

# TEST REPORT

**Report No.:** 8326EU011613W1

**Applicant:** Hong Kong Etech Groups Ltd.

**Address:** 16/F, Block C, 2nd Phase of Central Avenue, Haihong Industrial Area, Xixiang, Baoan, Shenzhen, China

**Product Name:** Life is for fun Series Foldable 3-in-1 Magnetic Charger

**Model No.:** EWL-24077-A (refer to clause 2.4)

**Trademark:** MINISO

**FCC ID:** 2A3ZO-24077A

**Test Standard(s):** 47 CFR Part 15 Subpart C

**Date of Receipt:** Jan. 16, 2025

**Test Date:** Jan. 16, 2025 – Feb. 12, 2025

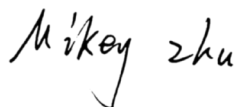
**Date of Issue:** Mar. 28, 2025

**ISSUED BY:**

SHENZHEN EU TESTING LABORATORY LIMITED



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## Revision Record

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|----------------|---------------|-------------|--------|
| V0             | Mar. 28, 2025 | Original    | Valid  |
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## Table of Contents

|                |                                                                     |           |
|----------------|---------------------------------------------------------------------|-----------|
| <b>1</b>       | <b>COVER PAGE.....</b>                                              | <b>1</b>  |
| <b>2</b>       | <b>GENERAL INFORMATION .....</b>                                    | <b>4</b>  |
| 2.1            | APPLICANT INFORMATION.....                                          | 4         |
| 2.2            | MANUFACTURER INFORMATION.....                                       | 4         |
| 2.3            | FACTORY INFORMATION.....                                            | 4         |
| 2.4            | GENERAL DESCRIPTION OF E.U.T.....                                   | 4         |
| 2.5            | TECHNICAL INFORMATION OF E.U.T.....                                 | 5         |
| <b>3</b>       | <b>TEST SUMMARY .....</b>                                           | <b>6</b>  |
| 3.1            | TEST STANDARD .....                                                 | 6         |
| 3.2            | TEST VERDICT.....                                                   | 6         |
| 3.3            | TEST LABORATORY .....                                               | 6         |
| <b>4</b>       | <b>TEST CONFIGURATION.....</b>                                      | <b>7</b>  |
| 4.1            | TEST ENVIRONMENT .....                                              | 7         |
| 4.2            | TEST EQUIPMENT .....                                                | 7         |
| 4.3            | DESCRIPTION OF SUPPORT UNIT .....                                   | 8         |
| 4.4            | TEST MODE .....                                                     | 8         |
| 4.5            | DESCRIPTION OF CALCULATION .....                                    | 8         |
| 4.6            | MEASUREMENT UNCERTAINTY .....                                       | 9         |
| 4.7            | DEVIATION FROM STANDARDS .....                                      | 9         |
| 4.8            | ABNORMALITIES FROM STANDARD CONDITION .....                         | 9         |
| <b>5</b>       | <b>TEST ITEMS .....</b>                                             | <b>10</b> |
| 5.1            | ANTENNA REQUIREMENT.....                                            | 10        |
| 5.1.1          | Test Requirement.....                                               | 10        |
| 5.1.2          | Antenna Anti-Replacement Construction.....                          | 10        |
| 5.1.3          | Antenna Gain .....                                                  | 10        |
| 5.2            | CONDUCTED EMISSION AT AC POWER LINE .....                           | 11        |
| 5.2.1          | Test Requirement.....                                               | 11        |
| 5.2.2          | Test Setup Diagram .....                                            | 11        |
| 5.2.3          | Test Procedure.....                                                 | 11        |
| 5.2.4          | Test Data.....                                                      | 11        |
| 5.3            | EMISSIONS BANDWIDTH.....                                            | 14        |
| 5.3.1          | Test Requirement.....                                               | 14        |
| 5.3.2          | Test Setup Diagram .....                                            | 14        |
| 5.3.3          | Test Procedure.....                                                 | 15        |
| 5.3.4          | Test Data.....                                                      | 15        |
| 5.4            | FIELD STRENGTH OF FUNDAMENTAL EMISSIONS AND RADIATED EMISSION ..... | 17        |
| 5.4.1          | Test Requirement.....                                               | 17        |
| 5.4.2          | Test Setup Diagram .....                                            | 18        |
| 5.4.3          | Test Procedure.....                                                 | 19        |
| 5.4.4          | Test Data.....                                                      | 19        |
| <b>ANNEX A</b> | <b>TEST SETUP PHOTOS .....</b>                                      | <b>26</b> |
| <b>ANNEX B</b> | <b>EXTERNAL PHOTOS.....</b>                                         | <b>26</b> |
| <b>ANNEX C</b> | <b>INTERNAL PHOTOS .....</b>                                        | <b>26</b> |

## 2 General Information

### 2.1 Applicant Information

|           |                                                                                                      |
|-----------|------------------------------------------------------------------------------------------------------|
| Applicant | Hong Kong Etech Groups Ltd.                                                                          |
| Address   | 16/F, Block C, 2nd Phase of Central Avenue, Haihong Industrial Area, Xixiang, Baoan, Shenzhen, China |

### 2.2 Manufacturer Information

|              |                                                                                                      |
|--------------|------------------------------------------------------------------------------------------------------|
| Manufacturer | Hong Kong Etech Groups Ltd.                                                                          |
| Address      | 16/F, Block C, 2nd Phase of Central Avenue, Haihong Industrial Area, Xixiang, Baoan, Shenzhen, China |

### 2.3 Factory Information

|         |                                                                                                      |
|---------|------------------------------------------------------------------------------------------------------|
| Factory | Hong Kong Etech Groups Ltd.                                                                          |
| Address | 16/F, Block C, 2nd Phase of Central Avenue, Haihong Industrial Area, Xixiang, Baoan, Shenzhen, China |

### 2.4 General Description of E.U.T.

|                                      |                                                                                                                                                                                   |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Name                         | Life is for fun Series Foldable 3-in-1 Magnetic Charger                                                                                                                           |
| Model No. Under Test                 | EWL-24077-A                                                                                                                                                                       |
| List Model No.                       | ECL1-240033A                                                                                                                                                                      |
| Description of Model differentiation | All models are same with electrical parameters and internal circuit structure, but only differ in appearance color and model name.<br>(this information provided by the customer) |
| Rating(s)                            | Input: 5V---3A/9V---3A<br>Wireless phone charging: 15W MAX<br>Wireless watch charging: 2.5W MAX<br>Wireless earphone charging: 5W MAX<br>Total output: 22.5W MAX                  |
| Product Type                         | <input checked="" type="checkbox"/> Mobile<br><input type="checkbox"/> Portable<br><input type="checkbox"/> Fix Location                                                          |
| Test Sample No.                      | -1/2(Normal Sample), -2/2(Engineering Sample)                                                                                                                                     |
| Hardware Version                     | V1.0                                                                                                                                                                              |
| Software Version                     | V1.0                                                                                                                                                                              |
| Remark                               | For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.                                                                 |

## 2.5 Technical Information of E.U.T.

|                                   |                         |
|-----------------------------------|-------------------------|
| Network and Wireless Connectivity | Wireless Power Transfer |
|-----------------------------------|-------------------------|

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

|                     |                                                                                                                                        |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Technology          | <b>WPT</b>                                                                                                                             |
| Operating Frequency | 115 - 150KHz                                                                                                                           |
| Modulation Type     | FSK                                                                                                                                    |
| Antenna Type        | Inductive Loop Coil Antenna                                                                                                            |
| Antenna Gain(Peak)  | 0 dBi                                                                                                                                  |
| Remark              | The above information are declared by the applicant, EU-LAB is not responsible for the information accuracy provided by the applicant. |

### 3 Test Summary

#### 3.1 Test Standard

The tests were performed according to following standards:

| No. | Identity                  | Document Title                                                     |
|-----|---------------------------|--------------------------------------------------------------------|
| 1   | 47 CFR Part 15, Subpart C | Intentional radiators of radio frequency equipment                 |
| 2   | ANSI C63.10-2020          | American National Standard for Testing Unlicensed Wireless Devices |

Remark:

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product maybe which result in lowering the emission/immunity should be checked to ensure compliance has been maintained.

