

# **FCC TEST REPORT**

## **FCC:2AZ3Z-ZSF6302**

**Product** : Electric scooter  
**Model Name** : 6302/A11PRO  
**Brand** : N/A  
**Report No.** : NCT25015195E1-2

Prepared for

**Shenzhen Z.S.F Technology Co.,Ltd**  
**Room 101-301, Building HC, Room 101-301, Building HD, beibu Industrial Park,**  
**Yanchuan Community,Yanluo Street, Bao'an District, Shenzhen**

Prepared by

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## 1 TEST RESULT CERTIFICATION

Applicant's name : Shenzhen Z.S.F Technology Co.,Ltd  
Address : Room 101-301, Building HC, Room 101-301, Building HD, beibu Industrial Park, Yanchuan Community, Yanluo Street, Bao'an District, Shenzhen  
Manufacture's name : Shenzhen Z.S.F Technology Co.,Ltd  
Address : Room 101-301, Building HC, Room 101-301, Building HD, beibu Industrial Park, Yanchuan Community, Yanluo Street, Bao'an District, Shenzhen  
Product name : Electric scooter  
Model number : 6302/A11PRO  
Standards : FCC CFR47 Part 15 Section 15.225  
Test procedure : ANSI C63.10:2020  
Date of test : Apr. 09, 2025 to May 29, 2025  
Date of Issue : May 29, 2025

This device described above has been tested by NCT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Test Engineer:

Keven Wu / Engineer

Technical Manager:

Henry Wang / Manager

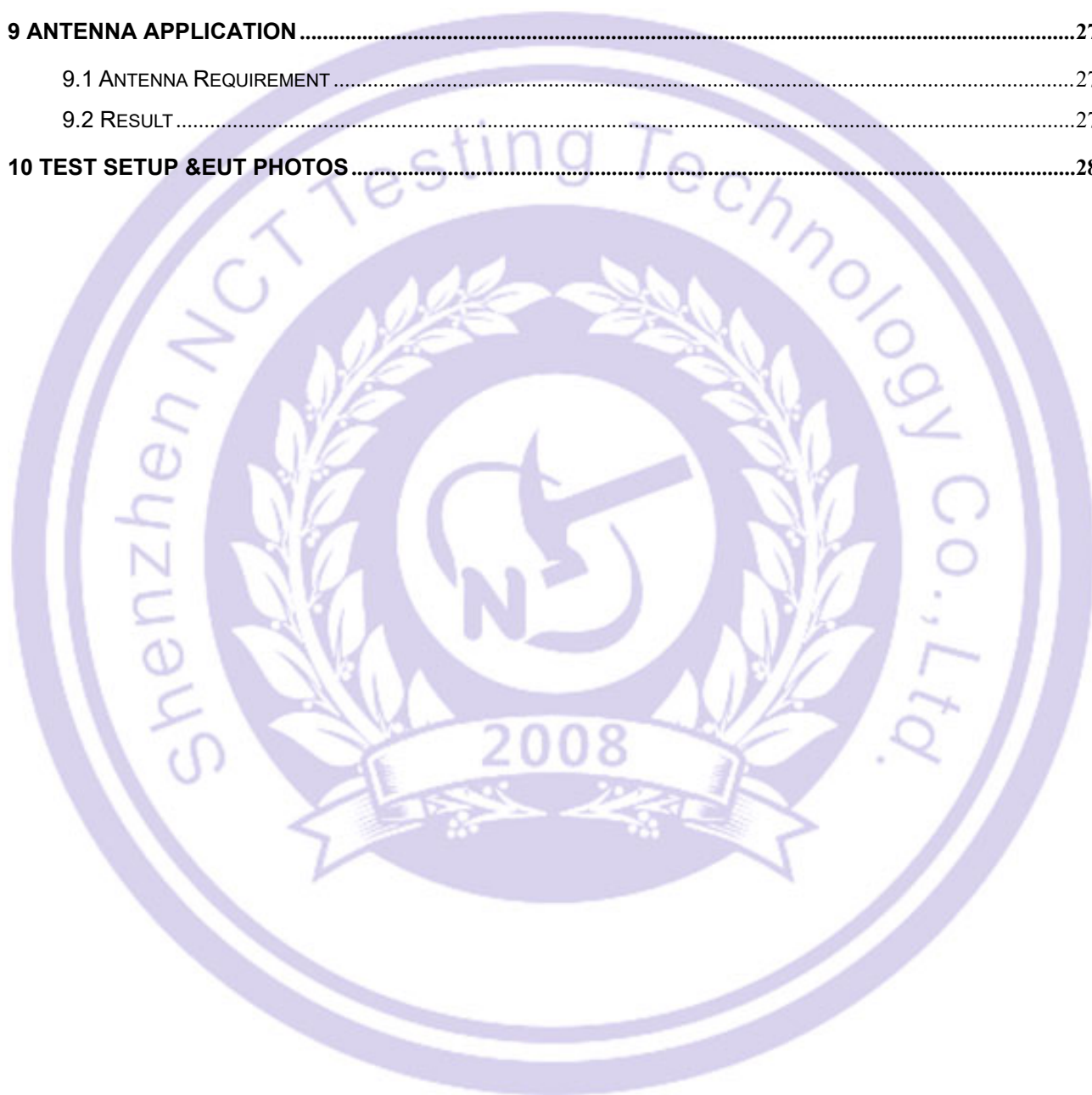


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## 2 Test Summary

| FCC CFR47 Part 15 Section 15.225 |                               |        |        |
|----------------------------------|-------------------------------|--------|--------|
| Standard Section                 | Test Item                     | Result | Remark |
| 15.203                           | Antenna requirement           | PASS   |        |
| 15.207                           | Conducted Emission            | PASS   |        |
| 15.225(d)<br>15.209              | Radiated Spurious Emission    | PASS   |        |
| 15.215                           | Bandwidth                     | PASS   |        |
| 15.225(d)<br>15.209              | Restricted Spurious Emission  | PASS   |        |
| 15.225(e)                        | Frequency Stability Tolerance | PASS   |        |

