

# TEST REPORT

**Applicant:** Xiaomi Communications Co., Ltd.  
**Address:** #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road,  
Haidian District, Beijing, China, 100085  
**Equipment Type:** Mobile Phone  
**Model Name:** 23124RA7EO  
**Brand Name:** Redmi  
**FCC ID:** 2AFZZA7EO  
**Test Standard:** 47 CFR Part 15 Subpart C  
ANSI C63.10-2020  
**Sample Arrival Date:** Oct. 16, 2023  
**Test Date:** Oct. 31, 2023 - Nov. 06, 2023  
**Date of Issue:** Nov. 27, 2023

**ISSUED BY:**

Shenzhen BALUN Technology Co., Ltd.

**Tested by:** Zhenxiang Liu

**Checked by:** Xia Long

**Approved by:** Liao Jianming  
(Technical Director)

*Zhenxiang Liu*

*Xia Long*

*Jim Liao*

### Revision History

| Version        | Issue Date           | Revisions            |
|----------------|----------------------|----------------------|
| <u>Rev. 01</u> | <u>Nov. 27, 2023</u> | <u>Initial Issue</u> |

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# 1 GENERAL INFORMATION

## 1.1 Test Laboratory

|              |                                                                                                                              |
|--------------|------------------------------------------------------------------------------------------------------------------------------|
| Name         | Shenzhen BALUN Technology Co., Ltd.                                                                                          |
| Address      | Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China |
| Phone Number | +86 755 6685 0100                                                                                                            |

## 1.2 Test Location

|                           |                                                                                                                                                                                                                         |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Name                      | Shenzhen BALUN Technology Co., Ltd.                                                                                                                                                                                     |
| Location                  | <input checked="" type="checkbox"/> Block B, 1/F, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China                                                        |
|                           | <input type="checkbox"/> 1/F, Building B, Ganghongji High-tech Intelligent Industrial Park, No. 1008, Songbai Road, Yangguang Community, Xili Sub-district, Nanshan District, Shenzhen, Guangdong Province, P. R. China |
| Accreditation Certificate | The laboratory is a testing organization accredited by FCC as a accredited testing laboratory. The designation number is CN1196.                                                                                        |

## 2 PRODUCT INFORMATION

### 2.1 Applicant Information

|           |                                                                                               |
|-----------|-----------------------------------------------------------------------------------------------|
| Applicant | Xiaomi Communications Co., Ltd.                                                               |
| Address   | #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085 |

### 2.2 Manufacturer Information

|              |                                                                                               |
|--------------|-----------------------------------------------------------------------------------------------|
| Manufacturer | Xiaomi Communications Co., Ltd.                                                               |
| Address      | #019, 9th Floor, Building 6, 33 Xi'erqi Middle Road, Haidian District, Beijing, China, 100085 |

### 2.3 General Description for Equipment under Test (EUT)

|                                           |                        |
|-------------------------------------------|------------------------|
| EUT Name                                  | Mobile Phone           |
| Model Name Under Test                     | 23124RA7EO             |
| Series Model Name                         | N/A                    |
| Description of Model name differentiation | N/A                    |
| Hardware Version                          | 135100N7               |
| Software Version                          | MIUI14                 |
| Dimensions (Approx.)                      | N/A                    |
| Weight (Approx.)                          | N/A                    |
| EUT ID                                    | S04                    |
| IMEI Number                               | IMEI 1:861678060030500 |
|                                           | IMEI 2:861678060030518 |

### 2.4 Technical Information

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Network and Wireless connectivity | 2G Network GSM/GPRS/EDGE 850/900/1800/1900<br>3G Network WCDMA/HSDPA/HSUPA/DC-HSDPA Band 1/5/8<br>4G Network FDD LTE Band 1/3/5/7/8/20/28<br>TDD LTE Band 38/40/41<br>LTE CA Uplink (UL): CA_7C, CA_38C, CA_40C<br>Bluetooth (BR+EDR+BLE)<br>2.4G WIFI 802.11b, 802.11g, 802.11n(HT20)<br>5G WIFI 802.11a, 802.11n(HT20/40) and 802.11ac(VHT20/40/80)<br>U-NII-1/2A/2C/3, GPS, GLONASS, Galileo, BDS, SBAS,<br>FM receiver, NFC |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The requirement for the following technical information of the EUT was tested in this report:

|                         |                                                                                                                          |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Modulation Type         | ASK                                                                                                                      |
| Product Type            | <input type="checkbox"/> Mobile<br><input checked="" type="checkbox"/> Portable<br><input type="checkbox"/> Fix Location |
| Frequency Range         | 13.56 MHz                                                                                                                |
| Receiver Categorization | 3                                                                                                                        |
| Number of channel       | 1                                                                                                                        |
| Tested Channel          | 1                                                                                                                        |
| Antenna Type            | PIFA Antenna                                                                                                             |

### 3 SUMMARY OF TEST RESULTS

#### 3.1 Test Standards

| No. | Identity                  | Document Title                                                     |
|-----|---------------------------|--------------------------------------------------------------------|
| 1   | 47 CFR Part 15, Subpart C | Miscellaneous Wireless Communications Services                     |
| 2   | ANSI C63.10-2020          | American National Standard for Testing Unlicensed Wireless Devices |

#### 3.2 Verdict

| No. | Description                             | FCC Part No.       | Verdict              |
|-----|-----------------------------------------|--------------------|----------------------|
| 1   | Antenna Requirement                     | 15.203             | Pass <sup>Note</sup> |
| 2   | Emissions Bandwidth                     | 15.215             | Pass                 |
| 3   | Field Strength of Fundamental Emissions | 15.225(a)          | Pass                 |
| 4   | Radiated Emissions                      | 15.225(d) / 15.209 | Pass                 |
| 5   | Frequency Stability                     | 15.225(e)          | Pass                 |
| 6   | Conducted Emission                      | 15.207             | Pass                 |

Note: The EUT has a permanently and irreplaceable attached antenna, which complies with the requirement FCC 15.203

#### 3.3 Test Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| Measurement                           | Value  |
|---------------------------------------|--------|
| Conducted emissions (9 kHz-30 MHz)    | 3.2 dB |
| Radiated emissions (9 kHz-30 MHz)     | 4.3 dB |
| Radiated emissions (30 MHz-1 GHz)-10m | 4.8 dB |

