

# FCC Test Report

APPLICANT : OnePlus Technology (Shenzhen) Co., Ltd.  
EQUIPMENT : Smart Phone  
BRAND NAME : ONEPLUS  
MODEL NAME : KB2007  
FCC ID : 2ABZ2-EF009  
STANDARD : 47 CFR Part 15 Subpart B  
CLASSIFICATION : Certification

The product was received on Jun. 15, 2020 and testing was completed on Jul. 04, 2020. We, Sporton International (ShenZhen) 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 (ShenZhen) Inc., the test report shall not be reproduced except in full.



Reviewed by: Derreck Chen / Supervisor



Approved by: Eric Shih / Manager



**Sporton International (ShenZhen) Inc.**

**1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen, 518055  
People's Republic of China**



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## REVISION HISTORY

| REPORT NO. | VERSION | DESCRIPTION             | ISSUED DATE   |
|------------|---------|-------------------------|---------------|
| FC061509   | Rev. 01 | Initial issue of report | Aug. 24, 2020 |
|            |         |                         |               |
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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>11.43 dB at<br>0.160 MHz  |
| 3.2            | 15.109   | Radiated Emission     | < 15.109 limits | PASS   | Under limit<br>10.29 dB at<br>90.140 MHz |

**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

OnePlus Technology (Shenzhen) Co., Ltd.

18C02, 18C03, 18C04,18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen,Guangdong,China

### 1.2. Manufacturer

OnePlus Technology (Shenzhen) Co., Ltd.

18C02, 18C03, 18C04,18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen,Guangdong,China

### 1.3. Product Feature of Equipment Under Test

| Product Feature                 |                                                                                                                                                                                                                                                             |
|---------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Equipment                       | Smart Phone                                                                                                                                                                                                                                                 |
| Brand Name                      | ONEPLUS                                                                                                                                                                                                                                                     |
| Model Name                      | KB2007                                                                                                                                                                                                                                                      |
| FCC ID                          | 2ABZ2-EF009                                                                                                                                                                                                                                                 |
| EUT supports Radios application | CDMA/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<br>WLAN 5GHz 802.11ax HE20/HE40/HE80<br>Bluetooth BR / EDR / LE / ANT+<br>GNSS/NFC |
| IMEI Code                       | Conduction: 990016770041901<br>Radiation: 990016770042016                                                                                                                                                                                                   |
| HW Version                      | 13                                                                                                                                                                                                                                                          |
| SW Version                      | 11.1.0.1.KB09                                                                                                                                                                                                                                               |
| EUT Stage                       | Production Unit                                                                                                                                                                                                                                             |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



## 1.4. Product Specification of Equipment Under Test

| Standards-related Product Specification |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Tx Frequency</b>                     | GSM850: 824.2 MHz ~ 848.8 MHz<br>GSM1900: 1850.2 MHz ~ 1909.8MHz<br>WCDMA Band V: 826.4 MHz ~ 846.6 MHz<br>WCDMA Band IV : 1712.4 MHz ~ 1752.6 MHz<br>WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz<br>LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz<br>LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz<br>LTE Band 5 : 824.7 MHz ~ 848.3 MHz<br>LTE Band 7 : 2502.5 MHz ~ 2567.5 MHz<br>LTE Band 12 : 699.7 MHz ~ 715.3 MHz<br>LTE Band 13 : 779.5 MHz ~ 784.5 MHz<br>LTE Band 17 : 706.5 MHz ~ 713.5 MHz<br>LTE Band 25 : 1850.7 MHz ~ 1914.3 MHz<br>LTE Band 26 : 814.7 MHz ~ 848.3 MHz<br>LTE Band 30 : 2307.5 MHz ~ 2312.5 MHz<br>LTE Band 38 : 2572.5 MHz ~ 2617.5 MHz<br>LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz<br>LTE Band 48 : 3552.5 MHz ~ 3697.5 MHz<br>LTE Band 66 : 1710.7 MHz ~ 1779.3 MHz<br>LTE Band 71: 665.5 MHz ~ 695.5MHz<br>CDMA2000 BC0: 824.70 MHz ~ 848.31 MHz<br>CDMA2000 BC1: 1851.25 MHz ~ 1908.75 MHz<br>CDMA2000 BC10: 817.9 MHz ~ 823.1 MHz<br>5G NR n2: 1852.5 MHz ~ 1907.5 MHz<br>5G NR n5: 826.5 MHz ~ 846.5 MHz<br>5G NR n25: 1852.5 MHz ~ 1912.5 MHz<br>5G NR n41: 2506 MHz ~ 2680 MHz<br>5G NR n66: 1712.5 MHz ~ 1777.5 MHz<br>5G NR n71: 665.5 MHz ~ 695.5MHz<br>802.11b/g/n/ax: 2412 MHz ~ 2462 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: 2402 MHz ~ 2480 MHz<br>ANT+ : 2402 MHz ~ 2480 MHz<br>NFC : 13.56 MHz |
| <b>Rx Frequency</b>                     | GSM850: 869.2 MHz ~ 893.8 MHz<br>GSM1900: 1930.2 MHz ~ 1989.8 MHz<br>WCDMA Band V: 871.4 MHz ~ 891.6 MHz<br>WCDMA Band IV : 2112.4 MHz ~ 2152.6 MHz<br>WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz<br>LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz<br>LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz<br>LTE Band 5 : 869.7 MHz ~ 893.3 MHz<br>LTE Band 7 : 2622.5 MHz ~ 2687.5 MHz<br>LTE Band 12 : 729.7 MHz ~ 745.3 MHz<br>LTE Band 13 : 748.5 MHz ~ 753.5 MHz<br>LTE Band 17 : 736.5 MHz ~ 743.5 MHz<br>LTE Band 25 : 1930.7 MHz ~ 1994.3 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                    | <p>LTE Band 26 : 859.7 MHz ~ 893.3 MHz<br/>         LTE Band 29 : 718.5 MHz ~ 726.5 MHz<br/>         LTE Band 30 : 2352.5 MHz ~ 2357.5 MHz<br/>         LTE Band 38: 2572.5 MHz ~ 2617.5 MHz<br/>         LTE Band 41 : 2498.5 MHz ~ 2687.5 MHz<br/>         LTE Band 48 : 3552.5 MHz ~ 3697.5 MHz<br/>         LTE Band 66 : 2110.7 MHz~ 2199.3 MHz<br/>         LTE Band 71: 619.5 MHz ~ 649.5MHz<br/>         CDMA2000 BC0: 869.70 MHz ~ 893.31 MHz<br/>         CDMA2000 BC1: 1931.25 MHz ~ 1988.75 MHz<br/>         CDMA2000 BC10: 862.9 MHz ~ 868.1 MHz<br/>         5G NR n2: 1932.5 MHz ~ 1987.5 MHz<br/>         5G NR n5: 871.5 MHz ~ 891.5 MHz<br/>         5G NR n25: 1932.5 MHz ~ 1992.5 MHz<br/>         5G NR n41: 2506 MHz ~ 2680 MHz<br/>         5G NR n66: 1712.5 MHz ~ 1777.5 MHz<br/>         5G NR n71: 665.5 MHz ~ 695.5MHz<br/>         802.11b/g/n/ax: 2412 MHz ~ 2462 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: 2402 MHz ~ 2480 MHz<br/>         ANT+ : 2402 MHz ~ 2480 MHz<br/>         GNSS : 1559 MHz ~ 1610 MHz; 1164 MHz ~ 1215MHz<br/>         NFC : 13.56 MHz</p> |
| Antenna Type       | <p>WWAN : PIFA Antenna<br/>         WLAN : PIFA Antenna<br/>         Bluetooth : PIFA Antenna<br/>         GNSS: PIFA Antenna<br/>         ANT+: PIFA Antenna<br/>         NFC : Loop Antenna</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Type of Modulation | <p>GSM: GMSK<br/>         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<br/>         DC-HSDPA : 64QAM<br/>         LTE: QPSK / 16QAM / 64QAM / 256QAM<br/>         5G NR:<br/>         DFT-s-OFDM (Pi/2 BPSK / QPSK / 16QAM / 64QAM / 256QAM)<br/>         CP-OFDM (QPSK / 16QAM / 64QAM / 256QAM)<br/>         CDMA2000 1xRTT: QPSK<br/>         CDMA2000 1xEV-DO: QPSK/8PSK<br/>         802.11b : DSSS (DBPSK / DQPSK / CCK)<br/>         802.11a/g/n/ac/ax : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM / 1024QAM)<br/>         Bluetooth LE : GFSK<br/>         Bluetooth (1Mbps) : GFSK<br/>         Bluetooth (2Mbps) : π/4-DQPSK<br/>         Bluetooth (3Mbps) : 8-DPSK<br/>         GNSS : BPSK</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