Remark:

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

### 3 General Information

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

|                                                                                                                                                                                                                |   |                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------------------------------|
| Product Name                                                                                                                                                                                                   | : | Electric scooter                      |
| Model Name                                                                                                                                                                                                     | : | A11PRO                                |
| Sample ID                                                                                                                                                                                                      | : | 25015190-001#                         |
| Sample(s) Status:                                                                                                                                                                                              | : | Engineer sample                       |
| Series Model                                                                                                                                                                                                   | : | N/A                                   |
| Model Different.:                                                                                                                                                                                              | : | N/A                                   |
| Operation Frequency                                                                                                                                                                                            | : | 13.56 MHz                             |
| Number of Channel                                                                                                                                                                                              | : | 1                                     |
| Type of Modulation                                                                                                                                                                                             | : | ASK                                   |
| Antenna installation                                                                                                                                                                                           | : | Coil Antenna                          |
| Antenna Gain                                                                                                                                                                                                   | : | 0 dBi                                 |
| Power supply                                                                                                                                                                                                   | : | DC 57.6V from Battery or AC 120V/60Hz |
| Hardware Version                                                                                                                                                                                               | : | N/A                                   |
| Software Version                                                                                                                                                                                               | : | N/A                                   |
| Remark: the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant. |   |                                       |

#### 3.2 Test Setup Configuration

Conducted Emission

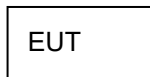
AC Line



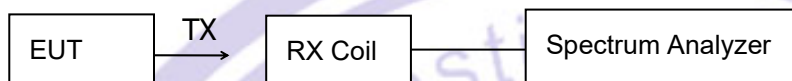
Radiated Emission(30MHz-1GHz)



Radiated Emission(above 1GHz)



Conducted Spurious



### 3.3 Test Mode

|                                                                                                                                                                                                                                       |                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| Transmitting mode                                                                                                                                                                                                                     | Keep the EUT in continuously transmitting mode. |
| Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data. |                                                 |

## 3.4 Test Site

### Site Description

EMC Lab. : Accredited by CNAS, 2022-09-27

The certificate is valid until 2028.01.07

The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)

The Certificate Registration Number is L8251

Designation Number: CN1347

Test Firm Registration Number: 894804

Accredited by A2LA, June 14, 2023

The Certificate Registration Number is 6837.01

Accredited by Industry Canada, November 09, 2018

The Conformity Assessment Body Identifier is CN0150

Company Number: 30806

Name of Firm : Shenzhen NCT Testing Technology Co., Ltd.

Site Location : A101&2F B2, Fuqiao 6th Area, Xintian Community, Fuhai Street, Baoan District, Shenzhen, People's Republic of China

## 4 Equipment During Test

### 4.1 Equipments List

#### Conducted emission Test Equipment

| Name              | Model No.    | Serial No. | Manufacturer    | Date of Cal. | Due Date  |
|-------------------|--------------|------------|-----------------|--------------|-----------|
| 944 Shielded Room | 944 Room     | /          | EMToni          | 2022/5/31    | 2025/5/30 |
| EMI Test Receiver | ESPI         | 101604     | Rohde & Schwarz | 2024/6/17    | 2025/6/16 |
| LISN              | ENV 216      | 102796     | Rohde & Schwarz | 2024/6/17    | 2025/6/16 |
| LISN              | VN1-13S      | 004023     | CRANAGE         | 2024/6/17    | 2025/6/16 |
| Cable             | RG223-1500MM | NA         | RG              | 2024/6/17    | 2025/6/16 |

#### Radiated emission & Radio Frequency Test Equipment

| Name                               | Model No.   | Serial No. | Manufacturer    | Date of Cal. | Due Date  |
|------------------------------------|-------------|------------|-----------------|--------------|-----------|
| 966 Shielded Room                  | 966 Room    | /          | EMToni          | 2022/5/31    | 2025/5/30 |
| EMI Test Receiver                  | ESCI        | 101178     | Rohde & Schwarz | 2024/6/17    | 2025/6/16 |
| Spectrum Analyze<br>(10Hz-26.5GHz) | N9020A      | MY50510202 | Agilent         | 2024/6/17    | 2025/6/16 |
| Amplifi<br>(30MHz-1GHz)            | BBV 9743 B  | 00374      | SCHNARZBECK     | 2025/3/08    | 2026/3/07 |
| Bilog Antenna<br>(30MHz-1GHz)      | VULB9162    | 00473      | SCHNARZBECK     | 2025/3/10    | 2026/3/09 |
| Horn antenna<br>(1GHz-18GHz)       | BBHA 9120 D | 02622      | SCHNARZBECK     | 2024/6/17    | 2025/6/16 |
| Pream plifier<br>(1GHz-18GHz)      | BBV 9718D   | 0024       | SCHNARZBECK     | 2024/6/17    | 2025/6/16 |
| Spectrum Analyze<br>(1GHz-40GHz)   | FSV 40      | 100952     | Rohde & Schwarz | 2024/6/17    | 2025/6/16 |
| Pream plifier<br>(15GHz-40GHz)     | BBV 9718D   | 0024       | SCHNARZBECK     | 2025/3/10    | 2026/3/09 |
| Broadband Antenna<br>(15GHz-40GHz) | SAS-574     | 588        | A.H.System      | 2024/6/17    | 2025/6/16 |
| Loop Antenna<br>(9KHz-30MHz)       | FMZB1519B   | 014        | SCHNARZBECK     | 2024/6/17    | 2025/6/16 |

