

# TEST REPORT

**FCC ID: 2ADYY-CM5****Product: Mobile Phone****Model No.: CM5****Trade Mark: TECNO****Report No.: WSCT-ANAB-R&E241100063A-NFC****Issued Date: 05 December 2024****Issued for:****TECNO MOBILE LIMITED****FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI  
STREET FOTAN NT HONGKONG****Issued By:****World Standardization Certification & Testing Group(Shenzhen) Co.,Ltd.  
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## 1. Test Certification

|                       |                                                                                                                    |
|-----------------------|--------------------------------------------------------------------------------------------------------------------|
| Product:              | Mobile Phone                                                                                                       |
| Model No.:            | CM5                                                                                                                |
| Trade Mark:           | TECNO                                                                                                              |
| Applicant:            | TECNO MOBILE LIMITED<br>FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI<br>STREET FOTAN NT HONGKONG |
| Manufacturer:         | TECNO MOBILE LIMITED<br>FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI<br>STREET FOTAN NT HONGKONG |
| Date of receipt:      | 29 September 2024                                                                                                  |
| Date of Test:         | 29 September 2024 to 04 December 2024                                                                              |
| Applicable Standards: | FCC CFR Title 47 Part 15 Subpart C<br>KDB 558074 D01 DTS Meas Guidance v04                                         |

The above equipment has been tested by World Standardization Certification & Testing Group (Shenzhen) Co., Ltd. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By: Wang Xiang  
(Wang Xiang)

Checked By: Qin Shuiquan  
(Qin Shuiquan)

Approved By: Li Huaibi  
(Li Huaibi)

Date: 05 December 2024

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## 2. Test Result Summary

| Requirement                             | CFR 47 Section      | Result |
|-----------------------------------------|---------------------|--------|
| Antenna requirement                     | §15.203             | PASS   |
| Emission Bandwidth                      | §15.215             | PASS   |
| Field Strength of Fundamental Emissions | §15.225(a)          | PASS   |
| Radiated Emissions                      | §15.225(d) / 15.209 | PASS   |
| Frequency Stability                     | §15.225(e)          | PASS   |
| Conducted Emission                      | §15.207             | PASS   |

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

### 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. EUT Description

|                        |                                                                                                                                                                                                                                                                                                                            |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name:          | Mobile Phone                                                                                                                                                                                                                                                                                                               |
| Model :                | CM5                                                                                                                                                                                                                                                                                                                        |
| Trade Mark:            | TECNO                                                                                                                                                                                                                                                                                                                      |
| Software version:      | CM5-H8918                                                                                                                                                                                                                                                                                                                  |
| Hardware version:      | V1.2                                                                                                                                                                                                                                                                                                                       |
| Operation Frequency:   | NFC: 13.56MHz(TX/RX)                                                                                                                                                                                                                                                                                                       |
| Antenna Type           | FPC Antenna                                                                                                                                                                                                                                                                                                                |
| Modulation Technology: | ASK(NFC)                                                                                                                                                                                                                                                                                                                   |
| Operating Voltage:     | Adapter: U450TSB<br>Input: 100-240V~50/60Hz 1.8A<br>Output: 5.0V~3.0A 15.0W or 5.0V-10.0V~4.5A<br>or 11.0V~4.1A 45.0W MAX<br>Rechargeable Li-ion Polymer Battery Model: BL-54AT<br>Rated Voltage: 3.91V<br>Rated Capacity: 5100mAh<br>Nominal Energy:19.95Wh<br>Typical Capacity: 5200mAh<br>Limited Charge Voltage: 4.50V |
| Remark:                | N/A.                                                                                                                                                                                                                                                                                                                       |

- Note:
1. N/A stands for no applicable.
  2. The antenna gain is provided by the customer. For any reported data issues caused by the antenna gain, World Standardization Certification&Testing Group (Shenzhen) Co., Ltd assumes no responsibility.
  3. The laboratory shall be responsible for all information in the report, except for the information provided by the client. The data provided by the client should be clearly identified. In addition, when the information provided by the client may affect the validity of the results, a disclaimer should be included in the report. When the laboratory is not responsible for sampling (such as when the sample is provided by the customer), the results should be declared in the report as applicable to the received sample.

## 4. General Information

### 4.1. Test environment and mode

| Operating Environment:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 25.0 °C                                                                                                                                  |
| Humidity:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 56 % RH                                                                                                                                  |
| Atmospheric Pressure:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1010 mbar                                                                                                                                |
| Test Mode:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                          |
| Engineering mode:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 98.46%) with Fully-charged battery. |
| The sample was placed (0.1m 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 are shown in Test Results of the following pages. |                                                                                                                                          |

### 4.2. 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 |
|-----------|-----------|------------|--------|------------|
| /         | /         | /          | /      | /          |

**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.
3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

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## 5. Facilities and Accreditations

### 5.1. Facilities

All measurement facilities used to collect the measurement data are located at **Building A-B, Baoli'an Industrial Park, No.58 and 60, Tangtou Avenue, Shiyao Street, Bao'an District, Shenzhen City, Guangdong Province, China of the World Standardization Certification & Testing Group (Shenzhen) Co., Ltd.**