#### 3.2 Test Verdict

| No. | Description                         | FCC Part No.      | Verdict | Remark |
|-----|-------------------------------------|-------------------|---------|--------|
| 1   | Antenna Requirement                 | 15.203            | Pass    | --     |
| 2   | Conducted Emission at AC Power Line | 15.207            | Pass    | --     |
| 3   | Emissions Bandwidth                 | 15.215            | Pass    | --     |
| 4   | Radiated Emissions                  | 15.209 /15.215(b) | Pass    | --     |

Note:

(1) "N/A" denotes test is not applicable in this Test Report.

#### 3.3 Test Laboratory

|                               |                                                                                                                        |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Test Laboratory               | Shenzhen EU Testing Laboratory Limited                                                                                 |
| Address                       | 101, Building B1, Fuqiao Fourth Area, Qiaotou Community, Fuhai Subdistrict, Baoan District, Shenzhen, Guangdong, China |
| Designation Number            | CN1368                                                                                                                 |
| Test Firm Registration Number | 952583                                                                                                                 |

## 4 Test Configuration

### 4.1 Test Environment

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

|                            |                         |                          |
|----------------------------|-------------------------|--------------------------|
| Relative Humidity          | 30% to 60%              |                          |
| Atmospheric Pressure       | 86 kPa to 106 kPa       |                          |
| Temperature                | NT (Normal Temperature) | +15°C to +35°C           |
| Working Voltage of the EUT | NV (Normal Voltage)     | AC 120V/60Hz for adapter |

### 4.2 Test Equipment

| Conducted Emission at AC power line  |                 |          |           |            |              |
|--------------------------------------|-----------------|----------|-----------|------------|--------------|
| Equipment                            | Manufacturer    | Model No | Serial No | Cal Date   | Cal Due Date |
| L.I.S.N.<br>Artificial Mains Network | Rohde & Schwarz | ENV216   | EE-004    | 2025/01/08 | 2026/01/07   |
| EMI Test Receiver                    | Rohde & Schwarz | ESCI     | EE-005    | 2025/01/08 | 2026/01/07   |
| Test Software                        | Farad           | EZ-EMC   | EE-014    | N.C.R      | N.C.R        |

| Radiated Emission and RF Test         |                 |              |           |            |               |
|---------------------------------------|-----------------|--------------|-----------|------------|---------------|
| Equipment                             | Manufacturer    | Model No     | Serial No | Cal. Date  | Cal. Due Date |
| EMI Test Receiver                     | ROHDE & SCHWARZ | ESPI         | EE-006    | 2025/01/08 | 2026/01/07    |
| Bilog Broadband Antenna               | SCHWARZBECK     | VULB 9163    | EE-007    | 2023/01/14 | 2026/01/09    |
| Double Ridged Horn Antenna            | A-INFOMW        | LB-10180-NF  | EE-008    | 2023/01/12 | 2026/01/09    |
| Pre-amplifier                         | Agilent         | 8447D        | EE-009    | 2025/01/08 | 2026/01/07    |
| Pre-amplifier                         | Agilent         | 8449B        | EE-010    | 2025/01/08 | 2026/01/07    |
| MXA Signal Analyzer                   | Agilent         | N9020A       | EE-011    | 2025/01/08 | 2026/01/07    |
| MXG RF Vector Signal Generator        | Agilent         | N5182A       | EE-012    | 2025/01/08 | 2026/01/07    |
| Test Software                         | Farad           | EZ-EMC       | EE-015    | N.C.R      | N.C.R         |
| MIMO Power Measurement Module         | TSTPASS         | TSPS 2023R   | EE-016    | 2025/01/08 | 2026/01/07    |
| RF Test Software                      | TSTPASS         | TS32893 V2.0 | EE-017    | N.C.R      | N.C.R         |
| Antenna Mast                          | TOP Precision   | TPBAM-4      | EE-306    | N.C.R      | N.C.R         |
| Wideband Radio Communication Tester   | ROHDE & SCHWARZ | CMW500       | EE-402    | 2024/02/15 | 2025/02/14    |
| Loop Antenna                          | TESEQ           | HLA6121      | EE-403    | 2024/02/15 | 2025/02/14    |
| MXG RF Analog Signal Generator        | Agilent         | N5181A       | EE-406    | 2024/02/15 | 2025/02/14    |
| DRG Horn Antenna                      | SCHWARZBECK     | BBHA 9170    | EE-410    | 2024/02/15 | 2025/02/14    |
| Pre-amplifier                         | SKET            | LNPA-1840-50 | EE-411    | 2024/02/15 | 2025/02/14    |
| Power Meter                           | Anritsu         | ML2495A      | EE-416    | 2024/02/15 | 2025/02/14    |
| Constant Temperature Humidity Chamber | Guangxin        | GXP-401      | ES-002    | 2024/07/30 | 2025/07/29    |

### 4.3 Description of Support Unit

| No. | Title                  | Manufacturer | Model No. | Serial No. |
|-----|------------------------|--------------|-----------|------------|
| 1   | Adapter                | UGREEN       | CD289     | EMC-PJ-054 |
| 2   | Wireless Charging Load | YBZ          | ID-ZWX    | EMC-PJ-050 |
| 3   | Wireless Charging Load | YBZ          | F18       | LVD-PJ-004 |
| 4   | Earphones              | Apple        | 4         | --         |

### 4.4 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned below was evaluated respectively.

| No.  | Description                           | Remark |
|------|---------------------------------------|--------|
| TM1  | Wireless Output (2.5W)                |        |
| TM2  | Wireless Output (5W)                  |        |
| TM3  | Wireless Output (15W)                 |        |
| TM4  | Wireless Output (2.5W) + (5W)         |        |
| TM5  | Wireless Output (2.5W) + (15W)        |        |
| TM6  | Wireless Output (5W) + (15W)          |        |
| TM7  | Wireless Output (2.5W) + (5W) + (15W) |        |
| TM14 | Standby                               |        |

Note:

1. EUT supports empty load, half load, full load working at the same time, so the all conditions have been tested. It is found that TM7 full load is the worst mode, and the data in the report only reflects the worst mode.