|                                |                   |            |             |           |           |
|--------------------------------|-------------------|------------|-------------|-----------|-----------|
| Amplifier<br>(9KHz-30MHz)      | CVP 9222 C        | 00109      | SCHNARZBECK | 2024/6/17 | 2025/6/16 |
| MXG Signal<br>Analyzer         | N9020A            | 101178     | RS          | 2024/6/17 | 2025/6/16 |
| MXG Vector Signal<br>Generator | N5182A            | MY50510202 | Agilent     | 2024/6/17 | 2025/6/16 |
| MXG Analog Signal<br>Generator | N5181A            | 00374      | SCHWARZBECK | 2024/6/17 | 2025/6/16 |
| Power Sensor                   | TR1029-2          | 00473      | SCHNARZBECK | 2024/6/17 | 2025/6/16 |
| RF Swith                       | TR1029-1          | 02622      | SCHNARZBECK | 2024/6/17 | 2025/6/16 |
| Cable                          | DA800-<br>4000MM  | NA         | DA          | 2024/6/17 | 2025/6/16 |
| Cable                          | DA800-<br>11000MM | NA         | DA          | 2022/5/31 | 2025/5/30 |

## Other

| Item | Name                         | Manufacturer | Model  | Software version   |
|------|------------------------------|--------------|--------|--------------------|
| 1    | EMC Conduction Test System   | FALA         | EZ-EMC | Ver.EMC-CON 3A1.1+ |
| 2    | EMC radiation test system    | FALA         | EZ-EMC | Ver.FA-03A2 RE+    |
| 3    | RF test system               | TACHOY       | RFTest | V1.0.0             |
| 4    | RF communication test system | TACHOY       | RFTest | V1.0.0             |

## 4.2 Measurement Uncertainty

| Parameter                          | Uncertainty              |
|------------------------------------|--------------------------|
| RF output power, conducted         | ±1.0dB                   |
| Power Spectral Density, conducted  | ±2.2dB                   |
| Radio Frequency                    | ± 1 x 10 <sup>-6</sup>   |
| Bandwidth                          | ± 1.5 x 10 <sup>-6</sup> |
| Time                               | ±2%                      |
| Duty Cycle                         | ±2%                      |
| Temperature                        | ±1°C                     |
| Humidity                           | ±5%                      |
| DC and low frequency voltages      | ±3%                      |
| Conducted Emissions (150kHz~30MHz) | ±3.64dB                  |
| Radiated Emission(9KHZ~30MHz)      | ±3.82dB                  |
| Radiated Emission(30MHz~1GHz)      | ±5.03dB                  |
| Radiated Emission(1GHz~25GHz)      | ±4.74dB                  |

## 4.3 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.

| Item | Equipment               | Mfr/Brand | Model/Type No.   | Series No. | Note      |
|------|-------------------------|-----------|------------------|------------|-----------|
| E-1  | Electric scooter        | N/A       | A11PRO           | N/A        | EUT       |
| E-2  | LITHIUM Battery Charger | N/A       | SPC-290WW-672040 | N/A        | Auxiliary |
|      |                         |           |                  |            |           |

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 5 Conducted Emission

Test Requirement: : FCC CFR 47 Part 15 Section 15.207  
Test Method : ANSI C63.10: 2020  
Test Result : PASS  
Frequency Range : 150kHz to 30MHz  
Class/Severity : Class B

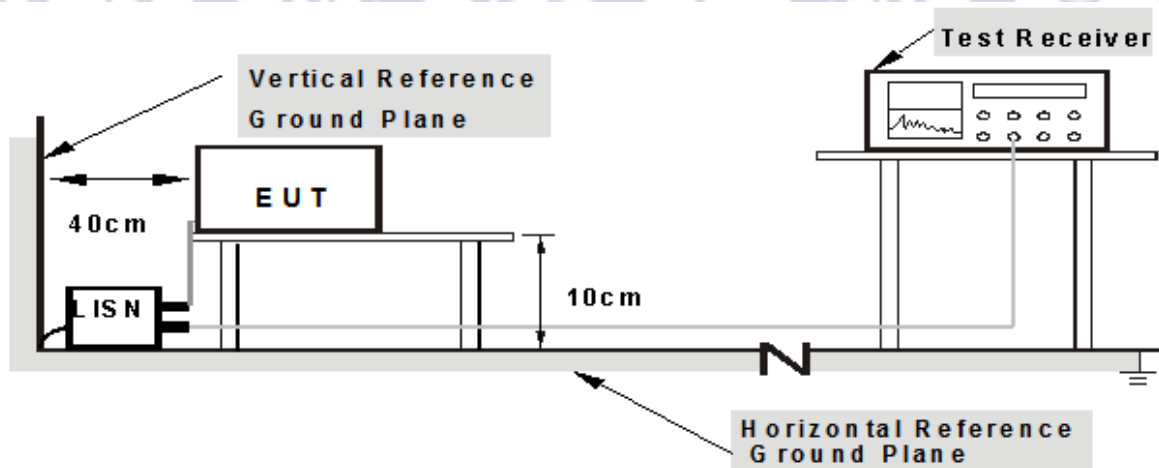
### 5.1 E.U.T. Operation

Operating Environment :

Temperature : 25 °C  
Humidity : 54% RH  
Atmospheric Pressure : 101kPa

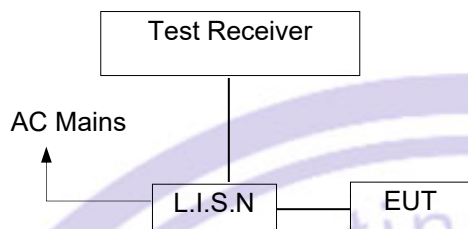
### 5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2020.



