

# TEST REPORT

**Application No:** AR/2020/C0004  
**Applicant:** Xiaomi Communications Co., Ltd.  
**Address of Applicant:** #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085  
**Manufacturer:** Xiaomi Communications Co., Ltd.  
**Address of Manufacturer:** #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085  
**EUT Description:** Mobile Phone  
**Model No.:** M2010J19SL  
**Trade Mark:** Redmi  
**FCC ID:** 2AFZZJ19SL  
**Standard(s) :** 47 CFR Part 15, Subpart B  
**Date of Receipt:** 2020/12/11  
**Date of Test:** 2020/12/11 to 2020/12/31  
**Date of Issue:** 2020/12/31

|                     |              |
|---------------------|--------------|
| <b>Test Result:</b> | <b>Pass*</b> |
|---------------------|--------------|

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Derek Yang

Wireless Laboratory Manager

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| <b>Revision Record</b> |                |             |                 |               |
|------------------------|----------------|-------------|-----------------|---------------|
| <b>Version</b>         | <b>Chapter</b> | <b>Date</b> | <b>Modifier</b> | <b>Remark</b> |
| 01                     |                | 2020/12/31  |                 | Original      |
|                        |                |             |                 |               |
|                        |                |             |                 |               |

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# Test Summary

| Emission Part   |                           |                 |             |        |
|---|---------------------------|-----------------|-------------|--------|
| Item  | Standard                  | Method          | Requirement | Result |
| Conducted Emissions at Mains Terminals (150kHz-30MHz) | 47 CFR Part 15, Subpart B | ANSI C63.4:2014 | Class B     | Pass   |
| Radiated Emissions (30MHz-1GHz)                       | 47 CFR Part 15, Subpart B | ANSI C63.4:2014 | Class B     | Pass   |
| Radiated Emissions (above 1GHz)                       | 47 CFR Part 15, Subpart B | ANSI C63.4:2014 | Class B     | Pass   |

| Internal Source    | Upper Frequency  |
|--------------------|--|
| Below 1.705MHz     | 30MHz  |
| 1.705MHz to 108MHz | 1GHz   |
| 108MHz to 500MHz   | 2GHz   |
| 500MHz to 1GHz     | 5GHz   |
| Above 1GHz         | 5th harmonic of the highest frequency or 40GHz, whichever is lower |

Checked By

*David Chen*

David Chen  
Reviewer

Test By

*Daniel Wang*

Daniel Wang  
Project Engineer

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# 1 General Information

|                                   |               |             |             |
|-----------------------------------|---------------|-------------|-------------|
| Product Name:                     | Mobile Phone  |             |             |
| Model No.(EUT):                   | M2010J19SL    |             |             |
| Trade Mark:                       | Redmi         |             |             |
| Hardware Version:                 | P2            |             |             |
| Software Version:                 | MIUI12        |             |             |
| Frequency Bands:                  | Band          | Tx (MHz)    | Rx (MHz)    |
|                                   | GSM850        | 824~849     | 869~894     |
|                                   | GSM1900       | 1850~1910   | 1930~1990   |
|                                   | WCDMA Band II | 1850~1910   | 1930~1990   |
|                                   | WCDMA Band IV | 1710~1755   | 2110~2155   |
|                                   | WCDMA Band V  | 824~849     | 869~894     |
|                                   | LTE Band 2    | 1850~1910   | 1930~1990   |
|                                   | LTE Band 4    | 1710~1755   | 2110~2155   |
|                                   | LTE Band 5    | 824~849     | 869~894     |
|                                   | LTE Band 7    | 2500~2570   | 2620~2690   |
|                                   | LTE Band 12   | 699~716     | 729~746     |
|                                   | LTE Band 17   | 704~716     | 734~746     |
|                                   | LTE Band 38   | 2570~2620   | 2570~2620   |
|                                   | LTE Band 41   | 2496~2690   | 2496~2690   |
|                                   | LTE Band 66   | 1710~1780   | 2110~2200   |
|                                   | Wi-Fi 2.4G    | 2400~2483.5 | 2400~2483.5 |
|                                   | Bluetooth     | 2400~2483.5 | 2400~2483.5 |
|                                   | Wi-Fi 5G      | 5150~5850   | 5150~5850   |
| FM                                | 87-108        |             |             |
| GNSS(GPS/Glonass/Bei dou/Galileo) | 1559~1610     |             |             |

\*EUT 1= 4+128G EUT2=4+64G

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## 1.1 Description of Support Units

| Description | Manufacturer | Model No. | Serial No.       |
|-------------|--------------|-----------|------------------|
| Laptop      | Lenovo       | T430u     | REF. No.SEA1800  |
| Mouse       | Lenovo       | M-U0025-O | REF. No.:SEA2400 |
| Router      | NETGEAR      | DGN2200   | REF. No.SEA2200  |

## 1.2 Test Location

All tests were performed at:

|            |   |
|------------|---|
| Company:   | SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.  |
| Address:   | 1st Floor, Unit D, Building 1, Kanghong Orange Technology Park, No.137, Keyuan 3rd Road, Fengdong New City, Xi'an, Shaanxi, China |
| Post code: | 710086  |

No tests were sub-contracted.