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

### 5.2. ACCREDITATIONS

#### ANAB - Certificate Number: AT-3951

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (ANAB). Certification Number: AT-3951

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### 5.3.Measurement Uncertainty

| PARAMETER                          | Value  |
|------------------------------------|--------|
| Conducted emissions (9 kHz-30 MHz) | 3.2 dB |
| Radiated emissions (9 kHz-30 MHz)  | 3.3 dB |
| Radiated emissions (30 MHz-1 GHz)  | 3.8 dB |

- Note:
- 1.The reported uncertainty of measurement  $y \pm U$ , 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 %.
  2. The  $U_{lab}$  is less than  $U_{cisp}$ , compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit; non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
  3. For conducted emission test of laboratory have a measurement uncertainty greater than that specified in harmonized standard, this equipment can still be used provided that an adjustment is made follows : any additional uncertainty in the test system over and above that specified in harmonized standard should be used to tighten the test requirements-making the test harder to pass. This procedure will ensure that a test system not compliant with harmonized standard does not increase the probability of passing a EUT that would otherwise have failed a test if a test system compliant with harmonized standard had been used.

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## 6. MEASUREMENT INSTRUMENTS

| Kind of Equipment           | Manufacturer      | Type No.    | Serial No. | Last Calibrated | Calibrated until | Use or Not                          |
|-----------------------------|-------------------|-------------|------------|-----------------|------------------|-------------------------------------|
| EMI Test Receiver           | R&S               | ESCI        | 100005     | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| Bi-log Antenna              | SCHWARZBECK       | VULB9168    | 01488      | 2024-07-29      | 2025-07-28       | <input checked="" type="checkbox"/> |
| Broadband Antenna           | SCHWARZBECK       | VULB9161    | 9161-4079  | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| Loop antenna                | SCHNARZBE         | FMZB1519B   | 00023      | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| pre-amplifier               | CDSI              | PAP-1G18-38 | --         | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| System Controller           | CT                | SC100       | -          | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| Spectrum analyzer           | R&S               | FSU26       | 200409     | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| H & T Chamber               | Guangzhou gongwen | GDJS-500-40 | 0329       | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| MXG Vector Signal Generator | KEYSIGHT          | N5182B      | 53060646   | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| EXG Analog Signal Generator | Agilent           | N5171B      | 40060472   | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| MXA Signal Analyzer         | Agilent           | N9020A      | 54123254   | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| USB Wideband Power Sensor   | Agilent           | U2021XA     | 52110008   | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| Simultaneous Sampling DAQ   | Agilent           | U2531A      | 53100008   | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| Coaxial cable               | Megalon           | LMR400      | N/A        | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| GPIB cable                  | megalon           | GPIB        | N/A        | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| Cable                       | H+S               | SUCOFLEX    | 102(0.2m)  | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| Cable                       | H+S               | SUCOFLEX    | 102(1.5m)  | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |
| Anechoic chamber            | SAEMC             | 966         | -          | 2024-11-04      | 2025-11-03       | <input checked="" type="checkbox"/> |

## 7. GENERAL TEST CONFIGURATIONS

### 7.1. Test Environments

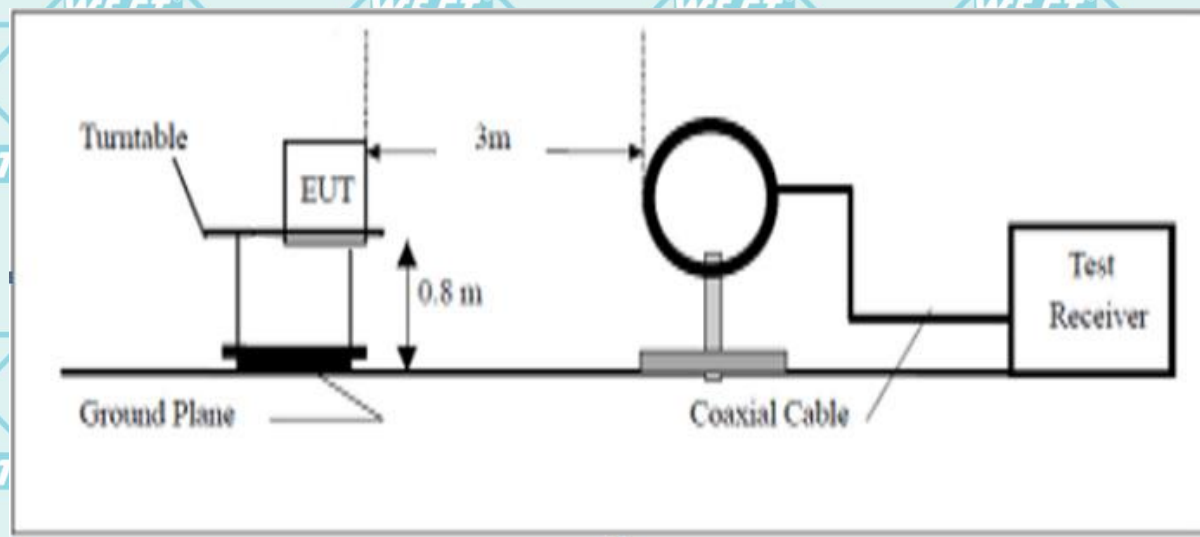
During the measurement, the normal environmental conditions were within the listed ranges:

|                            |                         |                |
|----------------------------|-------------------------|----------------|
| Relative Humidity          | 30% to 60%              |                |
| Atmospheric Pressure       | 100 kPa to 102 kPa      |                |
| Temperature                | NT (Normal Temperature) | +22°C to +25°C |
| Working Voltage of the EUT | NV (Normal Voltage)     | DC 3.91V       |