### 4.5 Description of Calculation

#### 4.5.1. Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS \text{ (dBuV/m)} = RA \text{ (dBuV)} + AF \text{ (dB/m)} + CL \text{ (dB)} - AG \text{ (dB)}$$

|                           |                                            |
|---------------------------|--------------------------------------------|
| Where FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude    | AG = Amplifier Gain                        |
| AF = Antenna Factor       |                                            |

#### 4.5.2. Disturbance Calculation

The AC mains conducted disturbance is calculated by adding the 10dB Pulse Limiter and Cable Factor and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$CD \text{ (dBuV)} = RA \text{ (dBuV)} + PL \text{ (dB)} + CL \text{ (dB)}$$

|                                  |                                            |
|----------------------------------|--------------------------------------------|
| Where CD = Conducted Disturbance | CL = Cable Attenuation Factor (Cable Loss) |
| RA = Reading Amplitude           | PL = 10 dB Pulse Limiter Factor            |

#### 4.6 Measurement 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.

| Test Item                         | Measurement Uncertainty   |
|-----------------------------------|---------------------------|
| Conducted Emission                | 2.64 dB                   |
| Occupied Channel Bandwidth        | 2.8 %                     |
| RF output power, conducted        | 0.68 dB                   |
| Power Spectral Density, conducted | 1.37 dB                   |
| Unwanted Emissions, conducted     | 1.84 dB                   |
| Radiated Emission (9kHz- 30MHz)   | Ur = 2.50 dB              |
| Radiated Emission (30MHz- 1GHz)   | Ur = 2.70 dB (Horizontal) |
|                                   | Ur = 2.70 dB (Vertical)   |
| Radiated Emission (1GHz- 18GHz)   | Ur = 3.50 dB (Horizontal) |
|                                   | Ur = 3.50 dB (Vertical)   |
| Radiated Emission (18GHz- 40GHz)  | Ur = 5.15 dB (Horizontal) |
|                                   | Ur = 5.24 dB (Vertical)   |
| Temperature                       | 0.8°C                     |
| Humidity                          | 4%                        |

#### 4.7 Deviation from Standards

None.

#### 4.8 Abnormalities from Standard Condition

None.

## 5 Test Items

### 5.1 Antenna requirement

#### 5.1.1 Test Requirement

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | <p>According to 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.</p> <p>If directional gain of transmitting antennas is greater than 6 dBi, the power shall be reduced by the same level in dB comparing to gain minus 6 dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 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 FCC rule.</p> |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### 5.1.2 Antenna Anti-Replacement Construction

The Antenna Anti-Replacement as following method:

| Protected Method                        | Description                                                         |
|-----------------------------------------|---------------------------------------------------------------------|
| The antenna is embedded in the product. | The EUT has a permanently and irreplaceable inductive loop antenna. |

#### 5.1.3 Antenna Gain

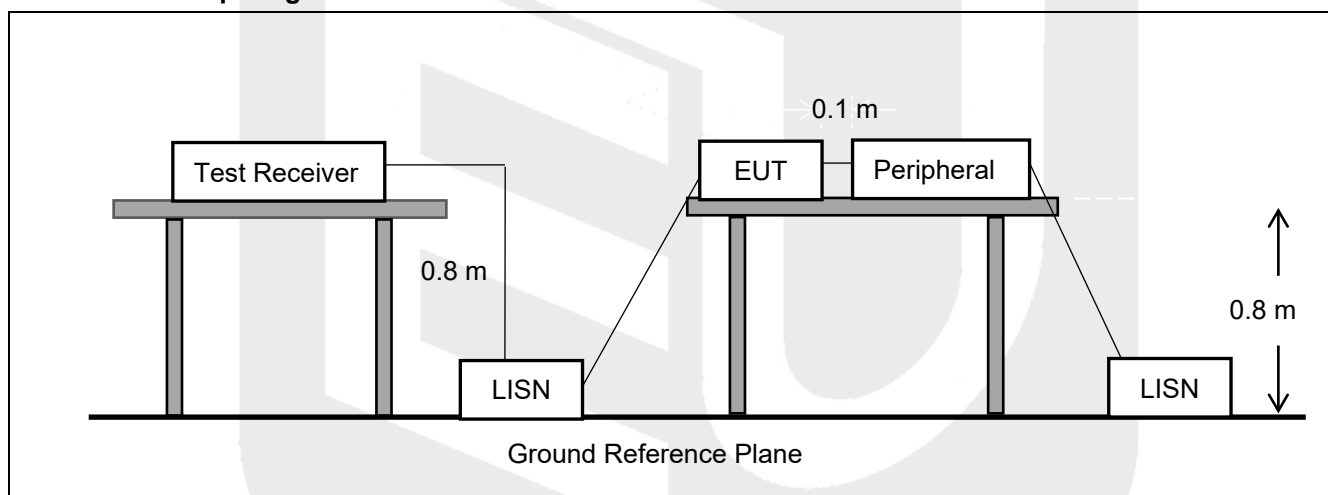
The antenna peak gain of EUT is less than 6 dBi.

## 5.2 Conducted Emission at AC Power Line

### 5.2.1 Test Requirement

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                              |           |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|-----------|
| Test Requirement: | Except as shown in paragraphs (b) and (c) of this section, 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 or frequencies, 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 ohms line impedance stabilization network (LISN). |                              |           |
| Test Limit        | Frequency of emission (MHz)                                                                                                                                                                                                                                                                                                                                                                                                                          | Conducted limit (dB $\mu$ V) |           |
|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Quasi-peak                   | Average   |
|                   | 0.15-0.5                                                                                                                                                                                                                                                                                                                                                                                                                                             | 66 to 56*                    | 56 to 46* |
|                   | 0.5-5                                                                                                                                                                                                                                                                                                                                                                                                                                                | 56                           | 46        |
|                   | 5-30                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 60                           | 50        |
|                   | *Decreases with the logarithm of the frequency.                                                                                                                                                                                                                                                                                                                                                                                                      |                              |           |
| Test Method       | Refer to ANSI C63.10-2020 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices.                                                                                                                                                                                                                                                                                                                  |                              |           |

### 5.2.2 Test Setup Diagram



### 5.2.3 Test Procedure

The EUT is put on the plane 0.8 m high above the ground by insulating support and connected to the AC mains through Line Impedance Stability Network (L.I.S.N). This provided a 50ohm coupling impedance for the tested equipment. Both sides of AC line are investigated to find out the maximum conducted emission according to the test standard regulations during conducted emission measurement.

The bandwidth of the field strength meter (R&S Test Receiver ESCI) is set at 9kHz in 150kHz~30MHz.

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.

### 5.2.4 Test Data

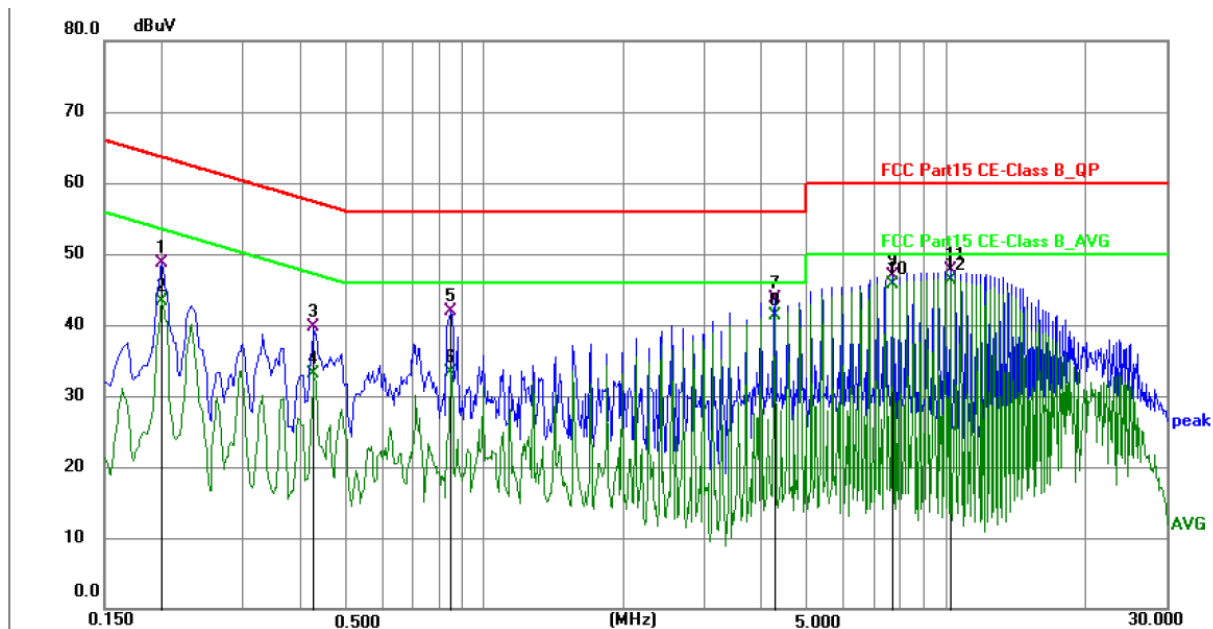
**PASS.**

The test curves are shown in the following pages.

