HW Version</b>                      | 98737_1_12                                                                                                                                               |
| <b>SW Version</b>                      | Blur-Version.24.10.9.Watson.europe.en.EN                                                                                                                 |
| <b>EUT Stage</b>                       | 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 for 10566. The product equality declaration can be reference of Appendix C. According to the differences, we only evaluate worst mode of Radiation Spurious emission and Conducted emission, all other test cases were quoted on original test report (Sporton Report Number FR710416A).

## 1.4 Product Specification of Equipment Under Test

| Standards-related Product Specification  |                                                                                                         |
|------------------------------------------|---------------------------------------------------------------------------------------------------------|
| <b>Tx/Rx Frequency Range</b>             | 2402 MHz ~ 2480 MHz                                                                                     |
| <b>Number of Channels</b>                | 79                                                                                                      |
| <b>Carrier Frequency of Each Channel</b> | 2402+n*1 MHz; n=0~78                                                                                    |
| <b>Antenna Type / Gain</b>               | PIFA Antenna with gain -2.00 dBi                                                                        |
| <b>Type of Modulation</b>                | Bluetooth BR (1Mbps) : GFSK<br>Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK<br>Bluetooth EDR (3Mbps) : 8-DPSK |

## 1.5 Specification of Accessory

| Specification of Accessory |                         |                                                      |                   |                |
|----------------------------|-------------------------|------------------------------------------------------|-------------------|----------------|
| <b>AC Adapter</b>          | <b>Brand Name</b>       | Motorola (Chenyang)                                  | <b>Model Name</b> | C-P56 SPN5987A |
|                            | <b>Power Rating</b>     | I/P: 100-240 Vac, 130mA, O/P: 5 Vdc, 1000mA          |                   |                |
| <b>Battery</b>             | <b>Brand Name</b>       | Motorola (SCUD)                                      | <b>Model Name</b> | HC40           |
|                            | <b>Power Rating</b>     | 3.8Vdc, 2245/2350mAh (Min/Typ)                       | <b>Type</b>       | Li-ion         |
| <b>Earphone</b>            | <b>Brand Name</b>       | Motorola (Juwei)                                     | <b>Model Name</b> | JWEP0987-W09R  |
|                            | <b>Signal Line Type</b> | 1.22 meter, non-shielded cable, without ferrite core |                   |                |
| <b>USB Cable</b>           | <b>Brand Name</b>       | Motorola (Liqi)                                      | <b>Model Name</b> | LQ-025280      |
|                            | <b>Signal Line Type</b> | 1.04 meter, shielded cable, without ferrite core     |                   |                |

## 1.6 Modification of EUT

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



## 1.7 Testing Location

|                           |                                                                                                                       |           |                             |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------|-----------------------------|
| <b>Test Site</b>          | Sporton International (KunShan) INC.                                                                                  |           |                             |
| <b>Test Site Location</b> | No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China<br>TEL: +86-0512-5790-0158<br>FAX: +86-0512-5790-0958 |           |                             |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>                                                                                               |           | <b>FCC Registration No.</b> |
|                           | CO01-KS                                                                                                               | 03CH03-KS | 306251                      |

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

## 1.8 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
- 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

### 2.1 Descriptions of Test Mode

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: conduction (150 kHz to 30 MHz), radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). Pre-scanned tests, X, Y, Z in three orthogonal panels, and different data rates were conducted to determine the final configuration (Z plane as worst plane) from all possible combinations, and the worst mode of radiated spurious emissions is Bluetooth 3Mbps mode, and recorded in this report.

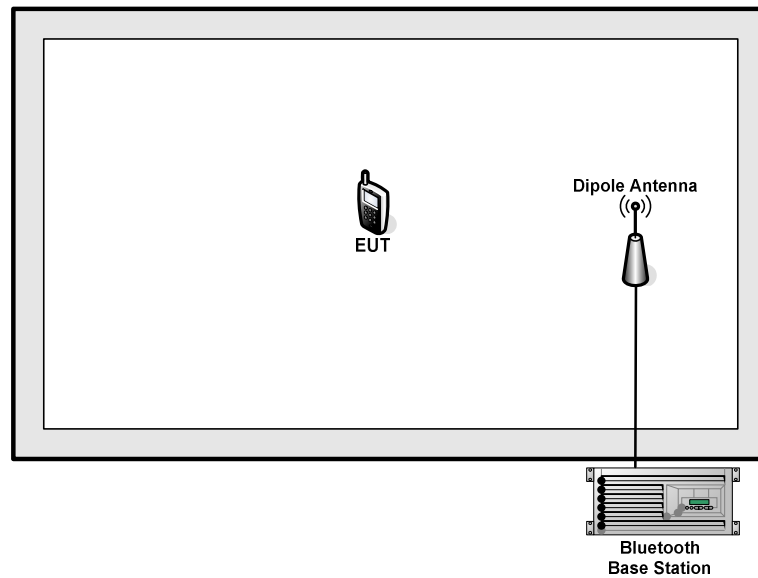
### 2.2 Test Mode

The following summary table is showing all test modes to demonstrate in compliance with the standard.

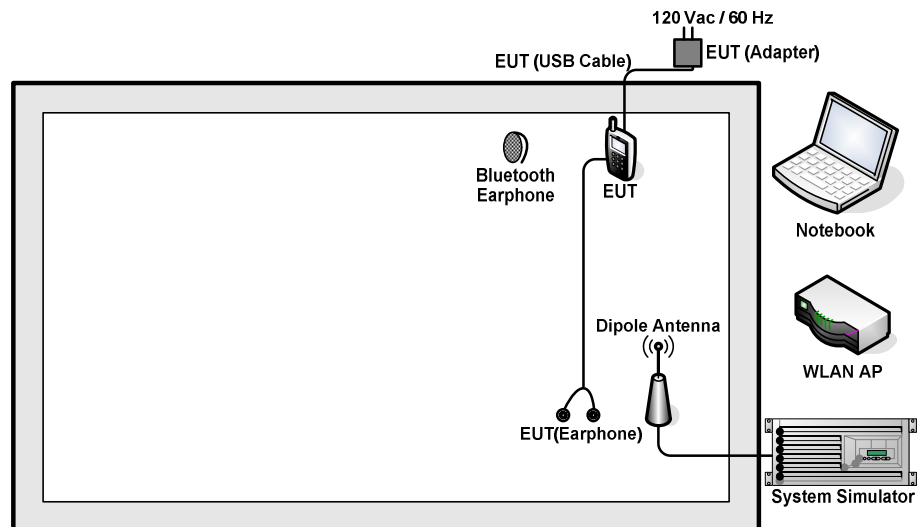
| Summary table of Test Cases |                                                                                                                         |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Radiated<br>Test Cases      | Bluetooth EDR 3Mbps 8-DPSK                                                                                              |
|                             | Mode 1: CH78_2480 MHz                                                                                                   |
| AC<br>Conducted<br>Emission | Mode 1 :GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable<br>(Charging from Adapter) + SIM 1 for Sample 1 |