|  |                        |
|--|------------------------|
|  | NFC: ASK<br>ANT+: GFSK |
|--|------------------------|

Note :

1. GNSS Rx (1559MHz ~ 1610MHz) = GLONASS + GPS + BDS + Galileo + SBAS
2. GNSS Rx (1164MHz ~ 1215MHz) = Galileo + GPS

## 1.5. Modification of EUT

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

## 1.6. Test Location

Sporton International (Shenzhen) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

|                           |                                                                                                                                                                         |                            |                                       |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------------|
| <b>Test Firm</b>          | Sporton International (Shenzhen) Inc.                                                                                                                                   |                            |                                       |
| <b>Test Site Location</b> | 1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China<br>TEL: +86-755-86379589<br>FAX: +86-755-86379595 |                            |                                       |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>                                                                                                                                                 | <b>FCC Designation No.</b> | <b>FCC Test Firm Registration No.</b> |
|                           | CO01-SZ                                                                                                                                                                 | CN1256                     | 421272                                |

|                           |                                                                                                                                                           |                            |                                       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------------|
| <b>Test Firm</b>          | Sporton International (Shenzhen) Inc.                                                                                                                     |                            |                                       |
| <b>Test Site Location</b> | No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan Shenzhen, 518055 People's Republic of China<br>TEL: +86-755-33202398 |                            |                                       |
| <b>Test Site No.</b>      | <b>Sporton Site No.</b>                                                                                                                                   | <b>FCC Designation No.</b> | <b>FCC Test Firm Registration No.</b> |
|                           | 03CH01-SZ                                                                                                                                                 | CN1256                     | 421272                                |

## 1.7. Test Software

| Item | Site      | Manufacture | Name | Version     |
|------|-----------|-------------|------|-------------|
| 1.   | 03CH01-SZ | AUDIX       | E3   | 6.2009-8-24 |
| 2.   | CO01-SZ   | AUDIX       | E3   | 6.120613b   |