## 4 GENERAL TEST CONFIGURATIONS

### 4.1 Test Environments

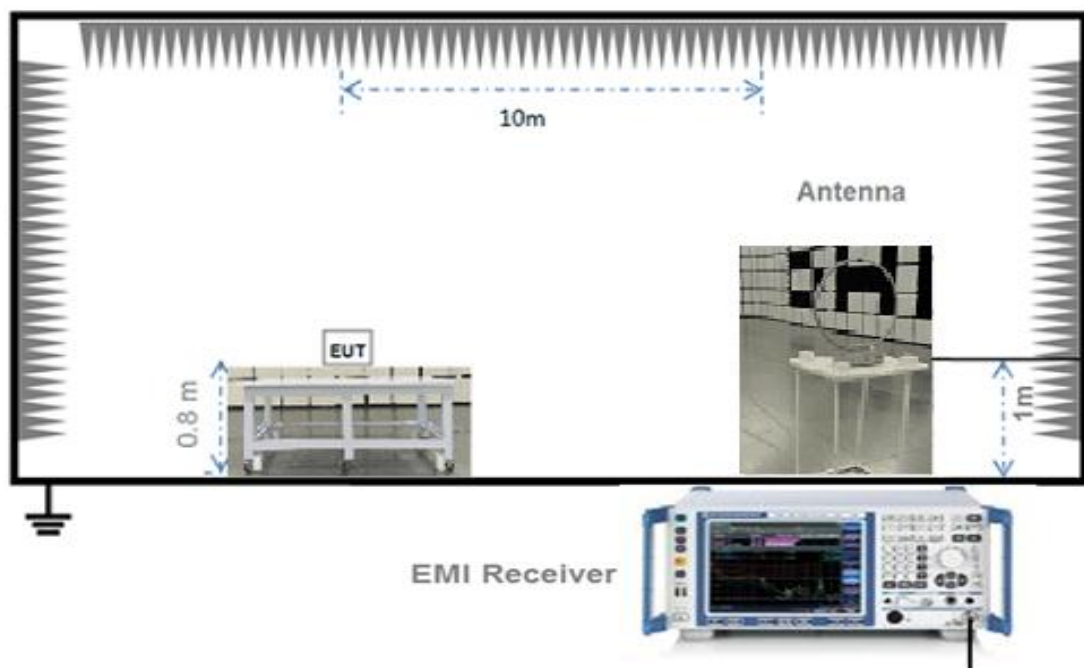
During the measurement, the normal environmental conditions were within the listed ranges:

|                            |                         |                    |
|----------------------------|-------------------------|--------------------|
| Relative Humidity          | 30% to 60%              |                    |
| Atmospheric Pressure       | 100 kPa to 102 kPa      |                    |
| Temperature                | NT (Normal Temperature) | +22.0°C to +25.0°C |
| Working Voltage of the EUT | NV (Normal Voltage)     | 3.89 V             |

### 4.2 Test Setups

#### Test Setup 1

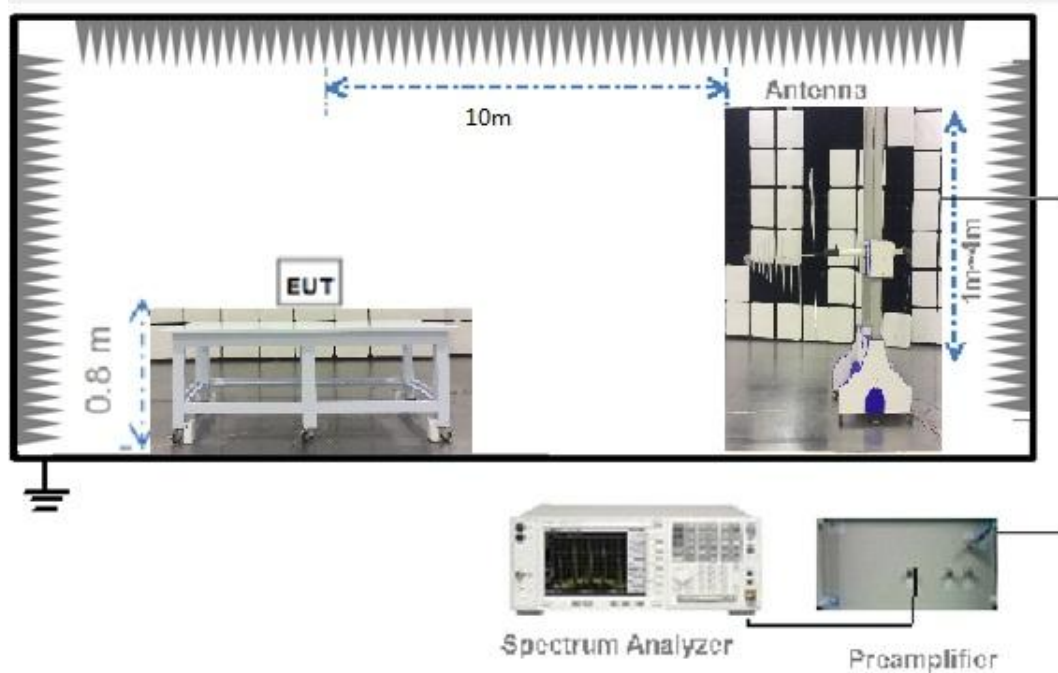
Radiated Test (Below 30 MHz)



(Diagram 1)

## Test Setup 2

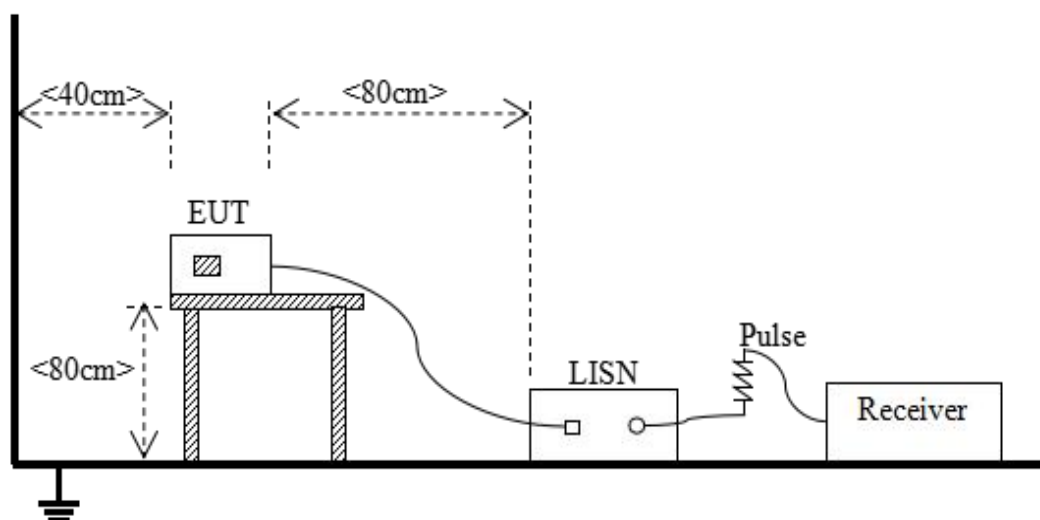
### Radiated Test (30 MHz-1 GHz)



(Diagram 2)

## Test Setup 3

### AC Power Supply Port Test



(Diagram 3)

## 5 TEST ITEMS

### 5.1 Antenna Requirements

#### 5.1.1 Relevant Standards

FCC §15.203

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 shall be considered sufficient to comply with the provisions of this section. 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.

#### 5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

| Protected Method                        | Description                            |
|-----------------------------------------|----------------------------------------|
| The antenna is embedded in the product. | An embedded-in antenna design is used. |

| Reference Documents | Item                              |
|---------------------|-----------------------------------|
| Photo               | Please refer EUT internal photos. |

## 5.2 Emission Bandwidth

### 5.2.1 Definition

15.215(c);

Intentional radiators operating under the alternative provisions to the general emission limits must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

The following conditions shall be observed for measuring the occupied bandwidth and x dB bandwidth:

- The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
- The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.
- The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.
- The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

### 5.2.2 Test Setup

See section 4.2(Diagram 1) for test setup for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.2.3 Test Procedure

The 20dB bandwidth is measured with a spectrum analyzer connected via a receiver antenna placed near the EUT while the EUT is operating in transmission mode.

Use the following spectrum analyzer settings:

Span = between 2 to 5 times the OBW

RBW = 1% to 5% the OBW

VBW  $\geq$  3RBW

Sweep = auto

Detector function = peak

Trace = max hold

The 99% emission bandwidth is measured with a spectrum analyzer connected via a receiver antenna placed near the EUT while the EUT is operating in transmission mode.

