



# FCC Test Report

APPLICANT : Xiaomi Communications Co., Ltd.  
EQUIPMENT : Mobile Phone  
BRAND NAME : XIAOMI  
MODEL NAME : 2109119DG  
FCC ID : 2AFZZ119DG  
STANDARD : 47 CFR Part 15 Subpart B  
CLASSIFICATION : Certification  
TEST DATE(S) : Jul. 08, 2021 ~ Jul. 11, 2021

We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 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.

Jason Jia

Reviewed by: Jason Jia / Supervisor

Alex Wang

Approved by: Alex Wang / Manager



**Sporton International (Kunshan) Inc.**

No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300  
People's Republic of China



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## REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION             | ISSUED DATE   |
|------------|---------|-------------------------|---------------|
| FC162118   | Rev. 01 | Initial issue of report | Aug. 02, 2021 |
|            |         |                         |               |
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|            |         |                         |               |

## SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description           | Limit           | Result | Remark                                                     |
|----------------|----------|-----------------------|-----------------|--------|------------------------------------------------------------|
| 3.1            | 15.107   | AC Conducted Emission | < 15.107 limits | PASS   | Under limit<br>6.52 dB at<br>0.194 MHz                     |
| 3.2            | 15.109   | Radiated Emission     | < 15.109 limits | PASS   | Under limit<br>6.93 dB at<br>538.280 MHz for<br>Quasi-Peak |

**Declaration of Conformity:**

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

**Comments and Explanations:**

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



## 1. General Description

### 1.1. Applicant

Xiaomi Communications Co., Ltd.

#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

### 1.2. Manufacturer

Xiaomi Communications Co., Ltd.

#019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085

### 1.3. Product Feature of Equipment Under Test

| Product Feature                 |                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment                       | Mobile Phone                                                                                                                                                                                                                                                                                                                                                                                                              |
| Brand Name                      | XIAOMI                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Model Name                      | 2109119DG                                                                                                                                                                                                                                                                                                                                                                                                                 |
| FCC ID                          | 2AFZZ119DG                                                                                                                                                                                                                                                                                                                                                                                                                |
| EUT supports Radios application | GSM/WCDMA/LTE/5G NR<br>WLAN 2.4GHz 802.11b/g/n HT20/HT40<br>WLAN 2.4GHz 802.11ax HE20/HE40<br>WLAN 5GHz 802.11a/n HT20/HT40<br>WLAN 5GHz 802.11ac VHT20/VHT40/VHT80/VHT160<br>WLAN 5GHz 802.11ax HE20/ HE40/ HE80/HE160<br>Bluetooth BR/EDR/LE<br>NFC/GNSS                                                                                                                                                                |
| IMEI Code                       | Conduction:<br>865950050029271/865950050029289 for sample 1<br>865950050057312/865950050057140 for sample 2<br>865950050056290/865950050056308 for sample 3<br>865950050039056/865950050039064 for sample 4<br>Radiation:<br>865950050022839/865950050022847 for sample 1<br>865950050057132/865950050057140 for sample 2<br>865950050056290/865950050056308 for sample 3<br>865950050039056/865950050039064 for sample 4 |
| HW Version                      | P2                                                                                                                                                                                                                                                                                                                                                                                                                        |
| SW Version                      | MIUI12.5                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 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. There are four types of EUT, sample 1: memory(6+128G) with battery1, sample 2: memory(6+128G) with battery2, sample 3: memory(8+128G) with battery1, sample 4: memory(8+256G) with battery1.

According to the differences, we choose sample 1 to perform full test and sample 2/3/4 to verify the difference.

## 1.4. Product Specification of Equipment Under Test

| Standards-related Product Specification |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tx Frequency</b>                     | GSM850: 824 MHz ~ 849 MHz<br>GSM1900: 1850MHz ~ 1910MHz<br>WCDMA Band II: 1850 MHz ~ 1910 MHz<br>WCDMA Band IV : 1710 MHz ~ 1755 MHz<br>WCDMA Band V: 824 MHz ~ 849 MHz<br>LTE Band 2 : 1850 MHz ~ 1910 MHz<br>LTE Band 4 : 1710 MHz ~ 1755 MHz<br>LTE Band 5 : 824 MHz ~ 849 MHz<br>LTE Band 7 : 2500 MHz ~ 2570 MHz<br>LTE Band 12 : 699 MHz ~ 716 MHz<br>LTE Band 13 : 777 MHz ~ 787 MHz<br>LTE Band 17 : 704 MHz ~ 716 MHz<br>LTE Band 26 : 814 MHz ~ 849 MHz<br>LTE Band 38 : 2570 MHz ~ 2620 MHz<br>LTE Band 41 : 2496 MHz ~ 2690 MHz<br>LTE Band 42 : 3450 MHz ~ 3550 MHz<br>LTE Band 66 : 1710 MHz ~ 1780 MHz<br>5G NR n5 : 824 MHz ~ 849 MHz<br>5G NR n7 : 2500 MHz ~ 2570 MHz<br>5G NR n38 : 2570 MHz ~ 2620 MHz<br>5G NR n41 : 2496 MHz ~ 2690 MHz<br>5G NR n66 : 1710 MHz ~ 1780 MHz<br>5G NR n77: 3450 MHz ~3550MHz; 3700~3980MHz<br>5G NR n78: 3450 MHz ~3550MHz; 3700~3800MHz<br>802.11b/g/n/ax: 2400 MHz ~ 2483.5 MHz<br>802.11a/n/ac/ax: 5180 MHz ~ 5240 MHz;<br>5260 MHz ~ 5320 MHz;<br>5500 MHz ~ 5720 MHz<br>5745 MHz ~ 5825 MHz<br>Bluetooth: 2400 MHz ~ 2483.5 MHz<br>NFC : 13.56 MHz |
| <b>Rx Frequency</b>                     | GSM850: 869 MHz ~ 894 MHz<br>GSM1900: 1930 MHz ~ 1990 MHz<br>WCDMA Band II: 1930 MHz ~ 1990 MHz<br>WCDMA Band IV : 2110 MHz ~ 2155 MHz<br>WCDMA Band V: 869 MHz ~ 894 MHz<br>LTE Band 2 : 1930 MHz ~ 1990 MHz<br>LTE Band 4 : 2110 MHz ~ 2155 MHz<br>LTE Band 5 : 869 MHz ~ 894 MHz<br>LTE Band 7 : 2620 MHz ~ 2690 MHz<br>LTE Band 12 : 729 MHz ~ 746 MHz<br>LTE Band 13 : 746 MHz ~ 756 MHz<br>LTE Band 17 : 734 MHz ~ 746 MHz<br>LTE Band 26 : 859 MHz ~ 894 MHz<br>LTE Band 38: 2570 MHz ~ 2620 MHz<br>LTE Band 41 : 2496 MHz ~ 2690 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                           | LTE Band 42 : 3450 MHz ~ 3550 MHz<br>LTE Band 66 : 2110 MHz~ 2200 MHz<br>5G NR n5 : 869 MHz ~ 894 MHz<br>5G NR n7 : 2620 MHz ~ 2690 MHz<br>5G NR n38: 2570 MHz ~ 2620 MHz<br>5G NR n41 : 2496 MHz ~ 2690 MHz<br>5G NR n66 : 2110 MHz~ 2200 MHz<br>5G NR n77: 3450 MHz ~3550MHz; 3700~3980MHz<br>5G NR n78: 3450 MHz ~3550MHz; 3700~3800MHz<br>802.11b/g/n/ax: 2400 MHz ~ 2483.5 MHz<br>802.11a/n/ac/ax: 5180 MHz ~ 5240 MHz;<br>5260 MHz ~ 5320 MHz;<br>5500 MHz ~ 5720 MHz<br>5745 MHz ~ 5825 MHz<br>Bluetooth: 2400 MHz ~ 2483.5 MHz<br>NFC : 13.56 MHz<br>GNSS : 1559 MHz ~ 1610 MHz ; 1164 MHz ~ 1215 MHz                                                                                                                    |
| <b>Antenna Type</b>       | WWAN : PIFA Antenna<br>WLAN : PIFA Antenna<br>Bluetooth : PIFA Antenna<br>GNSS: PIFA Antenna<br>NFC : Coil Antenna                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Type of Modulation</b> | GSM/GPRS: GMSK<br>EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK<br>WCDMA : BPSK<br>HSDPA/DC-HSDPA : QPSK<br>HSUPA : QPSK<br>HSPA+ : 16QAM (uplink is not supported)<br>DC-HSDPA : 64QAM<br>LTE: QPSK / 16QAM / 64QAM / 256QAM(256QAM downlink only)<br>5G NR:<br>DFT-s-OFDM (PI/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM)<br>CP-OFDM (QPSK / 16QAM / 64QAM / 256QAM)<br>802.11b : DSSS (DBPSK / DQPSK / CCK)<br>802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)<br>802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM /256QAM)<br>802.11ax:OFDM (BPSK / QPSK / 16QAM / 64QAM /256QAM/1024QAM)<br>Bluetooth LE : GFSK<br>Bluetooth (1Mbps) : GFSK<br>Bluetooth (2Mbps) : $\pi/4$ -DQPSK<br>Bluetooth (3Mbps) : 8-DPSK<br>GNSS : BPSK<br>NFC: ASK |

