TCT 通测检测 TESTING CENTRE TECHNOLOGY

# TEST REPORT

| | |
|---|---|
| **FCC ID. ..... :** | 2A6B4-FIGF52 |
| **Test Report No..... :** | TCT221014E055 |
| **Date of issue..... :** | Nov. 21, 2022 |
| **Testing laboratory ..... :** | SHENZHEN TONGCE TESTING LAB |
| **Testing location/ address:** | 2101 & 2201, Zhenchang Factory, Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China |
| **Applicant's name..... :** | Mulberry tech group LLC |
| **Address..... :** | 108 Wall st, lakewood, New Jersey, 08701, USA |
| **Manufacturer's name ... :** | Shenzhen Qimei Electronic Technology Co., Ltd |
| **Address..... :** | B307, Building G, No. 13, Second Industrial Zone, Xiacun Community, Gongming Street, Guangming District, Shenzhen, China |
| **Standard(s) ..... :** | FCC CFR Title 47 Part 15 Subpart C Section 15.225 |
| **Product Name..... :** | Mobile Phone |
| **Trade Mark ..... :** | fig |
| **Model/Type reference..... :** | F52 |
| **Rating(s)..... :** | Rechargeable Li-ion Battery DC 3.8V |
| **Date of receipt of test item ..... :** | Oct. 14, 2022 |
| **Date (s) of performance of test..... :** | Oct. 14, 2022 - Nov. 21, 2022 |
| **Tested by (+signature) ... :** | Brews XU |
| **Check by (+signature).... :** | Beryl ZHAO |
| **Approved by (+signature):** | Tomsin |

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# 1. General Product Information

## 1.1. EUT description

| | |
|---|---|
| **Product Name.....:** | Mobile Phone |
| **Model/Type reference.....:** | F52 |
| **Hardware Version.....:** | K62-MB-V1.1 |
| **Software Version.....:** | F52_ U01_V1.0.0 |
| **Sample Number.....:** | TCT221014E007-0101 |
| **Operation Frequency.....:** | 13.56MHz |
| **Antenna Type.....:** | Internal Antenna |
| **Rating(s).....:** | Rechargeable Li-ion Battery DC 3.8V |

## 1.2. Model(s) list

None.



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# 2. Test Result Summary

| Requirement | CFR 47 Section IC Paragraph | Result |
|---|---|---|
| Antenna requirement | §15.203 | PASS |
| AC Power Line Conducted Emission | §15.207 | PASS |
| Spurious emissions | §15.225/ §15.209 | PASS |
| Occupied Bandwidth | §15.215 (c) | PASS |
| Frequency stability | §15.225 | PASS |

***Note:***

*1. PASS: Test item meets the requirement.*

*2. Fail: Test item does not meet the requirement.*

*3. N/A: Test case does not apply to the test object.*

*4. The test result judgment is decided by the limit of test standard.*



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# 3. General Information

## 3.1. Test Environment and Mode

| Operating Environment: | | |
|---|---|---|
| Condition | Conducted Emission | Radiated Emission |
| Temperature: | 25.3°C | 24.8°C |
| Humidity: | 56% RH | 54 % RH |
| **Test Mode:** | | |
| Operation mode: | Keep the EUT in continuous transmitting with modulation | |
| The sample was placed (0.8m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case(Z axis) are shown in Test Results of the following pages. | | |

## 3.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Equipment | Model No. | Serial No. | FCC ID | Trade Name |
|---|---|---|---|---|
| IC Card | / | / | / | / |

***Note:***

*1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.*

*2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.*



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# 4. Facilities and Accreditations

## 4.1. Facilities

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

- FCC - Registration No.: 645098

  SHENZHEN TONGCE TESTING LAB

  Designation Number: CN1205

  The testing lab has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

  SHENZHEN TONGCE TESTING LAB

  CAB identifier: CN0031

  The testing lab has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing.

## 4.2. Location

SHENZHEN TONGCE TESTING LAB

Address: 2101 & 2201, Zhenchang Factory Renshan Industrial Zone, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, 518103, People's Republic of China

TEL: +86-755-27673339

## 4.3. Measurement Uncertainty

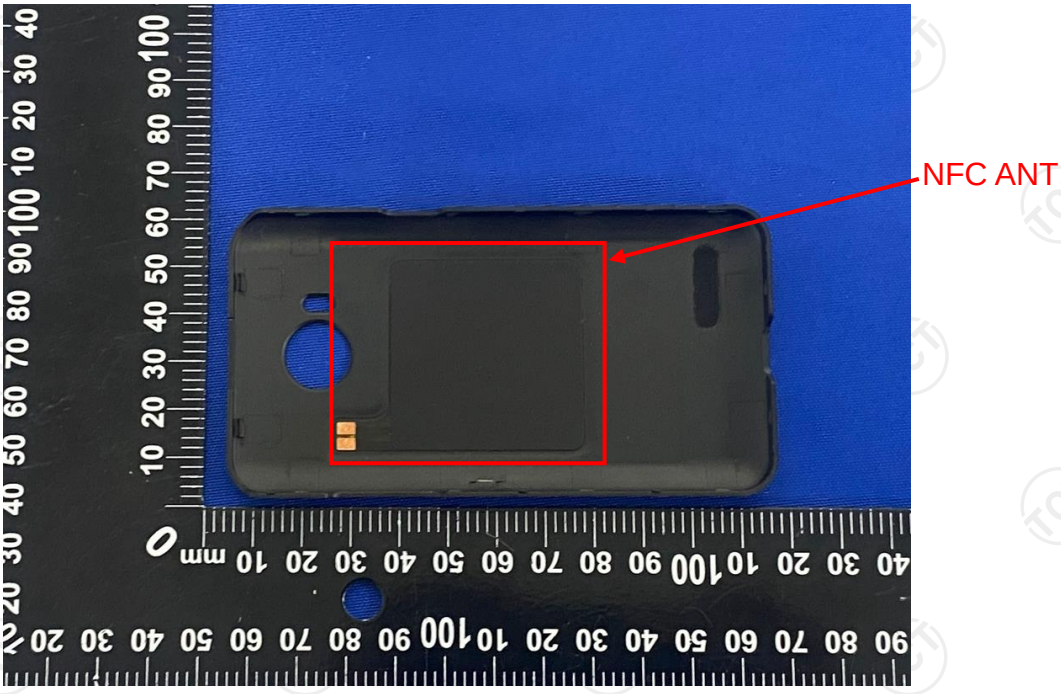
The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

| No. | Item | MU |
|---|---|---|
| 1 | Conducted Emission | ± 3.10 dB |
| 2 | RF power, conducted | ± 0.12 dB |
| 3 | Spurious emissions, conducted | ± 0.11 dB |
| 4 | All emissions, radiated(<1 GHz) | ± 4.56 dB |
| 5 | All emissions, radiated(1 GHz - 18 GHz) | ± 4.22 dB |
| 6 | All emissions, radiated(18 GHz- 40 GHz) | ± 4.36 dB |