Only the worst case data was showed in the report, please to see the following pages.

### Conducted Emission Test Data

Test Site: #1 Shielded Room  
 Test Mode: TM7  
 Comments: Live Line

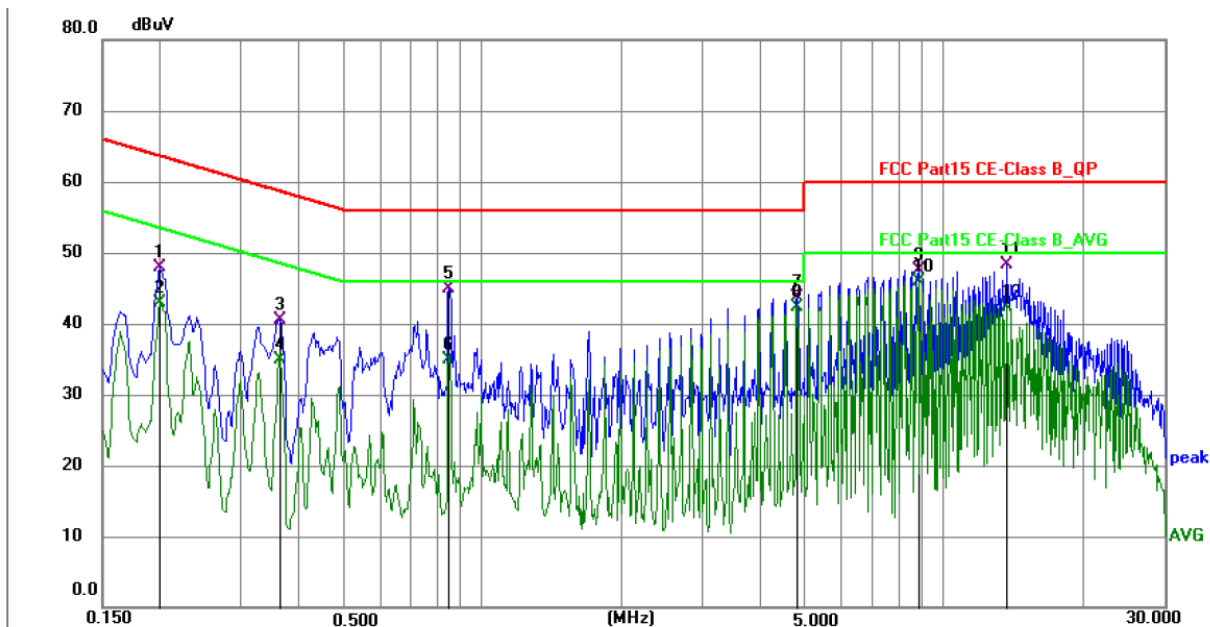


| No.  | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|------|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1    | 0.1995          | 38.74          | 9.97        | 48.71        | 63.63        | -14.92      | QP       | P   |        |
| 2    | 0.1995          | 33.37          | 9.97        | 43.34        | 53.63        | -10.29      | AVG      | P   |        |
| 3    | 0.4244          | 29.64          | 10.02       | 39.66        | 57.36        | -17.70      | QP       | P   |        |
| 4    | 0.4244          | 23.01          | 10.02       | 33.03        | 47.36        | -14.33      | AVG      | P   |        |
| 5    | 0.8475          | 31.83          | 10.04       | 41.87        | 56.00        | -14.13      | QP       | P   |        |
| 6    | 0.8475          | 23.31          | 10.04       | 33.35        | 46.00        | -12.65      | AVG      | P   |        |
| 7    | 4.2540          | 33.68          | 10.04       | 43.72        | 56.00        | -12.28      | QP       | P   |        |
| 8    | 4.2540          | 31.35          | 10.04       | 41.39        | 46.00        | -4.61       | AVG      | P   |        |
| 9    | 7.6560          | 36.93          | 10.00       | 46.93        | 60.00        | -13.07      | QP       | P   |        |
| 10   | 7.6560          | 35.65          | 10.00       | 45.65        | 50.00        | -4.35       | AVG      | P   |        |
| 11   | 10.2074         | 37.76          | 9.96        | 47.72        | 60.00        | -12.28      | QP       | P   |        |
| 12 * | 10.2074         | 36.39          | 9.96        | 46.35        | 50.00        | -3.65       | AVG      | P   |        |

Note: Level = Reading + Factor    Margin = Level - Limit

### Conducted Emission Test Data

Test Site: #1 Shielded Room  
 Test Mode: TM7  
 Comments: Neutral Line



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|-----|--------|
| 1   | 0.1995          | 37.92          | 9.99        | 47.91        | 63.63        | -15.72      | QP       | P   |        |
| 2   | 0.1995          | 33.00          | 9.99        | 42.99        | 53.63        | -10.64      | AVG      | P   |        |
| 3   | 0.3615          | 30.51          | 10.04       | 40.55        | 58.69        | -18.14      | QP       | P   |        |
| 4   | 0.3615          | 24.81          | 10.04       | 34.85        | 48.69        | -13.84      | AVG      | P   |        |
| 5   | 0.8475          | 34.91          | 10.07       | 44.98        | 56.00        | -11.02      | QP       | P   |        |
| 6   | 0.8475          | 24.81          | 10.07       | 34.88        | 46.00        | -11.12      | AVG      | P   |        |
| 7   | 4.8210          | 33.65          | 10.05       | 43.70        | 56.00        | -12.30      | QP       | P   |        |
| 8 * | 4.8210          | 32.26          | 10.05       | 42.31        | 46.00        | -3.69       | AVG      | P   |        |
| 9   | 8.7900          | 37.53          | 10.02       | 47.55        | 60.00        | -12.45      | QP       | P   |        |
| 10  | 8.7900          | 35.84          | 10.02       | 45.86        | 50.00        | -4.14       | AVG      | P   |        |
| 11  | 13.6725         | 38.30          | 10.00       | 48.30        | 60.00        | -11.70      | QP       | P   |        |
| 12  | 13.6725         | 32.38          | 10.00       | 42.38        | 50.00        | -7.62       | AVG      | P   |        |