## 2.3 Connection Diagram of Test System

### <Bluetooth Tx Mode>



### <AC Conducted Emission Mode>



## 2.4 Support Unit used in test configuration and system

| Item | Equipment              | Trade Name | Model Name | FCC ID         | Data Cable | Power Cord                                                 |
|------|------------------------|------------|------------|----------------|------------|------------------------------------------------------------|
| 1.   | System Simulator       | Anritsu    | MT8820C    | N/A            | N/A        | Unshielded, 1.8 m                                          |
| 2.   | Bluetooth Base Station | R&S        | CBT        | N/A            | N/A        | Unshielded, 1.8 m                                          |
| 3.   | WLAN AP                | LINKSYS    | WRT600N    | Q87-WRT600NV11 | N/A        | Unshielded, 1.8 m                                          |
| 4.   | Notebook               | Lenovo     | G480       | PRC4           | N/A        | AC I/P:<br>Unshielded, 1.8 m<br>DC O/P:<br>Shielded, 1.8 m |
| 5.   | Bluetooth Earphone     | Lenovo     | LBH308     | N/A            | N/A        | N/A                                                        |

## 2.5 EUT Operation Test Setup

For Bluetooth function, the engineering test program was provided and enabled to make EUT connect with Bluetooth base station to continuous transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the WLAN AP under large package sizes transmission.

### 3 Test Result

#### 3.1 Radiated Band Edges and Spurious Emission Measurement

##### 3.1.1 Limit of Radiated Band Edges and Spurious Emission

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. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

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

##### 3.1.2 Measuring Instruments

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



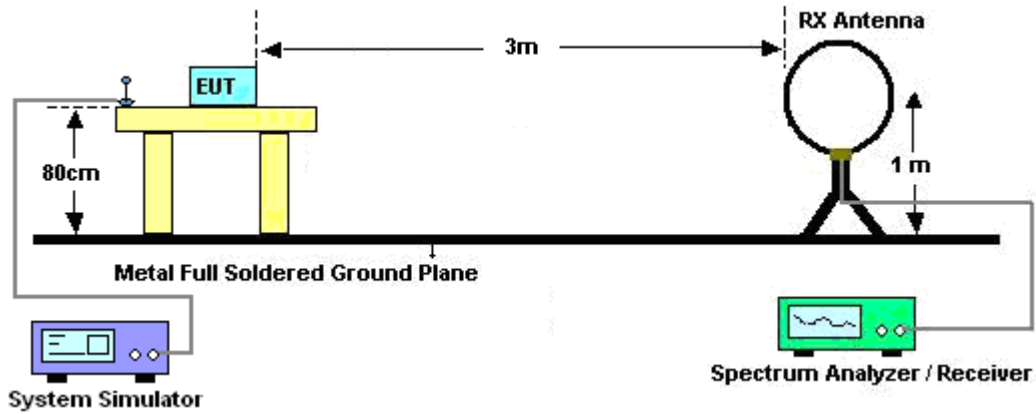
### 3.1.3 Test Procedures

1. The 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.
1. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
2. For each suspected emission, 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 to comply with the guidelines.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for  $f < 1 \text{ GHz}$ , RBW=1MHz for  $f > 1\text{GHz}$  ; VBW  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold for peak
  - (3) For average measurement: use duty cycle correction factor method per 15.35(c).  
Duty cycle = On time/100 milliseconds  
On time =  $N_1 * L_1 + N_2 * L_2 + \dots + N_{n-1} * L_{n-1} + N_n * L_n$   
Where  $N_1$  is number of type 1 pulses,  $L_1$  is length of type 1 pulses, etc.  
Average Emission Level = Peak Emission Level +  $20 * \log(\text{Duty cycle})$
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

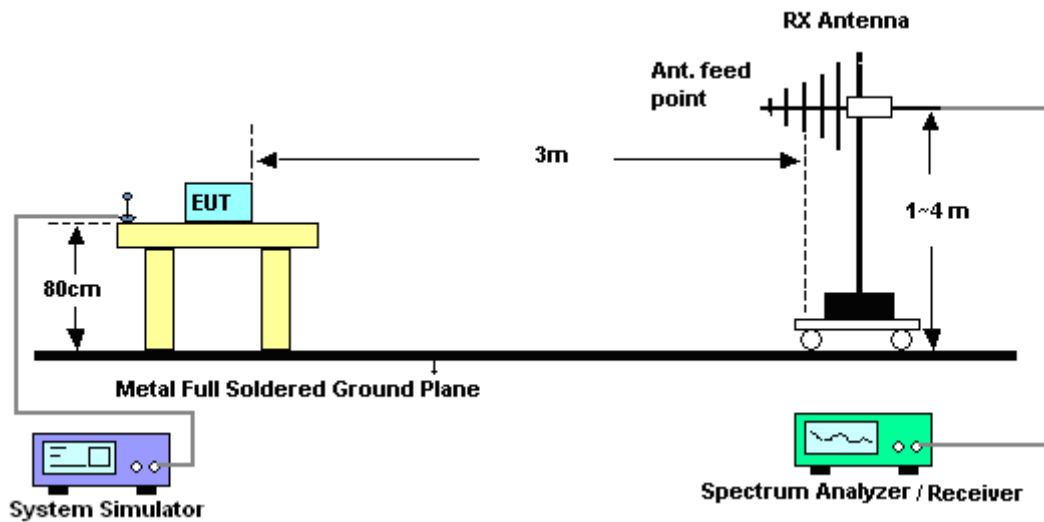
Note: The average levels were calculated from the peak level corrected with duty cycle correction factor (-24.82dB) derived from  $20\log(\text{dwell time}/100\text{ms})$ . This correction is only for signals that hop with the fundamental signal, such as band-edge and harmonic. Other spurious signals that are independent of the hopping signal would not use this correction.