### 1.5. Modification of EUT

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

## 1.6. Test Location

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

|                    |                                                                                                                                                                          |                     |                                   |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------------------|
| Test Firm          | Sporton International (Kunshan) Inc.                                                                                                                                     |                     |                                   |
| Test Site Location | No. 1098, Pengxi North Road, Kunshan Economic Development Zone<br>Jiangsu Province 215300 People's Republic of China<br>TEL : +86-512-57900158<br>FAX : +86-512-57900958 |                     |                                   |
| Test Site No.      | Sporton Site No.                                                                                                                                                         | FCC Designation No. | FCC Test Firm<br>Registration No. |
|                    | CO01-KS<br>03CH02-KS                                                                                                                                                     | CN1257              | 314309                            |

## 1.7. Test Software

| Item | Site      | Manufacturer | Name | Version      |
|------|-----------|--------------|------|--------------|
| 1.   | 03CH02-KS | AUDIX        | E3   | 6.2009-8-24a |
| 2.   | CO01-KS   | AUDIX        | E3   | 6.2009-8-24  |

## 1.8. Applicable Standards

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

- ♦ 47 CFR Part 15 Subpart B
- ♦ ANSI C63.4-2014

**Remark:** All test items were verified and recorded according to the standards and without any deviation during the test.

## 2. Test Configuration of Equipment Under Test

### 2.1. Test Mode

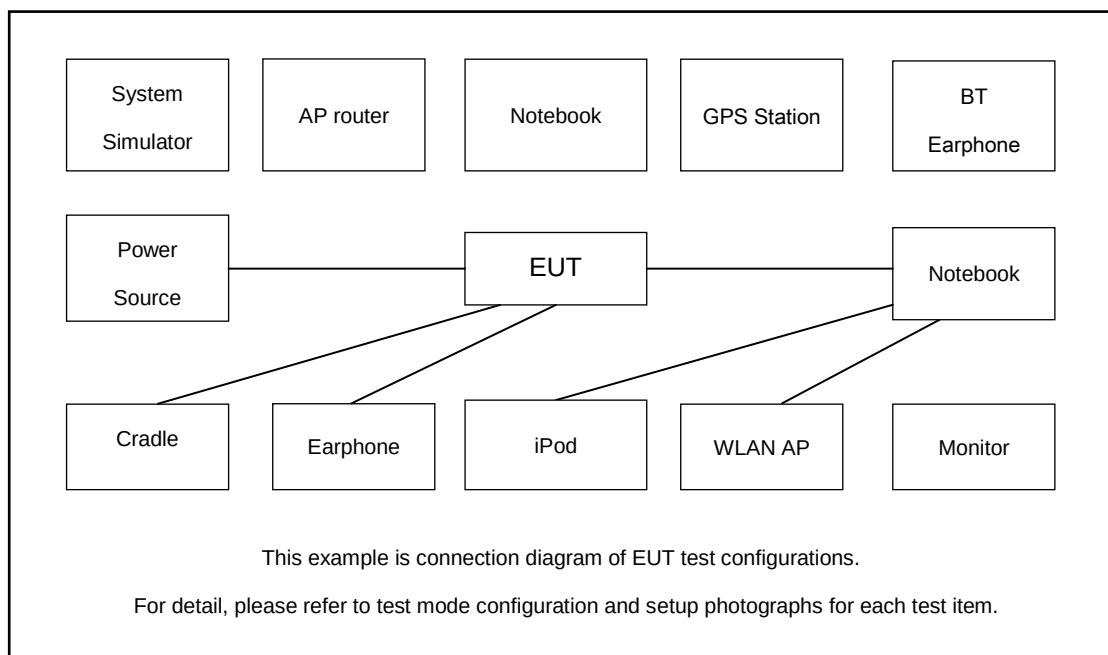
The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