## 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

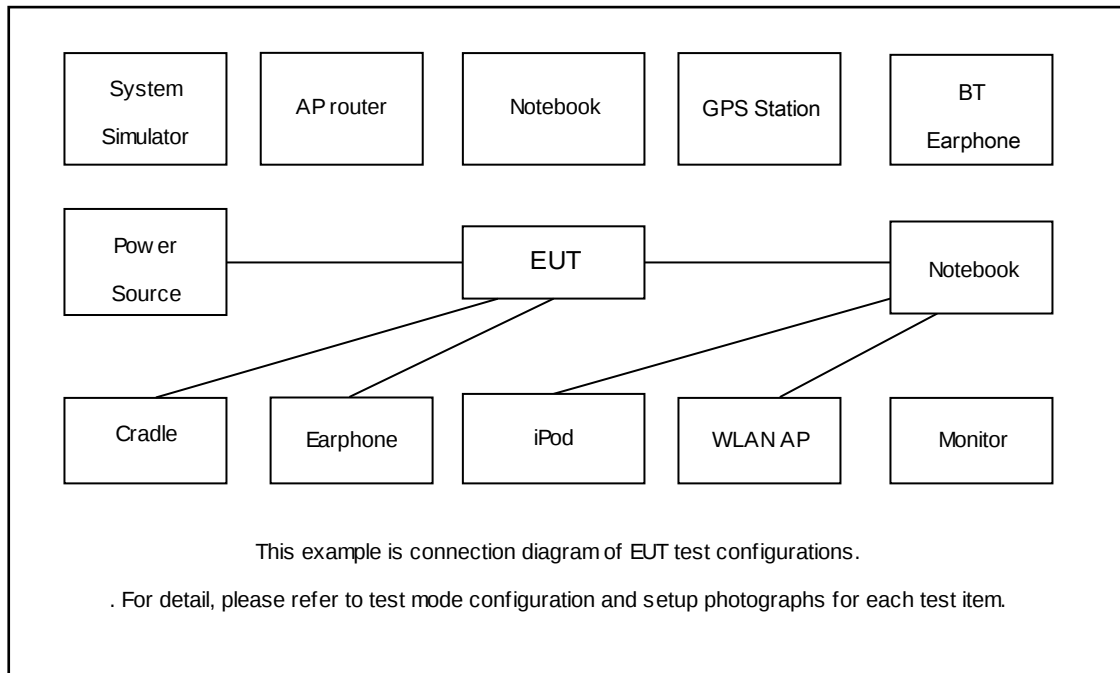
The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

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 Idle(Middle CH) + Camera(Rear) + USB Cable 1(Charging from Adapter) + Battery      |
|                       | Mode 2 : CDMA BC10 Idle(High CH) + Camera(Front) + USB Cable 1(Charging from Adapter) + Battery     |
|                       | Mode 3 : LTE Band 12 Idle(Low CH) + MPEG4(Colur bar) + USB Cable 1(Charging from Adapter) + Battery |
|                       | Mode 4 : LTE Band 7 Idle(High CH) + Camera(Rear) + USB Cable 2(Charging from Adapter 1) + Battery   |
|                       | Mode 5 : NSA:2A_N5A Idle(Middle CH) + H-Pattern + USB Cable 1(Data Link with Notebook) + Battery    |
|                       | Mode 6 : SA:N71 Idle(Middle CH) + H-Pattern + USB Cable 2(Data Link with Notebook) + Battery        |
|                       | Mode 7 : GSM 850 Idle(Middle CH) + Camera(Rear) + USB Cable 1(Charging from Adapter) + Battery      |
|                       | Mode 8 : GSM 850 Idle(Middle CH) + Camera(Rear) + USB Cable 1(Charging from Adapter) + Battery      |
|                       | Mode 9 : GSM 850 Idle(Middle CH) + Camera(Rear) + USB Cable 1(Charging from Adapter) + Battery      |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Radiated Emissions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>Mode 1 : GSM 850 Idle(Middle CH) + Camera(Rear) + USB Cable 1(Charging from Adapter) + Battery</p> <p>Mode 2 : CDMA BC10 Idle(High CH) + Camera(Front) + USB Cable 1(Charging from Adapter) + Battery</p> <p>Mode 3 : LTE Band 12 Idle(Low CH) + MPEG4(Colur bar) + USB Cable 1(Charging from Adapter) + Battery</p> <p>Mode 4 : LTE Band 7 Idle(High CH) + Camera(Front) + USB Cable 2(Charging from Adapter 1) + Battery</p> <p>Mode 5 : NSA:2A_N5A Idle(Middle CH) + H-Pattern + USB Cable 1(Data Link with Notebook) + Battery</p> <p>Mode 6 : SA:N71 Idle(Middle CH) + H-Pattern + USB Cable 2(Data Link with Notebook) + Battery</p> <p>Mode 7 : GSM 850 Idle(Middle CH) + MP3(Max volume) + Type C Earphone + Battery</p> |
| <p><b>Remark:</b></p> <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 2; 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 all Low/Middle/High channel in the frequency bands bellow 1G, the worst frequency band and 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.   | Base Station(LTE)   | Anritsu    | MT8820C             | N/A         | N/A            | Unshielded,1.8m                                            |
| 2.   | Base Station(5G NR) | Anritsu    | MT8821C             | N/A         | N/A            | Unshielded,1.8m                                            |
|      | Base Station        | Keysight   | UXM E7515B          | Fcc DoC     | N/A            | Shielded, 1.5m                                             |
| 3.   | WLAN AP             | Dlink      | DIR-820L            | KA2IR820LA1 | N/A            | Unshielded,1.8m                                            |
| 4.   | WLAN AP             | ASUSTek    | RT-AC66U            | MSQ-RTAC66U | N/A            | Unshielded,2.7m<br>with Core                               |
| 5.   | Bluetooth Earphone  | Samsung    | EO-MG900            | PYAH5-107W  | N/A            | N/A                                                        |
| 6.   | Notebook            | Lenovo     | E540                | FCC DoC     | N/A            | AC I/P:<br>Unshielded, 1.2 m<br>DC O/P:<br>Shielded, 1.8 m |
| 7.   | Notebook            | DELL       | Inspiron<br>15-7570 | Fcc DoC     | N/A            | AC I/P:<br>Unshielded, 1.2 m<br>DC O/P:<br>Shielded, 1.8 m |
| 8.   | Earphone            | N/A        | N/A                 | N/A         | N/A            | Unshielded,1.8m                                            |
| 9.   | iPod                | Apple      | MC69029/A           | N/A         | N/A            | N/A                                                        |
| 10.  | IPod                | Apple      | MC525 ZP/A          | Fcc DoC     | Shielded, 1.0m | N/A                                                        |

## 2.4. EUT Operation Test Setup

The EUT was in GSM or LTE or 5G NR or CDMA2000 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 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 camera to capture images.
3. Turn on MPEG4 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.