### 3.1.4 Test Setup

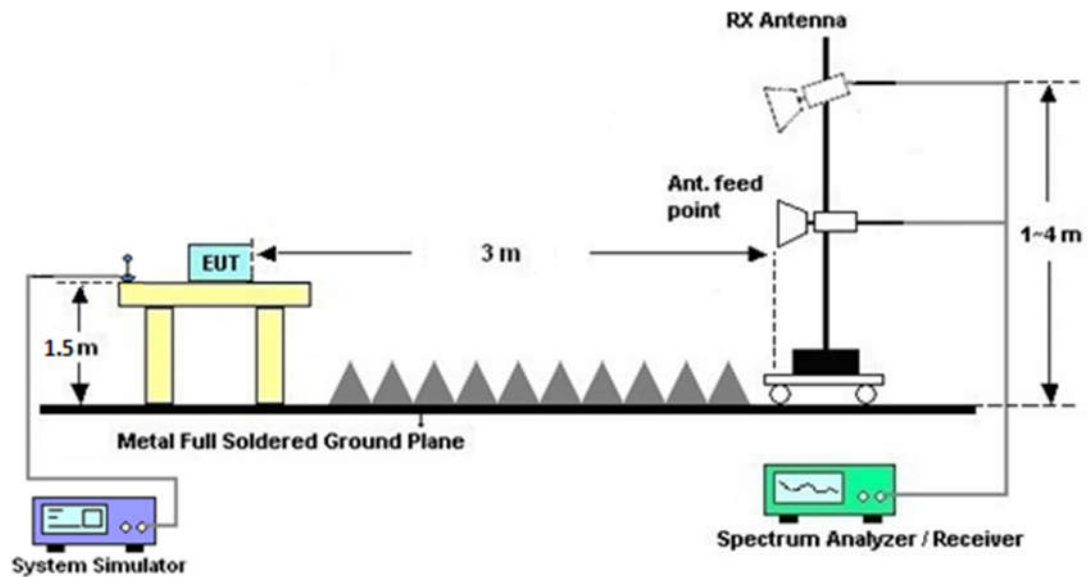
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz

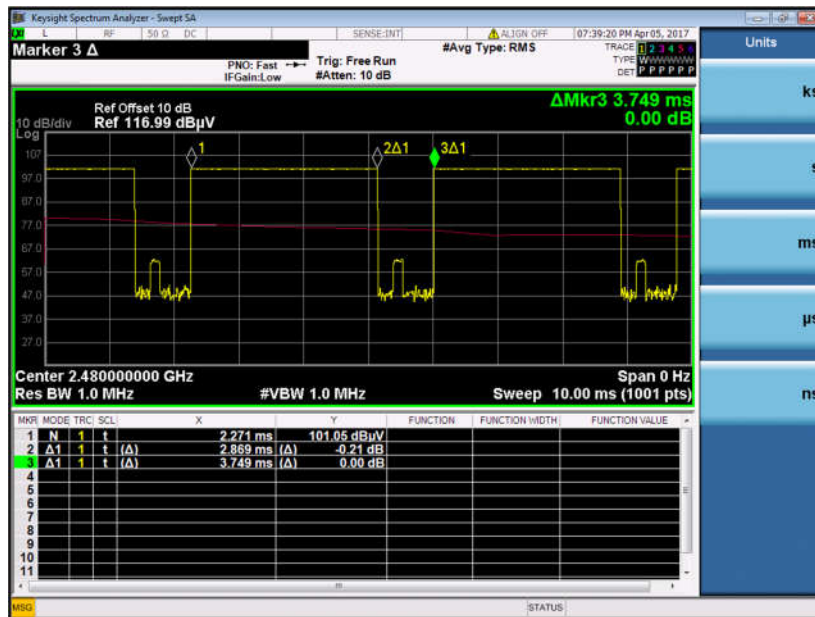


### 3.1.5 Test Results of Radiated Spurious Emissions (9 kHz ~ 30 MHz)

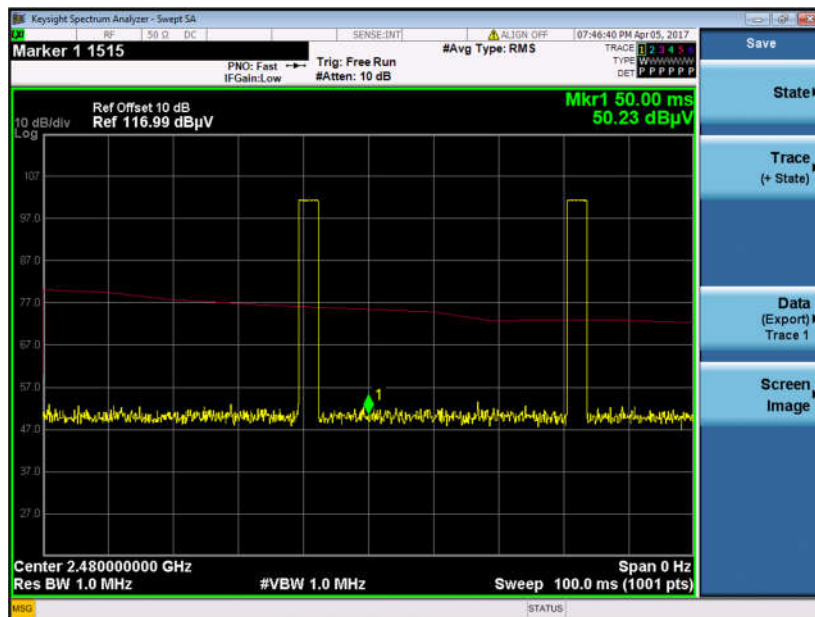
The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

### 3.1.6 Duty cycle correction factor for average measurement

**DH5 on time (One Pulse) Plot on Channel 39**



**DH5 on time (Count Pulses) Plot on Channel 39**



**Note:**

1. Worst case Duty cycle = on time/100 milliseconds =  $2 * 2.87 / 100 = 5.74 \%$
2. Worst case Duty cycle correction factor =  $20 * \log(\text{Duty cycle}) = -24.82 \text{ dB}$
3. DH5 has the highest duty cycle worst case and is reported.

**Duty Cycle Correction Factor Consideration for AFH mode:**

Bluetooth normal hopping rate is 1600Hz and reduced to 800Hz in AFH mode; due to the reduced number of hopping frequencies, with the same packet configuration the dwell time in each channel frequency within 100msec period is longer in AFH mode than normal mode.

