



FCC RF Test Report

APPLICANT : Xiaomi Communications Co., Ltd.
EQUIPMENT : Mobile Phone
BRAND NAME : XIAOMI
MODEL NAME : 2201123G
FCC ID : 2AFZZ123G
STANDARD : 47 CFR Part 2, 22, 27
CLASSIFICATION : PCS Licensed Transmitter Held to Ear (PCE)
TEST DATE(S) : Dec. 02, 2021

We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.26-2015 and shown 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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SUMMARY OF TEST RESULT

| Report Section | FCC Rule | Description | Limit | Result | Remark |
|----------------|-------------------------|----------------------------------------------|-------------------------------------|--------|------------------------------------------------|
| - | §2.1046 | Conducted Output Power | Reporting Only | PASS | 1 |
| | §27.50(h)(2) | Equivalent Isotropic Radiated Power (Band 7) | EIRP < 2Watt | PASS | 1 |
| | §27.50(d)(4) | Equivalent Isotropic Radiated Power (Band 4) | EIRP < 1Watt | | 1 |
| - | N/A | Peak-to-Average Ratio | <13 dB | PASS | 1 |
| - | §2.1049 | Occupied Bandwidth | Reporting Only | PASS | 1 |
| - | §2.1051 §27.53(h) | Conducted Band Edge Measurement (Band 4) | < 43+10log10(P[Watts]) | PASS | 1 |
| | §27.53(m)(4) | Conducted Band Edge Measurement (Band 7) | §27.53(m)(4) | | |
| - | §2.1051 §27.53(h) | Conducted Spurious Emission (Band 4) | < 43+10log10(P[Watts]) | PASS | 1 |
| | §2.1051 §27.53(m)(4) | Conducted Spurious Emission (Band 7) | < 55+10log ₁₀ (P[Watts]) | | |
| - | §2.1055 §27.54 | Frequency Stability Temperature & Voltage | Within Authorized Band | PASS | 1 |
| 3.4 | §2.1053 §27.53(h) | Radiated Spurious Emission (Band 4) | < 43+10log ₁₀ (P[Watts]) | PASS | Under limit 27.13 dB at 10104.000 MHz |
| | §2.1053 §27.53(m)(4) | Radiated Spurious Emission (Band 7) | < 55+10log ₁₀ (P[Watts]) | | |

Remark 1 :

The test items of inter band CA were cover by LTE single carrier due to the CA power is reduced according to 3GPP MPR.

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 | 2201123G |
| FCC ID | 2AFZZ123G |
| IMEI Code | Radiation: 860978050061858/860978050061866 |
| HW Version | P2.1 |
| SW Version | MIUI13 |
| EUT Stage | Identical Prototype |

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 | |
|-----------------------------------------|----------------------------------------------------------------------|
| Tx Frequency | LTE Band 4 : 1710 MHz ~ 1755 MHz LTE Band 7 : 2500 MHz ~ 2570 MHz |
| Rx Frequency | LTE Band 4 : 2110 MHz ~ 2155 MHz LTE Band 7 : 2620 MHz ~ 2690 MHz |
| Uplink CA Bands | 4A-7A |
| Type of Modulation | QPSK / 16QAM / 64QAM / 256QAM |

1.5 Modification of EUT

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



1.6 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO/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 Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958 | | |
| Test Site No. | Sporton Site No. | FCC Designation No. | FCC Test Firm Registration No. |
| | 03CH04-KS | CN1257 | 314309 |

1.7 Test Software

| Item | Site | Manufacture | Name | Version |
|------|-----------|-------------|------|--------------|
| 1. | 03CH04-KS | AUDIX | E3 | 6.2009-8-24a |

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 2, 27
- ANSI C63.26-2015
- FCC KDB 971168 D01 Power Meas License Digital Systems v03r01
- FCC KDB 412172 D01 Determining ERP and EIRP v01r01

Remark:

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

2 Test Configuration of Equipment Under Test

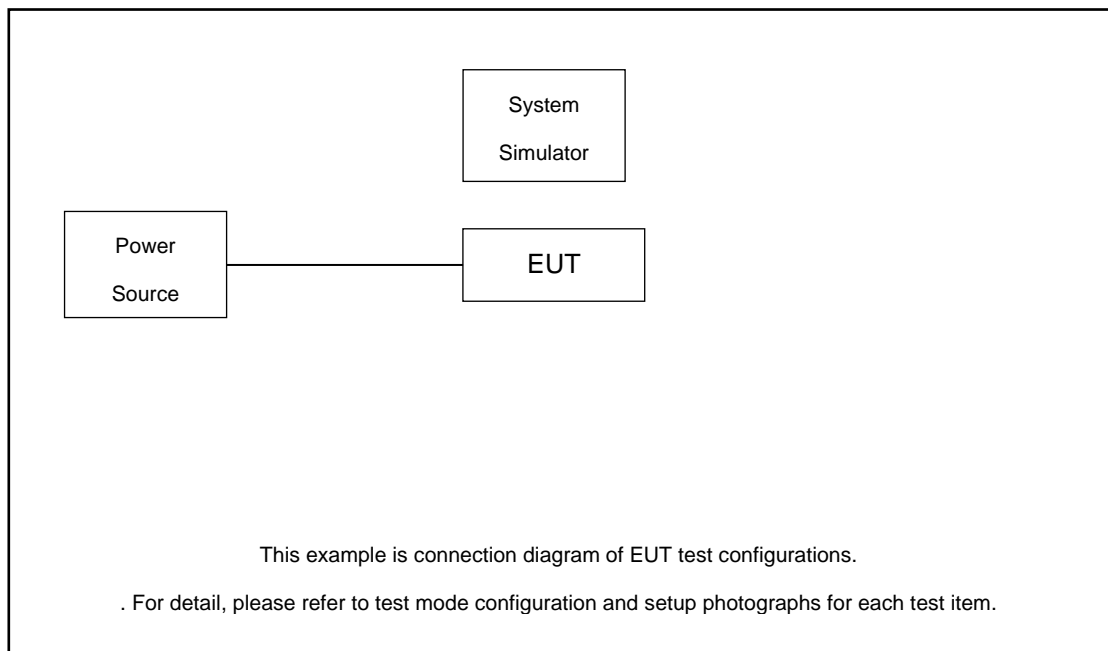
2.1 Test Mode

Antenna port conducted and radiated test items listed below are performed according to KDB 971168 D01 Power Meas License Digital Systems v03r01 with maximum output power.

Radiated measurements are performed by rotating the EUT in three different orthogonal test planes to find the maximum emission.

| Test Items | Band | Bandwidth (MHz) | | | | Modulation | | | | RB # | | | Test Channel | | |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----|----|----|------------|-------|-------|--------|------|------|------|--------------|---|---|
| | | 5 | 10 | 15 | 20 | QPSK | 16QAM | 64QAM | 256QAM | 1 | Half | Full | L | M | H |
| Radiated Spurious Emission | 4A-7A | Worst Case | | | | | | | | | | | | v | |
| Note | <ol style="list-style-type: none"> The mark "v" means that this configuration is chosen for testing The mark "-" means that this bandwidth is not supported. The device is investigated from 30MHz to 10 times of fundamental signal for radiated spurious emission test under different RB size/offset and modulations in exploratory test. Subsequently, only the worst case emissions are reported. | | | | | | | | | | | | | | |

2.2 Connection Diagram of Test System



The EUT has been 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 No. | FCC ID | Data Cable | Power Cord |
|------|--------------|------------|-----------|---------|------------|----------------|
| 1. | Base Station | Anritsu | MT8821C | Fcc DoC | N/A | Shielded, 1.5m |