## 1.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 4854.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (XI 'AN) CO., LTD.

is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4854.01.

| Test Site No.: | SGS Xian Site No. |           | FCC Designation No. |
|----------------|-------------------|-----------|---------------------|
|                | CO01-XA           | 03CH01-XA | CN1271              |

## 1.4 Deviation from Standards

None

## 1.5 Abnormalities from Standard Conditions

None

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## 2 Emission Test Results

### 2.1 Conducted Emissions at Mains Terminals (150kHz-30MHz)

|                   |  |
|-------------------|--|
| Test Requirement: | 47 CFR Part 15, Subpart B                                    |
| Test Method:      | ANSI C63.4:2014  |
| Frequency Range:  | 150kHz to 30MHz  |
| Limit:            |  |
| 0.15M-0.5MHz      | 66dB(μV)-56dB(μV) quasi-peak, 56dB(μV)-46dB(μV) average      |
| 0.5M-5MHz         | 56dB(μV) quasi-peak, 46dB(μV) average                        |
| 5M-30MHz          | 60dB(μV) quasi-peak, 50dB(μV) average                        |
| Detector:         | Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz |

#### 2.1.1 E.U.T. Operation

Operating Environment:

Temperature: 18.9 °C Humidity: 55.1 % RH Atmospheric Pressure: 1000 mbar

Pretest these modes to find the worst case:

- a: Transfer data between the EUT1 and the PC+USB cable1
- b: Transfer data between the EUT1 and the PC+USB cable2
- c: GSM 850 Idle+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card) +earphone+battery+Cable1+adapter1
- d: WCDMA Band V Idle+EUT1+BT+WLAN + GNSS Rx+playing MP4 (SD card) +earphone+battery+ Cable1+adapter1
- e: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter1
- f: LTE Band 12 Idle+EUT1+BT+WLAN +GNSS Rx+camera (back) +earphone+battery+ Cable1+adapter1
- g: LTE Band 17 Idle+EUT1+BT+WLAN +GNSS Rx +FM +earphone+battery+ Cable1+adapter1
- h: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter2
- i: LTE Band 5 Idle+EUT2+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter2
- j: Transfer data between the EUT2 and the PC+USB cable1

The worst case for final test:

- e: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter1

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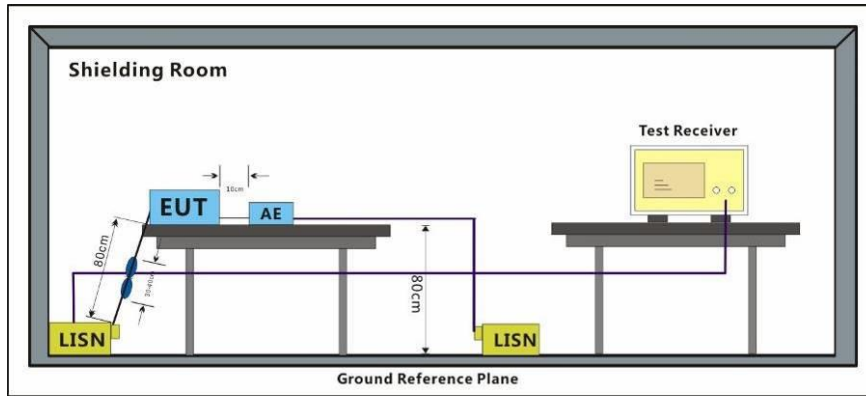
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## 2.1.2 Test Setup Diagram



## 2.1.3 Measurement Data

An initial pre-scan was performed with peak detector. Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected.