| Test Items            | Function Type                                                                                                                                                     |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| AC Conducted Emission | Mode 1: GSM 850 Rx(Middle) + Bluetooth Idle + WLAN (2.4G) Idle+ Battery + USB Cable 1(Charging from Adapter) + Camera(Rear) + ANT 1 + SIM 1 for Sample 1          |
|                       | Mode 2: WCDMA 850 Rx(High) + Bluetooth Idle + WLAN (5G) Idle + Battery + USB Cable 2(Charging from Adapter) + Camera(Front) + ANT 4 + SIM 2 for Sample 1          |
|                       | Mode 3: LTE Band 5 Rx(Low) + Bluetooth Idle + WLAN (2.4G) Idle + Battery + USB Cable 1(Charging from Adapter) + MPEG4(Run Color Bar) + ANT 1 + SIM 1 for Sample 1 |
|                       | Mode 4: LTE Band 12 Rx(Middle) + Bluetooth Idle + WLAN (5G) Idle + Battery + USB Cable 1(Charging from Adapter) + NFC On + ANT 4 + SIM 2 for Sample 1             |
|                       | Mode 5: LTE Band 13 Rx(Low) + Bluetooth Idle + WLAN (2.4G) Idle + Battery + USB Cable 1(Charging from Adapter) + GNSS Rx + ANT 1 + SIM 1 for Sample 1             |
|                       | Mode 6: LTE Band 17 Rx(Low) + Bluetooth Idle + WLAN (5G) Idle + Battery + USB Cable 1(Data Link with Notebook) + GNSS Rx + ANT 4 + SIM 2 for Sample 1             |
|                       | Mode 7: LTE Band 26 Rx(Middle) + Bluetooth Idle + WLAN (2.4G) Idle + Battery + USB Cable 2(Data Link with Notebook) + GNSS Rx + ANT 1 + SIM 1 for Sample 1        |
|                       | Mode 8: GSM 850 Rx(Middle) + Bluetooth Idle + WLAN (5G) Idle + Battery + USB Cable 1(Data Link with Notebook) + GNSS Rx + ANT 1 + SIM 2 for Sample 2              |
|                       | Mode 9: GSM 850 Rx(Middle) + Bluetooth Idle + WLAN (5G) Idle + Battery + USB Cable 1(Data Link with Notebook) + GNSS Rx + ANT 1 + SIM 1 for Sample 3              |
|                       | Mode 10 : GSM 850 Rx(Middle) + Bluetooth Idle + WLAN (2.4G) Idle + Battery + USB Cable 1(Charging from Adapter) + Camera(Rear) + ANT 1+ SIM 1 for Sample 4        |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Radiated Emissions                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>Mode 1: GSM 850 Rx(Middle) + Bluetooth Idle + WLAN (2.4G) Idle+ Battery + USB Cable 1(Charging from Adapter) + Camera(Rear) + ANT 1 + SIM 1 for Sample 1</p> <p>Mode 2: WCDMA 850 Rx(High) + Bluetooth Idle + WLAN (5G) Idle + Battery + USB Cable 2(Charging from Adapter) + Camera(Front) + ANT 4 + SIM 2 for Sample 1</p> <p>Mode 3: LTE Band 5 Rx(Low) + Bluetooth Idle + WLAN (2.4G) Idle + Battery + Earphone + MPEG4(Run Color Bar) + ANT 1 + SIM 1 for Sample 1</p> <p>Mode 4: LTE Band 12 Rx(Middle) + Bluetooth Idle + WLAN (5G) Idle + Battery + USB Cable 1(Charging from Adapter) + NFC On + ANT 4 + SIM 2 for Sample 1</p> <p>Mode 5: LTE Band 13 Rx(Low) + Bluetooth Idle + WLAN (2.4G) Idle + Battery + USB Cable 1(Charging from Adapter) + GNSS Rx + ANT 1 + SIM 1 for Sample 1</p> <p>Mode 6: LTE Band 17 Rx(Low) + Bluetooth Idle + WLAN (5G) Idle + Battery + USB Cable 1(Data Link with Notebook) + GNSS Rx + ANT 4 + SIM 2 for Sample 1</p> <p>Mode 7: LTE Band 26 Rx(Middle) + Bluetooth Idle + WLAN (2.4G) Idle + Battery + USB Cable 2(Data Link with Notebook) + GNSS Rx + ANT 1 + SIM 1 for Sample 1</p> <p>Mode 8: LTE Band 17 Rx(Low) + Bluetooth Idle + WLAN (5G) Idle + Battery + USB Cable 1(Data Link with Notebook) + GNSS Rx + ANT 4 + SIM 2 for Sample 2</p> <p>Mode 9: LTE Band 17 Rx(Low) + Bluetooth Idle + WLAN (2.4G) Idle + Battery + USB Cable 1(Data Link with Notebook) + GNSS Rx + ANT 4 + SIM 1 for Sample 3</p> <p>Mode 10: LTE Band 17 Rx(Low) + Bluetooth Idle + WLAN (2.4G) Idle + Battery + USB Cable 1(Data Link with Notebook) + GNSS Rx + ANT 4 + SIM 1 for Sample 4</p> |
| <b>Remark:</b> <ol style="list-style-type: none"> <li>1. The worst case of AC is mode 1; only the test data of this mode is reported.</li> <li>2. The worst case of RE is mode 10; only the test data of this mode is reported.</li> <li>3. Data Link with Notebook means data application transferred mode between EUT and Notebook</li> <li>4. Pre-scanned Low/Middle/High channel, the worst channel was recorded in this report.</li> </ol> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

## 2.2. Connection Diagram of Test System



The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application

## 2.3. Support Unit used in test configuration and system

| Item | Equipment          | Trade Name | Model Name | FCC ID        | Data Cable     | Power Cord                                                 |
|------|--------------------|------------|------------|---------------|----------------|------------------------------------------------------------|
| 1.   | LTE Base Station   | Anritsu    | MT8821C    | N/A           | N/A            | Unshielded,1.8m                                            |
| 2.   | LTE Base Station   | Anritsu    | MT8820C    | N/A           | N/A            | Unshielded,1.8m                                            |
| 3.   | WLAN AP            | D-link     | DIR-655    | KA21R655B1    | N/A            | Unshielded,1.8m                                            |
| 4.   | WLAN AP            | TP-Link    | TL-WDR5600 | N/A           | N/A            | Unshielded,1.8m                                            |
| 5.   | Bluetooth Earphone | Xiaomi     | LYEJ02LM   | N/A           | N/A            | N/A                                                        |
| 6.   | Notebook           | Lenovo     | G480       | QDS-BRCM1050I | N/A            | AC I/P:<br>Unshielded, 1.8 m<br>DC O/P:<br>Shielded, 1.8 m |
| 7.   | Notebook           | Lenovo     | S730-13IWL | N/A           | N/A            | AC I/P:<br>Unshielded, 1.8 m<br>DC O/P:<br>Shielded, 1.8 m |
| 8.   | GNSS Station       | R&S        | SMBV100A   | 258305        | N/A            | N/A                                                        |
| 9.   | Hard Disk          | Lenovo     | F310       | DoC           | Shielded, 1.2m | N/A                                                        |
| 10.  | Hard disk          | KINGSHARE  | KSP6120G   | Fcc DoC       | Shielded, 1.2m | N/A                                                        |
| 11.  | NFC Card           | N/A        | N/A        | N/A           | N/A            | N/A                                                        |

## **2.4. EUT Operation Test Setup**

The EUT was in GSM or WCDMA or LTE idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

At the same time, the EUT was attached to the Bluetooth earphone or WLAN AP, and the following programs installed in the EUT were programmed during the test.