Use the following spectrum analyzer settings:

Span = between 1.5 to 5 times the OBW

RBW = 1% to 5% OBW

VBW  $\geq$  3RBW

Sweep = auto

Detector function = peak

Trace = max hold

#### 5.2.4 Test Result and Test Equipment List

Please refer to ANNEX A.1

## 5.3 Field Strength of Fundamental Emissions and Radiated Emissions

### 5.3.1 Limit

FCC §15.225(a), (b), (c)

According to FCC section 15.225, for <30 MHz, Radiated emissions were measured according to ANSI C63.4. The EUT was set to transmit at the highest output power. The EUT was set 10 meter away from the measuring antenna. The loop antenna was positioned 1 meter above the ground from the center of the loop. The measuring bandwidth was set to 10 kHz. (Note: During testing the receive antenna was rotated about its axis to maximize the emission from the EUT)

There was no detected Restricted bands and Radiated spurious emission below 30MHz. The 30m limit was converted to 3m Limit using square factor(x) as it was found by measurements as follows; 3 m Limit(dBμV/m) = 20log(X)+40log(30/3)= 20log(15848)+40log(30/3) = 124dBμV

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency range<br>(MHz) | Field Strength@30m |        | Field Strength@10m | Field Strength@3m |
|--------------------------|--------------------|--------|--------------------|-------------------|
|                          | μV/m               | dBμV/m | dBμV/m             | dBμV/m            |
| Below 13.110             | 30                 | 29.5   | 48.58              | 69.5              |
| 13.110 ~ 13.410          | 106                | 40.5   | 59.58              | 80.5              |
| 13.410 ~ 13.553          | 334                | 50.5   | 69.58              | 90.5              |
| 13.553 ~13.567           | 15848              | 84     | 103.08             | 124               |
| 13.567 ~ 13.710          | 334                | 50.5   | 69.58              | 90.5              |
| 13.710 ~14.010           | 106                | 40.5   | 59.58              | 80.5              |
| Above 14.010             | 30                 | 29.5   | 48.58              | 69.5              |

NOTE:

1. Field Strength (dBμV/m) = 20\*log[Field Strength (μV/m)].
2. In the emission tables above, the tighter limit applies at the band edges.

FCC §15.225(d)

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field Strength (μV/m) | Measurement distance (meters) |
|-----------------|-----------------------|-------------------------------|
| 0.009 - 0.490   | 2400/F(kHz)           | 300                           |
| 0.490 - 1.705   | 24000/F(kHz)          | 30                            |
| 1.705 - 30.0    | 30                    | 30                            |
| 30 - 88         | 100                   | 3                             |
| 88 - 216        | 150                   | 3                             |
| 216 - 960       | 200                   | 3                             |
| Above 960       | 500                   | 3                             |

Note:

1. For Above 1000 MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
2. For above 1000 MHz, limit field strength of harmonics: 54dB $\mu$ V/m@3m (AV) and 74dB $\mu$ V/m@3m (PK).

### 5.3.2 Test Setup

See section 4.2(Diagram 1 and Diagram 2) for test setup for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.3.3 Test Procedure

The measurement frequency range is from 9 kHz to the 10th harmonic of the fundamental frequency. The Turn Table is actuated to turn from 0° to 360°, and both horizontal and vertical polarizations of the Test Antenna are used to find the maximum radiated power. Mid channels on all channel bandwidth verified. Only the worst RB size/offset presented. The power of the EUT transmitting frequency should be ignored.

All Spurious Emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $30 \text{ MHz} < f < 1 \text{ GHz}$ , 10 kHz for  $150 \text{ kHz} < f < 30 \text{ MHz}$ , 300 Hz for  $f < 150 \text{ kHz}$

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

### 5.3.4 Test Result and Test Equipment List

Please refer to ANNEX A.2 and A.3

NOTE:

1. Results (dB $\mu$ V/m) = Reading (dB $\mu$ V/m) + Factor (dB/m)

The reading level is calculated by software which is not shown in the sheet

2. Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Amplifier Gain (dB)

3. Margin = Limit – Results

## 5.4 Frequency Tolerance

### 5.4.1 Limit

FCC §15.225(e)

The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of  $-20$  degrees to  $+50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

### 5.4.2 Test Setup

See section 4.2(Diagram 1) for test setup for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.4.3 Test Procedure

1. The test is performed in a Temperature Chamber.
2. The EUT is configured as MS + DC Power Supply.

### 5.4.4 Test Result and Test Equipment List

Please refer to ANNEX A.4.

## 5.5 Conducted Emission

### 5.5.1 Limit

FCC §15.207

For an intentional radiator 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 within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

| Frequency range (MHz) | Conducted Limit (dBμV) |          |
|-----------------------|------------------------|----------|
|                       | Quai-peak              | Average  |
| 0.15 - 0.50           | 66 to 56               | 56 to 46 |
| 0.50 - 5              | 56                     | 46       |
| 0.50 - 30             | 60                     | 50       |

### 5.5.2 Test Setup

See section 4.2(Diagram 3) for test setup for the antenna port. The photo of test setup please refer to ANNEX B.

### 5.5.3 Test Procedure

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz) for which the device is capable of operation. A device rated for 50/60 Hz operation need not be tested at both frequencies provided the radiated and line conducted emissions are the same at both frequencies.

### 5.5.4 Test Result and Test Equipment List

Please refer to ANNEX A.5.

NOTE:

1. Results (dBμV) = Reading (dBμV) + Factor (dB)

The reading level is calculated by software which is not shown in the sheet

2. Factor = Insertion loss + Cable loss

3. Margin = Limit – Results

## ANNEX A TEST RESULT

### A.1 Emission Bandwidth

Note: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

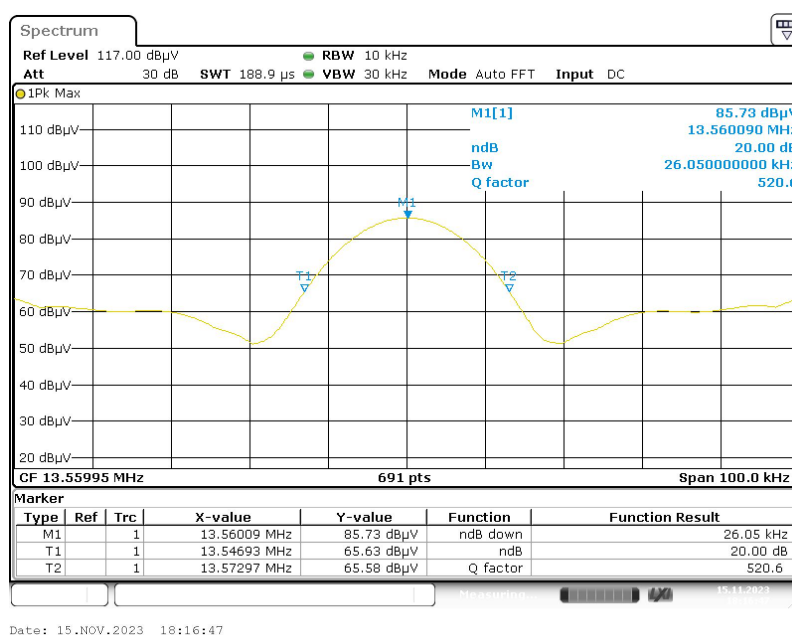
|               |           |             |            |
|---------------|-----------|-------------|------------|
| Sample No.    | S04       | Temperature | 23.9℃      |
| Humidity      | 54%RH     | Pressure    | 101kPa     |
| Test Engineer | Xi Zifeng | Test date   | 2023.10.18 |