### 7.2. Test Setups

Test Setup 1

Radiated Test (Below 30 MHz)

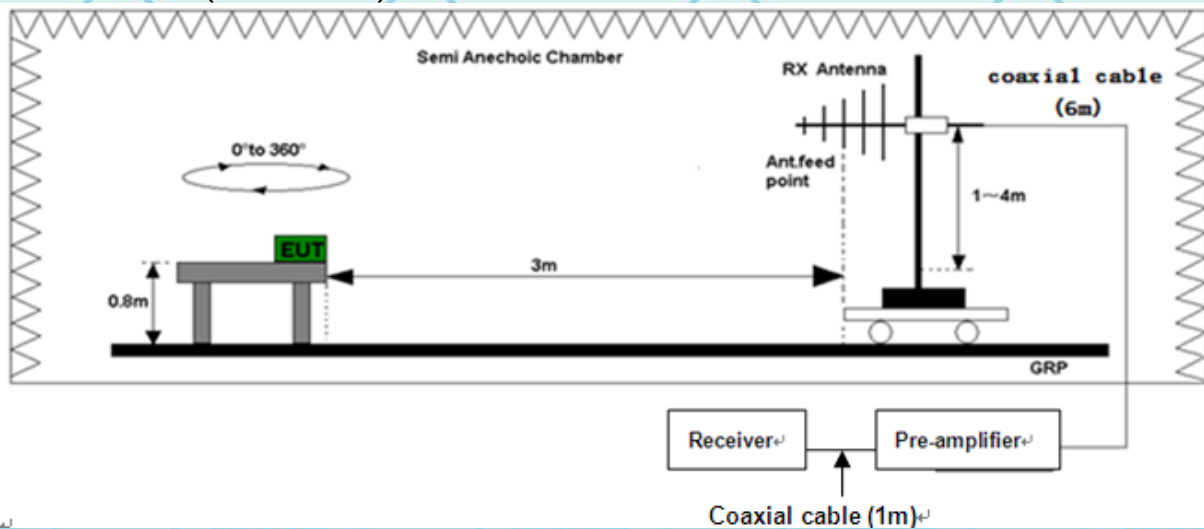


(Diagram 1)

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Test Setup 2

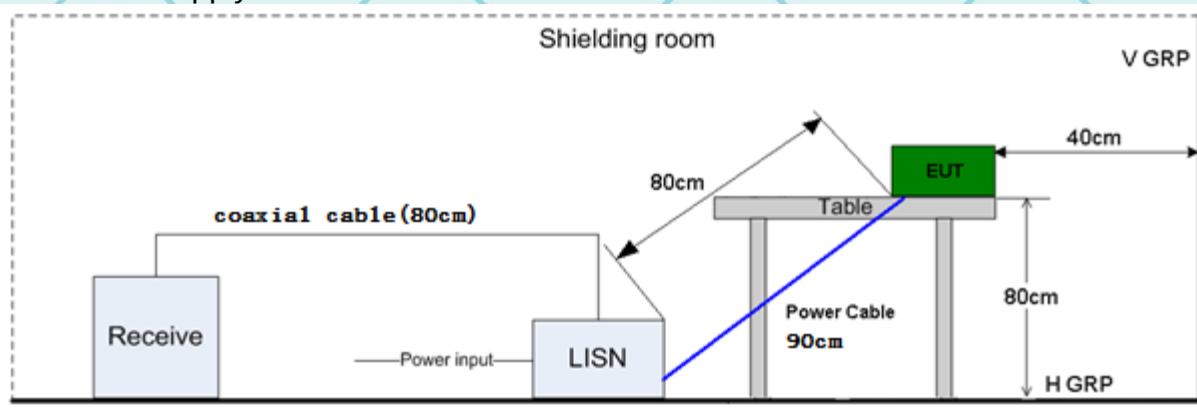
Radiated Test (30 MHz-1G)



(Diagram 2)

Test Setup 3

AC Power Supply Port Test



(Diagram 3)

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## 8. TEST ITEMS

### 8.1. Antenna Requirements

#### 8.1.1. 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.

#### 8.1.2. 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. |

## 8.2. Emission Bandwidth

### 8.2.1. 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).

### 8.2.2. Test Setup

See section 7.2(Diagram 1)

### 8.2.3. 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

### 8.2.4. Test Result

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.