1. Data application is transferred between notebook and EUT via USB cable.
2. Turn on MPEG4 function.
3. Turn on camera to capture images.
4. Turn on GNSS function to make the EUT receive continuous signals from GNSS station.
5. Turn on NFC function.

### 3. Test Result

#### 3.1. Test of AC Conducted Emission Measurement

##### 3.1.1 Limits 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.

<Class B Limit>

| Frequency of emission<br>(MHz) | Conducted limit (dBuV) |           |
|--------------------------------|------------------------|-----------|
|                                | 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.

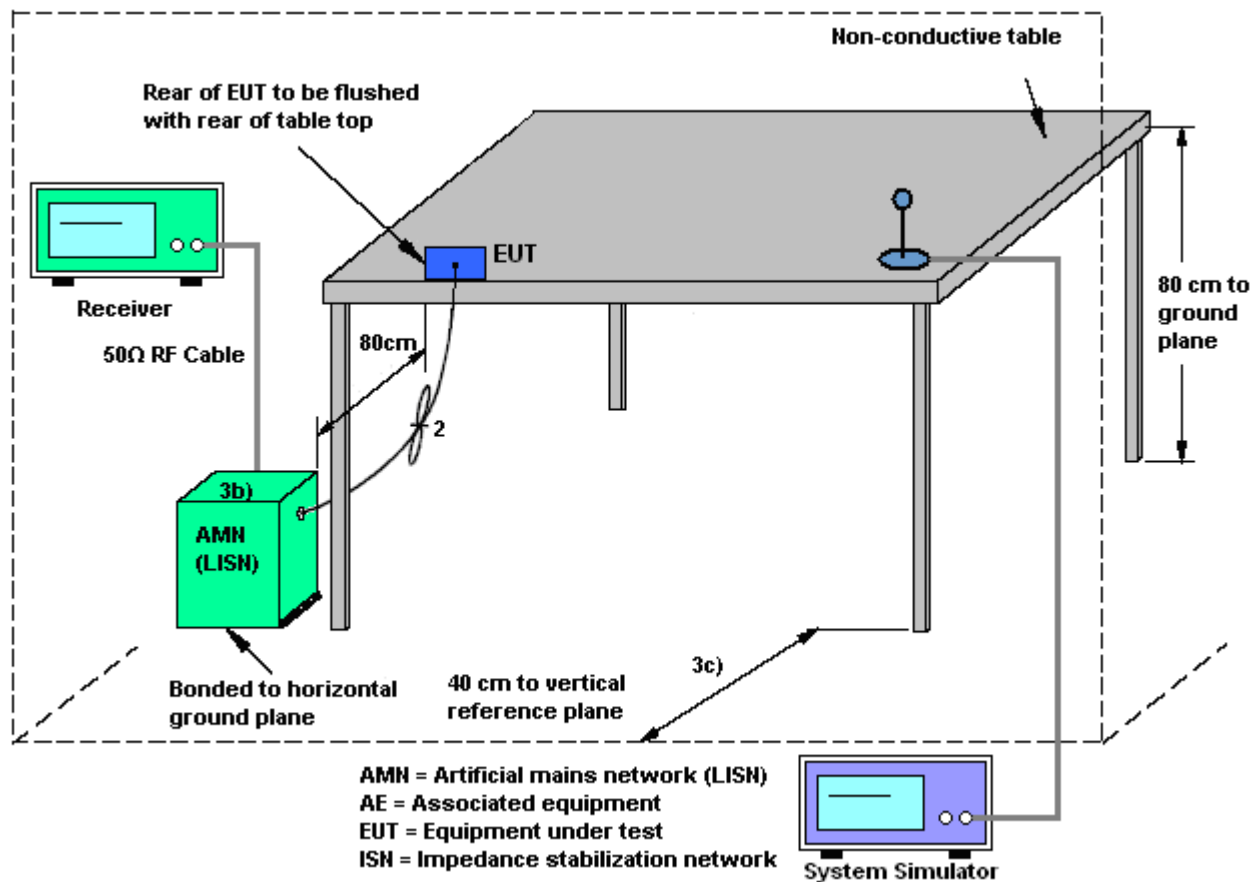
##### 3.1.2 Measuring Instruments

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

##### 3.1.3 Test Procedure

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.