In AFH mode, the minimum hopping frequencies are 20, to get the longest dwell time DH5 packet is observed; the period to have DH5 packet completing one hopping sequence is

$$2.87 \text{ ms} \times 20 \text{ channels} = 57.4 \text{ ms}$$

There cannot be 2 complete hopping sequences within 100ms period, considering the random hopping behavior, maximum 2 hops can be possibly observed within the period.  $[100\text{ms} / 57.6\text{ms}] = 2 \text{ hops}$

Thus, the maximum possible ON time:

$$2.87 \text{ ms} \times 2 = 5.74 \text{ ms}$$

Worst case Duty Cycle Correction factor, which is derived from the maximum possible ON time,

$$20 \times \log(5.74 \text{ ms}/100\text{ms}) = -24.82 \text{ dB}$$

**3.1.7 Test Result of Radiated Spurious at Band Edges**

Please refer to Appendix A.

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

Please refer to Appendix A.

## 3.2 AC Conducted Emission Measurement

### 3.2.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of emission (MHz) | Conducted limit (dB $\mu$ V) |           |
|-----------------------------|------------------------------|-----------|
|                             | Quasi-peak                   | Average   |
| 0.15-0.5                    | 66 to 56*                    | 56 to 46* |
| 0.5-5                       | 56                           | 46        |
| 5-30                        | 60                           | 50        |

\*Decreases with the logarithm of the frequency.

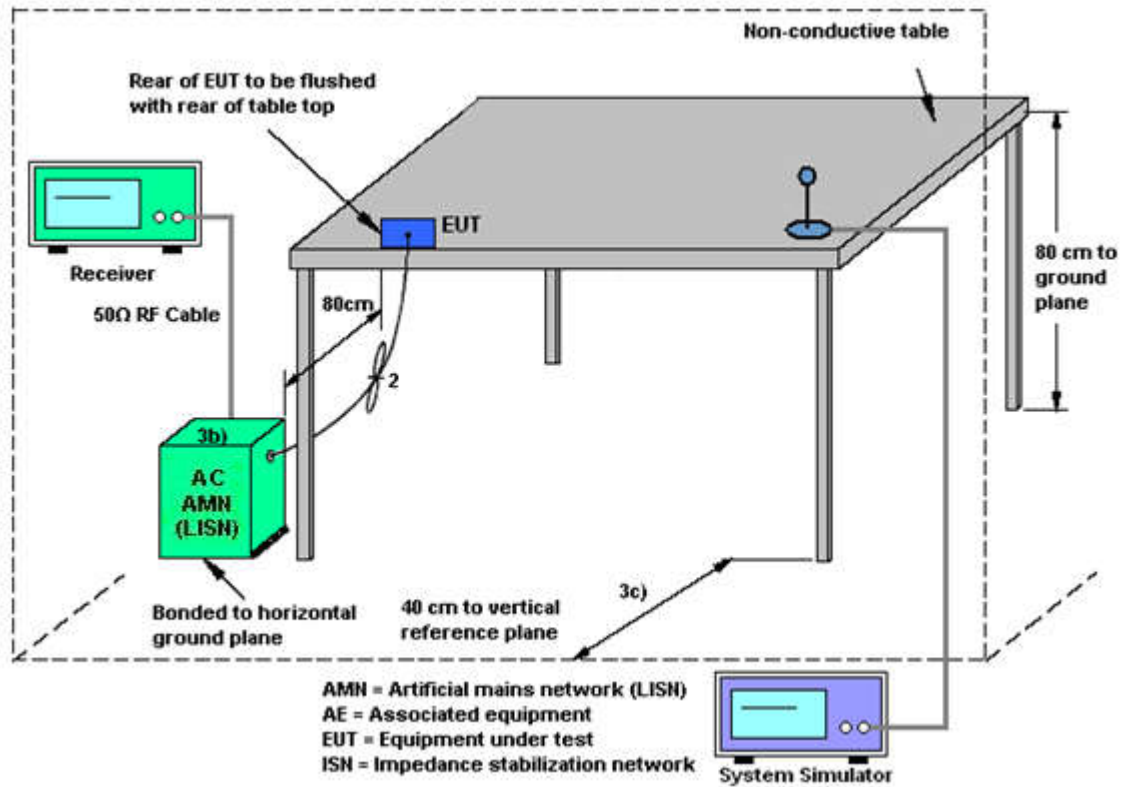
### 3.2.2 Measuring Instruments

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

### 3.2.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

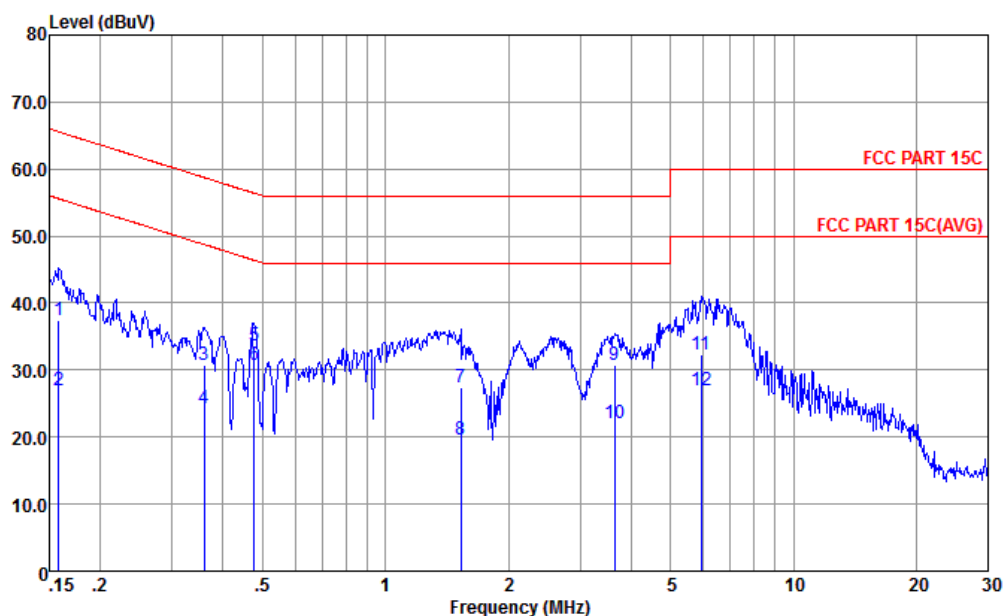
### 3.2.4 Test Setup





## 3.2.5 Test Result of AC Conducted Emission

|                 |                                                                                                              |                     |        |
|-----------------|--------------------------------------------------------------------------------------------------------------|---------------------|--------|
| Test Mode :     | Mode 1                                                                                                       | Temperature :       | 22~24℃ |
| Test Engineer : | Eligah Wang                                                                                                  | Relative Humidity : | 40~42% |
| Test Voltage :  | 120Vac / 60Hz                                                                                                | Phase :             | Line   |
| Function Type : | GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter) + SIM 1 for Sample 1 |                     |        |