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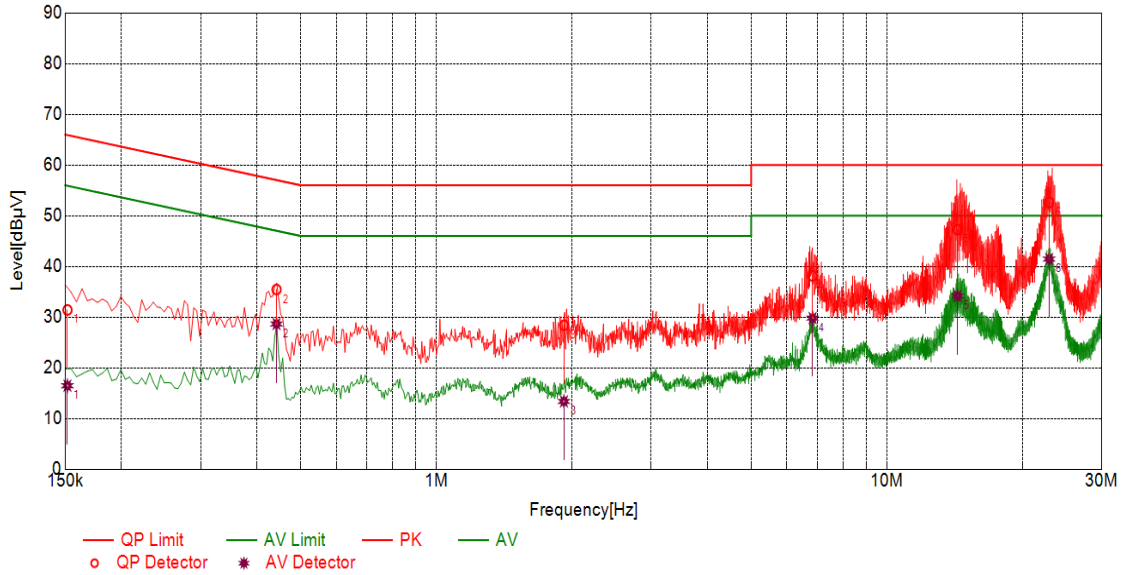
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Mode:d; Line:Live Line



Test Graph

| Final Data List |             |             |                 |                 |                |                 |                 |                |
|-----------------|-------------|-------------|-----------------|-----------------|----------------|-----------------|-----------------|----------------|
| NO.             | Freq. [MHz] | Factor [dB] | QP Value [dBµV] | QP Limit [dBµV] | QP Margin [dB] | AV Value [dBµV] | AV Limit [dBµV] | AV Margin [dB] |
| 1               | 0.1518      | 10.10       | 31.42           | 65.90           | 34.48          | 16.47           | 55.90           | 39.43          |
| 2               | 0.4419      | 10.10       | 35.44           | 57.03           | 21.59          | 28.65           | 47.03           | 18.38          |
| 3               | 1.9202      | 10.10       | 28.40           | 56.00           | 27.60          | 13.37           | 46.00           | 32.63          |
| 4               | 6.8420      | 10.10       | 38.12           | 60.00           | 21.88          | 29.81           | 50.00           | 20.19          |
| 5               | 14.3523     | 10.11       | 47.25           | 60.00           | 12.75          | 34.17           | 50.00           | 15.83          |
| 6               | 22.9176     | 10.11       | 52.63           | 60.00           | 7.37           | 41.45           | 50.00           | 8.55           |

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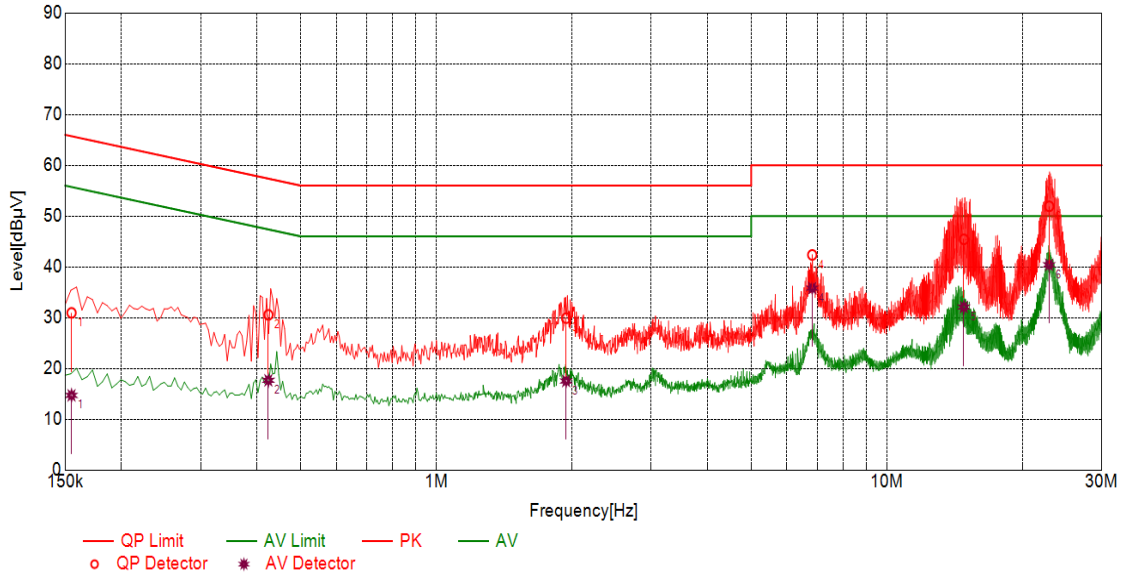
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Mode:d; Line:Neutral Line