#### Test Data

| Frequency<br>(MHz) | Emission Bandwidth(20dB down)<br>(kHz) | Occupied Bandwidth(99%)<br>(kHz) |
|--------------------|----------------------------------------|----------------------------------|
| 13.560             | 26.05                                  | 25.615                           |

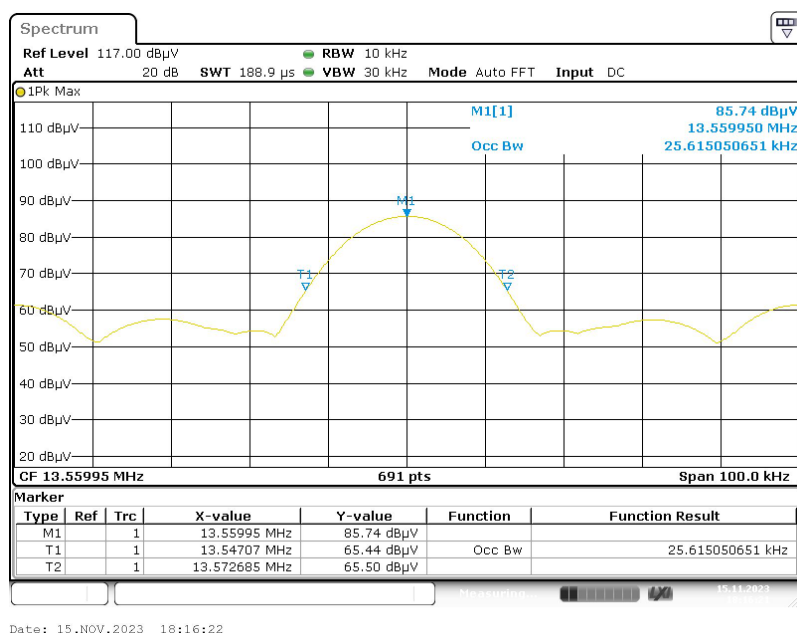
#### Test Plots

##### Emission Bandwidth



Note: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

## 99% Occupied Bandwidth



Note: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

| Equipment Information  |                    |                   |            |            |            |                                     |
|------------------------|--------------------|-------------------|------------|------------|------------|-------------------------------------|
| Equipment Name         | Supplier           | Model             | Serial No. | Cal. Date  | Cal. Due   | Use                                 |
| EMI Receiver           | ROHDE&SCHWARZ      | ESRP              | 101036     | 2023.09.05 | 2024.09.04 | <input checked="" type="checkbox"/> |
| Test Antenna-Loop      | SCHWARZBECK        | FMZB 1519         | 1519-037   | 2021.04.16 | 2024.04.15 | <input checked="" type="checkbox"/> |
| Anechoic Chamber (10M) | EMC TECHNOLOGY LTD | 20.1m*11.6m*7.35m | 130        | 2021.08.15 | 2024.08.14 | <input checked="" type="checkbox"/> |

## A.2 Field Strength of Fundamental Emissions

Note: Field Strength of Fundamental Emissions tests were performed in X, Y, Z axis direction of EUT. And only the worst axis test condition was recorded in this test report.

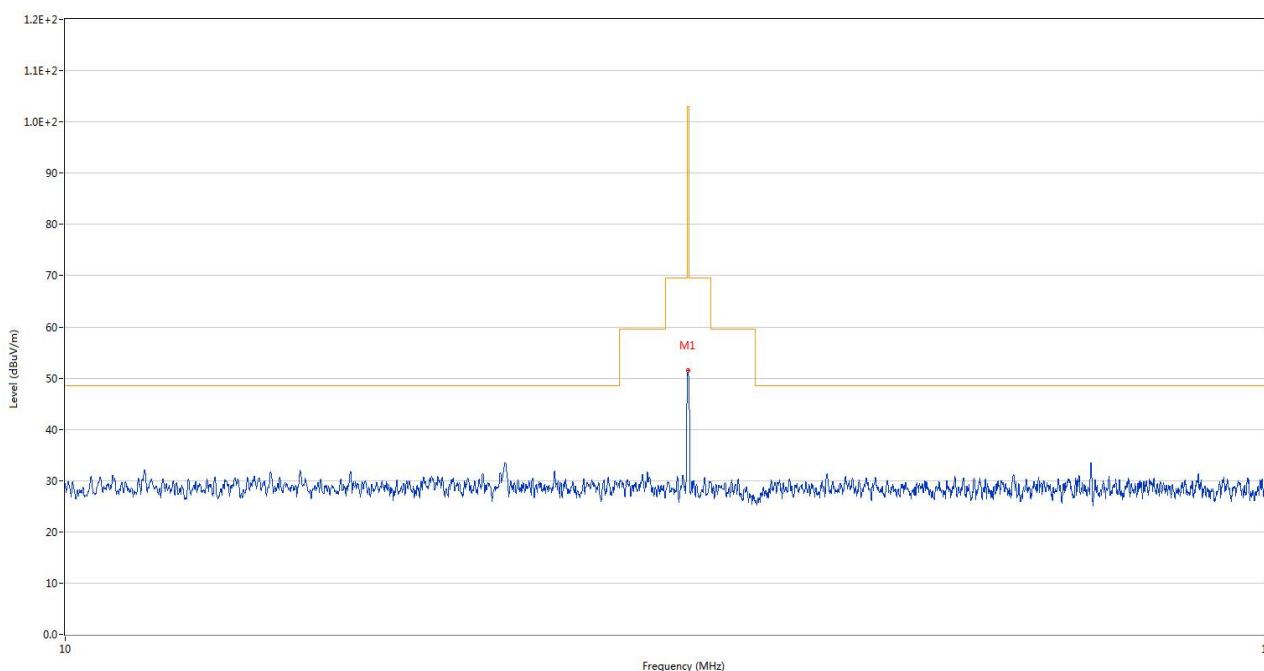
|               |           |             |            |
|---------------|-----------|-------------|------------|
| Sample No.    | S04       | Temperature | 23.9℃      |
| Humidity      | 54%RH     | Pressure    | 101kPa     |
| Test Engineer | Xi Zifeng | Test date   | 2023.10.18 |

### Test Data

| Field Strength of Fundamental Emissions Value |          |                         |                     |        |             |
|-----------------------------------------------|----------|-------------------------|---------------------|--------|-------------|
| Frequency (MHz)                               | Detector | Field Strength (dBμV/m) | Limit @10m (dBμV/m) | EUT    | Margin (dB) |
| 13.560                                        | PEAK     | 51.89                   | 103.1               | Y axis | 69.92       |

### Test Plot

Test Antenna-LOOP, EUT Y axis



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Margin (dB) | Detector | Table (Degree) | Height (cm) | Antenna  | Verdict |
|-----|-----------------|------------------|-------------|----------------|-------------|----------|----------------|-------------|----------|---------|
| 1   | 13.560          | 51.89            | 20.86       | 103.1          | 51.21       | Peak     | 96.00          | 100         | Vertical | Pass    |

| Equipment Information            |                         |                   |            |            |            |                                     |
|----------------------------------|-------------------------|-------------------|------------|------------|------------|-------------------------------------|
| Equipment Name                   | Supplier                | Model             | Serial No. | Cal. Date  | Cal. Due   | Use                                 |
| EMI Receiver                     | ROHDE&SCHWARZ           | ESRP              | 101036     | 2023.09.05 | 2024.09.04 | <input checked="" type="checkbox"/> |
| Test Antenna-Loop (9 kHz-30 MHz) | SCHWARZBECK             | FMZB 1519         | 1519-037   | 2021.04.16 | 2024.04.15 | <input checked="" type="checkbox"/> |
| Anechoic Chamber (10M)           | EMC Electronic Co., Ltd | 20.10*11.60*7.35m | 130        | 2021.08.15 | 2024.08.14 | <input checked="" type="checkbox"/> |
| Description                      | Supplier                | Name              | Version    | /          |            | Use                                 |
| Test Software                    | BALUN                   | BL410-E           | V22.930    | /          |            | <input checked="" type="checkbox"/> |