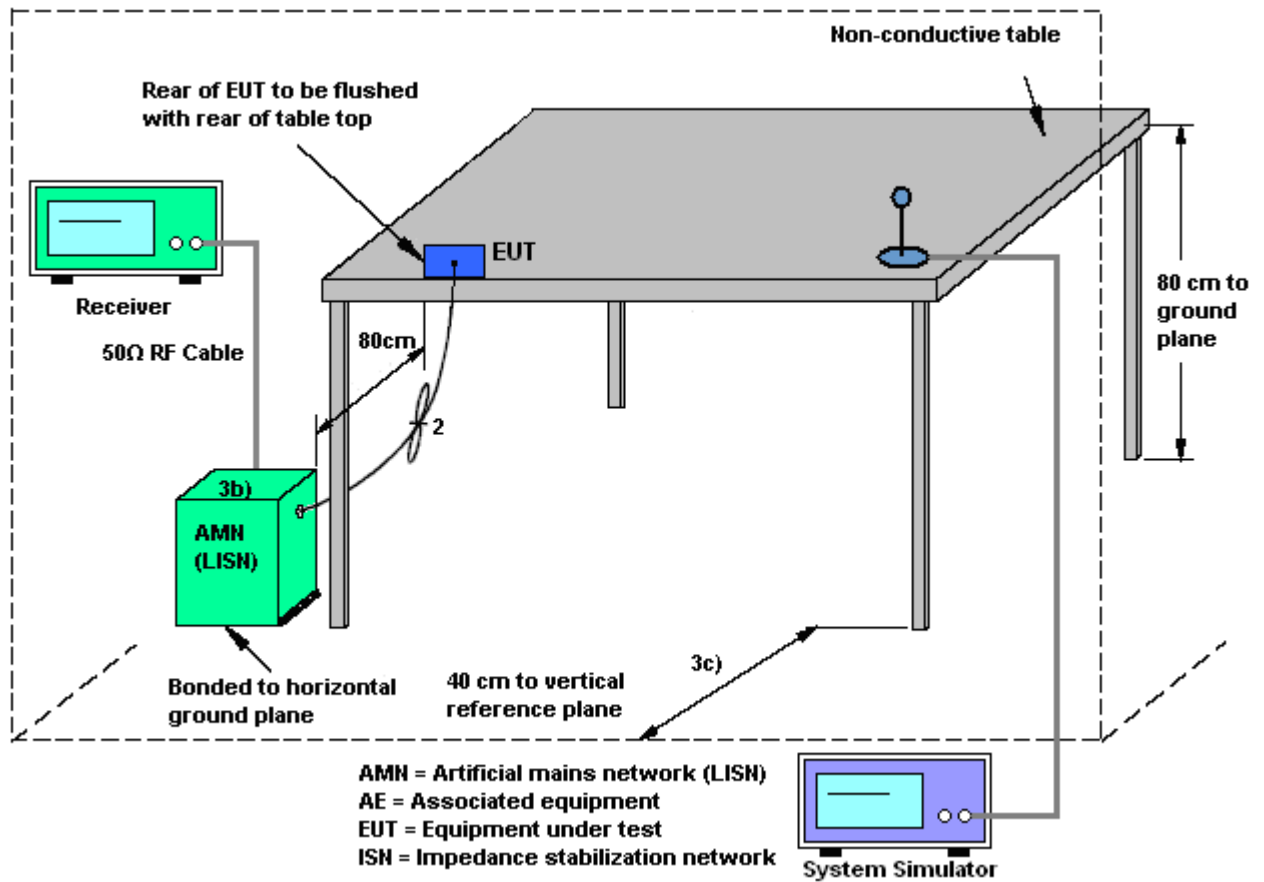
##### 3.1.2 Measuring Instruments

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.