Test Graph

| Final Data List |             |             |                 |                 |                |                 |                 |                |
|-----------------|-------------|-------------|-----------------|-----------------|----------------|-----------------|-----------------|----------------|
| NO.             | Freq. [MHz] | Factor [dB] | QP Value [dBµV] | QP Limit [dBµV] | QP Margin [dB] | AV Value [dBµV] | AV Limit [dBµV] | AV Margin [dB] |
| 1               | 0.1550      | 10.10       | 30.95           | 65.73           | 34.78          | 14.70           | 55.73           | 41.03          |
| 2               | 0.4239      | 10.10       | 30.55           | 57.37           | 26.82          | 17.66           | 47.37           | 29.71          |
| 3               | 1.9416      | 10.10       | 29.90           | 56.00           | 26.10          | 17.53           | 46.00           | 28.47          |
| 4               | 6.8291      | 10.10       | 42.36           | 60.00           | 17.64          | 35.82           | 50.00           | 14.18          |
| 5               | 14.8222     | 10.11       | 45.42           | 60.00           | 14.58          | 32.08           | 50.00           | 17.92          |
| 6               | 22.9201     | 10.11       | 51.93           | 60.00           | 8.07           | 40.41           | 50.00           | 9.59           |

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## 2.2 Radiated Emissions (30MHz-1GHz)

|                       |   |
|-----------------------|---|
| Test Requirement:     | 47 CFR Part 15, Subpart B                                     |
| Test Method:          | ANSI C63.4:2014   |
| Frequency Range:      | 30MHz to 1GHz   |
| Measurement Distance: | 3m  |
| Limit:                |   |
| 30MHz -88MHz          | 40.0(dBμV/m) quasi-peak                                       |
| 88MHz-216MHz          | 43.5(dBμV/m) quasi-peak                                       |
| 216MHz-960MHz         | 46.0(dBμV/m) quasi-peak                                       |
| 960MHz-1000MHz        | 54.0(dBμV/m) quasi-peak                                       |
| Detector:             | Peak for pre-scan (120kHz resolution bandwidth) 30M to1000MHz |

### 2.1.4 E.U.T. Operation

Operating Environment:

Temperature: 25 °C      Humidity: 66.5 % RH      Atmospheric Pressure: 1010 mbar

- Pretest these modes to find the worst case:
- a: Transfer data between the EUT1 and the PC+USB cable1
  - b: Transfer data between the EUT1 and the PC+USB cable2
  - c: GSM 850 Idle+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card) +earphone+battery+Cable1+adapter1
  - d: WCDMA Band V Idle+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card) +earphone+battery+ Cable1+adapter1
  - e: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter1
  - f: LTE Band 12 Idle+EUT1+BT+WLAN +GNSS Rx+camera (back) +earphone+battery+ Cable1+adapter1
  - g: LTE Band 17 Idle+EUT1+BT+WLAN +GNSS Rx +FM +earphone+battery+ Cable1+adapter1
  - h: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter2
  - i: LTE Band 5 Idle+EUT2+BT+WLAN +GNSS Rx+camera (Front) +earphone+battery+ Cable1+adapter2
  - j: Transfer data between the EUT2 and the PC+USB cable1
- The worst case for final test:
- b: Transfer data between the EUT1 and the PC+USB cable2

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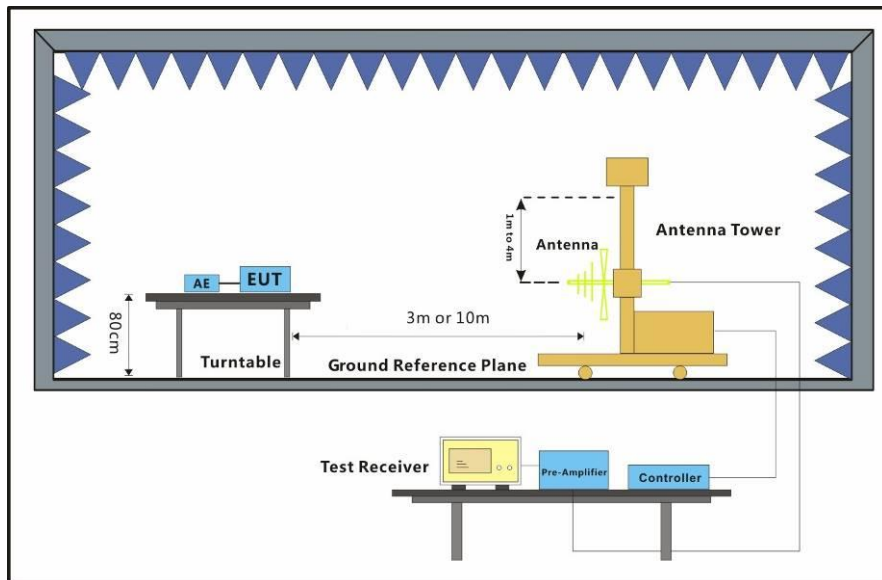
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## 2.1.5 Test Setup Diagram