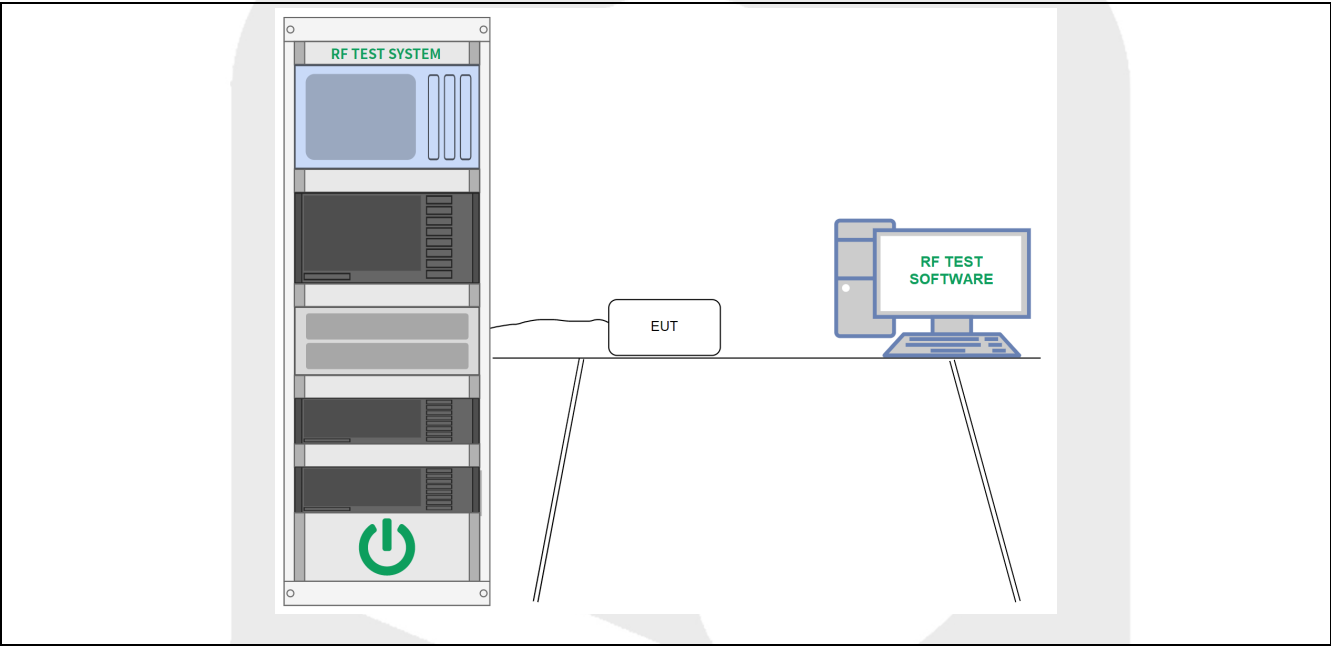
Note: Level = Reading + Factor    Margin = Level - Limit

5.3 Emissions Bandwidth

5.3.1 Test Requirement

|                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement | Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, 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. |
| Test Method      | ANSI C63.10-2020, section 6.9.2<br>Occupied bandwidth—relative measurement procedure                                                                                                                                                                                                                                                                                                                                                                                         |

5.3.2 Test Setup Diagram



### 5.3.3 Test Procedure

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW.
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement.
- c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than  $[10 \log (OBW/RBW)]$  below the reference level. Specific guidance is given in 4.1.5.2.
- d) Steps a) through c) might require iteration to adjust within the specified tolerances.
- e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target “-xx dB down” requirement; that is, if the requirement calls for measuring the -20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value.
- f) Set detection mode to peak and trace mode to maxhold.
- g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).
- h) Determine the “-xx dB down amplitude” using  $[(\text{reference value}) - xx]$ . Alternatively, this calculation may be made by using the marker-delta function of the instrument.
- i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j).
- j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the “-xx dB down amplitude” determined in step h). If a marker is below this “-xx dB down amplitude” value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the “-xx dB down amplitude” determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.
- k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

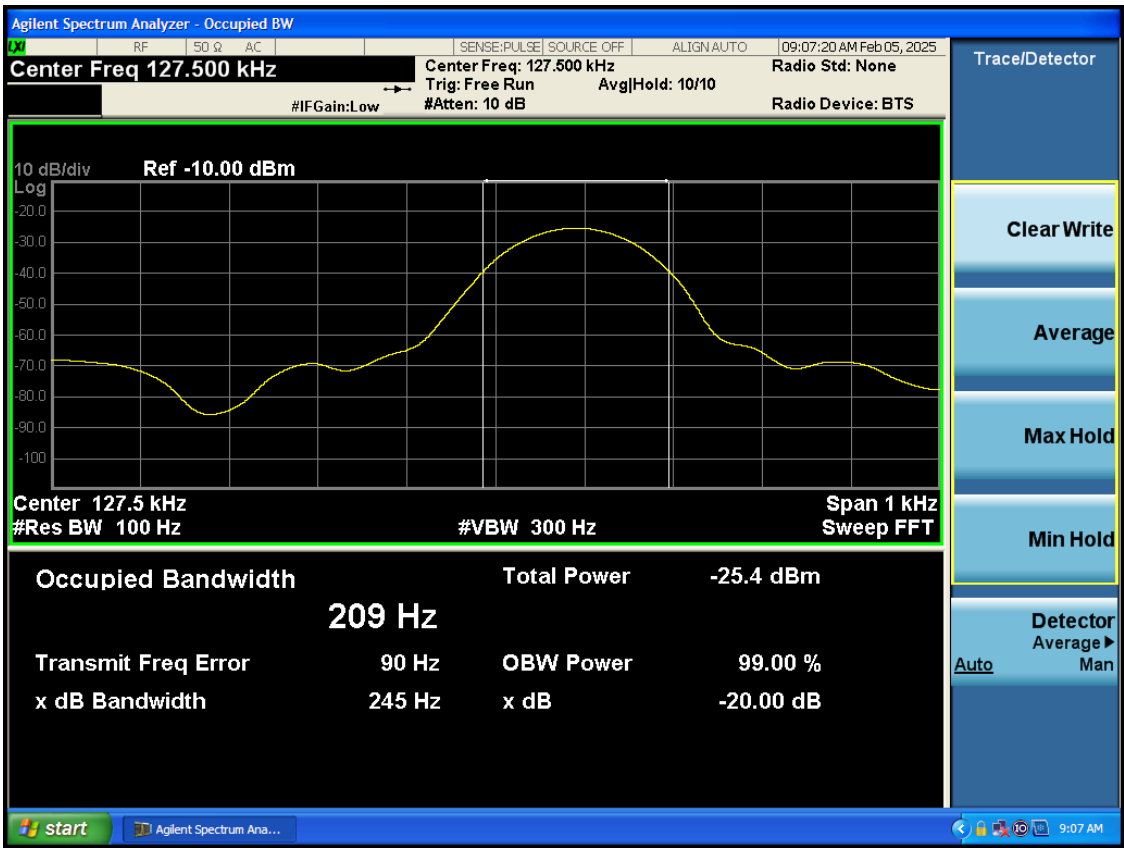
### 5.3.4 Test Data

**PASS.**

Please refer to the following pages.

| Frequency (KHz) | 20dB bandwidth | 99% bandwidth | Result |
|-----------------|----------------|---------------|--------|
| 127.5           | 245 Hz         | 209 Hz        | Pass   |

Test Graph:

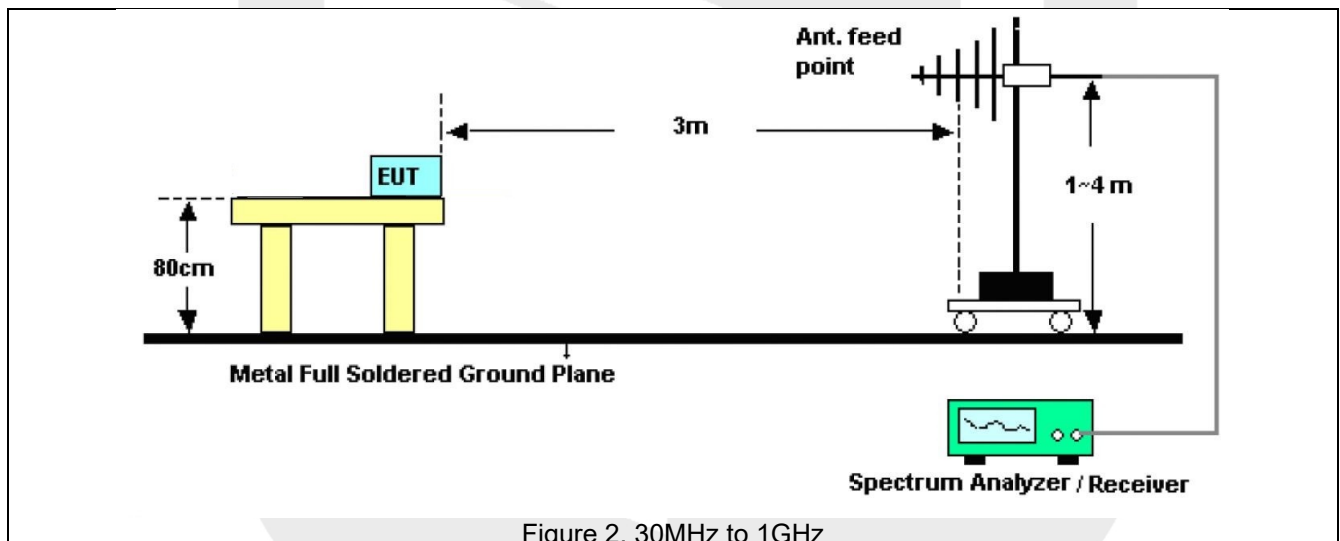
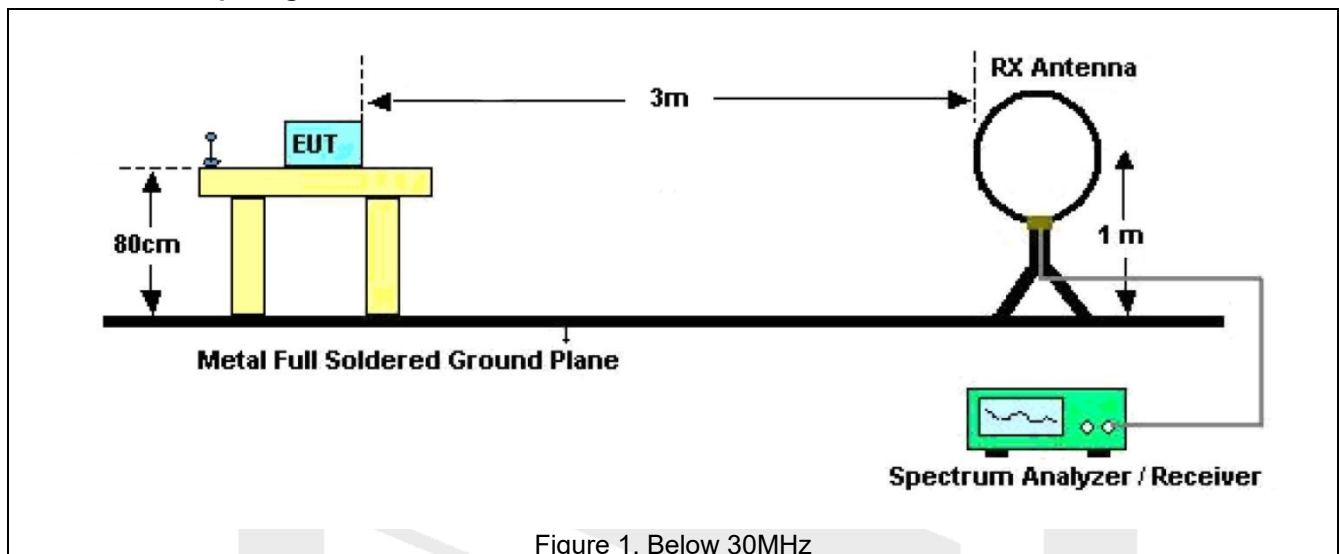


## 5.4 Field Strength of Fundamental Emissions and Radiated Emission

### 5.4.1 Test Requirement

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                     |                                   |                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------|
| Test Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | FCC §15.215; FCC §15.209;                                                                                                                                                                                                                                                                                                                                           |                                   |                               |
| Test Limit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | FCC §15.215(b):<br>In most unwanted emissions outside of the frequency bands shown in these alternative provisions must be attenuated to the emission limits shown in §15.209. In no case shall the level of the unwanted emissions from an intentional radiator operating under these additional provisions exceed the field strength of the fundamental emission. |                                   |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | FCC §15.209:<br>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 (microvolts/meter) | 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                             |
| ** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                     |                                   |                               |
| 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.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                     |                                   |                               |
| 3. At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). For example, at the frequency 9 kHz, limit @3m = 20*log (2400/f) + 40log (dlimit/dmeasure) where limit = 300m, dmeasure=3m. limit @3m = 20*log (2400/9) + 40log (300/3) = 128.52 (dBµV/m). |                                                                                                                                                                                                                                                                                                                                                                     |                                   |                               |
| 4. The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 90kHz,110-490 kHz and above 1000 MHZ Radiated emission limits in these three bands are based on measurements em-ploying an average detector.                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                     |                                   |                               |
| Test Method                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ANSI C63.10-2020 section 6.4, 6.5<br>Radiated emissions tests                                                                                                                                                                                                                                                                                                       |                                   |                               |

#### 5.4.2 Test Setup Diagram



### 5.4.3 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.

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

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW = 1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW = 30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW = 300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz, Set the spectrum analyzer as:

RBW = 1MHz, VBW = 1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW = 1MHz, VBW = 10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported, Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

### 5.4.4 Test Data

**PASS.**

Please refer to the following pages.

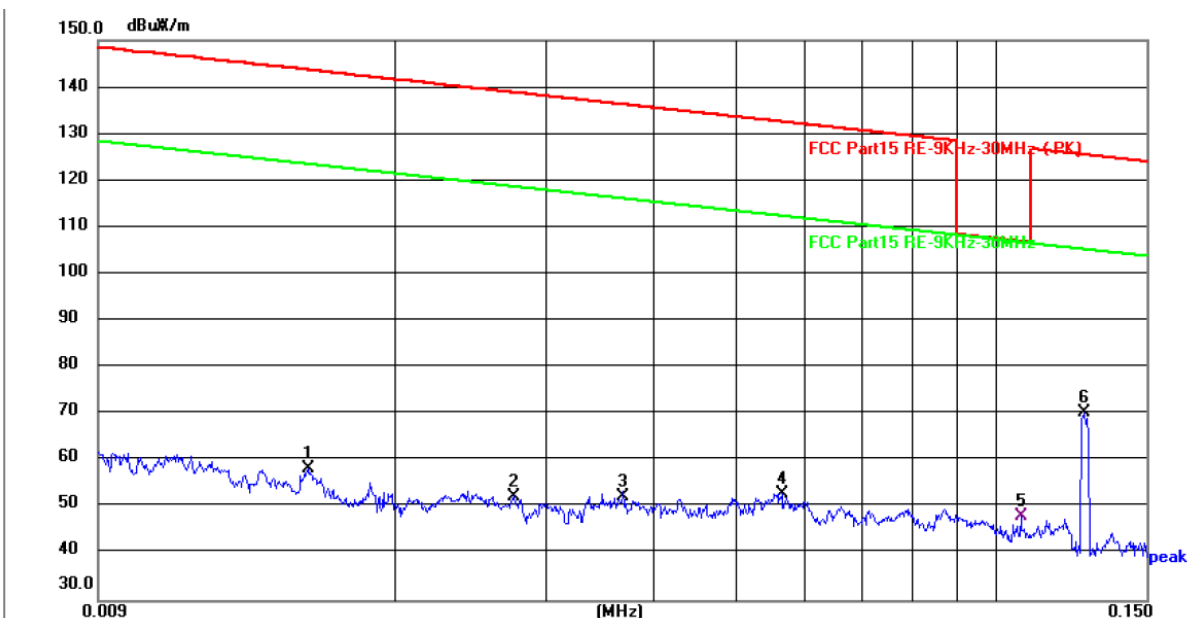
The frequency range from 9KHz to 1000MHz is checked.