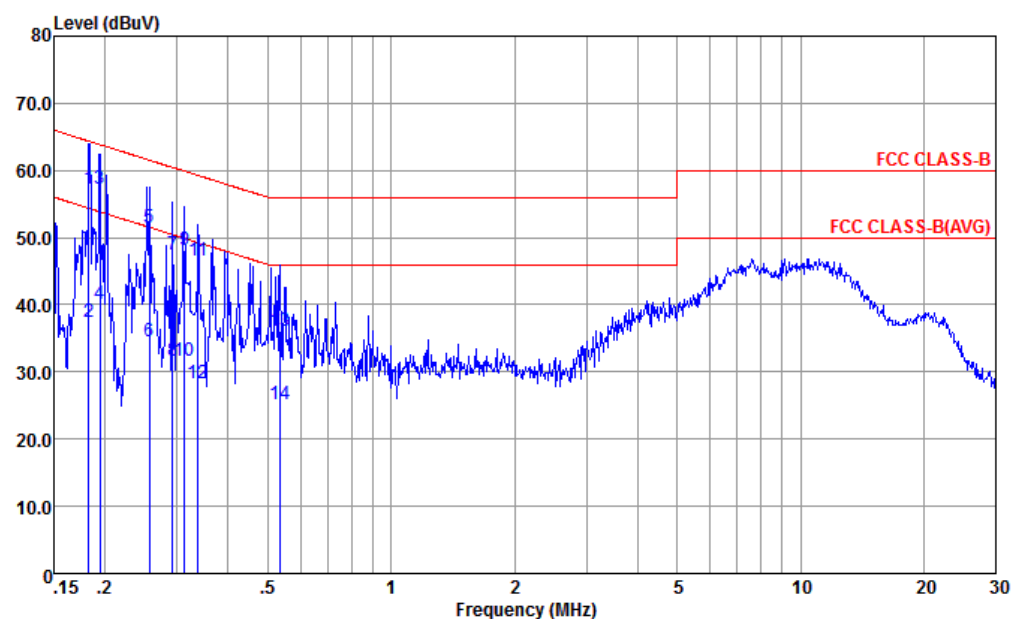
### 3.1.4 Test Setup





## 3.1.5 Test Result of AC Conducted Emission

|                 |                                                                                 |                     |               |
|-----------------|---------------------------------------------------------------------------------|---------------------|---------------|
| Test Engineer : | Amos Zhang                                                                      | Temperature :       | 25.3 ~26.2 °C |
|                 |                                                                                 | Relative Humidity : | 38~40%        |
| Test Voltage :  | 120Vac / 60Hz                                                                   | Phase :             | Line          |
| Remark :        | All emissions not reported here are more than 10 dB below the prescribed limit. |                     |               |

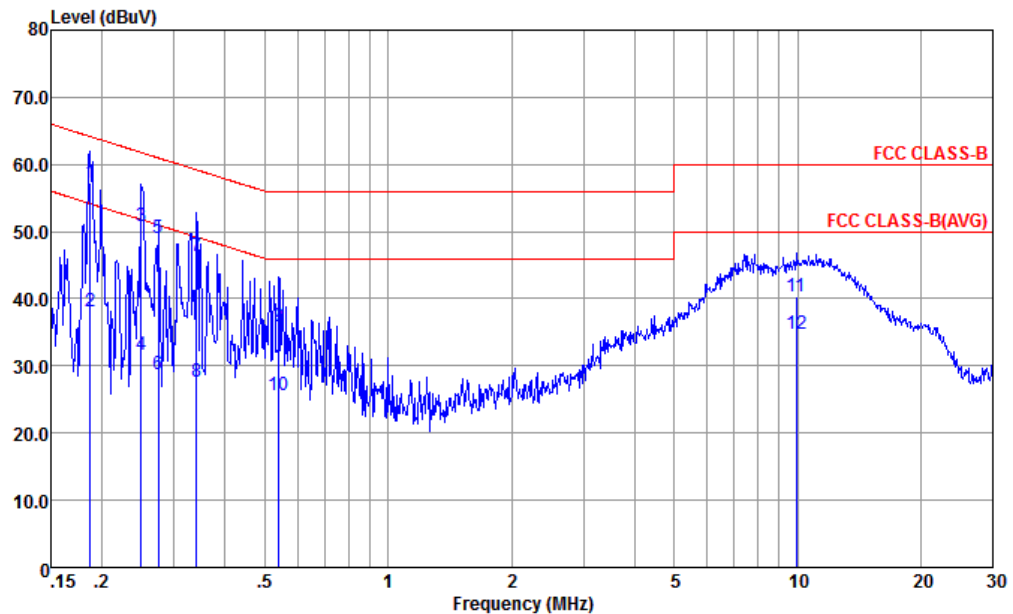


Site : CO01-KS  
Condition : FCC CLASS-B TWO-LISN-CN02-L LINE

|     | Freq  | Level | Over   | Limit | Read  | LISN   | Cable |         |
|-----|-------|-------|--------|-------|-------|--------|-------|---------|
|     | MHz   | dBuV  | Limit  | Line  | Level | Factor | Loss  | Remark  |
|     |       |       | dB     | dBuV  | dBuV  | dB     | dB    |         |
| 1   | 0.182 | 57.24 | -7.13  | 64.37 | 37.20 | 9.64   | 10.40 | QP      |
| 2   | 0.182 | 37.34 | -17.03 | 54.37 | 17.30 | 9.64   | 10.40 | Average |
| 3 * | 0.194 | 57.32 | -6.52  | 63.84 | 37.31 | 9.64   | 10.37 | QP      |
| 4   | 0.194 | 40.22 | -13.62 | 53.84 | 20.21 | 9.64   | 10.37 | Average |
| 5   | 0.256 | 51.47 | -10.09 | 61.56 | 31.50 | 9.64   | 10.33 | QP      |
| 6   | 0.256 | 34.47 | -17.09 | 51.56 | 14.50 | 9.64   | 10.33 | Average |
| 7   | 0.292 | 47.45 | -13.01 | 60.46 | 27.50 | 9.64   | 10.31 | QP      |
| 8   | 0.292 | 31.55 | -18.91 | 50.46 | 11.60 | 9.64   | 10.31 | Average |
| 9   | 0.313 | 48.14 | -11.74 | 59.88 | 28.20 | 9.64   | 10.30 | QP      |
| 10  | 0.313 | 31.54 | -18.34 | 49.88 | 11.60 | 9.64   | 10.30 | Average |
| 11  | 0.337 | 46.53 | -12.74 | 59.27 | 26.60 | 9.64   | 10.29 | QP      |
| 12  | 0.337 | 28.23 | -21.04 | 49.27 | 8.30  | 9.64   | 10.29 | Average |
| 13  | 0.535 | 36.09 | -19.91 | 56.00 | 16.20 | 9.65   | 10.24 | QP      |
| 14  | 0.535 | 25.09 | -20.91 | 46.00 | 5.20  | 9.65   | 10.24 | Average |



|                 |                                                                                 |                     |               |
|-----------------|---------------------------------------------------------------------------------|---------------------|---------------|
| Test Engineer : | Amos Zhang                                                                      | Temperature :       | 25.3 ~26.2 °C |
|                 |                                                                                 | Relative Humidity : | 38~40%        |
| Test Voltage :  | 120Vac / 60Hz                                                                   | Phase :             | Neutral       |
| Remark :        | All emissions not reported here are more than 10 dB below the prescribed limit. |                     |               |