## 2.1.6 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities.

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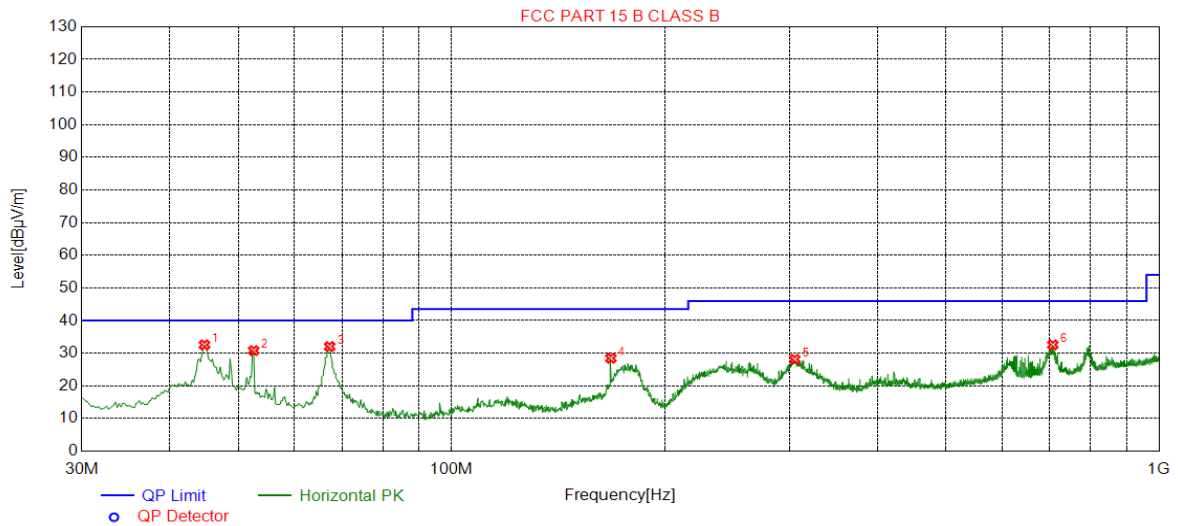
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Mode:b; Polarization:Horizontal



**Suspected List**

| Suspected List |             |                |                |             |             |           |            |
|----------------|-------------|----------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 44.7469     | 32.56          | 40.00          | 7.44        | 200         | 138       | Horizontal |
| 2              | 52.5085     | 30.80          | 40.00          | 9.20        | 200         | 98        | Horizontal |
| 3              | 67.2555     | 32.06          | 40.00          | 7.94        | 200         | 17        | Horizontal |
| 4              | 167.9616    | 28.46          | 43.50          | 15.04       | 200         | 22        | Horizontal |
| 5              | 305.5351    | 28.13          | 46.00          | 17.87       | 100         | 274       | Horizontal |
| 6              | 707.7776    | 32.59          | 46.00          | 13.41       | 100         | 323       | Horizontal |

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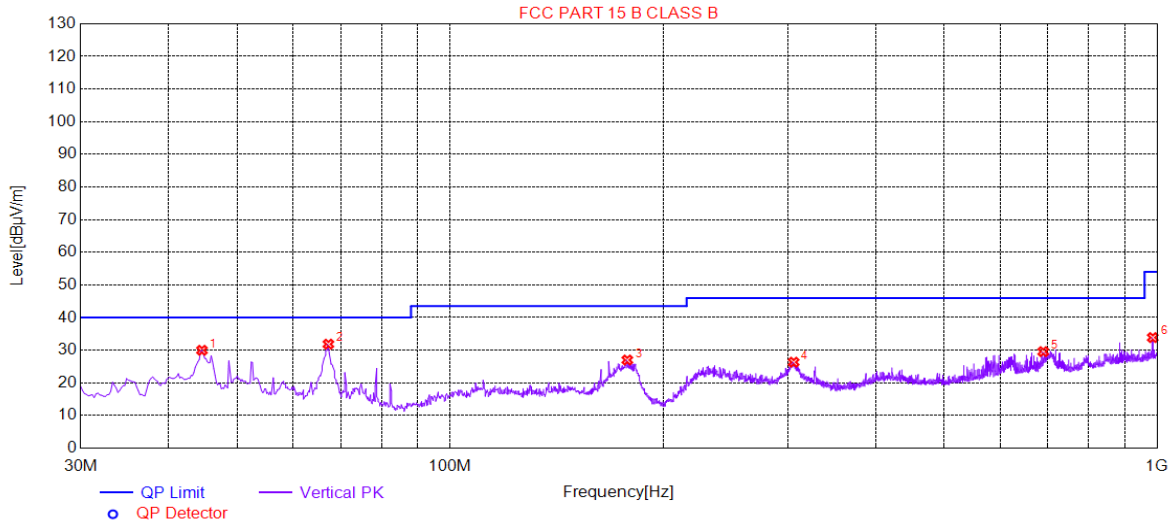
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Mode:b; Polarization:Vertical