### A.3 Radiated Emissions

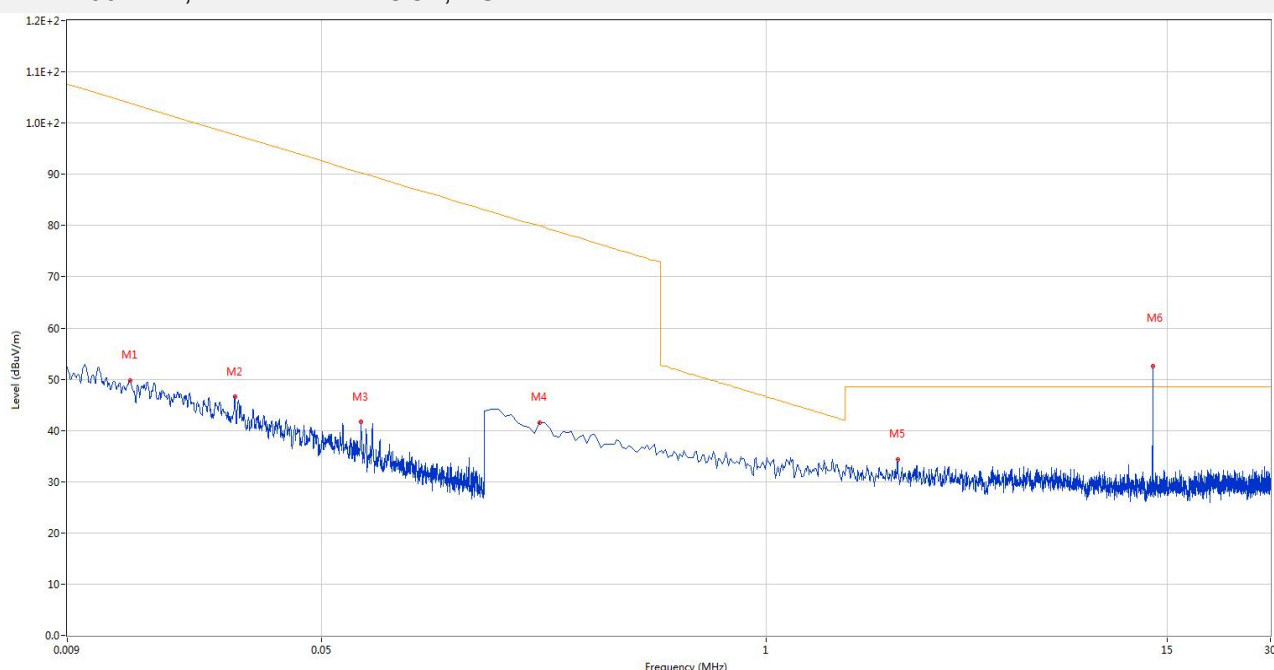
Note 1: This frequency which near 13.560 MHz with circle should be ignored because they are NFC carrier frequency.

Note 2: All Radiated Emissions tests were performed in X, Y, Z axis direction of EUT. And only the worst axis test condition was recorded in this test report.

The Data and Plots (9 kHz ~ 30 MHz) (at 10m chamber)

|               |           |             |            |
|---------------|-----------|-------------|------------|
| Sample No.    | S04       | Temperature | 24.9℃      |
| Humidity      | 57%RH     | Pressure    | 101kPa     |
| Test Engineer | Xi Zifeng | Test date   | 2023.10.18 |

Below 30 MHz, Test Antenna LOOP, EUT Y axis



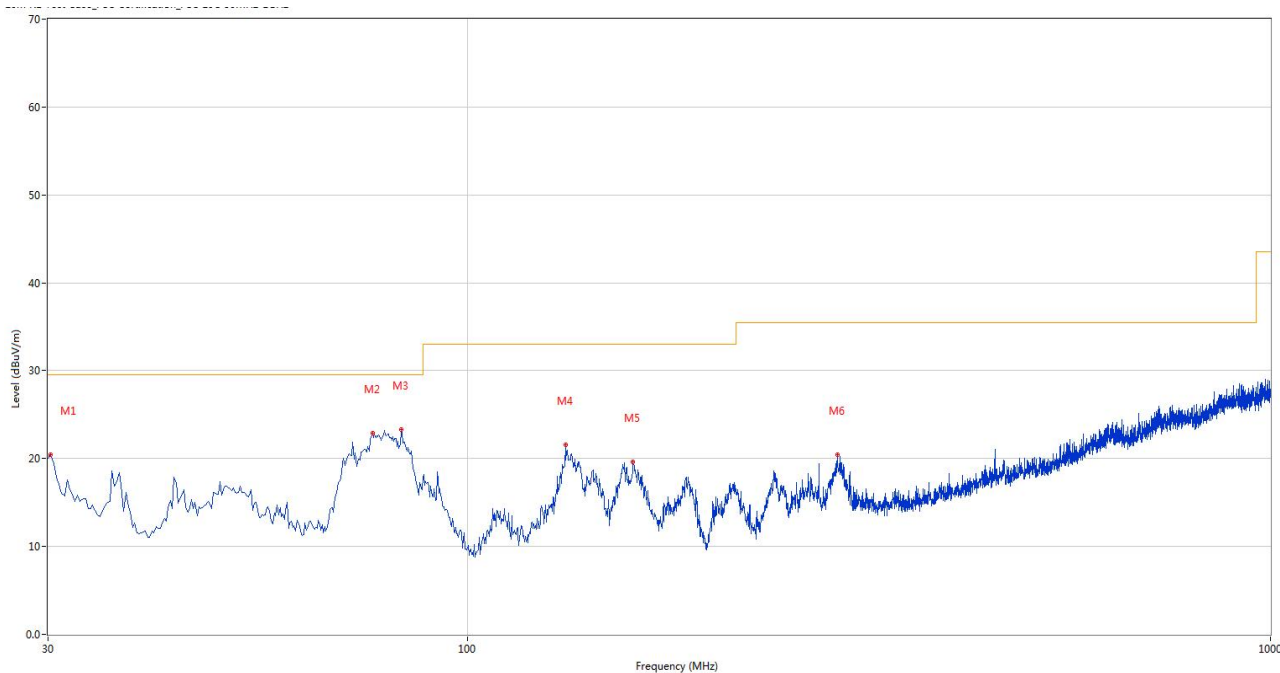
| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Margin (dB) | Detector | Table (Degree) | Height (cm) | Antenna  | Verdict |
|-----|-----------------|------------------|-------------|----------------|-------------|----------|----------------|-------------|----------|---------|
| 1   | 0.014           | 49.75            | 20.15       | 103.9          | 54.15       | Peak     | 228.00         | 100         | Vertical | Pass    |
| 2   | 0.028           | 46.53            | 20.17       | 97.7           | 51.17       | Peak     | 75.00          | 100         | Vertical | Pass    |
| 3   | 0.065           | 41.66            | 20.18       | 90.3           | 48.64       | Peak     | 293.00         | 100         | Vertical | Pass    |
| 4   | 0.217           | 41.56            | 20.11       | 79.9           | 38.34       | Peak     | 88.00          | 100         | Vertical | Pass    |
| 5   | 2.434           | 34.29            | 20.45       | 48.5           | 14.21       | Peak     | 17.00          | 100         | Vertical | Pass    |
| 6   | 13.560          | 53.59            | 20.86       | 48.5           | -5.09       | Peak     | 263.00         | 100         | Vertical | N/A     |