**Note: 1.Support units were connected to second LISN.  
2.Both of LISNs (AMN) are 10 cm from EUT and at least 10  
from other units and other metal planes**

### 5.3 Test SET-UP (Block Diagram of Configuration)



### 5.4 Measurement Procedure

1. The EUT was placed on a table, which is 0.1m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

### 5.5 Conducted Emission Limit

#### Conducted Emission

| Frequency(MHz) | Quasi-peak | Average |
|----------------|------------|---------|
| 0.15-0.5       | 66-56      | 56-46   |
| 0.5-5.0        | 56         | 46      |
| 5.0-30.0       | 60         | 50      |

#### Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 5.6 Measurement Description

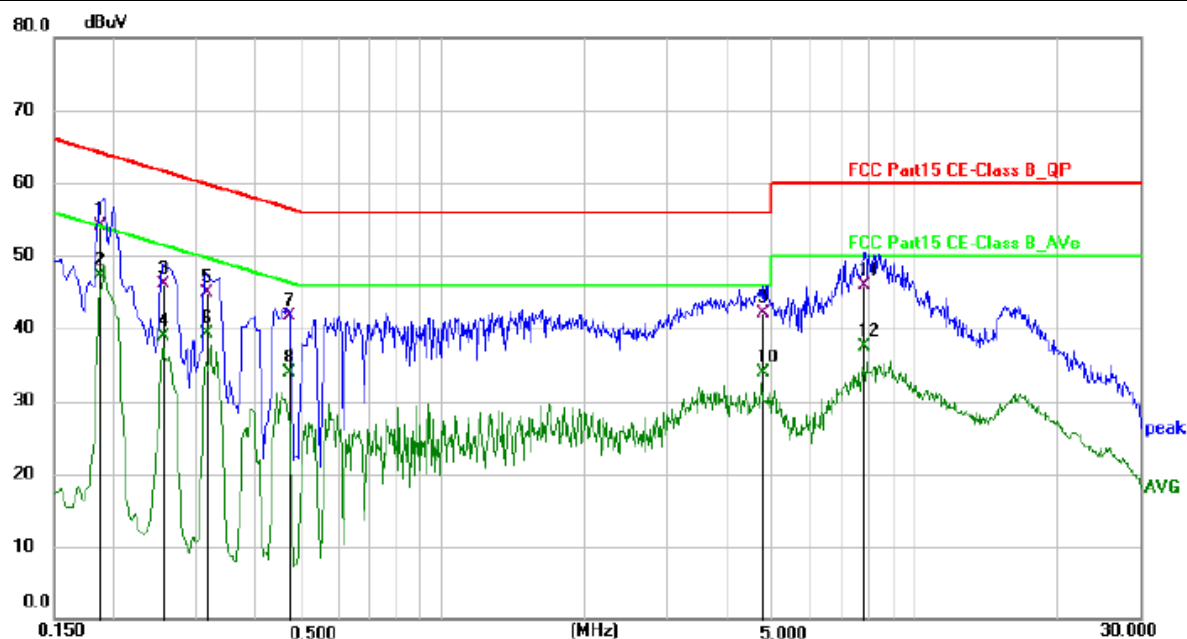
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

### 5.7 Conducted Emission Test Result

Pass

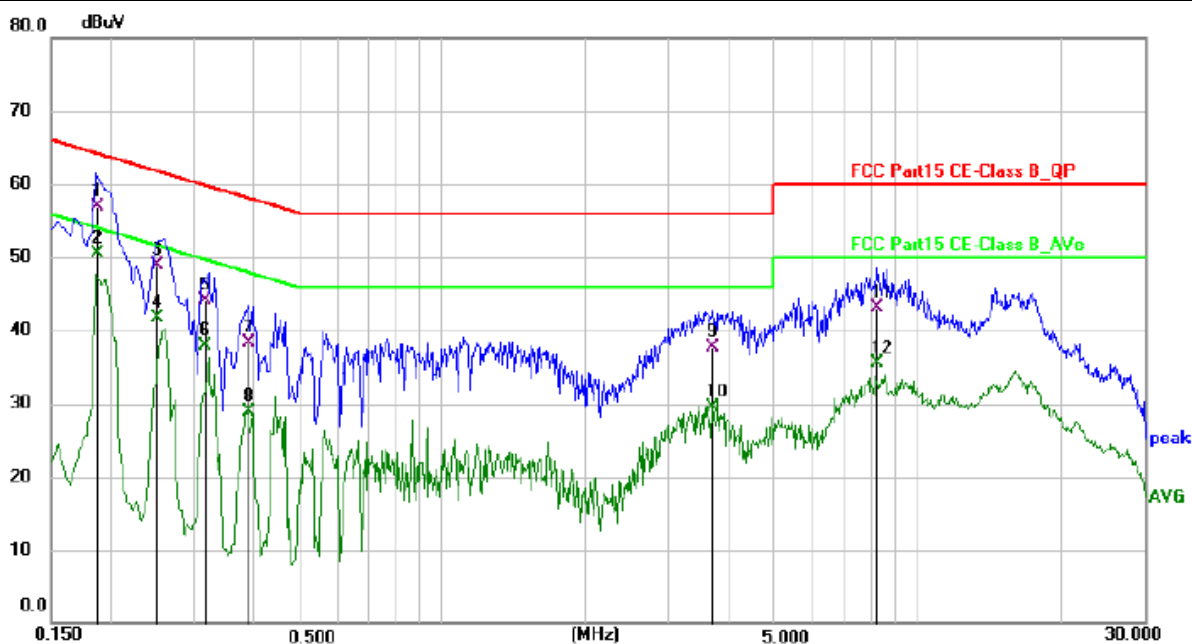
Conducted emission at both 120V & 240V is assessed, and emission at 120V represents the worst case. All the modulation modes were tested the data of the worst mode is recorded in the following pages.