**Suspected List**

| Suspected List |             |                |                |             |             |           |          |
|----------------|-------------|----------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 44.5529     | 29.99          | 40.00          | 10.01       | 100         | 245       | Vertical |
| 2              | 67.2555     | 31.88          | 40.00          | 8.12        | 100         | 131       | Vertical |
| 3              | 178.0516    | 27.01          | 43.50          | 16.49       | 100         | 58        | Vertical |
| 4              | 306.1172    | 26.34          | 46.00          | 19.66       | 200         | 356       | Vertical |
| 5              | 690.1200    | 29.58          | 46.00          | 16.42       | 100         | 172       | Vertical |
| 6              | 986.0292    | 33.89          | 54.00          | 20.11       | 100         | 346       | Vertical |

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## 2.3 Radiated Emissions (above 1GHz)

|                       |   |
|-----------------------|---|
| Test Requirement:     | 47 CFR Part 15, Subpart B   |
| Test Method:          | ANSI C63.4:2014   |
| Frequency Range:      | Above 1GHz  |
| Measurement Distance: | 3m  |
| Limit:                |   |
| Above 1GHz            | 74(dBµV/m) peak, 54(dBµV/m) average                               |
| Detector:             | Peak for pre-scan (1000kHz resolution bandwidth) 1000M to18000MHz |

### 2.1.7 E.U.T. Operation

Operating Environment:

Temperature: 21.7 °C      Humidity: 56.4 % RH      Atmospheric Pressure: 1010 mbar

|   |  |
|---|--|
| Pretest these modes to find the worst case: | a: Transfer data between the EUT1 and the PC+USB cable1  |
|   | b: Transfer data between the EUT1 and the PC+USB cable2  |
|   | c: GSM 850 Idle+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card)<br>+earphone+battery+Cable1+adapter1       |
|   | d: WCDMA Band V Idle+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card)<br>+earphone+battery+ Cable1+adapter1 |
|   | e: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front)<br>+earphone+battery+ Cable1+adapter1          |
|   | f: LTE Band 12 Idle+EUT1+BT+WLAN +GNSS Rx+camera (back)<br>+earphone+battery+ Cable1+adapter1          |
|   | g: LTE Band 17 Idle+EUT1+BT+WLAN +GNSS Rx +FM +earphone+battery+<br>Cable1+adapter1                    |
|   | h: LTE Band 5 Idle+EUT1+BT+WLAN +GNSS Rx+camera (Front)<br>+earphone+battery+ Cable1+adapter2          |
|   | i: LTE Band 5 Idle+EUT2+BT+WLAN +GNSS Rx+camera (Front)<br>+earphone+battery+ Cable1+adapter2          |
|   | j: Transfer data between the EUT2 and the PC+USB cable1  |
| The worst case for final test:              | d: WCDMA Band V Idle+EUT1+BT+WLAN +GNSS Rx+playing MP4 (SD card)<br>+earphone+battery+ Cable1+adapter1 |

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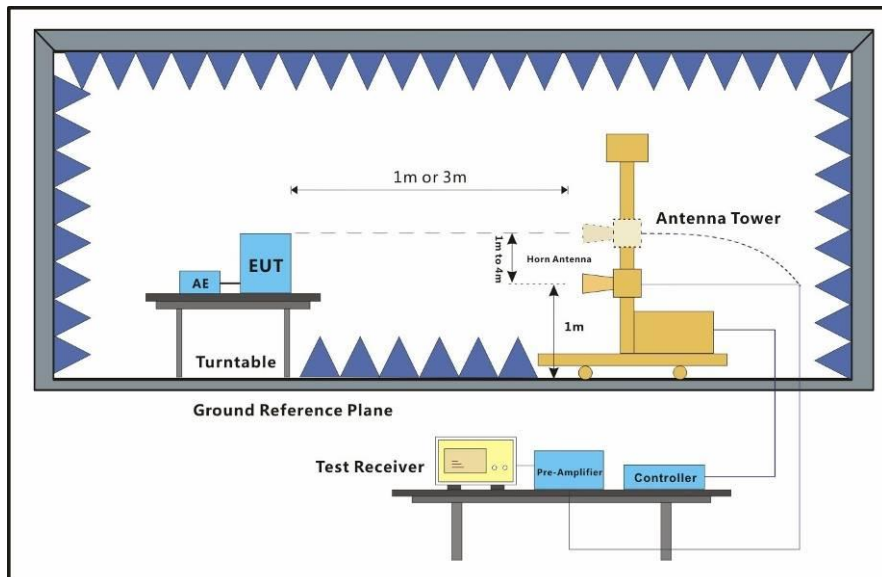
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## 2.1.8 Test Setup Diagram



## 2.1.9 Measurement Data

An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Average measurements were conducted based on the peak sweep graph. The EUT was measured by Horn antenna with 2 orthogonal polarities.