2.4 Frequency List of Low/Middle/High Channels

| LTE Band 4 Channel and Frequency List | | | | |
|---------------------------------------|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 20050 | 20175 | 20300 |
| | Frequency | 1720 | 1732.5 | 1745 |
| 15 | Channel | 20025 | 20175 | 20325 |
| | Frequency | 1717.5 | 1732.5 | 1747.5 |
| 10 | Channel | 20000 | 20175 | 20350 |
| | Frequency | 1715 | 1732.5 | 1750 |
| 5 | Channel | 19975 | 20175 | 20375 |
| | Frequency | 1712.5 | 1732.5 | 1752.5 |
| 3 | Channel | 19965 | 20175 | 20385 |
| | Frequency | 1711.5 | 1732.5 | 1753.5 |
| 1.4 | Channel | 19957 | 20175 | 20393 |
| | Frequency | 1710.7 | 1732.5 | 1754.3 |

| LTE Band 7 Channel and Frequency List | | | | |
|---------------------------------------|------------------------|--------|--------|---------|
| BW [MHz] | Channel/Frequency(MHz) | Lowest | Middle | Highest |
| 20 | Channel | 20850 | 21100 | 21350 |
| | Frequency | 2510 | 2535 | 2560 |
| 15 | Channel | 20825 | 21100 | 21375 |
| | Frequency | 2507.5 | 2535 | 2562.5 |
| 10 | Channel | 20800 | 21100 | 21400 |
| | Frequency | 2505 | 2535 | 2565 |
| 5 | Channel | 20775 | 21100 | 21425 |
| | Frequency | 2502.5 | 2535 | 2567.5 |

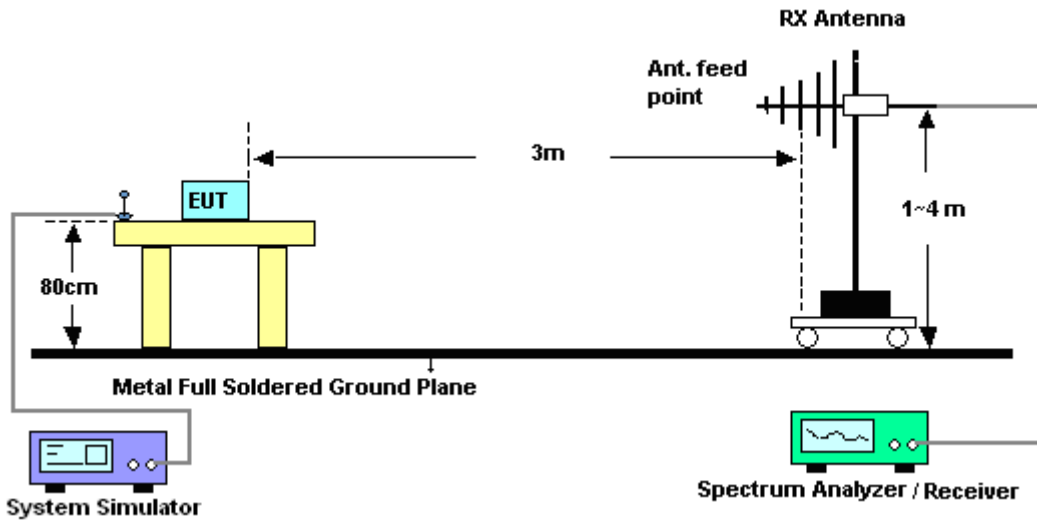
3 Radiated Test Items

3.1 Measuring Instruments

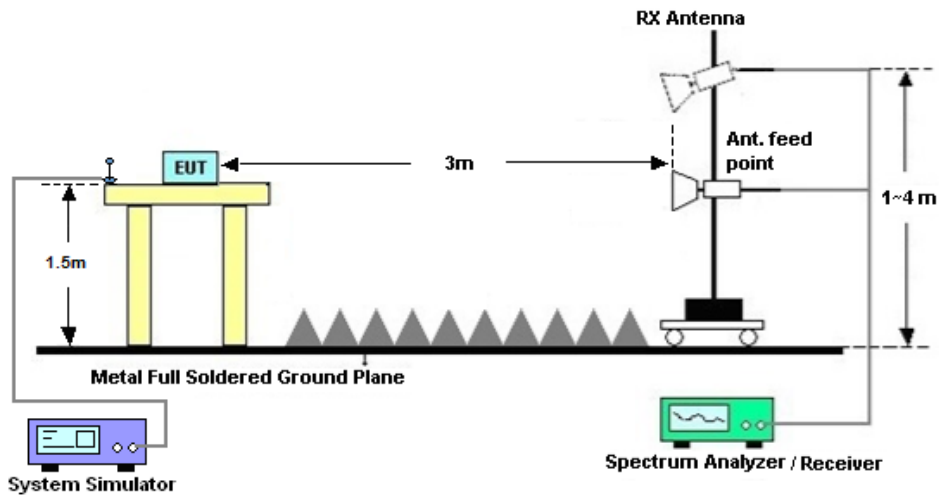
See list of measuring instruments of this test report.