# 5. Test Results and Measurement Data

## 5.1. Antenna Requirement

| **Standard requirement:** | FCC Part15 C Section 15.203 |
|---|---|
| 15.203 requirement:<br>An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded. | |
| **E.U.T Antenna:** | |
| The NFC antenna is internal antenna which permanently attached. | |





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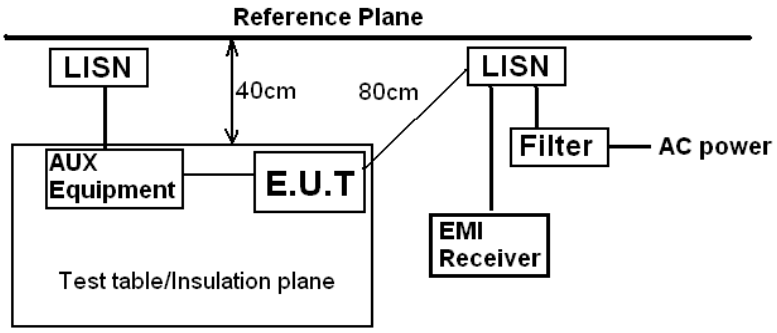
## 5.2. Conducted Emission

### 5.2.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz, Sweep time=auto</td></tr>
<tr><td>Limits:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr>
<tr><td>0.5-5</td><td>56</td><td>46</td></tr>
<tr><td>5-30</td><td>60</td><td>50</td></tr>
</table>
</td></tr>
<tr><td>Test Setup:</td><td> 

Remark:<br>E.U.T: Equipment Under Test<br>LISN: Line Impedence Stabilization Network<br>Test table height=0.8m</td></tr>
<tr><td>Test Mode:</td><td>Refer to section 3.1 for details</td></tr>
<tr><td>Test Procedure:</td><td>1. The E.U.T is connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.<br>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).<br>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

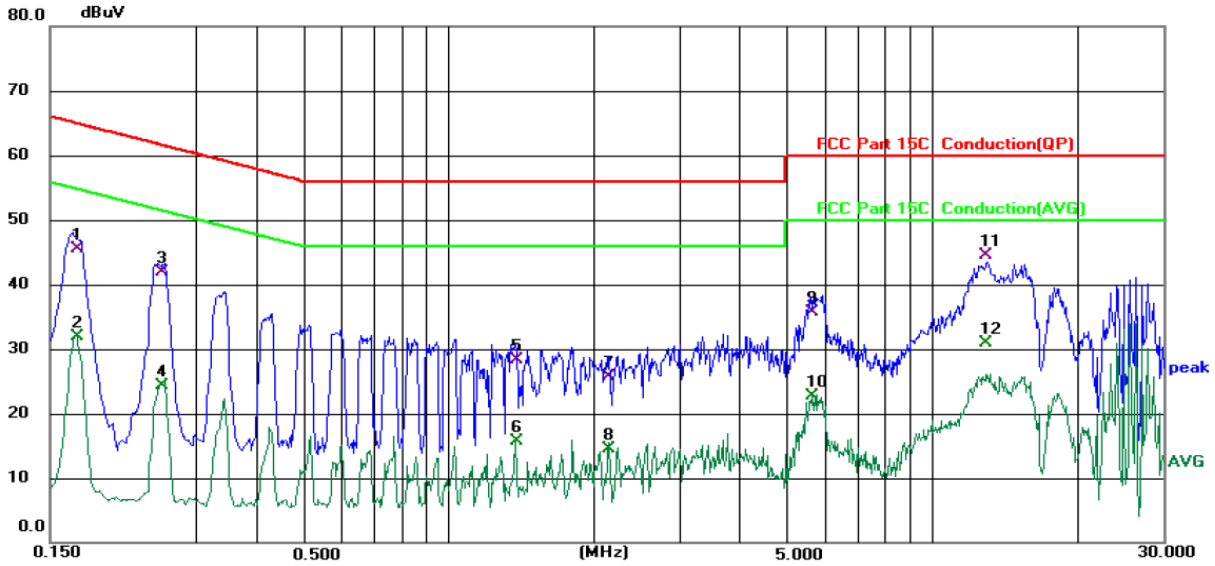
### 5.2.2. Test Instruments

| Conducted Emission Shielding Room Test Site (843) | | | | |
|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| EMI Test Receiver | R&S | ESCI3 | 100898 | Jul. 03, 2023 |
| Line Impedance Stabilisation Newtork(LISN) | Schwarzbeck | NSLK 8126 | 8126453 | Feb. 24, 2023 |
| Line-5 | TCT | CE-05 | / | Jul. 03, 2024 |
| EMI Test Software | Shurple Technology | EZ-EMC | / | / |

## 5.2.3. Test data

**Please refer to following diagram for individual**

**Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)**




Site 844 Shielding Room Phase: *L1* Temperature: 25.3 (℃) Humidity: 56 %

Limit: FCC Part 15C Conduction(QP) Power: DC 5V(Adapter Input AC 120V/60Hz)

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1700 | 34.98 | 10.52 | 45.50 | 64.96 | -19.46 | QP | |
| 2 | | 0.1700 | 21.48 | 10.52 | 32.00 | 54.96 | -22.96 | AVG | |
| 3 | | 0.2560 | 31.74 | 10.26 | 42.00 | 61.56 | -19.56 | QP | |
| 4 | | 0.2560 | 14.05 | 10.26 | 24.31 | 51.56 | -27.25 | AVG | |
| 5 | | 1.3778 | 18.28 | 10.08 | 28.36 | 56.00 | -27.64 | QP | |
| 6 | | 1.3778 | 5.71 | 10.08 | 15.79 | 46.00 | -30.21 | AVG | |
| 7 | | 2.1459 | 15.68 | 10.02 | 25.70 | 56.00 | -30.30 | QP | |
| 8 | | 2.1459 | 4.53 | 10.02 | 14.55 | 46.00 | -31.45 | AVG | |
| 9 | | 5.6779 | 25.63 | 10.16 | 35.79 | 60.00 | -24.21 | QP | |
| 10 | | 5.6779 | 12.64 | 10.16 | 22.80 | 50.00 | -27.20 | AVG | |
| 11 | * | 12.9740 | 34.23 | 10.27 | 44.50 | 60.00 | -15.50 | QP | |
| 12 | | 12.9740 | 20.73 | 10.27 | 31.00 | 50.00 | -19.00 | AVG | |