Only the worst case data was showed in the report, please to see the following pages.

For test of 30MHz-1GHz, during the test, pre-scan all test mode, the report only record this mode.

**Radiated Emission Test Data (9kHz -150kHz)**

Test item: **966 Chamber #1**      Polarization: **Coaxial**  
Distance: **3m**      Test Mode: **TM7**

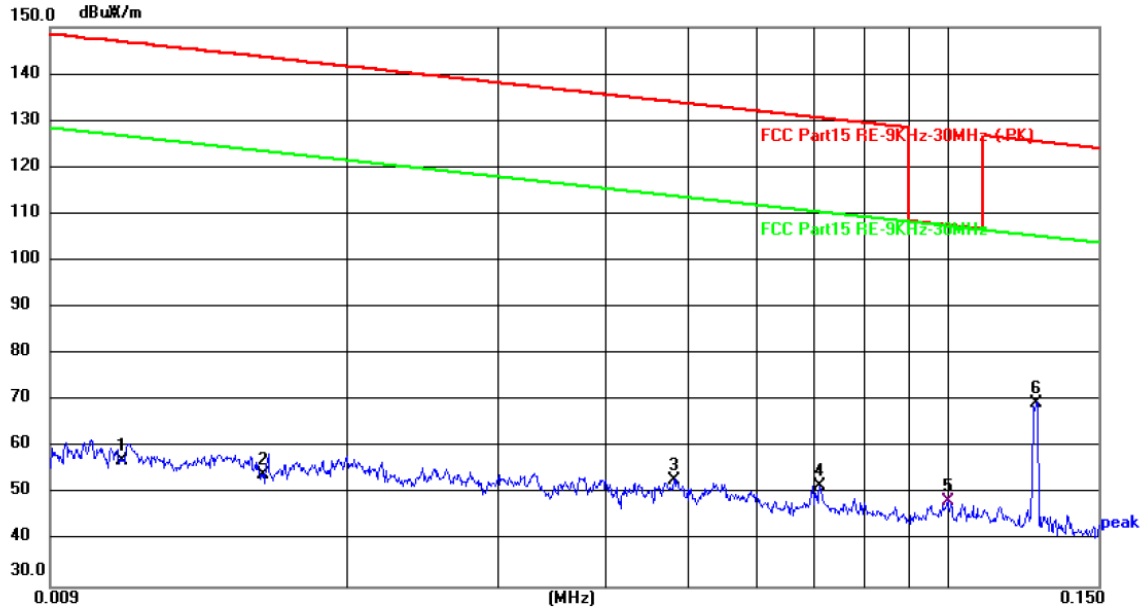


| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|--------|
| 1   | 0.0158          | 38.72          | 19.67         | 58.39          | 143.63         | -85.24      | peak     | P   |        |
| 2   | 0.0274          | 32.48          | 19.80         | 52.28          | 138.85         | -86.57      | peak     | P   |        |
| 3   | 0.0367          | 32.62          | 19.86         | 52.48          | 136.31         | -83.83      | peak     | P   |        |
| 4   | 0.0563          | 33.04          | 19.93         | 52.97          | 132.59         | -79.62      | peak     | P   |        |
| 5   | 0.1070          | 28.19          | 20.03         | 48.22          | 107.02         | -58.80      | QP       | P   |        |
| 6 * | 0.1270          | 50.37          | 19.97         | 70.34          | 125.53         | -55.19      | peak     | P   |        |

**Note:**    **Level = Reading + Factor**      **Margin =Level - Limit**

**Radiated Emission Test Data (9kHz -150kHz)**

|                   |                       |                      |                 |
|-------------------|-----------------------|----------------------|-----------------|
| <b>Test item:</b> | <b>966 Chamber #1</b> | <b>Polarization:</b> | <b>Coplanar</b> |
| <b>Distance:</b>  | <b>3m</b>             | <b>Test Mode:</b>    | <b>TM7</b>      |

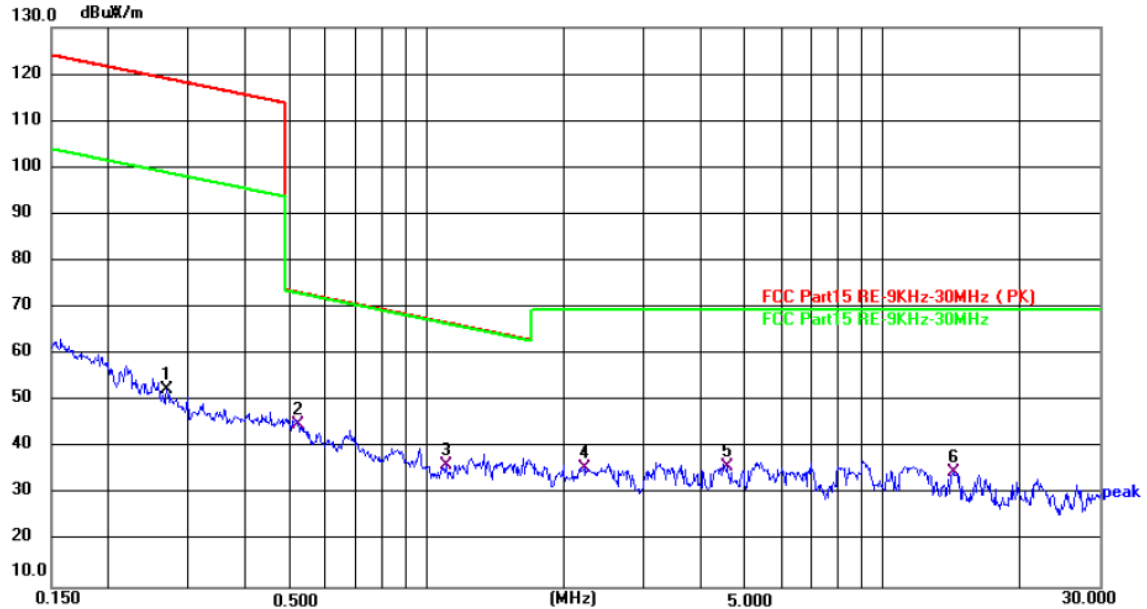


| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|--------|
| 1   | 0.0110          | 37.64          | 19.61         | 57.25          | 146.78         | -89.53      | peak     | P   |        |
| 2   | 0.0160          | 34.60          | 19.67         | 54.27          | 143.52         | -89.25      | peak     | P   |        |
| 3   | 0.0480          | 33.15          | 19.92         | 53.07          | 133.98         | -80.91      | peak     | P   |        |
| 4   | 0.0710          | 31.95          | 19.94         | 51.89          | 130.58         | -78.69      | peak     | P   |        |
| 5   | 0.1000          | 28.43          | 19.99         | 48.42          | 107.61         | -59.19      | QP       | P   |        |
| 6 * | 0.1270          | 49.37          | 19.97         | 69.34          | 125.53         | -56.19      | peak     | P   |        |