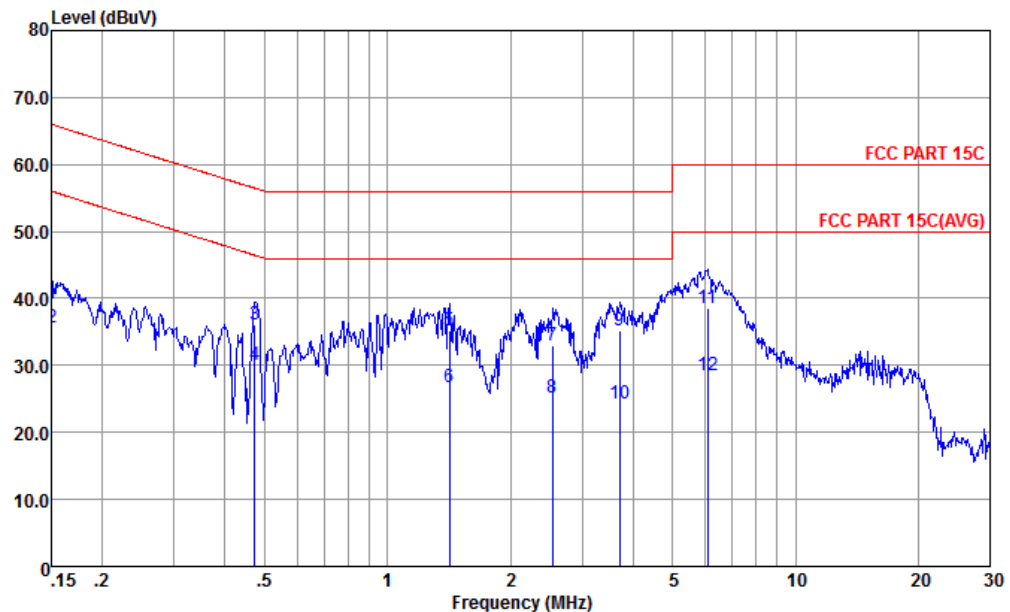
Site : CO01-KS  
Condition : FCC PART 15C LISN-L-20151024 LINE

Mode : Mode 1  
IMEI : 353314080084559/67

|     | Freq  | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark  |
|-----|-------|-------|------------|------------|------------|-------------|------------|---------|
|     | MHz   | dBuV  | dB         | dBuV       | dBuV       | dB          | dB         |         |
| 1   | 0.158 | 37.46 | -28.10     | 65.56      | 26.60      | 0.48        | 10.38      | QP      |
| 2   | 0.158 | 26.96 | -28.60     | 55.56      | 16.10      | 0.48        | 10.38      | Average |
| 3   | 0.360 | 30.75 | -27.99     | 58.74      | 20.30      | 0.23        | 10.22      | QP      |
| 4   | 0.360 | 24.25 | -24.49     | 48.74      | 13.80      | 0.23        | 10.22      | Average |
| 5   | 0.476 | 33.72 | -22.69     | 56.41      | 23.30      | 0.23        | 10.19      | QP      |
| 6 * | 0.476 | 30.72 | -15.69     | 46.41      | 20.30      | 0.23        | 10.19      | Average |
| 7   | 1.527 | 27.50 | -28.50     | 56.00      | 17.10      | 0.21        | 10.19      | QP      |
| 8   | 1.527 | 19.70 | -26.30     | 46.00      | 9.30       | 0.21        | 10.19      | Average |
| 9   | 3.642 | 30.72 | -25.28     | 56.00      | 20.30      | 0.19        | 10.23      | QP      |
| 10  | 3.642 | 22.02 | -23.98     | 46.00      | 11.60      | 0.19        | 10.23      | Average |
| 11  | 5.929 | 32.37 | -27.63     | 60.00      | 21.90      | 0.21        | 10.26      | QP      |
| 12  | 5.929 | 27.07 | -22.93     | 50.00      | 16.60      | 0.21        | 10.26      | Average |



|                 |                                                                                                              |                     |         |
|-----------------|--------------------------------------------------------------------------------------------------------------|---------------------|---------|
| Test Mode :     | Mode 1                                                                                                       | Temperature :       | 22~24°C |
| Test Engineer : | Eligah Wang                                                                                                  | Relative Humidity : | 40~42%  |
| Test Voltage :  | 120Vac / 60Hz                                                                                                | Phase :             | Neutral |
| Function Type : | GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter) + SIM 1 for Sample 1 |                     |         |



Site : CO01-KS  
Condition : FCC PART 15C LISN-N-20151024 NEUTRAL

Mode : Mode 1  
IMEI : 353314080084559/67

|     | Freq  | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark  |
|-----|-------|-------|------------|------------|------------|-------------|------------|---------|
|     | MHz   | dBuV  | dB         | dBuV       | dBuV       | dB          | dB         |         |
| 1   | 0.150 | 39.29 | -26.71     | 66.00      | 28.60      | 0.30        | 10.39      | QP      |
| 2   | 0.150 | 35.59 | -20.41     | 56.00      | 24.90      | 0.30        | 10.39      | Average |
| 3   | 0.474 | 36.11 | -20.34     | 56.45      | 25.60      | 0.32        | 10.19      | QP      |
| 4 * | 0.474 | 30.11 | -16.34     | 46.45      | 19.60      | 0.32        | 10.19      | Average |
| 5   | 1.418 | 35.16 | -20.84     | 56.00      | 24.59      | 0.38        | 10.19      | QP      |
| 6   | 1.418 | 26.66 | -19.34     | 46.00      | 16.09      | 0.38        | 10.19      | Average |
| 7   | 2.540 | 32.88 | -23.12     | 56.00      | 22.30      | 0.37        | 10.21      | QP      |
| 8   | 2.540 | 25.18 | -20.82     | 46.00      | 14.60      | 0.37        | 10.21      | Average |
| 9   | 3.700 | 35.20 | -20.80     | 56.00      | 24.60      | 0.37        | 10.23      | QP      |
| 10  | 3.700 | 24.20 | -21.80     | 46.00      | 13.60      | 0.37        | 10.23      | Average |
| 11  | 6.089 | 38.48 | -21.52     | 60.00      | 27.90      | 0.32        | 10.26      | QP      |
| 12  | 6.089 | 28.48 | -21.52     | 50.00      | 17.90      | 0.32        | 10.26      | Average |