***Note:***

*Freq. = Emission frequency in MHz*

*Reading level (dBμV) = Receiver reading*

*Corr. Factor (dB) = LISN factor + Cable loss*

*Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)*

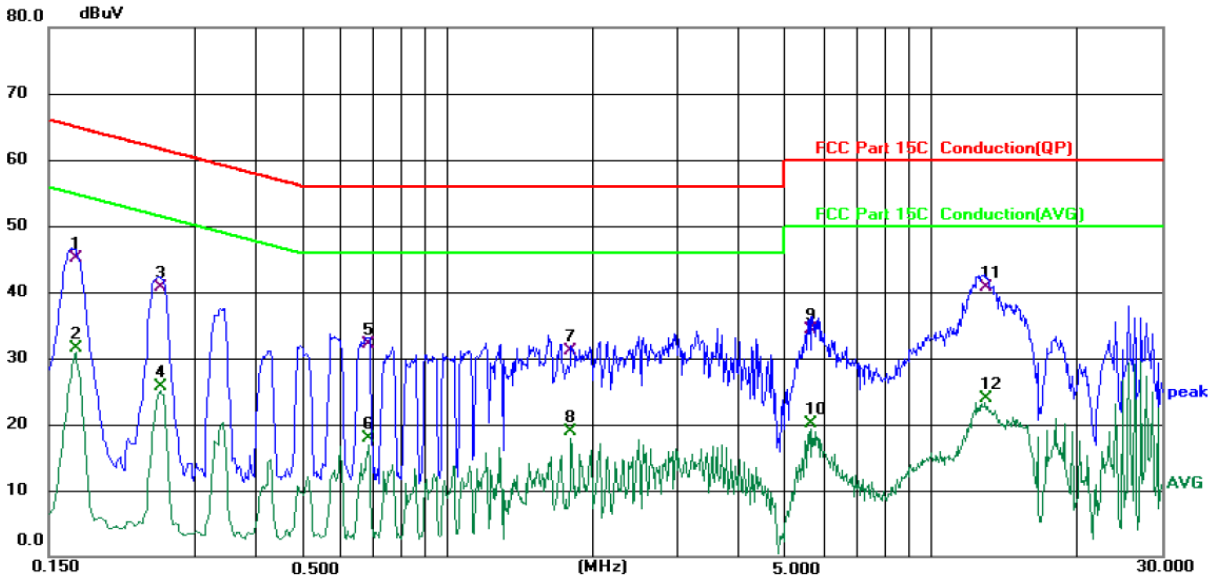
*Limit (dBμV) = Limit stated in standard*

*Margin (dB) = Measurement (dBμV) – Limits (dBμV)*

*Q.P. =Quasi-Peak, AVG =average*

** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz*

## Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)




Site 844 Shielding Room Phase: *N* Temperature: 25.3 (℃) Humidity: 56 %

Limit: FCC Part 15C Conduction(QP) Power: DC 5V(Adapter Input AC 120V/60Hz)

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1700 | 34.73 | 10.46 | 45.19 | 64.96 | -19.77 | QP | |
| 2 | | 0.1700 | 20.98 | 10.46 | 31.44 | 54.96 | -23.52 | AVG | |
| 3 | | 0.2540 | 30.51 | 10.26 | 40.77 | 61.63 | -20.86 | QP | |
| 4 | | 0.2540 | 15.36 | 10.26 | 25.62 | 51.63 | -26.01 | AVG | |
| 5 | | 0.6860 | 22.09 | 10.10 | 32.19 | 56.00 | -23.81 | QP | |
| 6 | | 0.6860 | 7.85 | 10.10 | 17.95 | 46.00 | -28.05 | AVG | |
| 7 | | 1.8060 | 20.89 | 10.12 | 31.01 | 56.00 | -24.99 | QP | |
| 8 | | 1.8060 | 8.82 | 10.12 | 18.94 | 46.00 | -27.06 | AVG | |
| 9 | | 5.6820 | 24.17 | 10.19 | 34.36 | 60.00 | -25.64 | QP | |
| 10 | | 5.6820 | 9.92 | 10.19 | 20.11 | 50.00 | -29.89 | AVG | |
| 11 | * | 12.9659 | 30.43 | 10.37 | 40.80 | 60.00 | -19.20 | QP | |
| 12 | | 12.9659 | 13.62 | 10.37 | 23.99 | 50.00 | -26.01 | AVG | |

***Note:***

*Freq. = Emission frequency in MHz*

*Reading level (dBμV) = Receiver reading*

*Corr. Factor (dB) = LISN factor + Cable loss*

*Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)*

*Limit (dBμV) = Limit stated in standard*

*Margin (dB) = Measurement (dBμV) – Limits (dBμV)*

*Q.P. =Quasi-Peak*

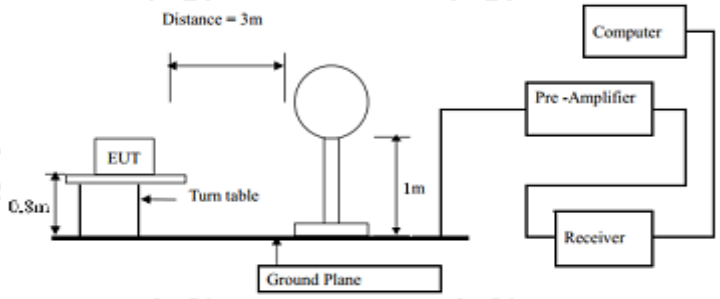
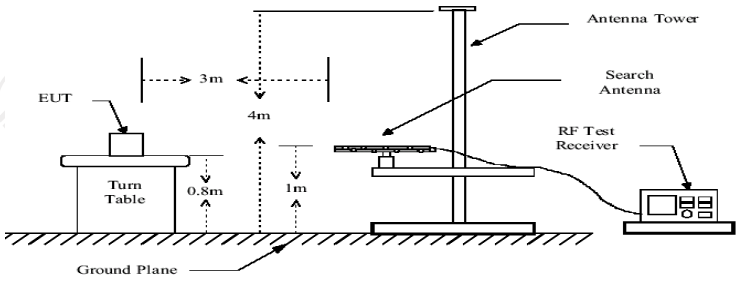
*AVG =average*

** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz*

## 5.3. Radiated Emission Measurement

### 5.3.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.225</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Frequency Range:</td><td>9 kHz to 1000 MHz</td></tr>
<tr><td>Measurement Distance:</td><td>3 m</td></tr>
<tr><td>Antenna Polarization:</td><td>Horizontal & Vertical</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>9kHz- 150kHz</td><td>Quasi-peak</td><td>200Hz</td><td>1kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>120kHz</td><td>300kHz</td><td>Quasi-peak Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>FCC Part15 C Section 15.225
<table>
<tr><th>Frequency (MHz)</th><th>Limit (uV/m @30m)</th><th>Limit (dBuV/m @3m)</th><th>Detector</th></tr>
<tr><td>13.110-13.410</td><td>106</td><td>80.5</td><td>QP</td></tr>
<tr><td>13.410-13.553</td><td>334</td><td>90.5</td><td>QP</td></tr>
<tr><td>13.553-13.567</td><td>15848</td><td>124.0</td><td>QP</td></tr>
<tr><td>13.567-13.7110</td><td>224</td><td>90.5</td><td>QP</td></tr>
<tr><td>13.710-14.010</td><td>106</td><td>80.5</td><td>QP</td></tr>
</table>
Note: RF Voltage (dBuV) = 20 log RF Voltage (uV)<br>
Limit (dBuV/m @3m) = 20log(Limit (uV/m @30m)) + 40<br>
FCC Part15 C Section 15.209
<table>
<tr><th>Frequency Range (MHz)</th><th>Distance (m)</th><th>Field strength (dB μ V/m)</th><th>Detector</th></tr>
<tr><td>0.009-0.490</td><td>3</td><td>20log 2400/F (kHz) + 80</td><td>QP</td></tr>
<tr><td>0.490-1.705</td><td>3</td><td>20log 24000/F (kHz) + 40</td><td>QP</td></tr>
<tr><td>1.705-30</td><td>3</td><td>20log 30 + 40</td><td>QP</td></tr>
<tr><td>30-88</td><td>3</td><td>40.0</td><td>QP</td></tr>
<tr><td>88-216</td><td>3</td><td>43.5</td><td>QP</td></tr>
<tr><td>216-960</td><td>3</td><td>46.0</td><td>QP</td></tr>
<tr><td>Above 960</td><td>3</td><td>54.0</td><td>QP</td></tr>
</table>
Note:<br>
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)<br>
2. In the Above Table, the tighter limit applies at the band edges.<br>
3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT<br>
4. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.<br>
5. If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula Ld1 = Ld2 * (d2/d1)
</td></tr>
</table>

| | |
|---|---|
| **Test Procedure:** | 1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber in below 1GHz. The table was rotated 360 degrees to determine the position of the highest radiation.<br>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.<br>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |
| **Test setup:** | For radiated emissions below 30MHz<br>  <br>30MHz to 1GHz<br>  |
| **Test Mode:** | Refer to section 3.1 for details |
| **Test results:** | PASS |

### 5.3.2. Test Instruments

| Radiated Emission Test Site (966) | | | | |
|---|---|---|---|---|
| **Name of Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| EMI Test Receiver | R&S | ESIB7 | 100197 | Jul. 03, 2023 |
| Spectrum Analyzer | R&S | FSQ40 | 200061 | Jul. 03, 2023 |
| Pre-amplifier | SKET | LNPA_0118G-45 | SK2021012102 | Feb. 24, 2023 |
| Pre-amplifier | SKET | LNPA_1840G-50 | SK202109203500 | Feb. 24, 2023 |
| Pre-amplifier | HP | 8447D | 2727A05017 | Jul. 03, 2023 |
| Loop antenna | Schwarzbeck | FMZB1519B | 00191 | Jun. 11, 2024 |
| Broadband Antenna | Schwarzbeck | VULB9163 | 340 | Jul. 05, 2024 |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 631 | Jul. 05, 2024 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | 00956 | Apr. 10, 2023 |
| Coaxial cable | SKET | RC-18G-N-M | / | Feb. 24, 2024 |
| Coaxial cable | SKET | RC_40G-K-M | / | Feb. 24, 2024 |
| EMI Test Software | Shurple Technology | EZ-EMC | / | / |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### 5.3.3. Test Data

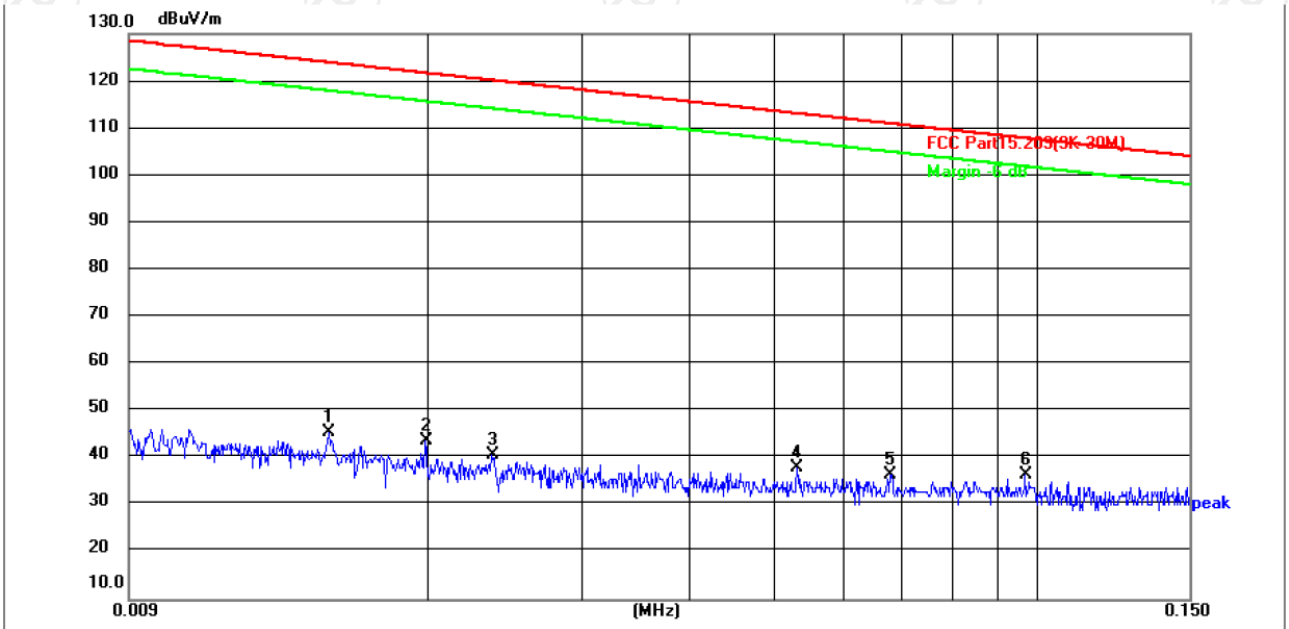
**Field Strength of Fundamental**

| Frequency (MHz) | Emission (dBuV/m) | Limits (dBuV/m) | Detector | Margin (dB) |
|---|---|---|---|---|
| 13.56 | 60.57 | 124.0 | QP | -63.43 |