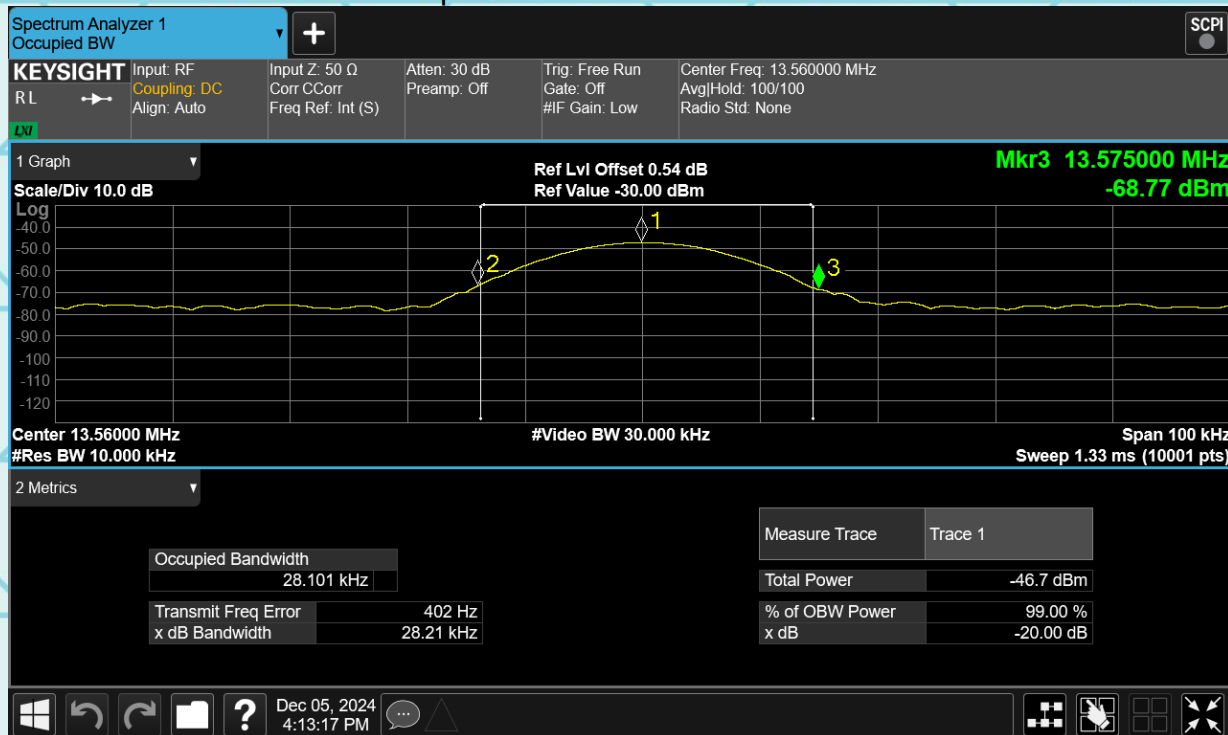
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## Test Data

| Frequency (MHz) | Emission Bandwidth(20dB down)(kHz) | Occupied Bandwidth(99%) (kHz) |
|-----------------|------------------------------------|-------------------------------|
| 13.56           | 28.21                              | 28.101                        |

## Test Plots

## Emission Bandwidth &amp; 99% Occupied Bandwidth



### 8.3. Field Strength of Fundamental Emissions and Radiated Emissions

#### 8.3.1. 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 3 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)=

$$20\log(15848)+40\log(30/3) = 124\text{dB}\mu\text{V}$$

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.

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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 ( $\mu\text{V/m}$ ) | 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 $\mu\text{V/m}$ @3m (AV) and 74dB $\mu\text{V/m}$ @3m (PK).

### 8.3.2. Test Setup

See section 7.2(Diagram 1 and Diagram 2)

### 8.3.3. 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  $f \geq 1 \text{ GHz}$ , 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

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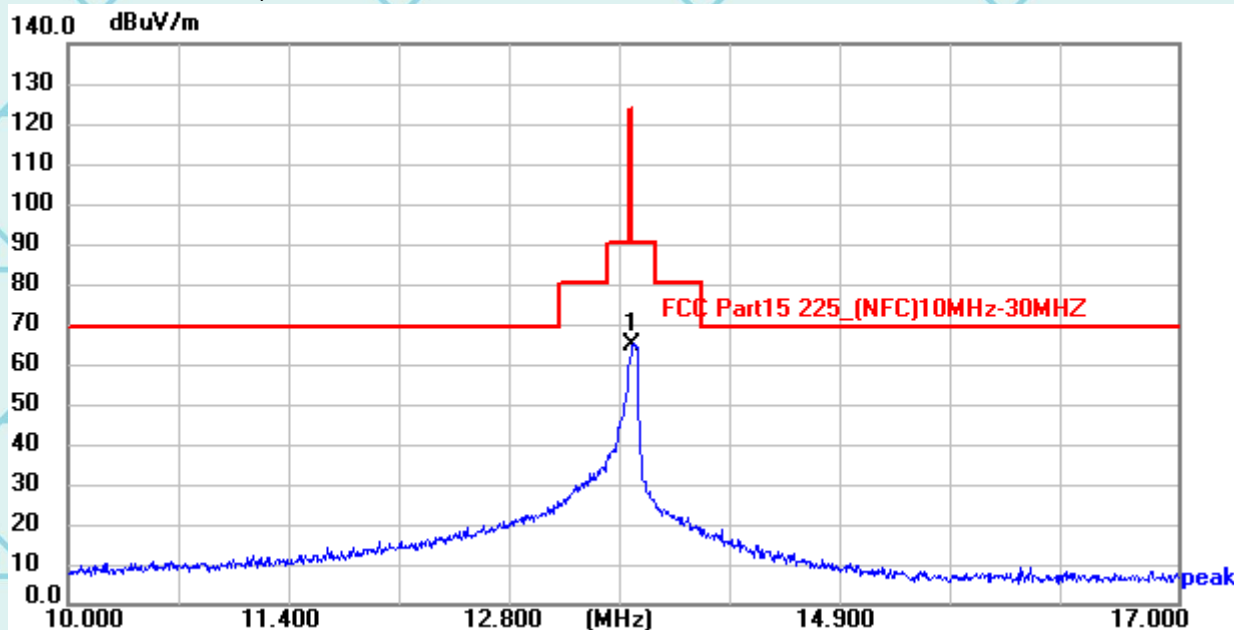
### 8.3.4. Test Result