### **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 FCC 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                              | Manufacturer | Model No.                  | Serial No.       | Characteristics            | Calibration Date | Test Date     | Due Date      | Remark                   |
|-----------------------------------------|--------------|----------------------------|------------------|----------------------------|------------------|---------------|---------------|--------------------------|
| EMI Test Receiver                       | R&S          | ESR7                       | 101403           | 9kHz~7GHz;<br>Max 30dBm    | Aug. 09, 2016    | Apr. 05, 2017 | Aug. 08, 2017 | Radiation<br>(03CH03-KS) |
| EXA Spectrum Analyzer                   | Keysight     | N9010A                     | MY551502<br>44   | 10Hz~44GHz                 | Apr. 22, 2016    | Apr. 05, 2017 | Apr. 21, 2017 | Radiation<br>(03CH03-KS) |
| Loop Antenna                            | R&S          | HFH2-Z2                    | 100321           | 9kHz~30MHz                 | Nov. 23, 2016    | Apr. 05, 2017 | Nov. 22, 2017 | Radiation<br>(03CH03-KS) |
| Bilog Antenna                           | TeseQ        | CBL6112D                   | 35406            | 25MHz~2GHz                 | Apr. 16, 2016    | Apr. 05, 2017 | Apr. 15, 2017 | Radiation<br>(03CH03-KS) |
| Horn Antenna                            | Schwarzbeck  | BBHA9120D                  | 9120D-135<br>6   | 1GHz~18GHz                 | Apr. 16, 2016    | Apr. 05, 2017 | Apr. 15, 2017 | Radiation<br>(03CH03-KS) |
| SHF-EHF Horn                            | com-power    | AH-840                     | 101070           | 18GHz~40GHz                | Oct. 19, 2016    | Apr. 05, 2017 | Oct. 18, 2017 | Radiation<br>(03CH03-KS) |
| Amplifier                               | SONOMA       | 310N                       | 187289           | 9kHz~1GHz                  | Aug. 09, 2016    | Apr. 05, 2017 | Aug. 08, 2017 | Radiation<br>(03CH03-KS) |
| high gain Amplifier                     | MITEQ        | AMF-7D-0010<br>1800-30-10P | 2025788          | 1Ghz-18Ghz                 | Apr. 18, 2016    | Apr. 05, 2017 | Apr. 17, 2017 | Radiation<br>(03CH03-KS) |
| Amplifier                               | Agilent      | 8449B                      | 3008A023<br>70   | 1GHz~26.5GHz               | Oct. 13, 2016    | Apr. 05, 2017 | Oct. 12, 2017 | Radiation<br>(03CH03-KS) |
| Amplifier                               | MITEQ        | TTA1840-35-<br>HG          | 1887435          | 18~40GHz                   | Oct. 13, 2016    | Apr. 05, 2017 | Oct. 12, 2017 | Radiation<br>(03CH03-KS) |
| AC Power Source                         | Chroma       | 61601                      | F1040900<br>04   | N/A                        | NCR              | Apr. 05, 2017 | NCR           | Radiation<br>(03CH03-KS) |
| Turn Table                              | ChamPro      | EM 1000-T                  | 060762-T         | 0~360 degree               | NCR              | Apr. 05, 2017 | NCR           | Radiation<br>(03CH03-KS) |
| Antenna Mast                            | ChamPro      | EM 1000-A                  | 060762-A         | 1 m~4 m                    | NCR              | Apr. 05, 2017 | NCR           | Radiation<br>(03CH03-KS) |
| EMI Receiver                            | R&S          | ESCI7                      | 100768           | 9kHz~7GHz;                 | Apr. 20, 2016    | Apr. 09, 2017 | Apr. 19, 2017 | Conduction<br>(CO01-KS)  |
| AC LISN                                 | MessTec      | AN3016                     | 060103           | 9kHz~30MHz                 | Oct. 13, 2016    | Apr. 09, 2017 | Oct. 13, 2017 | Conduction<br>(CO01-KS)  |
| AC LISN<br>(for auxiliary<br>equipment) | MessTec      | AN3016                     | 060105           | 9kHz~30MHz                 | Oct. 13, 2016    | Apr. 09, 2017 | Oct. 13, 2017 | Conduction<br>(CO01-KS)  |
| AC Power Source                         | Chroma       | 61602                      | ABP00000<br>0811 | AC 0V~300V,<br>45Hz~1000Hz | Oct. 13, 2016    | Apr. 09, 2017 | Oct. 13, 2017 | Conduction<br>(CO01-KS)  |

NCR: No Calibration Required

## 5 Uncertainty of Evaluation

### Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

|                                                                         |       |
|-------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 2.3dB |
|-------------------------------------------------------------------------|-------|

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

|                                                                         |       |
|-------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 4.6dB |
|-------------------------------------------------------------------------|-------|

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

|                                                                         |       |
|-------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 4.5dB |
|-------------------------------------------------------------------------|-------|

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

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



## Appendix A. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

BT (Band Edge @ 3m)