**Spurious Emissions**

**9KHz-30MHz**

9KHz-150KHz:

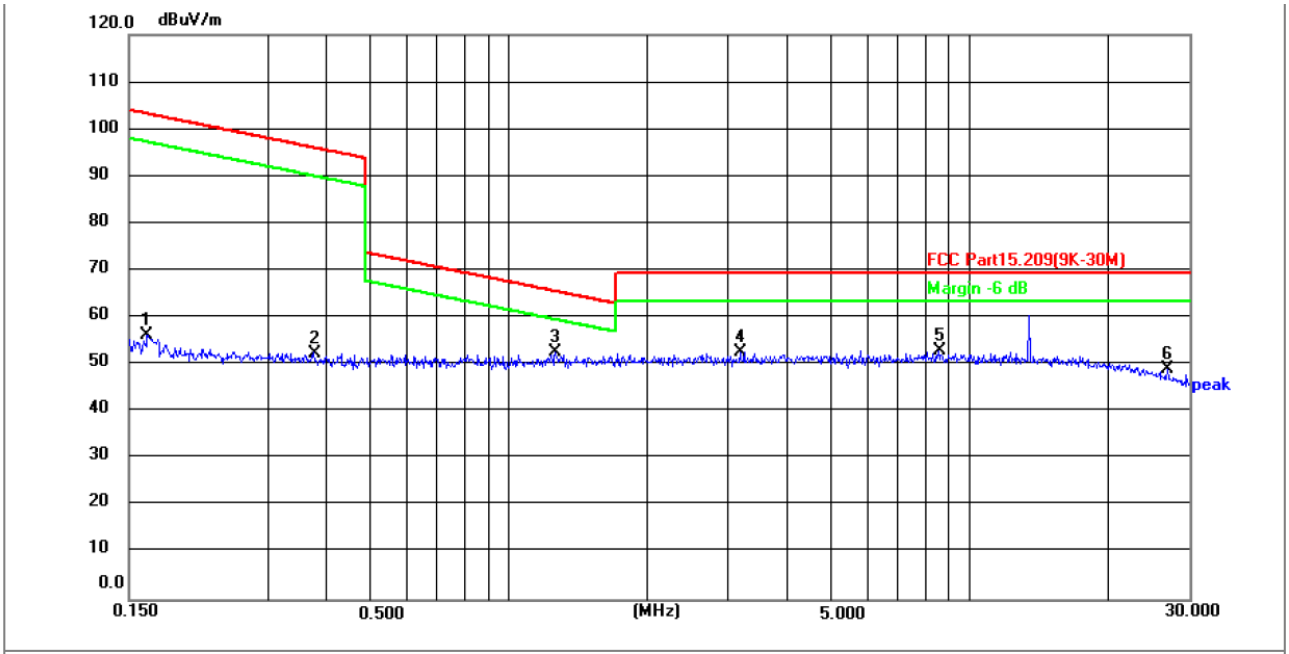



Site: #3 3m Anechoic Chamber Polarization: *Vertical* Temperature: 24(℃) Humidity: 52 %

Limit: FCC Part15.209(9K-30M) Power:DC 3.8 V

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.0153 | 24.90 | 20.67 | 45.57 | 123.91 | -78.34 | peak | P | |
| 2 | 0.0198 | 23.16 | 20.60 | 43.76 | 121.67 | -77.91 | peak | P | |
| 3 | 0.0236 | 20.21 | 20.54 | 40.75 | 120.15 | -79.40 | peak | P | |
| 4 | 0.0530 | 17.41 | 20.67 | 38.08 | 113.12 | -75.04 | peak | P | |
| 5 | 0.0680 | 15.65 | 21.02 | 36.67 | 110.95 | -74.28 | peak | P | |
| 6 * | 0.0970 | 15.57 | 21.06 | 36.63 | 107.87 | -71.24 | peak | P | |

150KHz-30MHz:




Site: #3 3m Anechoic Chamber Polarization: *Vertical* Temperature: 24(℃) Humidity: 52 %

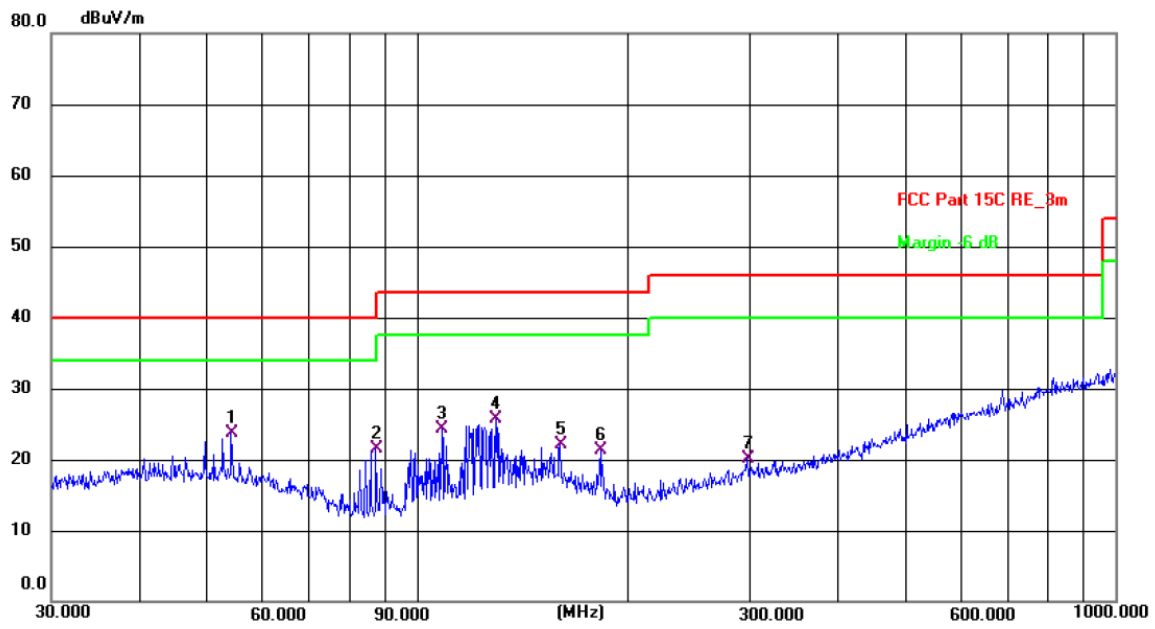
Limit: FCC Part15.209(9K-30M) Power:DC 3.8 V