3.2 Test Setup

3.2.1 For radiated test from 30MHz to 1GHz



3.2.2 For radiated test above 1GHz



3.3 Test Result of Radiated Test

Please refer to Appendix A.



3.4 Radiated Spurious Emission

3.4.1 Description of Radiated Spurious Emission

For LTE Band 4

The radiated spurious emission was measured by substitution method according to ANSI C63.26. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $43 + 10 \log (P)$ dB.

For Band 7

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least $55 + 10 \log (P)$ dB.

The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.4.2 Test Procedures

1. The testing follows ANSI C63.26 Section 5.5
2. The EUT was placed on a turntable with 0.8 meter height for frequency below 1GHz and 1.5 meter height for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the receiving antenna mounted on the antenna tower.
4. The table was rotated 360 degrees to determine the position of the highest spurious emission.
5. The height of the receiving antenna is varied between 1m to 4m to search the maximum spurious emission for both horizontal and vertical polarizations.
6. During the measurement, the system simulator parameters were set to force the EUT transmitting at maximum output power.
7. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, taking the record of maximum spurious emission.
8. A horn antenna was substituted in place of the EUT and was driven by a signal generator.
9. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
10. $EIRP \text{ (dBm)} = S.G. \text{ Power} - Tx \text{ Cable Loss} + Tx \text{ Antenna Gain}$
11. $ERP \text{ (dBm)} = EIRP - 2.15$
12. For Band 5
The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
The limit line is derived from $43 + 10\log(P)$ dB below the transmitter power P(Watts)
 $= P(W) - [43 + 10\log(P)] \text{ (dB)}$
 $= [30 + 10\log(P)] \text{ (dBm)} - [43 + 10\log(P)] \text{ (dB)}$
 $= -13\text{dBm}.$
13. For Band 7:
The limit line is derived from $55 + 10\log(P)$ dB below the transmitter power P(Watts)