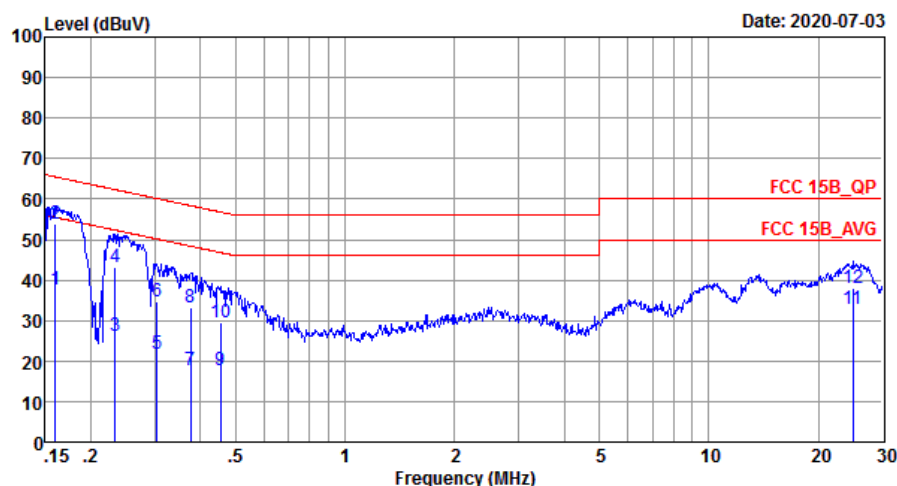
### 3.1.4 Test Setup





## 3.1.5 Test Result of AC Conducted Emission

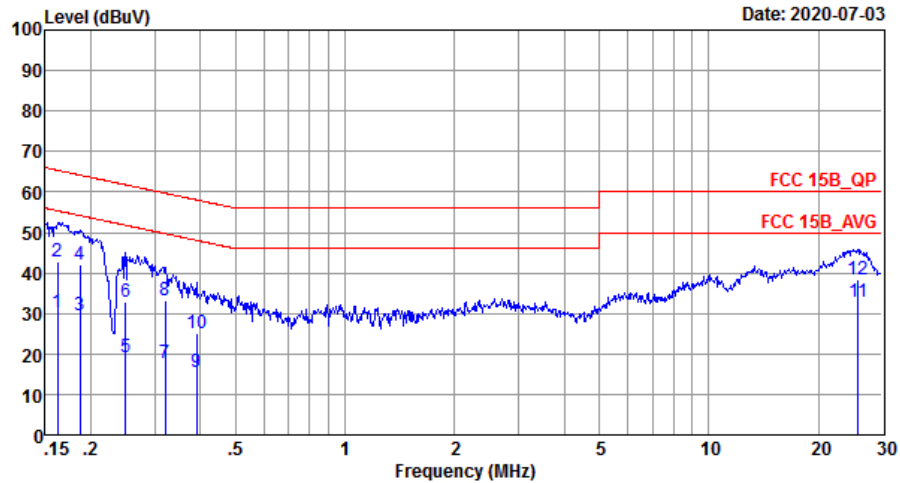
|                 |                                                                                 |                     |         |
|-----------------|---------------------------------------------------------------------------------|---------------------|---------|
| Test Engineer : | Doom Wu                                                                         | Temperature :       | 22~25°C |
|                 |                                                                                 | Relative Humidity : | 50~55%  |
| Test Voltage :  | 120Vac / 60Hz                                                                   | Phase :             | Line    |
| Remark :        | All emissions not reported here are more than 10 dB below the prescribed limit. |                     |         |



Site : C001-SZ  
Condition: FCC 15B\_QP LISN\_20190719\_L LINE

|     | Freq  | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark  |
|-----|-------|-------|------------|------------|------------|-------------|------------|---------|
|     | MHz   | dBuV  | dB         | dBuV       | dBuV       | dB          | dB         |         |
| 1   | 0.16  | 37.54 | -17.93     | 55.47      | 27.50      | 0.03        | 10.01      | Average |
| 2 * | 0.16  | 54.04 | -11.43     | 65.47      | 44.00      | 0.03        | 10.01      | QP      |
| 3   | 0.23  | 26.24 | -26.11     | 52.35      | 16.20      | 0.03        | 10.01      | Average |
| 4   | 0.23  | 43.34 | -19.01     | 62.35      | 33.30      | 0.03        | 10.01      | QP      |
| 5   | 0.30  | 21.74 | -28.41     | 50.15      | 11.70      | 0.03        | 10.01      | Average |
| 6   | 0.30  | 34.64 | -25.51     | 60.15      | 24.60      | 0.03        | 10.01      | QP      |
| 7   | 0.38  | 17.64 | -30.70     | 48.34      | 7.60       | 0.03        | 10.01      | Average |
| 8   | 0.38  | 33.04 | -25.30     | 58.34      | 23.00      | 0.03        | 10.01      | QP      |
| 9   | 0.45  | 17.76 | -29.04     | 46.80      | 7.70       | 0.02        | 10.04      | Average |
| 10  | 0.45  | 29.56 | -27.24     | 56.80      | 19.50      | 0.02        | 10.04      | QP      |
| 11  | 24.92 | 32.71 | -17.29     | 50.00      | 21.01      | 1.36        | 10.34      | Average |
| 12  | 24.92 | 37.91 | -22.09     | 60.00      | 26.21      | 1.36        | 10.34      | QP      |

|                        |                                                                                 |                            |         |
|------------------------|---------------------------------------------------------------------------------|----------------------------|---------|
| <b>Test Engineer :</b> | Doom Wu                                                                         | <b>Temperature :</b>       | 22~25°C |
|                        |                                                                                 | <b>Relative Humidity :</b> | 50~55%  |
| <b>Test Voltage :</b>  | 120Vac / 60Hz                                                                   | <b>Phase :</b>             | Neutral |
| <b>Remark :</b>        | All emissions not reported here are more than 10 dB below the prescribed limit. |                            |         |



Site : C001-SZ  
Condition: FCC 15B\_QP LISN\_20190719\_N NEUTRAL

|      | Freq  | Level | Over   | Limit | Read  | LISN   | Cable |         |
|------|-------|-------|--------|-------|-------|--------|-------|---------|
|      | MHz   | dBuV  | Limit  | Line  | Level | Factor | Loss  | Remark  |
|      |       |       | dB     | dBuV  | dBuV  | dB     | dB    |         |
| 1    | 0.16  | 30.44 | -24.90 | 55.34 | 20.40 | 0.03   | 10.01 | Average |
| 2    | 0.16  | 42.84 | -22.50 | 65.34 | 32.80 | 0.03   | 10.01 | QP      |
| 3    | 0.19  | 29.44 | -24.76 | 54.20 | 19.40 | 0.03   | 10.01 | Average |
| 4    | 0.19  | 42.04 | -22.16 | 64.20 | 32.00 | 0.03   | 10.01 | QP      |
| 5    | 0.25  | 19.14 | -32.64 | 51.78 | 9.10  | 0.03   | 10.01 | Average |
| 6    | 0.25  | 32.74 | -29.04 | 61.78 | 22.70 | 0.03   | 10.01 | QP      |
| 7    | 0.32  | 17.84 | -31.87 | 49.71 | 7.80  | 0.03   | 10.01 | Average |
| 8    | 0.32  | 33.34 | -26.37 | 59.71 | 23.30 | 0.03   | 10.01 | QP      |
| 9    | 0.39  | 15.63 | -32.40 | 48.03 | 5.60  | 0.02   | 10.01 | Average |
| 10   | 0.39  | 25.03 | -33.00 | 58.03 | 15.00 | 0.02   | 10.01 | QP      |
| 11 * | 25.73 | 32.70 | -17.30 | 50.00 | 21.30 | 1.05   | 10.35 | Average |
| 12   | 25.73 | 38.20 | -21.80 | 60.00 | 26.80 | 1.05   | 10.35 | QP      |