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1650 | 35.57 | 20.76 | 56.33 | 103.25 | -46.92 | peak | P | |
| 2 | 0.3791 | 31.24 | 21.26 | 52.50 | 96.03 | -43.53 | peak | P | |
| 3 * | 1.2653 | 29.32 | 23.21 | 52.53 | 65.58 | -13.05 | peak | P | |
| 4 | 3.1815 | 25.42 | 27.14 | 52.56 | 69.50 | -16.94 | peak | P | |
| 5 | 8.5916 | 15.31 | 37.73 | 53.04 | 69.50 | -16.46 | peak | P | |
| 6 | 26.8410 | 29.32 | 19.78 | 49.10 | 69.50 | -20.40 | peak | P | |

***Note*** *：1) Emission Level=Peak Reading + Correction Factor;*

*Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*

Horizontal:

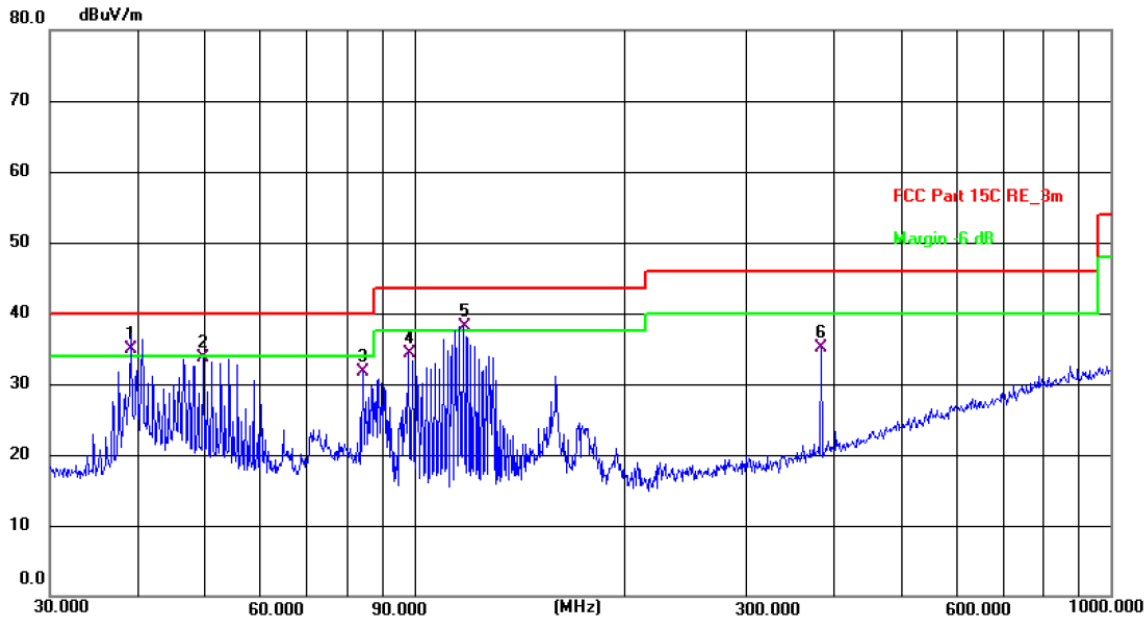



Site #1 3m Anechoic Chamber Polarization: *Horizontal* Temperature: 24.8(C) Humidity: 54 %

Limit: FCC Part 15C RE_3m Power: DC 3.8 V

| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 * | 54.2609 | 10.85 | 12.92 | 23.77 | 40.00 | -16.23 | QP | P | |
| 2 | 87.4176 | 12.97 | 8.62 | 21.59 | 40.00 | -18.41 | QP | P | |
| 3 | 108.6470 | 13.63 | 10.62 | 24.25 | 43.50 | -19.25 | QP | P | |
| 4 | 129.9225 | 13.48 | 12.13 | 25.61 | 43.50 | -17.89 | QP | P | |
| 5 | 160.3456 | 8.66 | 13.35 | 22.01 | 43.50 | -21.49 | QP | P | |
| 6 | 183.2005 | 10.00 | 11.22 | 21.22 | 43.50 | -22.28 | QP | P | |
| 7 | 297.2240 | 6.68 | 13.44 | 20.12 | 46.00 | -25.88 | QP | P | |

Vertical:




Site #1 3m Anechoic Chamber Polarization: *Vertical* Temperature: 24.8(C) Humidity: 54 %

Limit: FCC Part 15C RE_3m Power: DC 3.8 V

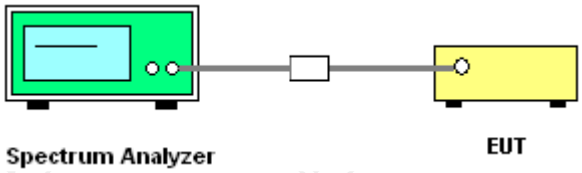
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|---|---|---|---|---|---|---|---|---|---|
| 1 * | 39.1616 | 21.25 | 13.65 | 34.90 | 40.00 | -5.10 | QP | P | |
| 2 | 49.7068 | 20.24 | 13.47 | 33.71 | 40.00 | -6.29 | QP | P | |
| 3 | 84.4054 | 23.07 | 8.71 | 31.78 | 40.00 | -8.22 | QP | P | |
| 4 | 98.1419 | 24.72 | 9.63 | 34.35 | 43.50 | -9.15 | QP | P | |
| 5 ! | 117.7725 | 26.77 | 11.41 | 38.18 | 43.50 | -5.32 | QP | P | |
| 6 | 383.9318 | 19.40 | 15.64 | 35.04 | 46.00 | -10.96 | QP | P | |

***Note*** *: 1) Emission Level=Peak Reading + Correction Factor;*

*Correction Factor= Antenna Factor + Cable loss – Pre-amplifier*

## 5.4. Occupied Bandwidth

### 5.4.1. Test Specification

| | |
|---|---|
| **Test Requirement:** | FCC Part15 C Section 15.215(c) |
| **Test Method:** | ANSI C63.10: 2013 |
| **Limit:** | N/A |
| **Test Procedure:** | 1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT.<br>2. Set to the maximum power setting and enable the EUT transmit continuously.<br>3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement.<br>Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW≥1% of the 20 dB bandwidth; VBW≥RBW; Sweep = auto; Detector function = peak; Trace = max hold.<br>4. Measure and record the results in the test report. |
| **Test setup:** |  |
| **Test Mode:** | Refer to section 3.1 for details |
| **Test results:** | PASS |