| Equipment Information  |                    |                   |            |            |            |                                     |
|------------------------|--------------------|-------------------|------------|------------|------------|-------------------------------------|
| Equipment Name         | Supplier           | Model             | Serial No. | Cal. Date  | Cal. Due   | Use                                 |
| Frequency 9kHz-30MHz   |                    |                   |            |            |            |                                     |
| EMI Receiver           | ROHDE&SCHWARZ      | ESRP              | 101036     | 2023.09.05 | 2024.09.04 | <input checked="" type="checkbox"/> |
| Test Antenna-Loop      | SCHWARZBECK        | FMZB 1519         | 1519-037   | 2021.04.16 | 2024.04.15 | <input checked="" type="checkbox"/> |
| Anechoic Chamber (10M) | EMC TECHNOLOGY LTD | 20.1m*11.6m*7.35m | 130        | 2021.08.15 | 2024.08.14 | <input checked="" type="checkbox"/> |
| Description            | Supplier           | Name              | Version    | /          |            | Use                                 |
| Test Software          | BALUN              | BL410-E           | V22.930    | /          |            | <input checked="" type="checkbox"/> |

## The Data and Plots (30 MHz ~ 10th Harmonic)

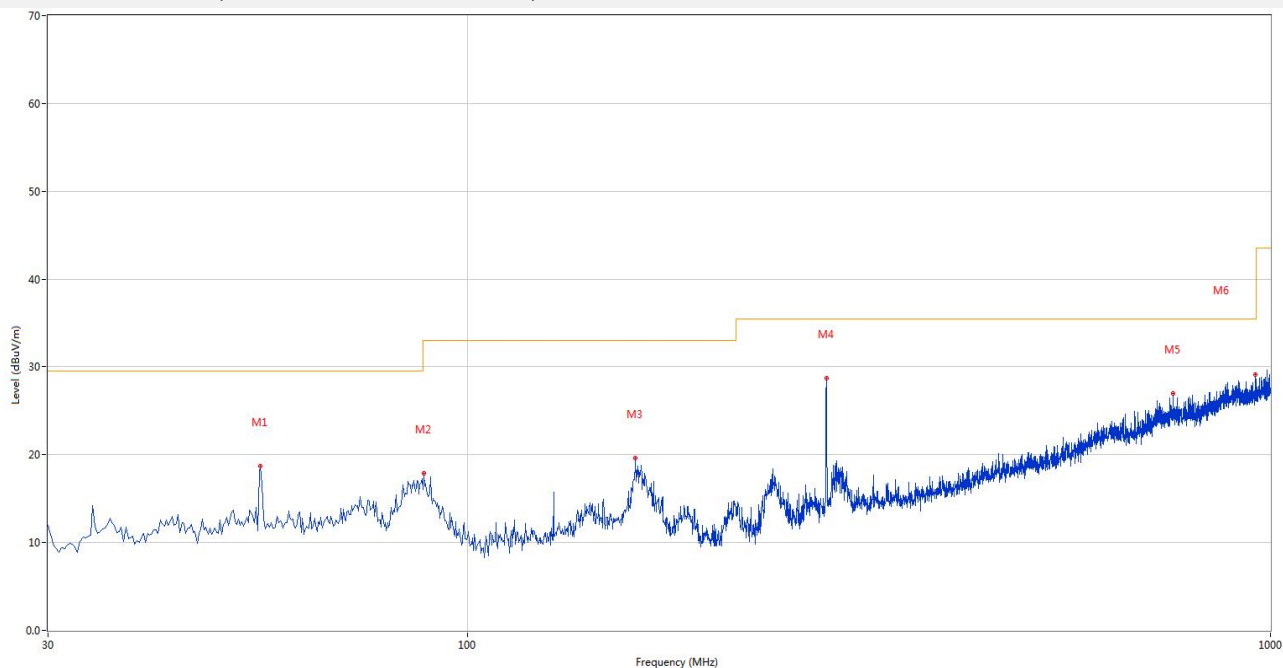
|               |           |             |            |
|---------------|-----------|-------------|------------|
| Sample No.    | S04       | Temperature | 24.9℃      |
| Humidity      | 57%RH     | Pressure    | 101kPa     |
| Test Engineer | Xi Zifeng | Test date   | 2023.11.06 |

## 30 MHz to 1 GHz, Test Antenna Vertical, EUT Y axis



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Margin (dB) | Detector | Table (Degree) | Height (cm) | Antenna  | Verdict |
|-----|-----------------|------------------|-------------|----------------|-------------|----------|----------------|-------------|----------|---------|
| 1   | 30.242          | 20.43            | -28.19      | 29.5           | 9.07        | Peak     | 188.00         | 200         | Vertical | Pass    |
| 2   | 76.063          | 22.90            | -29.35      | 29.5           | 6.60        | Peak     | 4.00           | 400         | Vertical | Pass    |
| 3   | 82.609          | 23.32            | -30.84      | 29.5           | 6.18        | Peak     | 237.00         | 100         | Vertical | Pass    |
| 4   | 132.309         | 21.55            | -27.21      | 33.0           | 11.45       | Peak     | 0.00           | 200         | Vertical | Pass    |
| 5   | 160.675         | 19.66            | -25.80      | 33.0           | 13.34       | Peak     | 253.00         | 100         | Vertical | Pass    |
| 6   | 288.683         | 20.40            | -24.95      | 35.5           | 15.10       | Peak     | 209.00         | 100         | Vertical | Pass    |

## 30 MHz to 1 GHz, Test Antenna Horizontal, EUT Y axis



| No. | Frequency (MHz) | Results (dBuV/m) | Factor (dB) | Limit (dBuV/m) | Margin (dB) | Detector | Table (Degree) | Height (cm) | Antenna    | Verdict |
|-----|-----------------|------------------|-------------|----------------|-------------|----------|----------------|-------------|------------|---------|
| 1   | 55.214          | 18.70            | -26.15      | 29.5           | 10.80       | Peak     | 360.00         | 200         | Horizontal | Pass    |
| 2   | 88.185          | 17.89            | -31.71      | 33.0           | 15.11       | Peak     | 107.00         | 200         | Horizontal | Pass    |
| 3   | 161.887         | 19.65            | -25.78      | 33.0           | 13.35       | Peak     | 58.00          | 400         | Horizontal | Pass    |
| 4   | 279.713         | 28.76            | -25.66      | 35.5           | 6.74        | Peak     | 31.00          | 300         | Horizontal | Pass    |
| 5   | 756.833         | 26.93            | -13.07      | 35.5           | 8.57        | Peak     | 329.00         | 100         | Horizontal | Pass    |
| 6   | 958.543         | 29.14            | -10.76      | 35.5           | 6.36        | Peak     | 167.00         | 100         | Horizontal | Pass    |

| Equipment Information |                         |                   |             |            |            |                                     |
|-----------------------|-------------------------|-------------------|-------------|------------|------------|-------------------------------------|
| Equipment Name        | Supplier                | Model             | Serial No.  | Cal. Date  | Cal. Due   | Use                                 |
| Frequency Below 1 GHz |                         |                   |             |            |            |                                     |
| EMI Receiver          | ROHDE&SCHWARZ           | ESRP              | 101036      | 2023.09.08 | 2024.09.05 | <input checked="" type="checkbox"/> |
| Amplifier (30-1GHz)   | COM-MV                  | ZT30-1000M        | B2018054558 | 2022.12.07 | 2023.12.06 | <input checked="" type="checkbox"/> |
| Test Antenna-Bi-Log   | SCHWARZBECK             | VULB 9168         | 9168-01162  | 2023.08.04 | 2026.08.03 | <input checked="" type="checkbox"/> |
| Anechoic Chamber      | EMC Electronic Co., Ltd | 20.10*11.60*7.35m | 130         | 2021.08.15 | 2024.08.14 | <input checked="" type="checkbox"/> |
| Description           | Supplier                | Name              | Version     | /          |            | Use                                 |
| Test Software         | BALUN                   | BL410-E           | V22.930     | /          |            | <input checked="" type="checkbox"/> |

The equipment listed in the table below are supported unit provided by the laboratory for achieving EUT functions or monitor EUT functions during the testing process. The supported units are validated by the laboratory before testing.