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

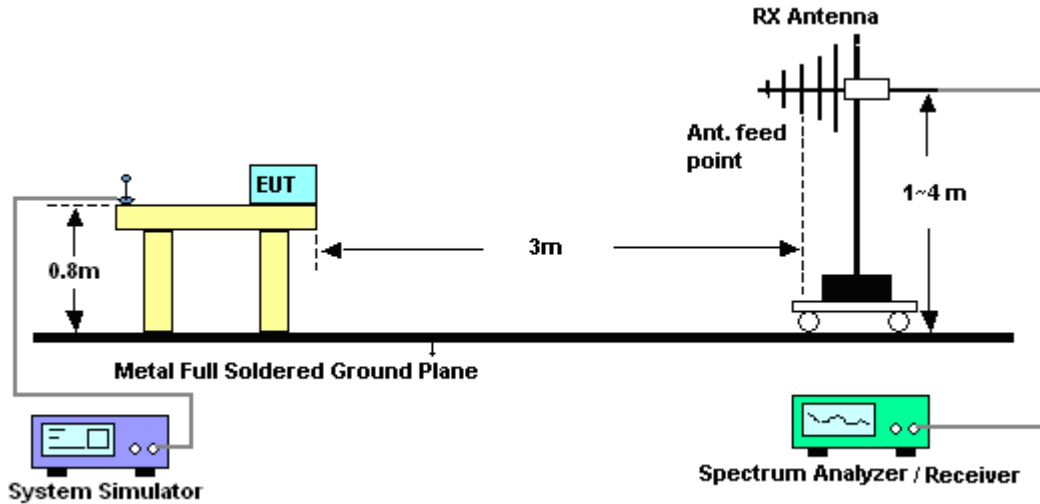
The measuring equipment is listed in the section 4 of this test report.

### 3.2.3. Test Procedures

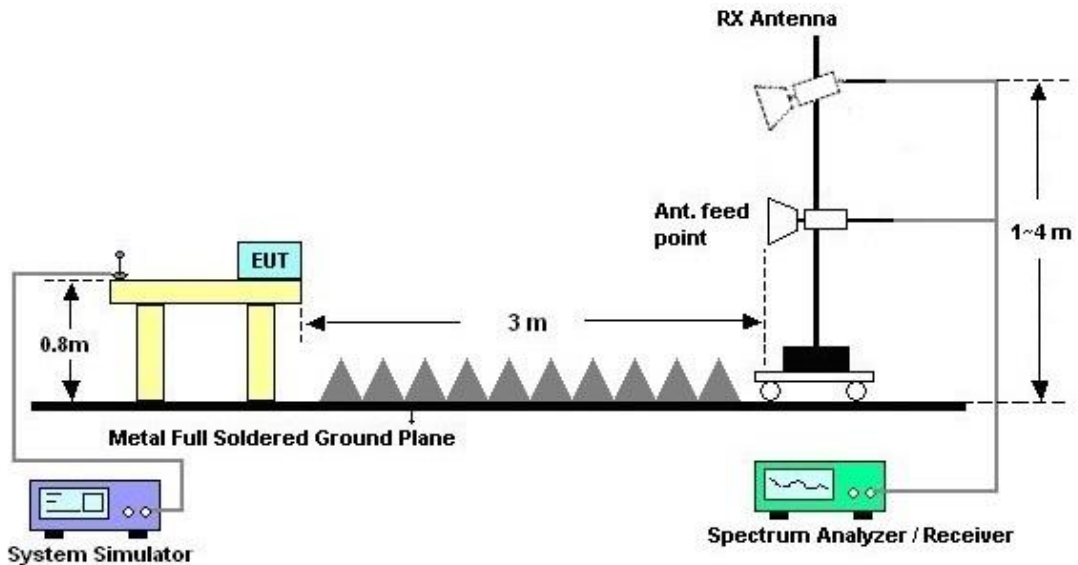
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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