|                |              |                    |     |
|----------------|--------------|--------------------|-----|
| Temperature:   | 25 °C        | Relative Humidity: | 54% |
| Pressure:      | 101kPa       | Phase :            | L   |
| Test Voltage : | AC 120V/60Hz |                    |     |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|
| 1   | 0.1875          | 44.43          | 9.68        | 54.11        | 64.15        | -10.04      | QP       |
| 2 * | 0.1875          | 37.56          | 9.68        | 47.24        | 54.15        | -6.91       | AVG      |
| 3   | 0.2552          | 36.46          | 9.67        | 46.13        | 61.59        | -15.46      | QP       |
| 4   | 0.2552          | 29.26          | 9.67        | 38.93        | 51.59        | -12.66      | AVG      |
| 5   | 0.3171          | 35.20          | 9.67        | 44.87        | 59.78        | -14.91      | QP       |
| 6   | 0.3171          | 29.68          | 9.67        | 39.35        | 49.78        | -10.43      | AVG      |
| 7   | 0.4715          | 31.97          | 9.66        | 41.63        | 56.49        | -14.86      | QP       |
| 8   | 0.4715          | 24.32          | 9.66        | 33.98        | 46.49        | -12.51      | AVG      |
| 9   | 4.7683          | 32.32          | 9.72        | 42.04        | 56.00        | -13.96      | QP       |
| 10  | 4.7683          | 24.18          | 9.72        | 33.90        | 46.00        | -12.10      | AVG      |
| 11  | 7.8265          | 36.16          | 9.76        | 45.92        | 60.00        | -14.08      | QP       |
| 12  | 7.8265          | 27.79          | 9.76        | 37.55        | 50.00        | -12.45      | AVG      |

|                |              |                    |     |
|----------------|--------------|--------------------|-----|
| Temperature:   | 25 °C        | Relative Humidity: | 54% |
| Pressure:      | 101kPa       | Phase :            | N   |
| Test Voltage : | AC 120V/60Hz |                    |     |



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|----------------|-------------|--------------|--------------|-------------|----------|
| 1   | 0.1874          | 47.25          | 9.68        | 56.93        | 64.15        | -7.22       | QP       |
| 2 * | 0.1874          | 40.79          | 9.68        | 50.47        | 54.15        | -3.68       | AVG      |
| 3   | 0.2513          | 39.25          | 9.66        | 48.91        | 61.71        | -12.80      | QP       |
| 4   | 0.2513          | 32.03          | 9.66        | 41.69        | 51.71        | -10.02      | AVG      |
| 5   | 0.3181          | 34.52          | 9.66        | 44.18        | 59.76        | -15.58      | QP       |
| 6   | 0.3181          | 28.18          | 9.66        | 37.84        | 49.76        | -11.92      | AVG      |
| 7   | 0.3928          | 28.55          | 9.67        | 38.22        | 58.00        | -19.78      | QP       |
| 8   | 0.3928          | 19.33          | 9.67        | 29.00        | 48.00        | -19.00      | AVG      |
| 9   | 3.6991          | 28.01          | 9.72        | 37.73        | 56.00        | -18.27      | QP       |
| 10  | 3.6991          | 19.77          | 9.72        | 29.49        | 46.00        | -16.51      | AVG      |
| 11  | 8.2276          | 33.37          | 9.77        | 43.14        | 60.00        | -16.86      | QP       |
| 12  | 8.2276          | 25.74          | 9.77        | 35.51        | 50.00        | -14.49      | AVG      |

Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

## 6 Radiated Spurious Emissions & Restricted Spurious Emission

Test Requirement : FCC CFR 47 Part 15 Section 15.225(d)&15.209  
Test Method : ANSI C63.10:2020  
Test Result : PASS  
Measurement Distance : 3m  
Limit : See the follow table

| Frequency (MHz) | Field Strength        |              | Field Strength Limit at 3m Measurement Dist |                                       |
|-----------------|-----------------------|--------------|---------------------------------------------|---------------------------------------|
|                 | uV/m                  | Distance (m) | uV/m                                        | dBuV/m                                |
| 0.009 ~ 0.490   | $2400/F(\text{kHz})$  | 300          | $10000 * 2400/F(\text{kHz})$                | $20\log^{(2400/F(\text{kHz}))} + 80$  |
| 0.490 ~ 1.705   | $24000/F(\text{kHz})$ | 30           | $100 * 24000/F(\text{kHz})$                 | $20\log^{(24000/F(\text{kHz}))} + 40$ |
| 1.705 ~ 30      | 30                    | 30           | $100 * 30$                                  | $20\log^{(30)} + 40$                  |
| 30 ~ 88         | 100                   | 3            | 100                                         | $20\log^{(100)}$                      |
| 88 ~ 216        | 150                   | 3            | 150                                         | $20\log^{(150)}$                      |
| 216 ~ 960       | 200                   | 3            | 200                                         | $20\log^{(200)}$                      |
| Above 960       | 500                   | 3            | 500                                         | $20\log^{(500)}$                      |