## A.4 Frequency Stability

Note 1: Because the 85%(3.3065V) and 115% (4.4735V)of the rated supply voltage value exceeds the cut-off voltage upper(4.45V) and lower(3.45V) limit of the manufacturer, the cut-off voltage of EUT is test here.

Note 2: The operating temperature range of the EUT is 0.0°C to 40.0°C.

|                      |              |
|----------------------|--------------|
| OPERATING FREQUENCY: | 13560000 Hz  |
| REFERENCE VOLTAGE:   | 3.89 V       |
| DEVIATION LIMIT:     | $\pm 0.01\%$ |

| VOLTAGE (%)                 | Test Conditions |                  | Frequency(Hz) | Deviation(%) | Verdict |
|-----------------------------|-----------------|------------------|---------------|--------------|---------|
|                             | Power (VDC)     | Temperature (°C) |               |              |         |
| 100                         | 3.87            | -20              | 13560028      | -0.000206    |         |
| 100                         |                 | -10              | 13560024      | 0.000177     |         |
| 100                         |                 | 0                | 13560024      | 0.000177     |         |
| 100                         |                 | +10              | 13559950      | -0.000369    |         |
| 100                         |                 | +20              | 13560028      | 0.000206     |         |
| 100                         |                 | +25              | 13560028      | 0.000206     |         |
| 100                         |                 | +30              | 13559920      | -0.000590    |         |
| 100                         |                 | +40              | 13560028      | 0.000206     |         |
| 100                         |                 | +50              | 13560028      | 0.000206     |         |
| MAX(Battery End Point, 85)  | 4.45            | +20              | 13560028      | 0.000206     |         |
| MIN(Battery End Point, 115) | 3.45            | +20              | 13559950      | -0.000369    |         |

| Equipment Information  |                    |                   |            |            |            |                                     |
|------------------------|--------------------|-------------------|------------|------------|------------|-------------------------------------|
| Equipment Name         | Supplier           | Model             | Serial No. | Cal. Date  | Cal. Due   | Use                                 |
| EMI Receiver           | ROHDE&SCHWARZ      | ESRP              | 101036     | 2023.09.05 | 2024.09.04 | <input checked="" type="checkbox"/> |
| Test Antenna-Loop      | SCHWARZBECK        | FMZB 1519         | 1519-037   | 2021.04.16 | 2024.04.15 | <input checked="" type="checkbox"/> |
| Temperature Chamber    | AHK                | SP20              | 1412       | 2023.09.20 | 2024.09.19 | <input checked="" type="checkbox"/> |
| DC Power Supply        | ROHDE&SCHWARZ      | HMP2020           | 018141664  | 2023.05.15 | 2024.05.14 | <input checked="" type="checkbox"/> |
| Anechoic Chamber (10M) | EMC TECHNOLOGY LTD | 20.1m*11.6m*7.35m | 130        | 2021.08.15 | 2024.08.14 | <input checked="" type="checkbox"/> |
| Description            | Supplier           | Name              | Version    | /          |            | Use                                 |
| Test Software          | BALUN              | BL410-E           | V22.930    | /          |            | <input checked="" type="checkbox"/> |

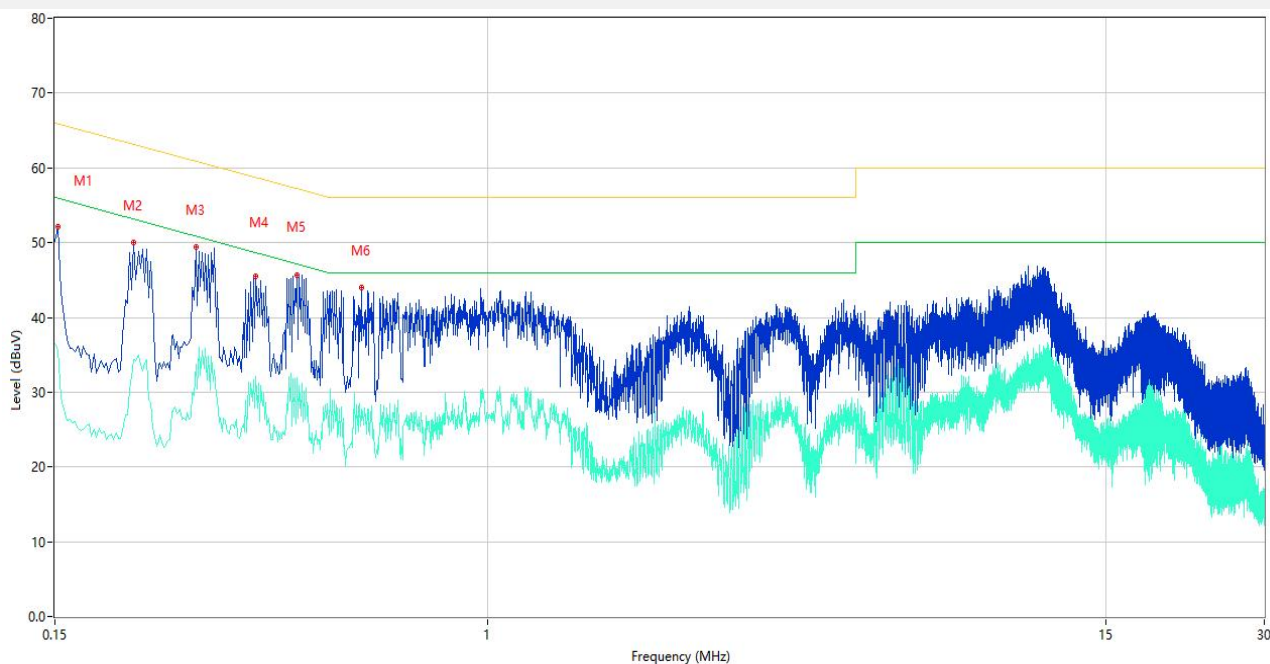
## A.5 Conducted Emissions

Note 1: Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz ) shown here.