| BT                     | Note                                                                                        | Frequency | Level      | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Ant Pos | Table Pos | Peak Avg. | Pol.    |
|------------------------|---------------------------------------------------------------------------------------------|-----------|------------|------------|------------|------------|----------------|------------|---------------|---------|-----------|-----------|---------|
|                        |                                                                                             | ( MHz )   | ( dBμV/m ) | ( dB )     | ( dBμV/m ) | ( dBμV )   | ( dB/m )       | ( dB )     | ( dB )        | ( cm )  | ( deg )   | ( P/A )   | ( H/V ) |
| BT<br>CH 78<br>2480MHz | *                                                                                           | 2480      | 95.74      | -          | -          | 100.61     | 26.09          | 5.51       | 36.47         | 300     | 315       | P         | H       |
|                        | *                                                                                           | 2480      | 70.92      | -          | -          | -          | -              | -          | -             | -       | -         | A         | H       |
|                        |                                                                                             | 2487.82   | 49.44      | -24.56     | 74         | 54.36      | 26.04          | 5.52       | 36.48         | 300     | 315       | P         | H       |
|                        |                                                                                             | 2487.82   | 24.62      | -29.38     | 54         | -          | -              | -          | -             | -       | -         | A         | H       |
|                        | *                                                                                           | 2480      | 96.57      | -          | -          | 101.44     | 26.09          | 5.51       | 36.47         | 296     | 245       | P         | V       |
|                        | *                                                                                           | 2480      | 71.75      | -          | -          | -          | -              | -          | -             | -       | -         | A         | V       |
|                        |                                                                                             | 2484.88   | 49         | -25        | 74         | 53.87      | 26.09          | 5.51       | 36.47         | 296     | 245       | P         | V       |
|                        |                                                                                             | 2484.88   | 24.18      | -29.82     | 54         | -          | -              | -          | -             | -       | -         | A         | V       |
| Remark                 | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |           |            |            |            |            |                |            |               |         |           |           |         |



## 2.4GHz 2400~2483.5MHz

## BT (Harmonic @ 3m)

| BT                     | 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 ) | Cable<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 ) |
|------------------------|---------------------------------------------------------------------------------------------|----------------------|---------------------|-------------------------|-----------------------------|---------------------------|-------------------------------|-------------------------|----------------------------|----------------------|-------------------------|-------------------------|-----------------|
| BT<br>CH 78<br>2480MHz |                                                                                             | 4962                 | 41.07               | -32.93                  | 74                          | 38.58                     | 31.24                         | 7.82                    | 36.57                      | 100                  | 360                     | P                       | H               |
|                        |                                                                                             | 7440                 | 46.5                | -27.50                  | 74                          | 37.48                     | 35.44                         | 9.87                    | 36.29                      | 100                  | 360                     | P                       | H               |
|                        |                                                                                             | 4962                 | 41.99               | -32.01                  | 74                          | 39.5                      | 31.24                         | 7.82                    | 36.57                      | 100                  | 360                     | P                       | V               |
|                        |                                                                                             | 7440                 | 47.63               | -26.37                  | 74                          | 38.61                     | 35.44                         | 9.87                    | 36.29                      | 100                  | 360                     | P                       | V               |
| Remark                 | 1. No other spurious found.<br>2. All results are PASS against Peak and Average limit line. |                      |                     |                         |                             |                           |                               |                         |                            |                      |                         |                         |                 |



## Emission below 1GHz

## 2.4GHz BT (LF)

| BT                 | Note                                                                       | Frequency | Level      | Over   | Limit      | Read   | Antenna  | Cable  | Preamp | Ant    | Table   | Peak  | Pol.  |
|--------------------|----------------------------------------------------------------------------|-----------|------------|--------|------------|--------|----------|--------|--------|--------|---------|-------|-------|
|                    |                                                                            |           |            | Limit  | Line       | Level  | Factor   | Loss   | Factor | Pos    | Pos     | Avg.  |       |
|                    |                                                                            | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | (dBμV) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | (P/A) | (H/V) |
| 2.4GHz<br>BT<br>LF |                                                                            | 31.94     | 25.96      | -14.04 | 40         | 30.06  | 26.52    | 0.68   | 31.3   | 100    | 36      | P     | H     |
|                    |                                                                            | 216.24    | 20.58      | -25.42 | 46         | 34.1   | 16.23    | 1.73   | 31.48  | -      | -       | P     | H     |
|                    |                                                                            | 373.38    | 23.68      | -22.32 | 46         | 30.36  | 22.18    | 2.38   | 31.24  | -      | -       | P     | H     |
|                    |                                                                            | 457.77    | 25.99      | -20.01 | 46         | 29.41  | 25.15    | 2.67   | 31.24  | -      | -       | P     | H     |
|                    |                                                                            | 752.65    | 28.85      | -17.15 | 46         | 29.13  | 27.32    | 3.48   | 31.08  | -      | -       | P     | H     |
|                    |                                                                            | 904.94    | 30.95      | -15.05 | 46         | 29.31  | 28.62    | 3.86   | 30.84  | -      | -       | P     | H     |
|                    |                                                                            | 38.73     | 31.96      | -8.04  | 40         | 39.72  | 22.86    | 0.75   | 31.37  | 200    | 37      | P     | V     |
|                    |                                                                            | 74.62     | 19.47      | -20.53 | 40         | 35.04  | 14.9     | 1.05   | 31.52  | -      | -       | P     | V     |
|                    |                                                                            | 288.02    | 23         | -23.00 | 46         | 33.8   | 18.55    | 2.04   | 31.39  | -      | -       | P     | V     |
|                    |                                                                            | 306.45    | 23.11      | -22.89 | 46         | 32.97  | 19.32    | 2.16   | 31.34  | -      | -       | P     | V     |
|                    |                                                                            | 323.91    | 26.52      | -19.48 | 46         | 35.48  | 20.13    | 2.21   | 31.3   | -      | -       | P     | V     |
|                    |                                                                            | 451.95    | 26.26      | -19.74 | 46         | 29.44  | 25.41    | 2.65   | 31.24  | -      | -       | P     | 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>P</b> eak or <b>A</b> verage                                                                                                                          |
| 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  | Cable  | Preamp | Ant    | Table   | Peak    | Pol.    |
|---------|------|-----------|------------|--------|------------|----------|----------|--------|--------|--------|---------|---------|---------|
| Ant.    |      |           |            | Limit  | Line       | Level    | Factor   | Loss   | Factor | Pos    | Pos     | Avg.    |         |
| 1+2     |      | ( MHz )   | ( dBμV/m ) | ( dB ) | ( dBμV/m ) | ( dBμV ) | ( dB/m ) | ( dB ) | ( dB ) | ( cm ) | ( deg ) | ( P/A ) | ( H/V ) |
| 802.11b |      | 2390      | 55.45      | -18.55 | 74         | 54.51    | 32.22    | 4.58   | 35.86  | 103    | 308     | P       | H       |
| CH 01   |      |           |            |        |            |          |          |        |        |        |         |         |         |
| 2412MHz |      | 2390      | 43.54      | -10.46 | 54         | 42.6     | 32.22    | 4.58   | 35.86  | 103    | 308     | A       | H       |

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

**For Peak Limit @ 2390MHz:**

1. 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)

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) + 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)

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 C. Product Equality Declaration**