### According to RSS-210 Annex B.6

Devices shall comply with the following requirements:

the field strength of any emission shall not exceed the following limits:

15.848 mV/m (84 dBμV/m) at 30 m, within the band 13.553-13.567 MHz

334 μV/m (50.5 dBμV/m) at 30 m, within the bands 13.410-13.553 MHz and 13.567-13.710 MHz

106 μV/m (40.5 dBμV/m) at 30 m, within the bands 13.110-13.410 MHz and 13.710-14.010 MHz

RSS-Gen general field strength limits for frequencies outside the band 13.110-14.010 MHz

### 6.1 EUT Operation

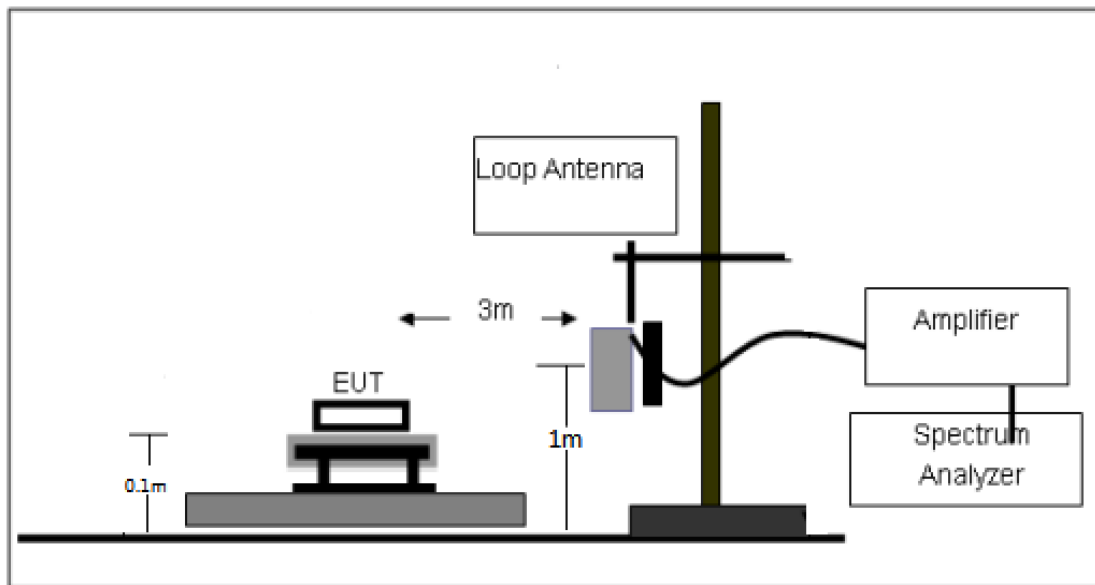
Operating Environment :

Temperature: : 25°C  
Humidity: : 54% RH  
Atmospheric Pressure: : 101kPa

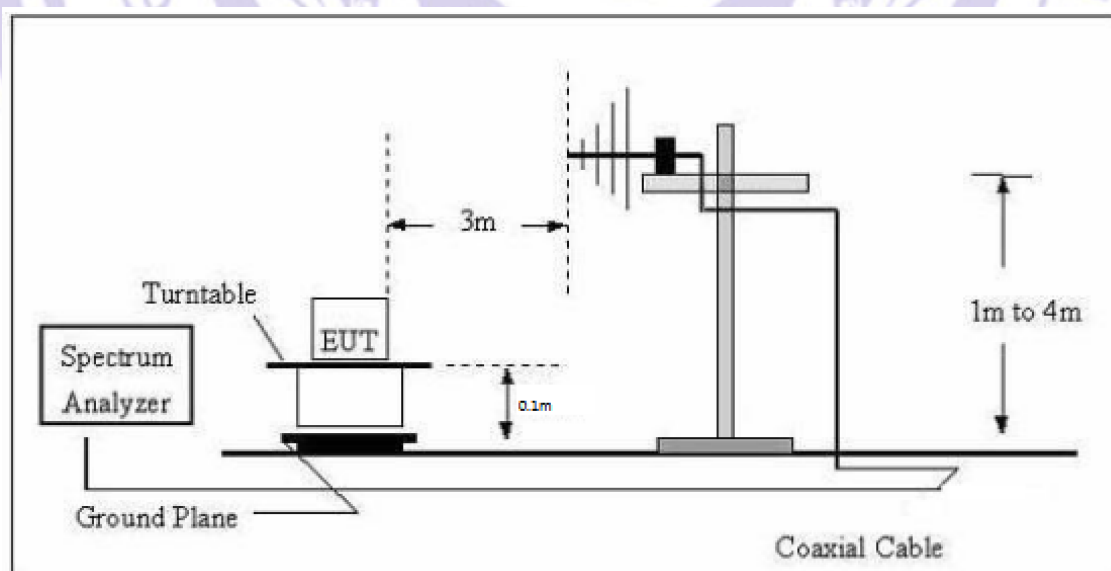
## 6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