Site : CO01-KS  
Condition : FCC CLASS-B TWO-LISN-CN02-N NEUTRAL

|     | Freq  | Level | Over   | Limit | Read  | LISN   | Cable |         |
|-----|-------|-------|--------|-------|-------|--------|-------|---------|
|     | MHz   | dBuV  | Limit  | Line  | Level | Factor | Loss  | Remark  |
|     | MHz   | dBuV  | dB     | dBuV  | dBuV  | dB     | dB    |         |
| 1 * | 0.187 | 57.16 | -6.99  | 64.15 | 36.90 | 9.87   | 10.39 | QP      |
| 2   | 0.187 | 38.06 | -16.09 | 54.15 | 17.80 | 9.87   | 10.39 | Average |
| 3   | 0.249 | 50.77 | -11.01 | 61.78 | 30.60 | 9.84   | 10.33 | QP      |
| 4   | 0.249 | 31.67 | -20.11 | 51.78 | 11.50 | 9.84   | 10.33 | Average |
| 5   | 0.274 | 48.93 | -12.05 | 60.98 | 28.80 | 9.81   | 10.32 | QP      |
| 6   | 0.274 | 28.73 | -22.25 | 50.98 | 8.60  | 9.81   | 10.32 | Average |
| 7   | 0.341 | 46.26 | -12.92 | 59.18 | 26.19 | 9.78   | 10.29 | QP      |
| 8   | 0.341 | 27.66 | -21.52 | 49.18 | 7.59  | 9.78   | 10.29 | Average |
| 9   | 0.541 | 35.81 | -20.19 | 56.00 | 15.84 | 9.73   | 10.24 | QP      |
| 10  | 0.541 | 25.56 | -20.44 | 46.00 | 5.59  | 9.73   | 10.24 | Average |
| 11  | 9.913 | 40.38 | -19.62 | 60.00 | 19.50 | 10.54  | 10.34 | QP      |
| 12  | 9.913 | 34.68 | -15.32 | 50.00 | 13.80 | 10.54  | 10.34 | Average |

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

## 3.2. Test of Radiated Emission Measurement

### 3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

**<Class B Limit>**

| Frequency<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meters) |
|--------------------|--------------------------------------|----------------------------------|
| 30 – 88            | 100                                  | 3                                |
| 88 – 216           | 150                                  | 3                                |
| 216 - 960          | 200                                  | 3                                |
| Above 960          | 500                                  | 3                                |

### 3.2.2. Measuring Instruments

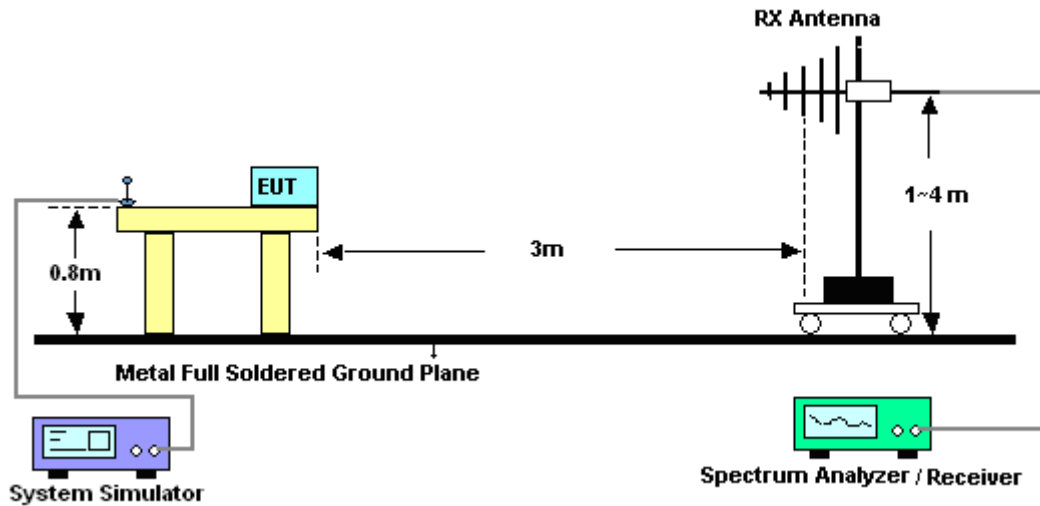
The measuring equipment is listed in the section 4 of this test report.

### 3.2.3. Test Procedures

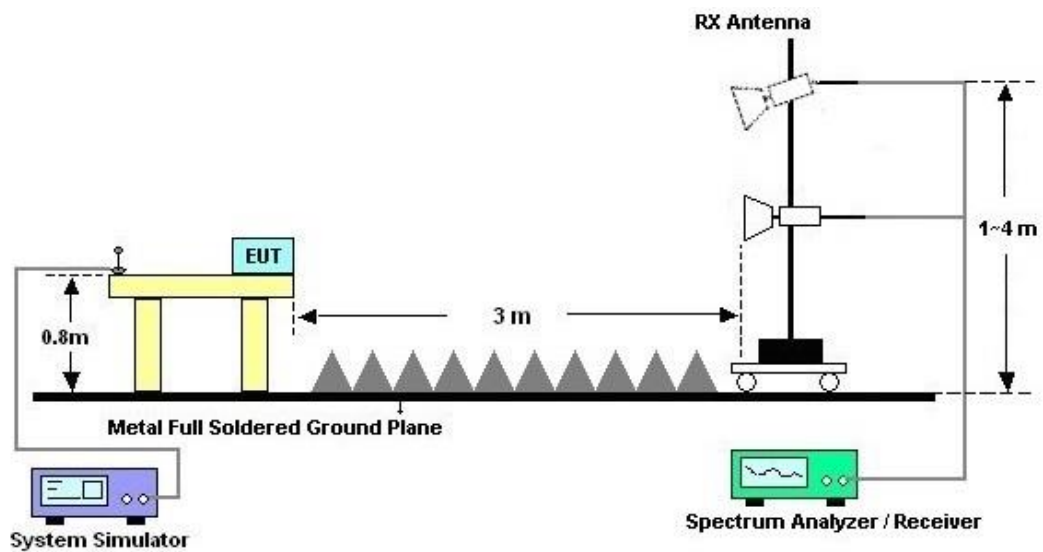
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dBμV/m) = 20 log Emission level (μV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