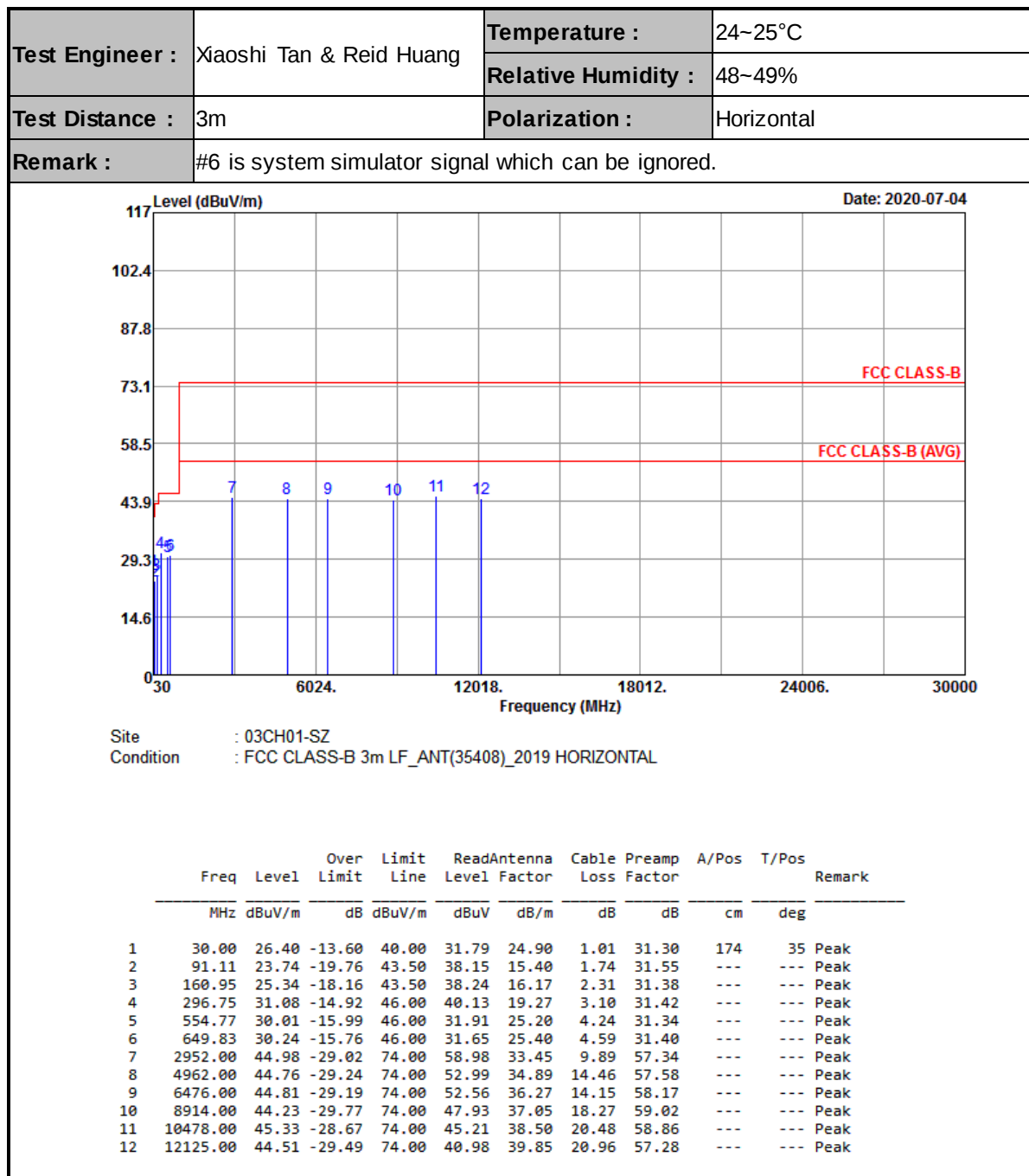


For radiated emissions above 1GHz



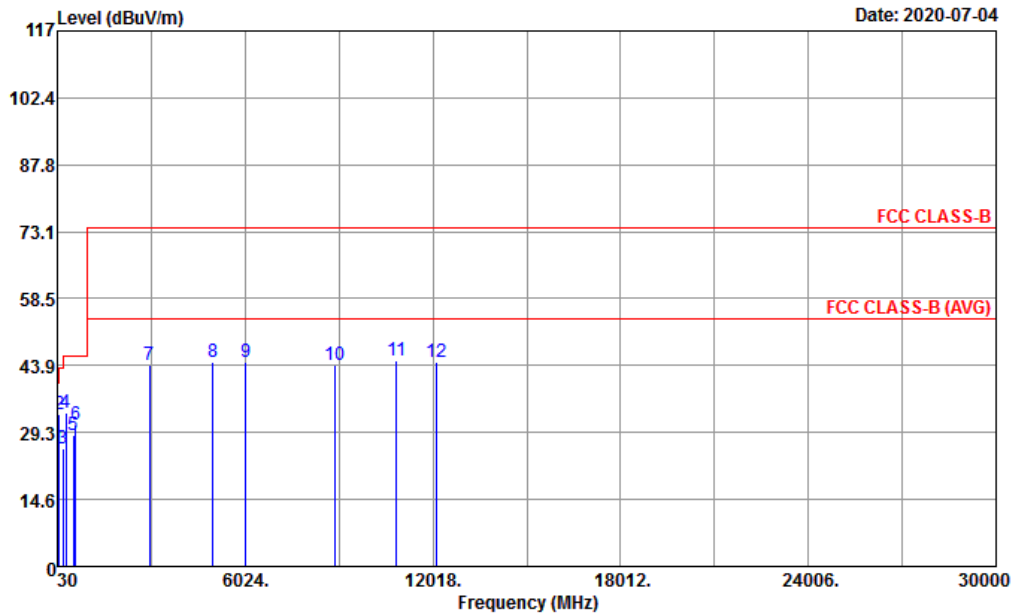


## 3.2.5. Test Result of Radiated Emission





|                 |                                                     |                     |          |
|-----------------|-----------------------------------------------------|---------------------|----------|
| Test Engineer : | Xiaoshi Tan & Reid Huang                            | Temperature :       | 24~25°C  |
|                 |                                                     | Relative Humidity : | 48~49%   |
| Test Distance : | 3m                                                  | Polarization :      | Vertical |
| Remark :        | #6 is system simulator signal which can be ignored. |                     |          |