**Note:**    **Level = Reading + Factor**                      **Margin =Level - Limit**

**Radiated Emission Test Data (150kHz - 30MHz)**

Test item: **966 Chamber #1**      Polarization: **Coaxial**  
Distance: **3m**      Test Mode: **TM7**



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|--------|
| 1   | 0.2686          | 32.30          | 20.09         | 52.39          | 119.02         | -66.63      | peak     | P   |        |
| 2 * | 0.5210          | 24.81          | 20.08         | 44.89          | 73.27          | -28.38      | QP       | P   |        |
| 3   | 1.1050          | 16.11          | 20.11         | 36.22          | 66.74          | -30.52      | QP       | P   |        |
| 4   | 2.2130          | 15.65          | 20.09         | 35.74          | 69.54          | -33.80      | QP       | P   |        |
| 5   | 4.5494          | 15.91          | 20.07         | 35.98          | 69.54          | -33.56      | QP       | P   |        |
| 6   | 14.3640         | 15.08          | 19.56         | 34.64          | 69.54          | -34.90      | QP       | P   |        |

**Note:**    **Level = Reading + Factor**      **Margin = Level - Limit**

**Radiated Emission Test Data (150kHz - 30MHz)**

Test item: **966 Chamber #1**      Polarization: **Coplanar**  
 Distance: **3m**      Test Mode: **TM7**



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|--------|
| 1   | 0.2714          | 35.24          | 20.10         | 55.34          | 118.93         | -63.59      | peak     | P   |        |
| 2 * | 0.6683          | 24.47          | 20.09         | 44.56          | 71.10          | -26.54      | QP       | P   |        |
| 3   | 1.2160          | 17.68          | 20.11         | 37.79          | 65.91          | -28.12      | QP       | P   |        |
| 4   | 3.3814          | 16.43          | 20.08         | 36.51          | 69.54          | -33.03      | QP       | P   |        |
| 5   | 6.5224          | 14.01          | 19.94         | 33.95          | 69.54          | -35.59      | QP       | P   |        |
| 6   | 18.1352         | 16.06          | 19.39         | 35.45          | 69.54          | -34.09      | QP       | P   |        |

**Note:**    **Level = Reading + Factor**      **Margin = Level - Limit**

### Radiated Emission Test Data (30-1000MHz)

|                   |                |                      |            |
|-------------------|----------------|----------------------|------------|
| <b>Test item:</b> | 966 Chamber #1 | <b>Polarization:</b> | Horizontal |
| <b>Distance:</b>  | 3m             | <b>Test Mode:</b>    | TM7        |



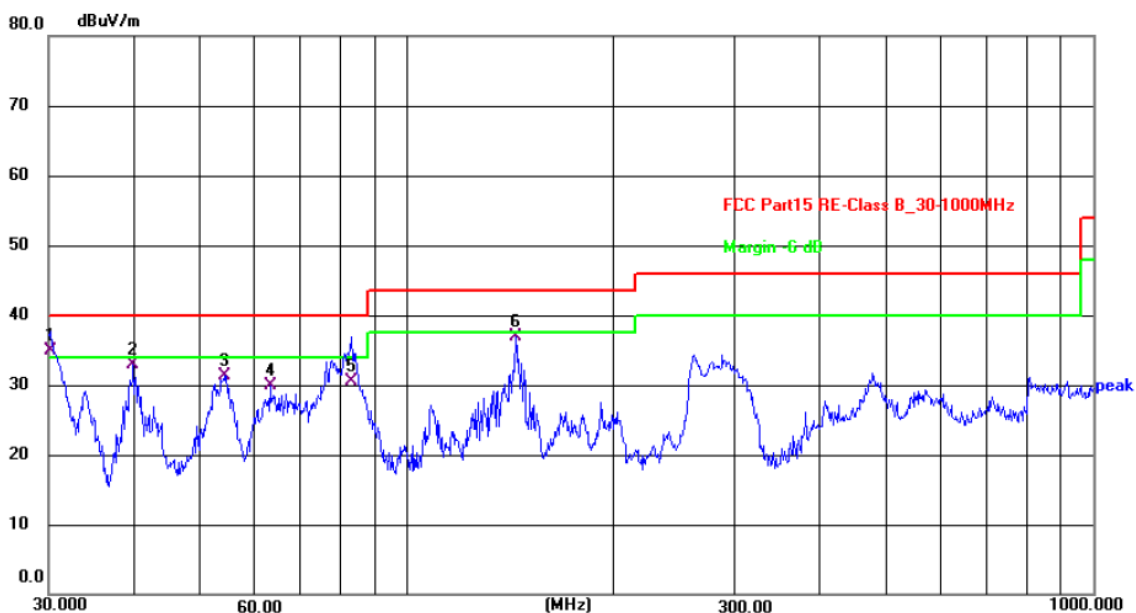
| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|--------|
| 1   | 30.9619         | 44.34          | -16.91        | 27.43          | 40.00          | -12.57      | QP       | P   |        |
| 2   | 84.1100         | 49.59          | -18.90        | 30.69          | 40.00          | -9.31       | QP       | P   |        |
| 3   | 108.2667        | 46.59          | -16.22        | 30.37          | 43.50          | -13.13      | QP       | P   |        |
| 4   | 228.4904        | 48.42          | -14.07        | 34.35          | 46.00          | -11.65      | QP       | P   |        |
| 5 * | 287.9904        | 49.73          | -12.31        | 37.42          | 46.00          | -8.58       | QP       | P   |        |
| 6   | 302.4812        | 48.56          | -11.93        | 36.63          | 46.00          | -9.37       | QP       | P   |        |

**Note:** Level = Reading + Factor

Margin = Level - Limit

### Radiated Emission Test Data (30-1000MHz)

|                   |                |                      |          |
|-------------------|----------------|----------------------|----------|
| <b>Test item:</b> | 966 Chamber #1 | <b>Polarization:</b> | Vertical |
| <b>Distance:</b>  | 3m             | <b>Test Mode:</b>    | TM7      |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | P/F | Remark |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|-----|--------|
| 1 * | 30.2111         | 51.84          | -16.94        | 34.90          | 40.00          | -5.10       | QP       | P   |        |
| 2   | 39.8542         | 48.25          | -15.25        | 33.00          | 40.00          | -7.00       | QP       | P   |        |
| 3   | 54.0711         | 45.82          | -14.45        | 31.37          | 40.00          | -8.63       | QP       | P   |        |
| 4   | 63.0916         | 45.89          | -15.90        | 29.99          | 40.00          | -10.01      | QP       | P   |        |
| 5   | 82.9385         | 49.62          | -19.12        | 30.50          | 40.00          | -9.50       | QP       | P   |        |
| 6   | 143.8295        | 55.17          | -18.33        | 36.84          | 43.50          | -6.66       | QP       | P   |        |

**Note:** Level = Reading + Factor

Margin = Level - Limit

## **ANNEX A TEST SETUP PHOTOS**

Please refer to the document "8326EU011613W-AA.PDF"

## **ANNEX B EXTERNAL PHOTOS**

Please refer to the document "8326EU011613W-AB.PDF"

## **ANNEX C INTERNAL PHOTOS**

Please refer to the document "8326EU011613W-AC.PDF"



## STATEMENT

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--- End of Report ---