## Test Data and Plots

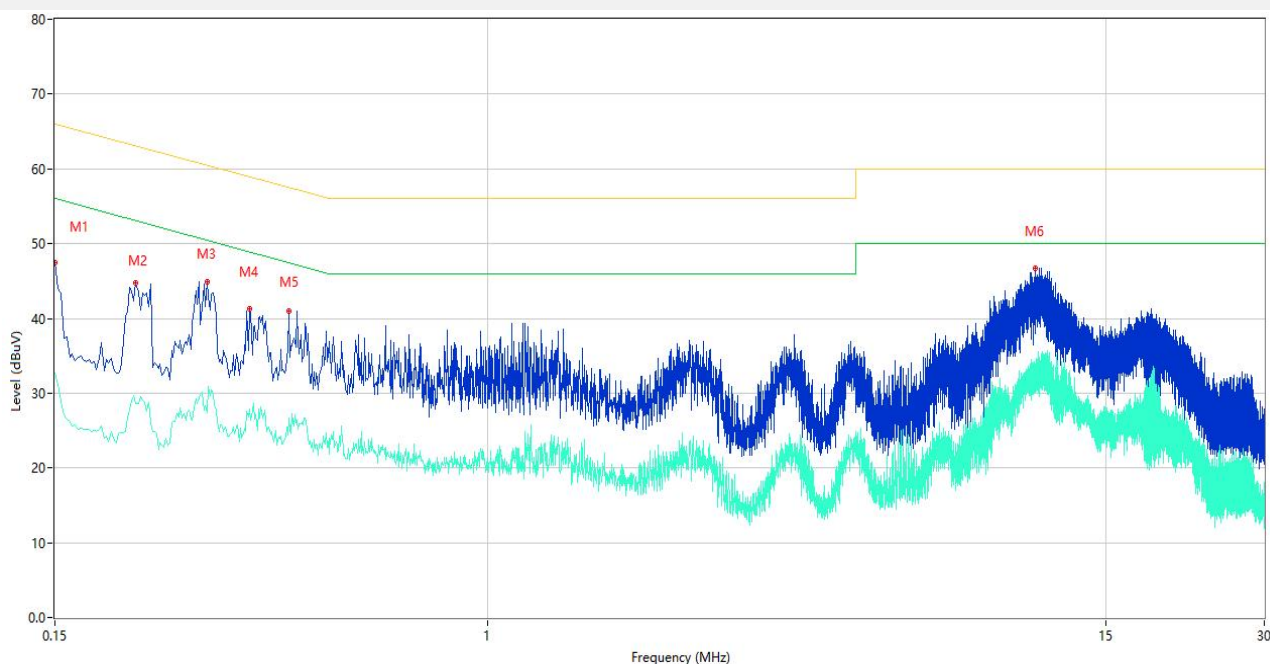
|               |           |             |            |
|---------------|-----------|-------------|------------|
| Sample No.    | S04       | Temperature | 26.3°C     |
| Humidity      | 48%RH     | Pressure    | 101kPa     |
| Test Engineer | Yang Yang | Test date   | 2023.10.31 |

## PHASE L



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Margin (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-------------|----------|------|---------|
| 1   | 0.152           | 52.14          | 9.47        | 65.89        | 13.75       | Peak     | L    | Pass    |
| 1** | 0.152           | 35.67          | 9.47        | 55.89        | 20.22       | AV       | L    | Pass    |
| 2   | 0.212           | 50.01          | 9.42        | 63.13        | 13.12       | Peak     | L    | Pass    |
| 2** | 0.212           | 34.28          | 9.42        | 53.13        | 18.85       | AV       | L    | Pass    |
| 3   | 0.278           | 49.46          | 9.43        | 60.88        | 11.42       | Peak     | L    | Pass    |
| 3** | 0.278           | 33.77          | 9.43        | 50.88        | 17.11       | AV       | L    | Pass    |
| 4   | 0.362           | 45.56          | 9.50        | 58.68        | 13.12       | Peak     | L    | Pass    |
| 4** | 0.362           | 32.07          | 9.50        | 48.68        | 16.61       | AV       | L    | Pass    |
| 5   | 0.434           | 45.65          | 9.96        | 57.18        | 11.53       | Peak     | L    | Pass    |
| 5** | 0.434           | 31.95          | 9.96        | 47.18        | 15.23       | AV       | L    | Pass    |
| 6   | 0.574           | 43.94          | 9.91        | 56.00        | 12.06       | Peak     | L    | Pass    |
| 6** | 0.574           | 27.69          | 9.91        | 46.00        | 18.31       | AV       | L    | Pass    |

## PHASE N



| No. | Frequency (MHz) | Results (dBuV) | Factor (dB) | Limit (dBuV) | Margin (dB) | Detector | Line | Verdict |
|-----|-----------------|----------------|-------------|--------------|-------------|----------|------|---------|
| 1   | 0.150           | 47.53          | 9.47        | 66.00        | 18.47       | Peak     | N    | Pass    |
| 1** | 0.150           | 32.66          | 9.47        | 56.00        | 23.34       | AV       | N    | Pass    |
| 2   | 0.214           | 44.71          | 9.42        | 63.05        | 18.34       | Peak     | N    | Pass    |
| 2** | 0.214           | 28.66          | 9.42        | 53.05        | 24.39       | AV       | N    | Pass    |
| 3   | 0.292           | 44.96          | 9.43        | 60.47        | 15.51       | Peak     | N    | Pass    |
| 3** | 0.292           | 27.41          | 9.43        | 50.47        | 23.06       | AV       | N    | Pass    |
| 4   | 0.352           | 41.29          | 9.36        | 58.92        | 17.63       | Peak     | N    | Pass    |
| 4** | 0.352           | 27.84          | 9.36        | 48.92        | 21.08       | AV       | N    | Pass    |
| 5   | 0.418           | 40.93          | 9.98        | 57.49        | 16.56       | Peak     | N    | Pass    |
| 5** | 0.418           | 26.74          | 9.98        | 47.49        | 20.75       | AV       | N    | Pass    |
| 6   | 10.984          | 46.74          | 8.49        | 60.00        | 13.26       | Peak     | N    | Pass    |
| 6** | 10.984          | 30.89          | 8.49        | 50.00        | 19.11       | AV       | N    | Pass    |

| Equipment Information |                            |                |            |            |            |                                     |
|-----------------------|----------------------------|----------------|------------|------------|------------|-------------------------------------|
| Equipment Name        | Supplier                   | Model          | Serial No. | Cal. Date  | Cal. Due   | Use                                 |
| EMI Receiver          | KEYSIGHT                   | N9010B         | MY57110309 | 2023.09.05 | 2024.09.04 | <input checked="" type="checkbox"/> |
| LISN                  | SCHWARZBECK                | NSLK 8127      | 8127-687   | 2023.05.16 | 2024.05.15 | <input checked="" type="checkbox"/> |
| ISN                   | TESEQ                      | ISN T800       | 34449      | 2023.11.10 | 2024.11.09 | <input type="checkbox"/>            |
| ISN                   | TESEQ                      | ISN T8-Cat6    | 53561      | 2023.04.23 | 2024.04.22 | <input type="checkbox"/>            |
| Shielded Room         | YiHeng Electronic Co., Ltd | 3.5m*3.1m*2.8m | 112        | 2022.02.19 | 2025.02.18 | <input checked="" type="checkbox"/> |
| Description           | Manufacturer               | Name           | Version    | /          |            | Use                                 |
| Test Software         | BALUN                      | BL410-E        | V22.930    | /          |            | <input checked="" type="checkbox"/> |

## **ANNEX B TEST SETUP PHOTOS**

Please refer the document “BL-SZ23A0971-AE-2.PDF”.

## **ANNEX C EUT EXTERNAL PHOTOS**

Please refer the document “BL-SZ23A0971-AW.PDF”.

## **ANNEX D EUT INTERNAL PHOTOS**

Please refer the document “BL-SZ23A0971-AI.PDF”.

## Statement

1. The laboratory guarantees the scientificity, accuracy and impartiality of the test, and is responsible for all the information in the report, except the information provided by the customer. The customer is responsible for the impact of the information provided on the validity of the results.
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--END OF REPORT--