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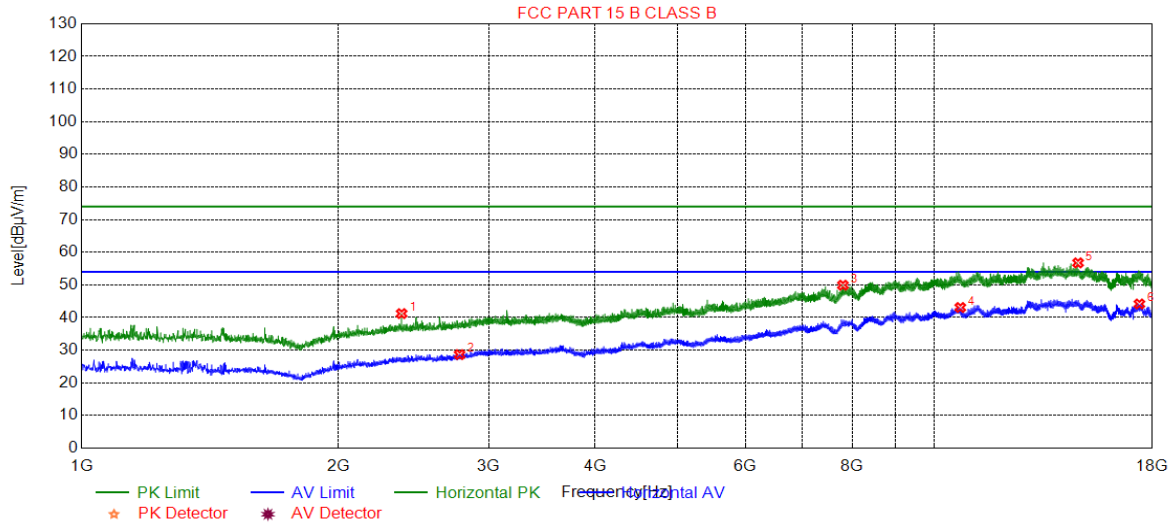
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Mode:d; Polarization:Horizontal



**Suspected List**

| Suspected List |             |                |                |             |             |           |            |
|----------------|-------------|----------------|----------------|-------------|-------------|-----------|------------|
| NO.            | Freq. [MHz] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity   |
| 1              | 2371.968    | 41.23          | 74.00          | 32.77       | 100         | 301       | Horizontal |
| 2              | 2774.038    | 28.67          | 54.00          | 25.33       | 100         | 20        | Horizontal |
| 3              | 7806.290    | 49.92          | 74.00          | 24.08       | 200         | 276       | Horizontal |
| 4              | 10716.83    | 43.09          | 54.00          | 10.91       | 100         | 193       | Horizontal |
| 5              | 14724.78    | 56.76          | 74.00          | 17.24       | 100         | 42        | Horizontal |
| 6              | 17376.91    | 44.18          | 54.00          | 9.82        | 200         | 59        | Horizontal |

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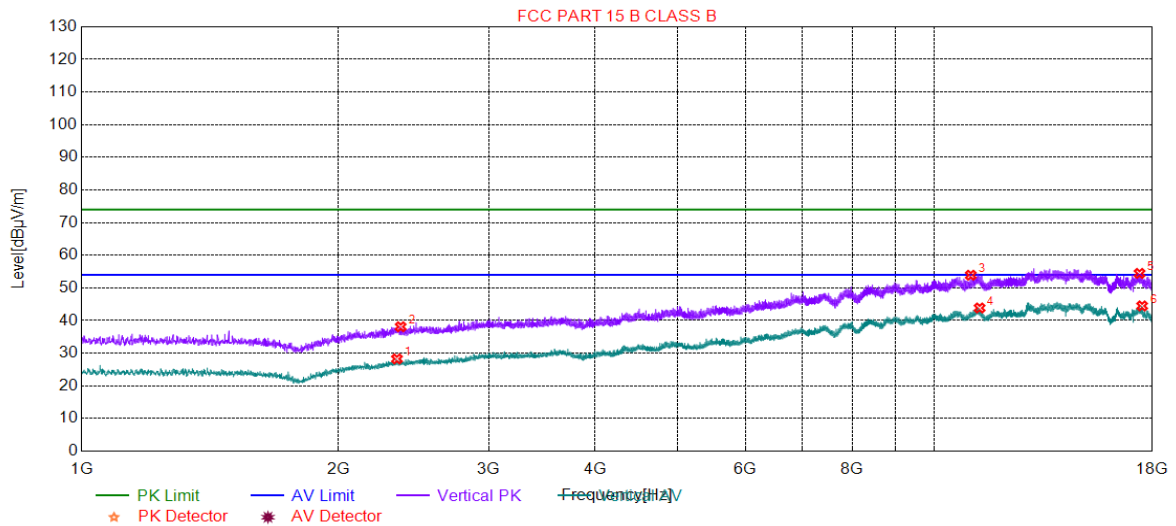
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邮编 710086 [sgs.china@sgs.com](mailto:sgs.china@sgs.com)