#### 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.

Test Plot

Test Antenna-LOOP, EUT X axis



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1 * | 13.5600         | 29.44          | 35.50         | 64.94          | 124.00         | -59.06      | peak     |

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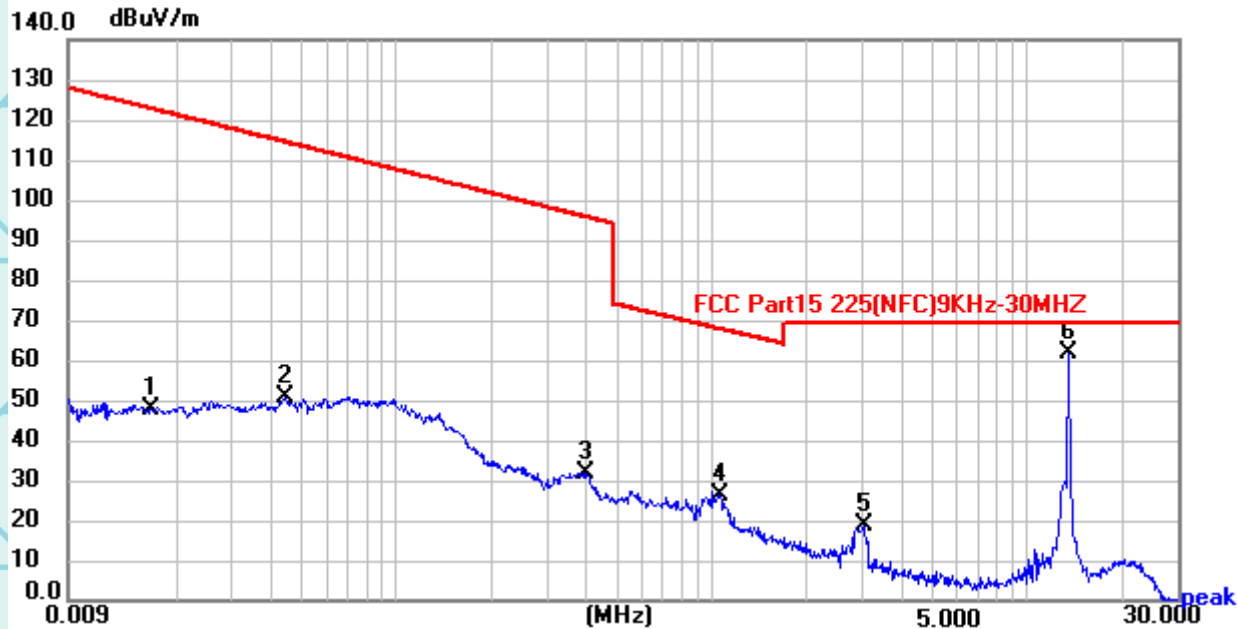
## Radiated Emissions

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)