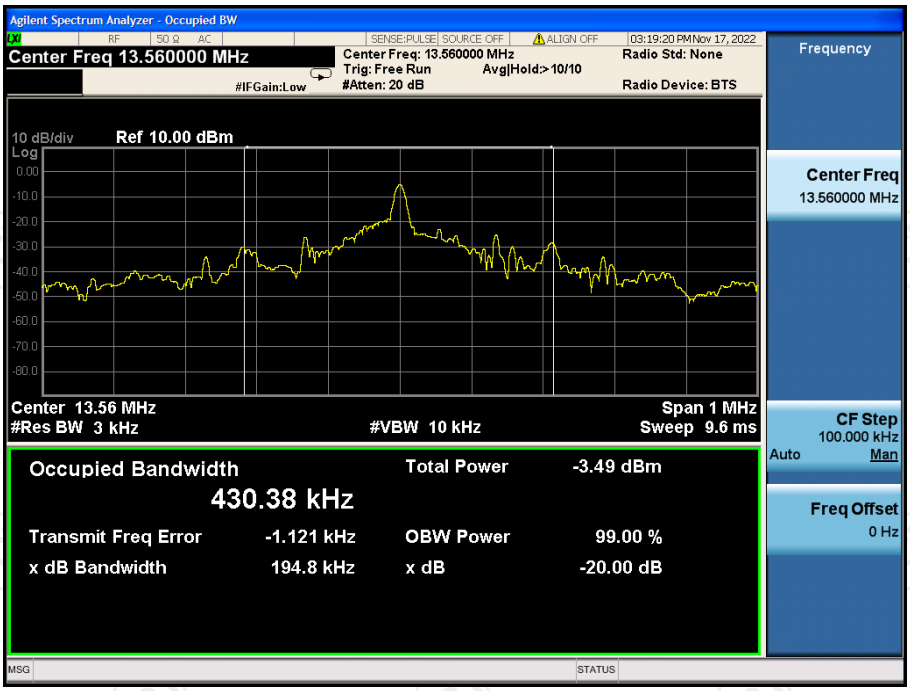
### 5.4.2. Test Instruments

| RF Test Room | | | | |
|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| Spectrum Analyzer | Agilent | N9020A | MY49100619 | Jul. 04, 2023 |

### 5.4.3. Test data

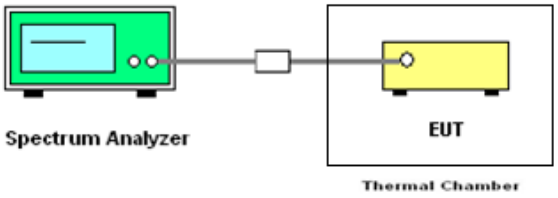
| Frequency(MHz) | 20dB Occupy Bandwidth (kHz) | Limit (kHz) | Conclusion |
|---|---|---|---|
| 13.56 | 194.8 | --- | PASS |

**Test plots as follows:**



## 5.5. Frequency stability

### 5.5.1. Test Specification

| | |
|---|---|
| **Test Requirement:** | FCC Part15 C Section 15.225 |
| **Test Method:** | ANSI C63.10 : 2013 |
| **Operation mode:** | Refer to item 3.1 |
| **Limit:** | +/-0.01% |
| **Test Setup:** |  |
| **Test Procedure:** | 1. The equipment under test was connected to an external DC power supply and input rated voltage.<br>2. RF output was connected to a spectrum analyzer.<br>3. The EUT was placed inside the temperature chamber.<br>4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20℃ operating frequency as reference frequency.<br>5. Turn EUT off and set the chamber temperature to -20℃. After the temperature stabilized for approximately 30 minutes recorded the frequency.<br>6. Repeat step measure with 10℃ increased per stage until the highest temperature of +55℃ reached.<br>7. Repeat step measure with a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C |
| **Test Result:** | PASS |

### 5.5.2. Test Instruments

| RF Test Room | | | | |
|---|---|---|---|---|
| **Equipment** | **Manufacturer** | **Model** | **Serial Number** | **Calibration Due** |
| Spectrum Analyzer | R&S | FSU | 200054 | Jul. 04, 2023 |
| DC power supply | Kingrang | KR3005K | / | Jul. 04, 2023 |