Site : 03CH01-SZ  
Condition : FCC CLASS-B 3m LF\_ANT(35408)\_2019 VERTICAL

|    | Freq     | Level  | Over Limit | Limit Line | ReadAntenna Level | Cable Factor | Preamp Loss | A/Pos | T/Pos | Remark   |
|----|----------|--------|------------|------------|-------------------|--------------|-------------|-------|-------|----------|
|    | MHz      | dBuV/m | dB         | dBuV/m     | dBuV              | dB/m         | dB          | dB    | cm    | deg      |
| 1  | 30.00    | 25.60  | -14.40     | 40.00      | 30.99             | 24.90        | 1.01        | 31.30 | ---   | Peak     |
| 2  | 90.14    | 33.21  | -10.29     | 43.50      | 47.78             | 15.20        | 1.73        | 31.50 | 154   | 136 Peak |
| 3  | 198.78   | 25.60  | -17.90     | 43.50      | 38.59             | 15.75        | 2.56        | 31.30 | ---   | Peak     |
| 4  | 305.48   | 33.54  | -12.46     | 46.00      | 42.32             | 19.46        | 3.15        | 31.39 | ---   | Peak     |
| 5  | 553.80   | 28.78  | -17.22     | 46.00      | 30.64             | 25.22        | 4.24        | 31.32 | ---   | Peak     |
| 6  | 624.61   | 30.95  | -15.05     | 46.00      | 32.70             | 25.25        | 4.51        | 31.51 | ---   | Peak     |
| 7  | 2968.00  | 44.02  | -29.98     | 74.00      | 57.98             | 33.47        | 9.89        | 57.32 | ---   | Peak     |
| 8  | 4990.00  | 44.72  | -29.28     | 74.00      | 52.96             | 34.90        | 14.46       | 57.60 | ---   | Peak     |
| 9  | 6038.00  | 44.65  | -29.35     | 74.00      | 51.91             | 35.93        | 14.45       | 57.64 | ---   | Peak     |
| 10 | 8890.00  | 44.04  | -29.96     | 74.00      | 48.00             | 37.03        | 18.03       | 59.02 | ---   | Peak     |
| 11 | 10868.00 | 45.03  | -28.97     | 74.00      | 44.53             | 38.36        | 20.59       | 58.45 | ---   | Peak     |
| 12 | 12155.00 | 44.77  | -29.23     | 74.00      | 41.24             | 39.86        | 20.98       | 57.31 | ---   | 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 Test Receiver&SA              | Agilent      | N9038A                       | MY52260185   | 20Hz~26.5GHz    | Jul. 22, 2019    | Jul. 04, 2020 | Jul. 21, 2020 | Radiation (03CH01-SZ) |
| EXA Spectrum Analyzer             | KEYSIGHT     | N9010A                       | MY55150213   | 10Hz~44GHz      | Apr. 17, 2020    | Jul. 04, 2020 | Apr. 16, 2021 | Radiation (03CH01-SZ) |
| HF Amplifier                      | KEYSIGHT     | 83017A                       | MY53270104   | 0.5GHz~26.5GHz  | Dec. 27, 2019    | Jul. 04, 2020 | Dec. 26, 2020 | Radiation (03CH01-SZ) |
| Bilog Antenna                     | TeseQ        | CBL6112D                     | 35407        | 30MHz~2GHz      | Jul. 19, 2019    | Jul. 04, 2020 | Jul. 18, 2020 | Radiation (03CH01-SZ) |
| Double Ridge Horn Antenna         | ETS-Lindgren | 3117                         | 00119436     | 1GHz~18GHz      | Aug. 27, 2019    | Jul. 04, 2020 | Aug. 26, 2020 | Radiation (03CH01-SZ) |
| LF Amplifier                      | Burgeon      | BPA-530                      | 102209       | 0.01~3000Mhz    | Apr. 17, 2020    | Jul. 04, 2020 | Apr. 16, 2021 | Radiation (03CH01-SZ) |
| HF Amplifier                      | MITEQ        | AMF-7D-0010<br>1800-30-10P-R | 1943528      | 1GHz~18GHz      | Oct. 18, 2019    | Jul. 04, 2020 | Oct. 17, 2020 | Radiation (03CH01-SZ) |
| HF Amplifier                      | MITEQ        | TTA1840-35-H<br>G            | 1871923      | 18GHz~40GHz     | Jul. 22, 2019    | Jul. 04, 2020 | Jul. 21, 2020 | Radiation (03CH01-SZ) |
| SHF-EHF Horn                      | com-power    | AH-840                       | 101071       | 18GHz~40GHz     | Apr. 17, 2020    | Jul. 04, 2020 | Apr. 16, 2021 | Radiation (03CH01-SZ) |
| AC Power Source                   | Chroma       | 61601                        | 616010001985 | N/A             | NCR              | Jul. 04, 2020 | NCR           | Radiation (03CH01-SZ) |
| Turn Table                        | EM           | EM1000                       | N/A          | 0~360 degree    | NCR              | Jul. 04, 2020 | NCR           | Radiation (03CH01-SZ) |
| Antenna Mast                      | EM           | EM1000                       | N/A          | 1 m~4 m         | NCR              | Jul. 04, 2020 | NCR           | Radiation (03CH01-SZ) |
| EMI Receiver                      | R&S          | ESR7                         | 101630       | 9kHz~7GHz;      | Dec. 26, 2018    | Jul. 03, 2020 | Dec. 25, 2020 | Conduction (CO01-SZ)  |
| AC LISN                           | EMCO         | 3816/2SH                     | 00103912     | 9kHz~30MHz      | Oct. 17, 2019    | Jul. 03, 2020 | Oct. 16, 2020 | Conduction (CO01-SZ)  |
| AC LISN (for auxiliary equipment) | EMCO         | 3816/2SH                     | 00103892     | 9kHz~30MHz      | Oct. 17, 2019    | Jul. 03, 2020 | Oct. 16, 2020 | Conduction (CO01-SZ)  |
| AC Power Source                   | Chroma       | 61602                        | 616020000891 | 100Vac~250Vac   | NCR              | Jul. 03, 2020 | NCR           | Conduction (CO01-SZ)  |

NCR: No Calibration Required

## 5. Uncertainty of Evaluation

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

|                                                                            |       |
|----------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 2.7dB |
|----------------------------------------------------------------------------|-------|

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

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

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

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

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

|                                                                            |       |
|----------------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence<br>of 95% ( $U = 2Uc(y)$ ) | 4.3dB |
|----------------------------------------------------------------------------|-------|