Below 30 MHz, Test Antenna LOOP, EUT X axis

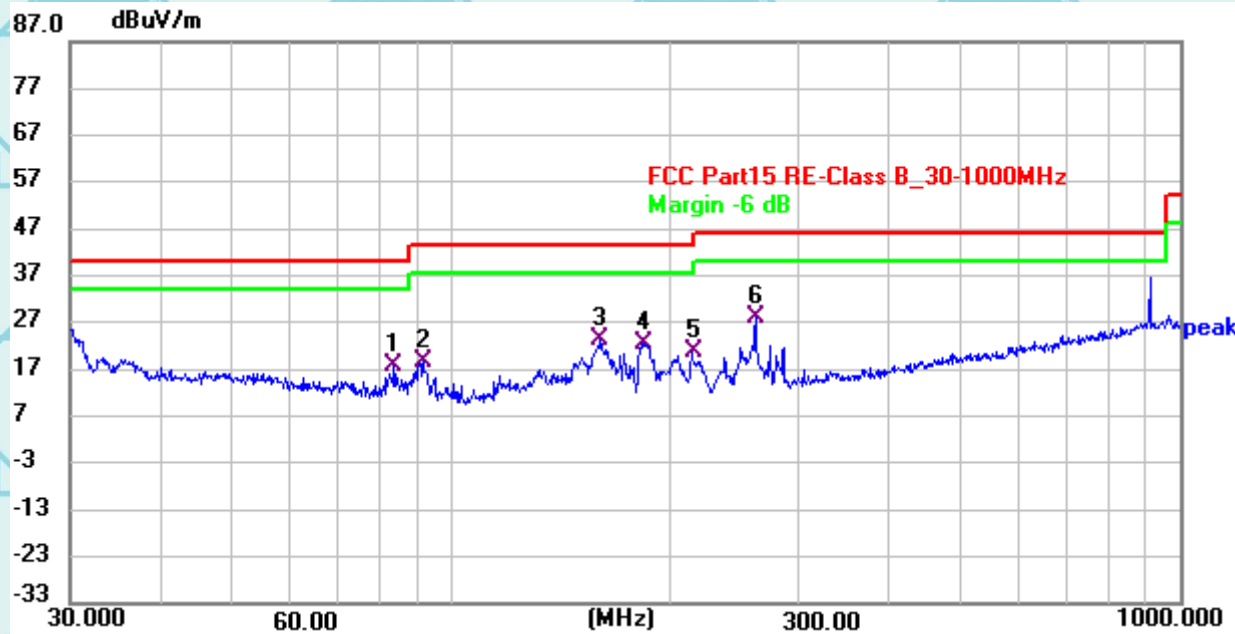


| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 0.0166          | 37.98          | 10.00         | 47.98          | 122.79         | -74.81      | peak     |
| 2   | 0.0442          | 40.97          | 10.00         | 50.97          | 114.46         | -63.49      | peak     |
| 3   | 0.3960          | 21.57          | 10.00         | 31.57          | 95.81          | -64.24      | peak     |
| 4   | 1.0651          | 16.20          | 10.00         | 26.20          | 67.77          | -41.57      | peak     |
| 5   | 3.0331          | 8.79           | 10.00         | 18.79          | 69.50          | -50.71      | peak     |
| 6 * | 13.5617         | 30.15          | 31.49         | 61.64          | 69.50          | -7.86       | peak     |

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30 MHz to 1 GHz,

Horizontal:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 83.6688         | 41.92          | -23.93        | 17.99          | 40.00          | -22.01      | QP       |
| 2   | 91.6153         | 43.05          | -24.22        | 18.83          | 43.50          | -24.67      | QP       |
| 3   | 160.6271        | 42.96          | -19.66        | 23.30          | 43.50          | -20.20      | QP       |
| 4   | 184.2474        | 45.24          | -22.60        | 22.64          | 43.50          | -20.86      | QP       |
| 5   | 214.5143        | 44.73          | -24.09        | 20.64          | 43.50          | -22.86      | QP       |
| 6 * | 262.2049        | 49.55          | -21.56        | 27.99          | 46.00          | -18.01      | QP       |

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Vertical:



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1 * | 30.0395         | 55.55          | -19.13        | 36.42          | 40.00          | -3.58       | QP       |
| 2   | 56.1236         | 45.51          | -19.88        | 25.63          | 40.00          | -14.37      | QP       |
| 3   | 83.6688         | 52.71          | -23.93        | 28.78          | 40.00          | -11.22      | QP       |
| 4   | 131.0665        | 41.15          | -20.41        | 20.74          | 43.50          | -22.76      | QP       |
| 5   | 165.7771        | 45.30          | -20.06        | 25.24          | 43.50          | -18.26      | QP       |
| 6   | 184.8136        | 51.89          | -22.66        | 29.23          | 43.50          | -14.27      | QP       |

Note1:

Freq. = Emission frequency in MHz

Reading level (dBuV) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss - Amplifier factor.

Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)

Limit (dBuV) = Limit stated in standard

Margin (dB) = Measurement (dBuV) - Limits (dBuV)

## 8.4. Frequency Tolerance

### 8.4.1. 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.

### 8.4.2. Test Setup

See section 7.2(Diagram 1)

### 8.4.3. Test Procedure

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

### 8.4.4. Test Result

Note 1: Because the 85%(3.2895V) and 115% (4.4505V)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.

|                      |              |
|----------------------|--------------|
| OPERATING FREQUENCY: | 13560000 Hz  |
| REFERENCE VOLTAGE:   | 3.87 V       |
| DEVIATION LIMIT:     | $\pm 0.01\%$ |

| VOLTAGE (%)                 | Test Conditions |                  | Frequency(Hz) | Deviation (%) | Verdict |
|-----------------------------|-----------------|------------------|---------------|---------------|---------|
|                             | Power (VDC)     | Temperature (°C) |               |               |         |
| 100                         | 3.87            | -20              | 13560008      | -0.000067     | Pass    |
| 100                         |                 | 0                | 13560000      | 0.000001      | Pass    |
| 100                         |                 | +10              | 13559989      | 0.000084      | Pass    |
| 100                         |                 | +20              | 13560018      | -0.000136     | Pass    |
| 100                         |                 | +25              | 13560000      | -0.000000     | Pass    |
| 100                         |                 | +30              | 13559985      | 0.000113      | Pass    |
| 100                         |                 | +40              | 13559973      | 0.000198      | Pass    |
| 100                         |                 | +50              | 13560028      | -0.000207     | Pass    |
| 100                         |                 | +60              | 13560039      | -0.000287     | Pass    |
| MAX(Battery End Point, 85)  | 3.45            | +25              | 13559992      | 0.000056      | Pass    |
| MIN(Battery End Point, 115) | 4.45            | +25              | 13559975      | 0.000186      | Pass    |