### 5.5.3. Test Data

| Voltage (Vdc) | Temperature (℃) | Frequency (MHz) | Deviation (%) | Limit (%) |
|---|---|---|---|---|
| 3.8 | -20 | 13.560254 | 0.00187 | +/-0.01% |
| 3.8 | -10 | 13.560218 | 0.00161 | |
| 3.8 | 0 | 13.560142 | 0.00105 | |
| 3.8 | 10 | 13.560269 | 0.00198 | |
| 3.8 | 20 | 13.560163 | 0.00120 | |
| 3.8 | 30 | 13.560285 | 0.00210 | |
| 3.8 | 40 | 13.560207 | 0.00153 | |
| 3.8 | 50 | 13.560218 | 0.00161 | |
| 3.8 | 55 | 13.560212 | 0.00156 | |
| 4.35 | 20 | 13.560175 | 0.00129 | |
| 3.3 | 20 | 13.560160 | 0.00118 | |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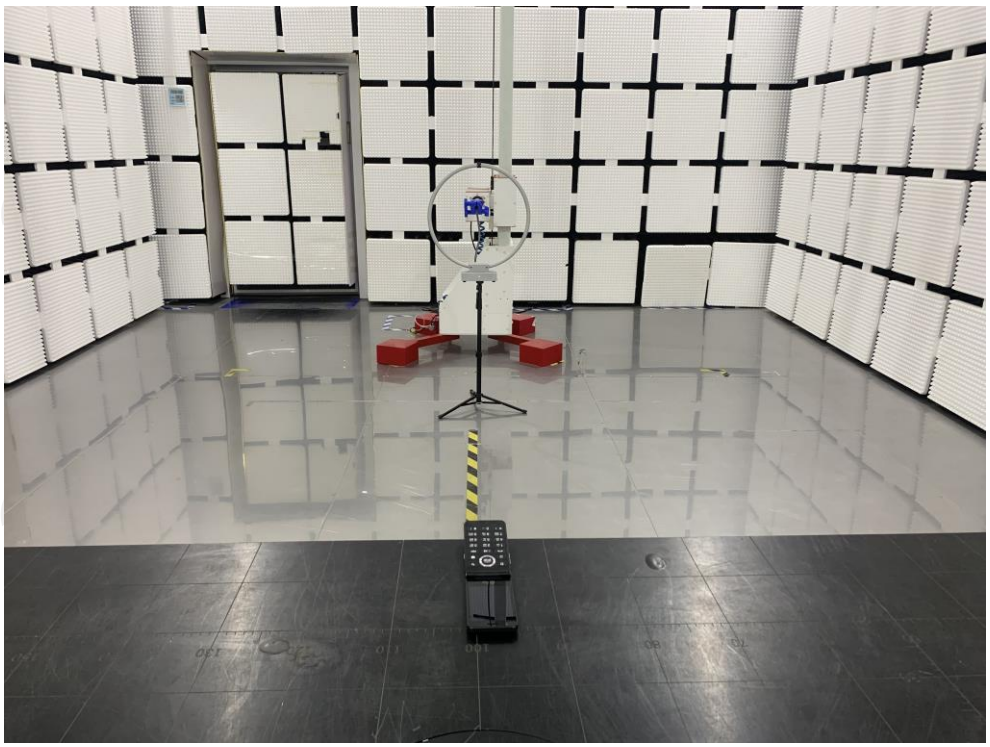
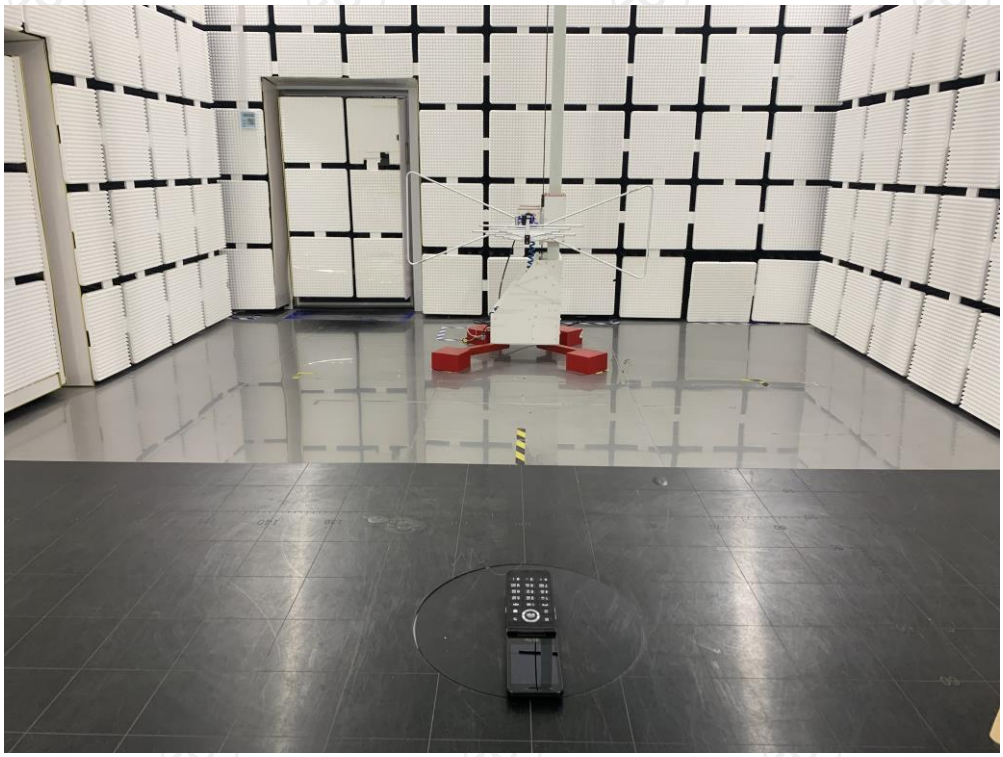
# Appendix A: Photographs of Test Setup

Radiated Emission







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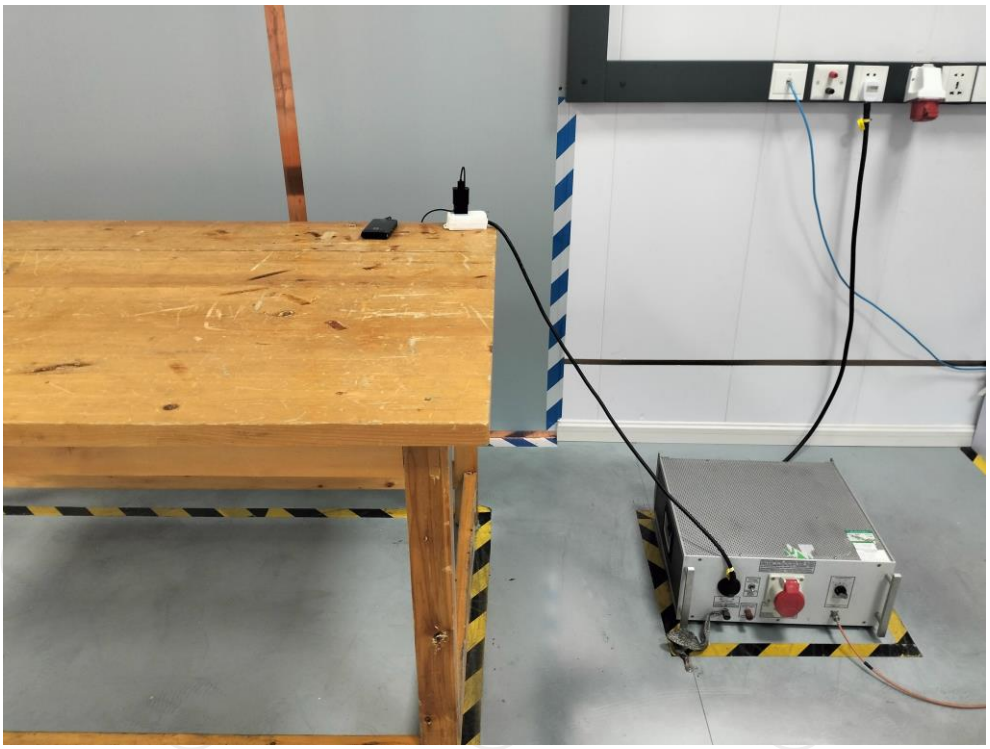
Conducted Emission



## Appendix B: Photographs of EUT

Refer to the test report No. TCT221014E007

********END OF REPORT********



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