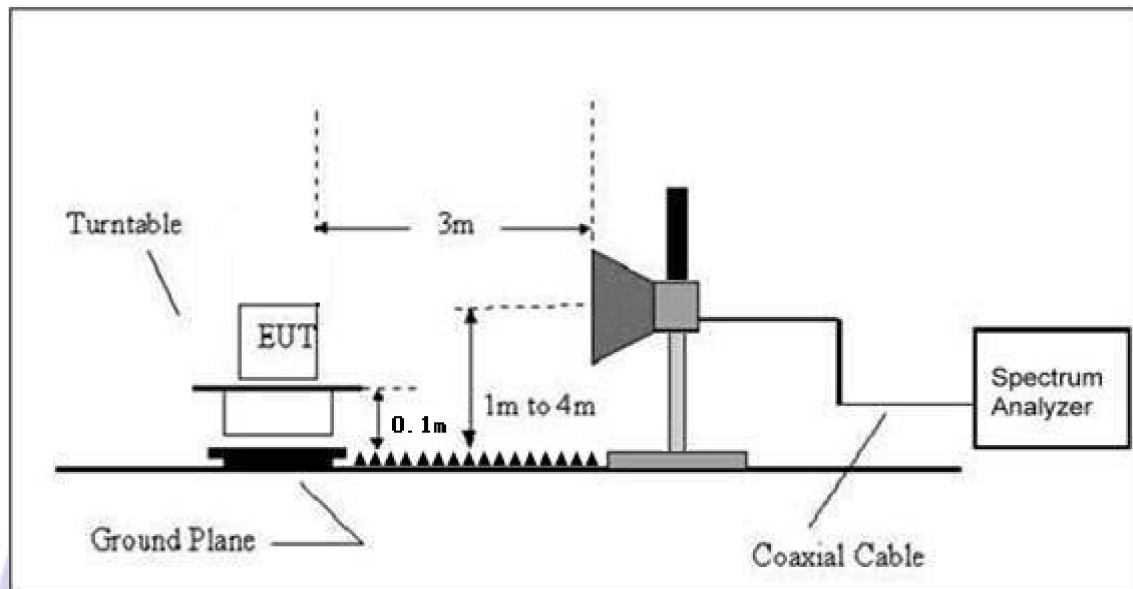
The test setup for emission measurement below 30MHz



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz



## 6.3 Spectrum Analyzer Setup

|                      |   |        |        |
|----------------------|---|--------|--------|
| Below 30MHz          |   |        |        |
| IF Bandwidth         | : | 10kHz  |        |
| Resolution Bandwidth | : | 10kHz  |        |
| Video Bandwidth      | : | 10kHz  |        |
| 30MHz ~ 1GHz         |   |        |        |
| Detector             | : | PK     | QP     |
| Resolution Bandwidth | : | 100kHz | 120kHz |
| Video Bandwidth      | : | 300kHz | 300kHz |
| Above 1GHz           |   |        |        |
| Detector             | : | PK     | AV     |
| Resolution Bandwidth | : | 1MHz   | 1MHz   |
| Video Bandwidth      | : | 3MHz   | 10Hz   |

## 6.4 Test Procedure

1. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane, And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
8. The test above 1GHz must be use the fully anechoic room, and the test below 1GHz use the half anechoic room

## 6.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Ant Pol.:Coplanar

| Frequency                                                                                     | Reading Result | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------------------------------------------------------------------------------------------|----------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                         | (dBμV)         | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 0.092                                                                                         | 73.69          | 20.94  | 52.75          | 107.52   | -54.77 | QP            |
| 0.163                                                                                         | 71.47          | 20.86  | 50.61          | 104.8    | -54.19 | QP            |
| 1.903                                                                                         | 44.00          | 20.73  | 23.27          | 69.54    | -46.27 | QP            |
| 4.687                                                                                         | 36.31          | 20.58  | 15.73          | 69.54    | -53.81 | QP            |
| 6.726                                                                                         | 34.05          | 20.07  | 13.98          | 69.54    | -55.56 | QP            |
| 18.263                                                                                        | 34.95          | 19.11  | 15.84          | 69.54    | -53.70 | QP            |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit |                |        |                |          |        |               |