**Motorola Mobility LLC**  
**222 W,Merchandise Mart Plaza, Chicago IL 60654 USA**  
**Tel: 18150396560**

**Date: June 13, 2017**

**Product Equality Declaration**

We, Motorola Mobility LLC, declare on our sole responsibility for the product of **XT1750** as below, the detailed differences between Original and Variant project are list in the table:

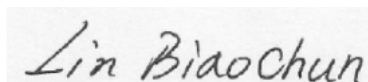
| Object                       | Original                                                                                                               | Variant                                                                               |
|------------------------------|------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Motor                        | <b>Hongzhifa:</b> 1027;Flat;Work height 3.05;Lead 8 mm;At the bottom of the conductive glue, foam thickness of 0.20 mm | <b>AWA:</b> LC-B681                                                                   |
| Front Camera                 | <b>JSL:</b> 2M,FF,C2590,6*6*4.42,ZIF                                                                                   | <b>Broadsands:</b> BLX2375W-S98737AA1-F                                               |
| Back Camera                  | <b>Syoptical:</b> 5M,FF,HI-553,6.5*6.5*4.66,BTB                                                                        | <b>Broadsands:</b> BLX5005W-S98737AA1-CB                                              |
| LCD                          | <b>TXD:</b> 5 inches, 480*854, 10 star light, BTB                                                                      | <b>Holitech:</b> HTB050W361                                                           |
| Touch panel                  | <b>Holitech:</b> 5 inches, G + F partition 2 MSG2256A, second generation 0.7 asahi                                     | <b>Biel:</b> WTS5002B                                                                 |
| USB                          | <b>STARW:</b> XJ-007075                                                                                                | <b>Liqi:</b> s98736,micro USB, Line 1 m long                                          |
| Adapter                      | <b>Acbel:</b> C-P56, C-P57 C-P58 C-P59 C-P60 C-P45                                                                     | <b>Chenyang:</b> C-P56, C-P57 -P58 C-P59 C-P60 C-P45                                  |
| headphones                   | <b>NEW LEADER:</b> NLD-EM127T-97SF                                                                                     | <b>Juwei:</b> s98736,White double channel headphones, hands-free line length of 1.1 m |
| RCV                          | <b>Xichun</b>                                                                                                          | <b>Bosheng:</b> MRFD1206A123008                                                       |
| speaker                      | <b>Xichun</b>                                                                                                          | <b>Haosheng:</b> XHS151124SW35P33-10-RH                                               |
| Memory                       | <b>Samsung :</b> KMFXN0012M-B214                                                                                       | <b>Hynix :</b> H9TQ64A8GTCCUR-KUM                                                     |
| Filtering duplex class       | <b>Murata:</b> SAFFB1G56KB0F0A                                                                                         | <b>TAIYO:</b> F6QA1G581M2QZ                                                           |
| Filtering duplex class       | <b>Kyocera:</b> SD18-0897R8UBQ1                                                                                        | <b>MURATA:</b> SAYEY897MCA0B0A                                                        |
| The acceleration sensor chip | <b>KIONIX:</b> KXTJ2-1009-HQ                                                                                           | <b>BOSCH :</b> BMA253                                                                 |
| High frequency crystal class | <b>TXC:</b> OZ26000004                                                                                                 | <b>EPSON:</b> X1E000291001400                                                         |
| Headphone jack               | <b>Jie huang:</b> JAF00-05152-0151                                                                                     | <b>Jie huang:</b> PH12-6BS5F3MB                                                       |
| Booth connector              | <b>Qiande:</b> TF-1502-001                                                                                             | <b>Qiande:</b> CAF11-08153-011401-CUS                                                 |
| Booth connector              | <b>Jie huang :</b> CAF99-08153-010609                                                                                  | <b>Jie huang:</b> S34-0B08F15C                                                        |
| ZIF connector                | <b>Kyocera:</b> 04 6298 706 200 883+;04 6298 706 220 883+                                                              | <b>UJU :</b> PF050-B06B-C09-A                                                         |
| ZIF connector                | <b>UJU:</b> PF030-O25B-C10-H                                                                                           | <b>HIROSE:</b> FH26W-25S-0.3SHW(60)                                                   |
| Other connector              | <b>Sinopow:</b> C-10020059                                                                                             | <b>MURATA:</b> MM8030-2610RK0                                                         |
| LED driver                   | <b>Orientchip:</b> OCP8132AVAD                                                                                         | <b>SGMC:</b> SGM3756YTDI6G/TR                                                         |
| LED driver                   | <b>AWINIC:</b> AW9961DNR                                                                                               | <b>SILERGY:</b> SYWT78DUC                                                             |
| Low noise put                | <b>Maxscend:</b> MXDLN16G                                                                                              | <b>AWINIC:</b> AW5005DNR                                                              |
| barron                       | <b>ACX:</b> BD2012-20L0820T/LF                                                                                         | <b>WALSIN:</b> RFBLN2012090BM5T25                                                     |
| Filtering duplex class       | <b>Kyocera:</b> SD18-1950R8UBQ1                                                                                        | <b>ACX:</b> DP1608-V1524CAT                                                           |
| Filtering duplex class       | <b>Walsin:</b> RFDIP1608060TM7T62                                                                                      | <b>MURATA:</b> SAYEY1G95HA0F0A                                                        |
| The main antenna             | WELLETRONICS COMMUNICATION TECHNOLOGY CO.,LTD: V2.0                                                                    | WELLETRONICS COMMUNICATION TECHNOLOGY CO.,LTD: V2.2                                   |

|               |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Triad antenna | WELLETRONICS COMMUNICATION<br>TECHNOLOGY CO.,LTD: V2.0 | WELLETRONICS COMMUNICATION<br>TECHNOLOGY CO.,LTD:<br>Two samples V2.3<br>Version V2.2 agree with the original<br>antenna in-kind, screen printing is unified<br>with the main antenna, are upgraded to<br>V2.2 (previous consulting certification, is<br>reported to the printing does not need to<br>change)<br>V2.3 is to optimize the factory feedback<br>antenna case become warped, antenna<br>made small optimization, two for the<br>report<br>Mass production using V2.2 (antenna case<br>become warped with other solutions,<br>antenna do not change) |
|---------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Except above, the others are all the same.

Should you have any questions or comments regarding this matter, please have my best  
attention.

Sincerely yours,




---

Contact Person: Lin BiaoChun

COMPANY: Motorola Mobility LLC.

Tel:86- 18150396560

E-Mail: Linbc@lenovo.com