Mode:d; Polarization:Vertical



**Suspected List**

| Suspected List |             |                |                |             |             |           |          |
|----------------|-------------|----------------|----------------|-------------|-------------|-----------|----------|
| NO.            | Freq. [MHz] | Level [dBµV/m] | Limit [dBµV/m] | Margin [dB] | Height [cm] | Angle [°] | Polarity |
| 1              | 2342.217    | 28.27          | 54.00          | 25.73       | 200         | 80        | Vertical |
| 2              | 2366.018    | 38.12          | 74.00          | 35.88       | 200         | 338       | Vertical |
| 3              | 11024.55    | 53.91          | 74.00          | 20.09       | 200         | 145       | Vertical |
| 4              | 11289.76    | 43.86          | 54.00          | 10.14       | 200         | 16        | Vertical |
| 5              | 17384.56    | 54.46          | 74.00          | 19.54       | 100         | 150       | Vertical |
| 6              | 17506.12    | 44.50          | 54.00          | 9.50        | 100         | 194       | Vertical |

Remark:

1) Scan from 1GHz to 30GHz, The disturbance above 18GHz was very low and all noise floor. The above radiated emissions were the highest point could be found when testing, so only the above radiated emissions had been displayed

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### 3 Equipment List

| Chamber                             |               |             |               |              |              |
|-------------------------------------|---------------|-------------|---------------|--------------|--------------|
| Test Equipment                      | Manufacturer  | Model No.   | Inventory No. | Cal. date    | Cal.Due date |
|                                     |               |             |               | (yyyy-mm-dd) | (yyyy-mm-dd) |
| Semi-Anechoic Chamber               | Brilliant-emc | 966         | XAW03-35-01   | NCR          | NCR          |
| MXA signal analyzer                 | Keysight      | N9020A      | XAW01-06-01   | 2020/4/2     | 2021/4/2     |
| Radio communication analyzer        | ROHDE&SCHWARZ | CMW 500     | XAW01-03-02   | 2020/4/2     | 2021/4/2     |
| Test receiver                       | ROHDE&SCHWARZ | ESR         | XAW01-08-01   | 2020/9/7     | 2021/9/6     |
| Receiving antenna                   | Rosenberger   | VULB 9163   | XAW01-09-01   | 2019/10/13   | 2021/10/12   |
| Receiving antenna                   | Rosenberger   | BBHA 9120D  | XAW01-09-02   | 2019/10/13   | 2021/10/12   |
| Receiving antenna                   | Rosenberger   | BBHA 9170   | XAW01-09-03   | 2019/10/13   | 2021/10/12   |
| Directional antenna rack controller | Max-Full      | MF-7802BS   | XAW03-03-01   | NCR          | NCR          |
| High-speed antenna rack controller  | Max-Full      | MF-7802     | XAW03-04-01   | NCR          | NCR          |
| Filter bank                         | Tonscend      | JS0806-F    | XAW03-05-01   | NCR          | NCR          |
| Filter bank                         | Tonscend      | JS0806s     | XAW03-05-02   | NCR          | NCR          |
| Amplifier                           | Tonscend      | TAP00903040 | XAW01-41-01   | 2020/11/18   | 2021/11/18   |
| Amplifier                           | Tonscend      | TAP01018048 | XAW01-41-02   | 2020/11/18   | 2021/11/18   |
| Amplifier                           | Tonscend      | TAP18040048 | XAW01-41-03   | 2020/12/3    | 2021/12/3    |
| Amplifier                           | Brilliant-emc | YX28980930  | XAW01-41-06   | 2020/11/18   | 2021/11/18   |
| Artificial network                  | ROHDE&SCHWARZ | ENV216      | XAW01-19-02   | 2020/9/16    | 2021/9/15    |

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## 4 Measurement Uncertainty

| No. | Item                | Measurement Uncertainty   |
|-----|---------------------|---------------------------|
| 1   | Conduction Emission | ± 3.4dB (150kHz to 30MHz) |
| 2   | Radiated Emission   | ± 4.8dB (30MHz-1GHz)      |
|     |                     | ± 5.2dB (1GHz-6GHz)       |
|     |                     | ± 5.5dB (6GHz-18GHz)      |
|     |                     | ± 5.02dB (18GHz-40GHz)    |

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## 5 Photographs

### 5.1 Test Setup

Refer to Appendix A - Photographs of Set-Up for AR/2020/C0004.

### 5.2 EUT Constructional Details (EUT Photos)

Refer to Photographs of EUT Constructional Details

- End of the Report -

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