4 List of Measuring Equipment

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Test Date | Due Date | Remark |
|-----------------------|--------------|--------------------------|------------|-------------------|------------------|---------------|---------------|-----------------------|
| EXA Spectrum Analyzer | Keysight | N9010A | MY55150244 | 10Hz-44G,MAX 30dB | Apr. 13, 2021 | Dec. 02, 2021 | Apr. 12, 2022 | Radiation (03CH04-KS) |
| Loop Antenna | R&S | HFH2-Z2 | 100321 | 9kHz~30MHz | Oct. 30, 2021 | Dec. 02, 2021 | Oct. 29, 2022 | Radiation (03CH04-KS) |
| Bilog Antenna | TeseQ | CBL6111D | 49922 | 30MHz-1GHz | May 30, 2021 | Dec. 02, 2021 | May 29, 2022 | Radiation (03CH04-KS) |
| Horn Antenna | Schwarzbeck | BBHA9120D | 1356 | 1GHz~18GHz | Apr. 18, 2021 | Dec. 02, 2021 | Apr. 17, 2022 | Radiation (03CH04-KS) |
| SHF-EHF Horn | Com-power | AH-840 | 101070 | 18GHz~40GHz | Jan. 06, 2021 | Dec. 02, 2021 | Jan. 05, 2022 | Radiation (03CH04-KS) |
| Amplifier | SONOMA | 310N | 187289 | 9KHz-1GHz | Jan. 06, 2021 | Dec. 02, 2021 | Jan. 05, 2022 | Radiation (03CH04-KS) |
| Amplifier | MITEQ | EM18G40G GA | 060728 | 18~40GHz | Jan. 07, 2021 | Dec. 02, 2021 | Jan. 06, 2022 | Radiation (03CH04-KS) |
| high gain Amplifier | MITEQ | AMF-7D-00 101800-30-1 0P | 2025788 | 1Ghz-18Ghz | Jan. 06, 2021 | Dec. 02, 2021 | Jan. 05, 2022 | Radiation (03CH04-KS) |
| Amplifier | Keysight | 83017A | MY57280106 | 500MHz~26.5GHz | Oct. 13, 2021 | Dec. 02, 2021 | Oct. 12, 2022 | Radiation (03CH04-KS) |
| AC Power Source | Chroma | 61601 | F104090004 | N/A | NCR | Dec. 02, 2021 | NCR | Radiation (03CH04-KS) |
| Turn Table | ChamPro | EM 1000-T | 060762-T | 0~360 degree | NCR | Dec. 02, 2021 | NCR | Radiation (03CH04-KS) |
| Antenna Mast | ChamPro | EM 1000-A | 060762-A | 1 m~4 m | NCR | Dec. 02, 2021 | NCR | Radiation (03CH04-KS) |

NCR: No Calibration Required



5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.26-2015. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

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

| | |
|---------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 3.3dB |
|---------------------------------------------------------------------|-------|

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

| | |
|---------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 2.8dB |
|---------------------------------------------------------------------|-------|

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

| | |
|---------------------------------------------------------------------|-------|
| Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y)) | 2.8dB |
|---------------------------------------------------------------------|-------|



Appendix A. Test Results of Radiated Test

Radiated Spurious Emission

| | | | |
|-----------------|------------|---------------------|---------|
| Test Engineer : | Chris Chen | Temperature : | 22~23°C |
| | | Relative Humidity : | 41~42% |

Ant 5+0 :

| ULCA_4A-7A | | | | | | | | |
|-------------------------------------------|-------------------|--------------|---------------|-------------------|--------------------|----------------------|-----------------------|--------------------|
| Channel | Frequency (MHz) | EIRP (dBm) | Limit (dBm) | Over Limit (dB) | S.G. Power (dBm) | TX Cable loss (dB) | TX Antenna Gain (dBi) | Polarization (H/V) |
| LTE B4 BW 20MHz Middle 1RB0,QPSK | 3447 | -59.66 | -13 | -46.66 | -70.40 | 2.60 | 13.34 | H |
| | 5172 | -57.57 | -13 | -44.57 | -68.08 | 3.01 | 13.52 | H |
| | 6888 | -56.38 | -13 | -43.38 | -66.58 | 3.27 | 13.47 | H |
| | 3447 | -59.83 | -13 | -46.83 | -70.57 | 2.60 | 13.34 | V |
| | 5172 | -58.00 | -13 | -45.00 | -68.51 | 3.01 | 13.52 | V |
| | 6888 | -56.45 | -13 | -43.45 | -66.65 | 3.27 | 13.47 | V |
| LTE B7 BW 20MHz Middle 1RB0,QPSK | 5052 | -57.15 | -25 | -32.15 | -59.78 | 1.09 | 5.87 | H |
| | 7584 | -54.88 | -25 | -29.88 | -57.28 | 1.37 | 5.92 | H |
| | 10104 | -52.13 | -25 | -27.13 | -56.02 | 1.64 | 7.68 | H |
| | 5052 | -57.04 | -25 | -32.04 | -59.67 | 1.09 | 5.87 | V |
| | 7584 | -54.81 | -25 | -29.81 | -57.21 | 1.37 | 5.92 | V |
| | 10104 | -52.45 | -25 | -27.45 | -56.34 | 1.64 | 7.68 | V |

Remark: Spurious emissions within 30-1000MHz were found more than 20dB below limit line.