### 3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



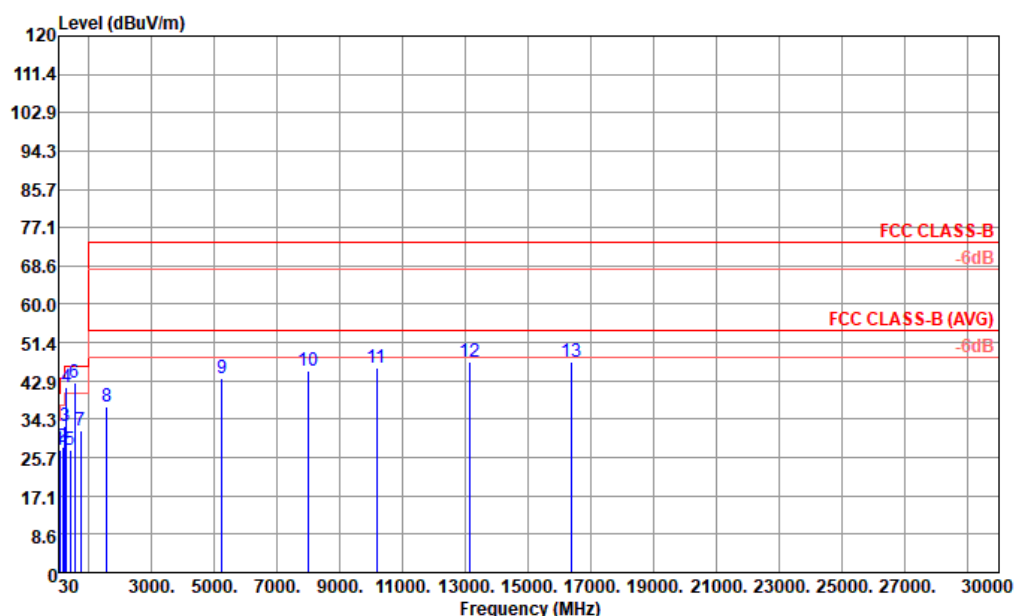
For radiated emissions above 1GHz





## 3.2.5. Test Result of Radiated Emission

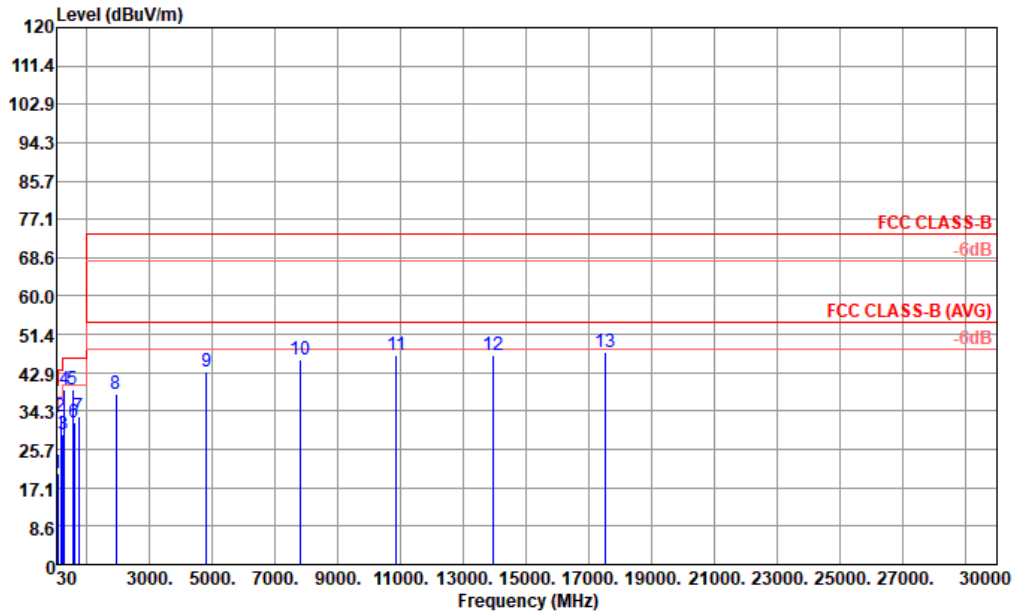
|                 |                                                     |                     |            |
|-----------------|-----------------------------------------------------|---------------------|------------|
| Test Engineer : | Jl Feng                                             | Temperature :       | 21~22°C    |
|                 |                                                     | Relative Humidity : | 41~42%     |
| Test Distance : | 3m                                                  | Polarization :      | Horizontal |
| Remark :        | #7 is system simulator signal which can be ignored. |                     |            |



Site : 03CH02-KS  
Condition : FCC CLASS-B 3m LF 6111D SN44483 HORIZONTAL

|    | Freq      | Level  | Over   | Limit | ReadAntenna | Cable  | Preamp | A/Pos  | T/Pos | Remark |
|----|-----------|--------|--------|-------|-------------|--------|--------|--------|-------|--------|
|    | MHz       | dBuV/m | Limit  | Line  | Level       | Factor | Loss   | Factor | cm    | deg    |
| 1  | 67.830    | 27.44  | -12.56 | 40.00 | 45.82       | 12.38  | 1.40   | 32.16  | ---   | Peak   |
| 2  | 166.770   | 27.97  | -15.53 | 43.50 | 41.88       | 15.94  | 2.25   | 32.10  | ---   | Peak   |
| 3  | 239.520   | 32.59  | -13.41 | 46.00 | 44.57       | 17.50  | 2.70   | 32.18  | ---   | Peak   |
| 4  | 268.620   | 41.51  | -4.49  | 46.00 | 51.01       | 19.80  | 2.86   | 32.16  | ---   | Peak   |
| 5  | 408.300   | 27.46  | -18.54 | 46.00 | 34.10       | 22.11  | 3.53   | 32.28  | ---   | Peak   |
| 6  | 538.280   | 42.40  | -3.60  | 46.00 | 45.61       | 25.07  | 4.04   | 32.32  | 200   | 0 Peak |
| 7  | 740.000   | 31.87  |        |       | 31.51       | 27.91  | 4.73   | 32.28  | ---   | Peak   |
| 8  | 1576.000  | 36.97  | -37.03 | 74.00 | 36.31       | 28.98  | 6.95   | 35.27  | ---   | Peak   |
| 9  | 5224.000  | 43.52  | -30.48 | 74.00 | 27.56       | 35.56  | 12.65  | 32.25  | ---   | Peak   |
| 10 | 8008.000  | 44.99  | -29.01 | 74.00 | 26.49       | 37.30  | 15.88  | 34.68  | ---   | Peak   |
| 11 | 10170.000 | 45.94  | -28.06 | 74.00 | 23.68       | 39.37  | 18.12  | 35.23  | ---   | Peak   |
| 12 | 13140.000 | 47.01  | -26.99 | 74.00 | 21.53       | 40.50  | 20.53  | 35.55  | ---   | Peak   |
| 13 | 16362.000 | 47.22  | -26.78 | 74.00 | 16.02       | 43.11  | 23.24  | 35.15  | ---   | Peak   |

|                        |                                                     |                            |          |
|------------------------|-----------------------------------------------------|----------------------------|----------|
| <b>Test Engineer :</b> | Jl Feng                                             | <b>Temperature :</b>       | 21~22°C  |
|                        |                                                     | <b>Relative Humidity :</b> | 41~42%   |
| <b>Test Distance :</b> | 3m                                                  | <b>Polarization :</b>      | Vertical |
| <b>Remark :</b>        | #7 is system simulator signal which can be ignored. |                            |          |