## 8.5. Conducted Emission

### 8.5.1. 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 50 $\mu$ H/50 $\Omega$  line impedance stabilization network (LISN).

| Frequency range (MHz) | Conducted Limit (dB $\mu$ V) |          |
|-----------------------|------------------------------|----------|
|                       | Quai-peak                    | Average  |
| 0.15 - 0.50           | 66 to 56                     | 56 to 46 |
| 0.50 - 5              | 56                           | 46       |
| 0.50 - 30             | 60                           | 50       |

### 8.5.2. Test Setup

See section 4.2(Diagram 3)

### 8.5.3. 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.

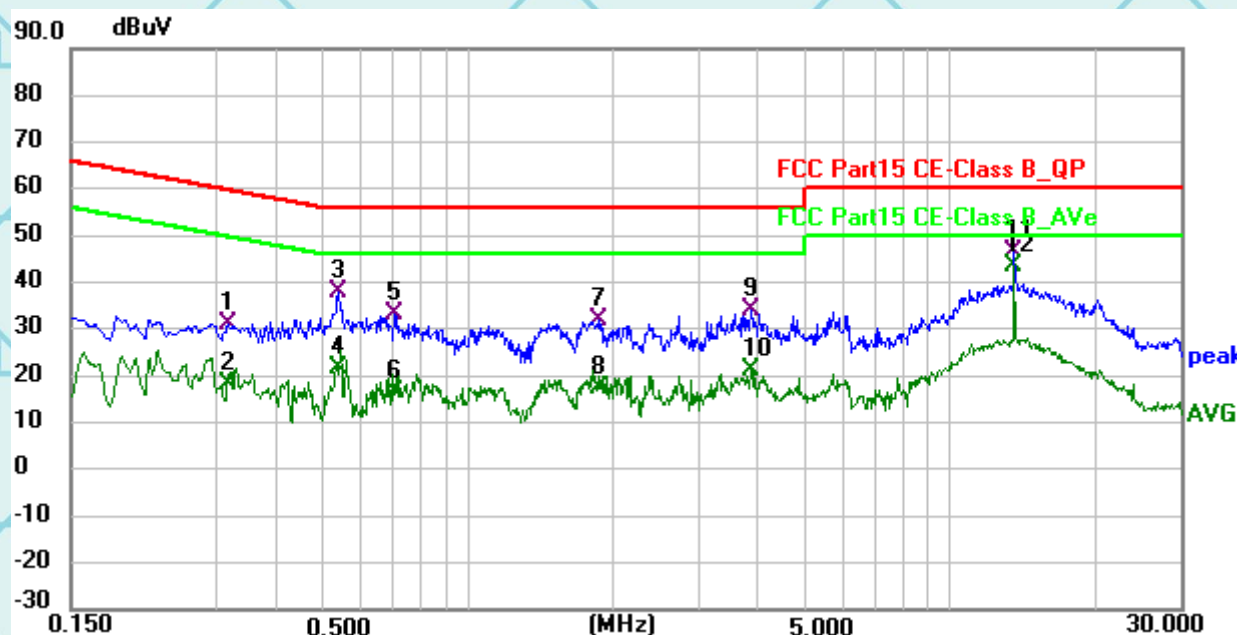
### 8.5.4. Test Result

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.

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|             |          |                   |     |
|-------------|----------|-------------------|-----|
| Temperature | 24 °C    | Relative Humidity | 48% |
| Pressure    | 1010 hPa | Test Mode         | NFC |

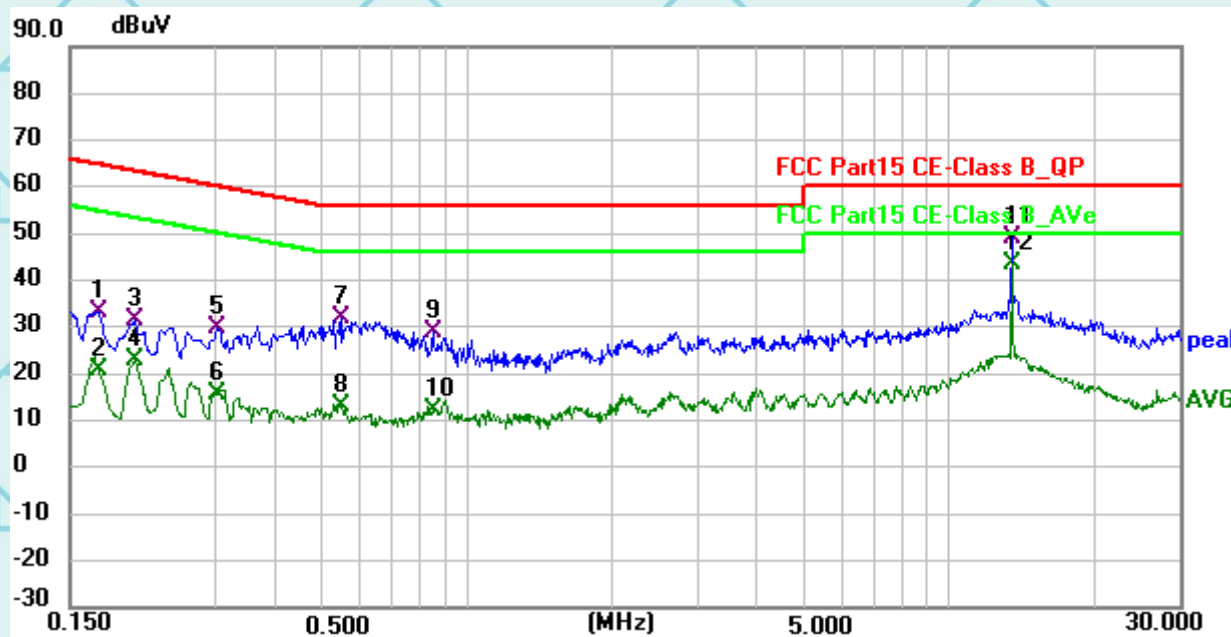
### Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



| No.  | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|------|-----------------|----------------|-------------|--------------|--------------|-------------|----------|
| 1    | 0.3165          | 10.24          | 20.62       | 30.86        | 59.80        | -28.94      | QP       |
| 2    | 0.3165          | -2.56          | 20.62       | 18.06        | 49.80        | -31.74      | AVG      |
| 3    | 0.5370          | 17.20          | 20.52       | 37.72        | 56.00        | -18.28      | QP       |
| 4    | 0.5370          | 0.96           | 20.52       | 21.48        | 46.00        | -24.52      | AVG      |
| 5    | 0.7035          | 12.69          | 20.54       | 33.23        | 56.00        | -22.77      | QP       |
| 6    | 0.7035          | -4.02          | 20.54       | 16.52        | 46.00        | -29.48      | AVG      |
| 7    | 1.8733          | 11.25          | 20.62       | 31.87        | 56.00        | -24.13      | QP       |
| 8    | 1.8733          | -3.15          | 20.62       | 17.47        | 46.00        | -28.53      | AVG      |
| 9    | 3.8445          | 13.62          | 20.59       | 34.21        | 56.00        | -21.79      | QP       |
| 10   | 3.8445          | 0.54           | 20.59       | 21.13        | 46.00        | -24.87      | AVG      |
| 11   | 13.5600         | 26.31          | 20.25       | 46.56        | 60.00        | -13.44      | QP       |
| 12 * | 13.5600         | 23.25          | 20.25       | 43.50        | 50.00        | -6.50       | AVG      |

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



| No.  | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|------|-----------------|----------------|-------------|--------------|--------------|-------------|----------|
| 1    | 0.1723          | 12.58          | 20.71       | 33.29        | 64.85        | -31.56      | QP       |
| 2    | 0.1723          | -0.04          | 20.71       | 20.67        | 54.85        | -34.18      | AVG      |
| 3    | 0.2040          | 10.74          | 20.69       | 31.43        | 63.45        | -32.02      | QP       |
| 4    | 0.2040          | 2.20           | 20.69       | 22.89        | 53.45        | -30.56      | AVG      |
| 5    | 0.3030          | 9.37           | 20.63       | 30.00        | 60.16        | -30.16      | QP       |
| 6    | 0.3030          | -4.84          | 20.63       | 15.79        | 50.16        | -34.37      | AVG      |
| 7    | 0.5460          | 11.50          | 20.52       | 32.02        | 56.00        | -23.98      | QP       |
| 8    | 0.5460          | -7.33          | 20.52       | 13.19        | 46.00        | -32.81      | AVG      |
| 9    | 0.8520          | 8.30           | 20.61       | 28.91        | 56.00        | -27.09      | QP       |
| 10   | 0.8520          | -8.19          | 20.61       | 12.42        | 46.00        | -33.58      | AVG      |
| 11   | 13.5015         | 28.90          | 20.25       | 49.15        | 60.00        | -10.85      | QP       |
| 12 * | 13.5015         | 23.25          | 20.25       | 43.50        | 50.00        | -6.50       | AVG      |

### Note1:

Freq. = Emission frequency in MHz

Reading level (dBuV) = Receiver reading

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

Measurement (dBuV) = Reading level (dBuV) + Corr. Factor (dB)

Limit (dBuV) = Limit stated in standard

Margin (dB) = Measurement (dBuV) - Limits (dBuV)

Q.P. =Quasi-Peak AVG =average

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

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## 9. Test Setup Photographs

Please refer to Annex "Set Up Photos-15C" for test setup photos

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