Site : 03CH02-KS  
Condition : FCC CLASS-B 3m LF 6111D SN44483 VERTICAL

|    | Freq      | Level  | Over<br>Limit | Limit<br>Line | ReadAntenna<br>Level | Factor | Cable<br>Loss | Preamp<br>Factor | A/Pos | T/Pos | Remark |
|----|-----------|--------|---------------|---------------|----------------------|--------|---------------|------------------|-------|-------|--------|
|    | MHz       | dBuV/m | dB            | dBuV/m        | dBuV                 | dB/m   | dB            | dB               | cm    | deg   |        |
| 1  | 67.830    | 20.27  | -19.73        | 40.00         | 38.65                | 12.38  | 1.40          | 32.16            | ---   | ---   | Peak   |
| 2  | 167.740   | 33.04  | -10.46        | 43.50         | 47.02                | 15.86  | 2.26          | 32.10            | ---   | ---   | Peak   |
| 3  | 239.520   | 29.06  | -16.94        | 46.00         | 41.04                | 17.50  | 2.70          | 32.18            | ---   | ---   | Peak   |
| 4  | 268.620   | 39.03  | -6.97         | 46.00         | 48.53                | 19.80  | 2.86          | 32.16            | ---   | ---   | Peak   |
| 5  | 538.280   | 39.07  | -6.93         | 46.00         | 42.28                | 25.07  | 4.04          | 32.32            | 200   | 60    | QP     |
| 6  | 600.360   | 31.65  | -14.35        | 46.00         | 33.89                | 25.80  | 4.26          | 32.30            | ---   | ---   | Peak   |
| 7  | 740.000   | 33.12  |               |               | 32.76                | 27.91  | 4.73          | 32.28            | ---   | ---   | Peak   |
| 8  | 1920.000  | 38.03  | -35.97        | 74.00         | 33.77                | 31.72  | 7.67          | 35.13            | ---   | ---   | Peak   |
| 9  | 4808.000  | 43.09  | -30.91        | 74.00         | 27.78                | 35.54  | 12.19         | 32.42            | ---   | ---   | Peak   |
| 10 | 7784.000  | 45.72  | -28.28        | 74.00         | 26.58                | 37.69  | 15.60         | 34.15            | ---   | ---   | Peak   |
| 11 | 10854.000 | 46.95  | -27.05        | 74.00         | 24.05                | 39.44  | 18.63         | 35.17            | ---   | ---   | Peak   |
| 12 | 13941.000 | 46.93  | -27.07        | 74.00         | 19.86                | 41.02  | 21.18         | 35.13            | ---   | ---   | Peak   |
| 13 | 17496.000 | 47.61  | -26.39        | 74.00         | 15.27                | 43.49  | 24.05         | 35.20            | ---   | ---   | Peak   |

Note:

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



## 4. List of Measuring Equipment

| Instrument                        | Manufacturer | Model No.  | Serial No.   | Characteristics         | Calibration Date | Test Date     | Due Date      | Remark                |
|-----------------------------------|--------------|------------|--------------|-------------------------|------------------|---------------|---------------|-----------------------|
| EMI Receiver                      | R&S          | ESCI7      | 100768       | 9kHz~7GHz;              | Apr. 21, 2021    | Jul. 08, 2021 | Apr. 20, 2022 | Conduction (CO01-KS)  |
| AC LISN (for auxiliary equipment) | MessTec      | AN3016     | 060103       | 9kHz~30MHz              | Oct. 17, 2020    | Jul. 08, 2021 | Oct. 16, 2021 | Conduction (CO01-KS)  |
| AC LISN                           | R&S          | ENV216     | 100334       | 9kHz~30MHz              | Oct. 17, 2020    | Jul. 08, 2021 | Oct. 16, 2021 | Conduction (CO01-KS)  |
| AC Power Source                   | Chroma       | 61602      | ABP000000811 | AC 0V~300V, 45Hz~1000Hz | Oct. 17, 2020    | Jul. 08, 2021 | Oct. 16, 2021 | Conduction (CO01-KS)  |
| EMI Test Receiver                 | R&S          | ESR7       | 101403       | 9kHz~7GHz;Max 30dBm     | Oct. 17, 2020    | Jul. 11, 2021 | Oct. 16, 2021 | Radiation (03CH02-KS) |
| EXA Spectrum Analyzer             | Keysight     | N9010A     | MY55370528   | 10Hz~44G,MAX 30dB       | Oct. 17, 2020    | Jul. 11, 2021 | Oct. 16, 2021 | Radiation (03CH02-KS) |
| Bilog Antenna                     | TeseQ        | CBL6111D   | 44483        | 30MHz~1GHz              | Jan. 26, 2021    | Jul. 11, 2021 | Jan. 25, 2022 | Radiation (03CH02-KS) |
| Double Ridge Horn Antenna         | ETS-Lindgren | 3117       | 75957        | 1GHz~18GHz              | Nov. 01, 2020    | Jul. 11, 2021 | Oct. 31, 2021 | Radiation (03CH02-KS) |
| SHF-EHF Horn                      | Com-power    | AH-840     | 101115       | 18GHz~40GHz             | Nov. 06, 2020    | Jul. 11, 2021 | Nov. 05, 2021 | Radiation (03CH02-KS) |
| Amplifier                         | MITEQ        | EM18G40GGA | 060728       | 18~40GHz                | Jan. 06, 2021    | Jul. 11, 2021 | Jan. 05, 2022 | Radiation (03CH02-KS) |
| Amplifier                         | SONOMA       | 310N       | 187289       | 9KHz~1GHz               | Apr. 12, 2021    | Jul. 11, 2021 | Apr. 11, 2022 | Radiation (03CH02-KS) |
| Amplifier                         | Keysight     | 83017A     | MY53270316   | 500MHz~26.5GHz          | Oct. 17, 2020    | Jul. 11, 2021 | Oct. 16, 2021 | Radiation (03CH02-KS) |
| AC Power Source                   | Chroma       | 61601      | 616010002473 | N/A                     | NCR              | Jul. 11, 2021 | NCR           | Radiation (03CH02-KS) |
| Turn Table                        | MF           | MF7802     | N/A          | 0~360 degree            | NCR              | Jul. 11, 2021 | NCR           | Radiation (03CH02-KS) |
| Antenna Mast                      | MF           | MF7802     | N/A          | 1 m~4 m                 | NCR              | Jul. 11, 2021 | NCR           | Radiation (03CH02-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% ( $U = 2Uc(y)$ ) | 2.9dB |
|-------------------------------------------------------------------------|-------|

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

|                                                                         |       |
|-------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 4.9dB |
|-------------------------------------------------------------------------|-------|

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

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

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

|                                                                         |       |
|-------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% ( $U = 2Uc(y)$ ) | 5.1dB |
|-------------------------------------------------------------------------|-------|