Ant Pol.:Coaxial

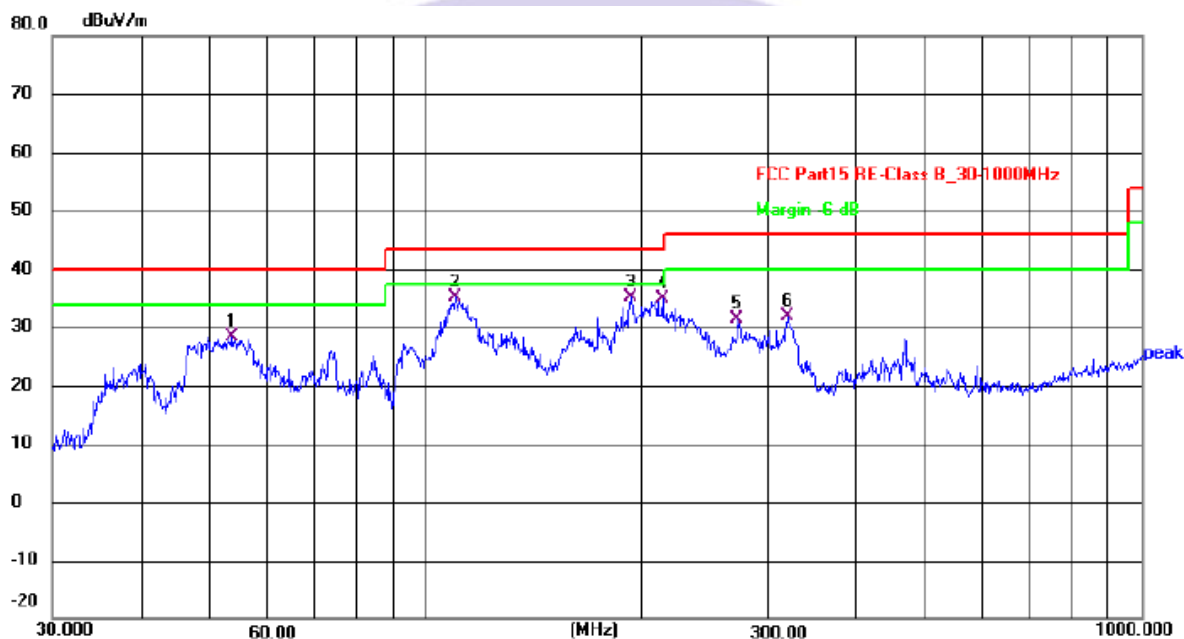
| Frequency                                                                                     | Reading Result | Factor | Emission Level | Limits   | Margin | Detector Type |
|-----------------------------------------------------------------------------------------------|----------------|--------|----------------|----------|--------|---------------|
| (MHz)                                                                                         | (dBμV)         | (dB)   | (dBμV/m)       | (dBμV/m) | (dB)   |               |
| 0.092                                                                                         | 75.78          | 20.94  | 54.84          | 107.52   | -52.68 | QP            |
| 0.163                                                                                         | 76.36          | 20.86  | 55.5           | 104.8    | -49.3  | QP            |
| 2.365                                                                                         | 46.36          | 20.73  | 25.63          | 69.54    | -43.91 | QP            |
| 5.625                                                                                         | 39.63          | 20.58  | 19.05          | 69.54    | -50.49 | QP            |
| 6.875                                                                                         | 38.88          | 20.07  | 18.81          | 69.54    | -50.73 | QP            |
| 19.123                                                                                        | 38.36          | 19.11  | 19.25          | 69.54    | -50.29 | QP            |
| Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit |                |        |                |          |        |               |

Note:

Distance extrapolation factor =  $40\log(\text{Specific distance} / \text{test distance})$  (dB);  
Limit line = Specific limits (dBμV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

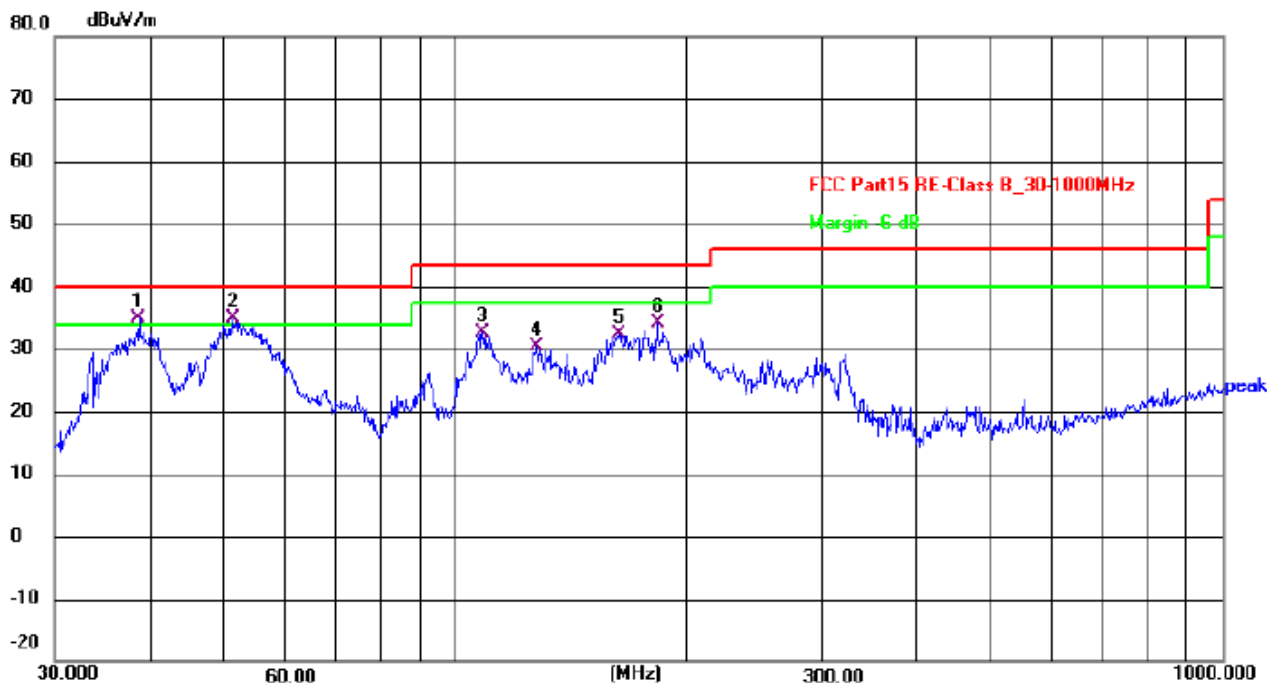
Test plot for Horizontal



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 53.5052         | 42.98          | -14.51        | 28.47          | 40.00          | -11.53      | QP       |
| 2   | 109.7960        | 50.78          | -15.68        | 35.10          | 43.50          | -8.40       | QP       |
| 3   | 193.0944        | 51.98          | -16.74        | 35.24          | 43.50          | -8.26       | QP       |
| 4   | 213.7632        | 50.69          | -15.88        | 34.81          | 43.50          | -8.69       | QP       |
| 5   | 272.2776        | 45.79          | -14.29        | 31.50          | 46.00          | -14.50      | QP       |
| 6   | 319.9370        | 45.30          | -13.37        | 31.93          | 46.00          | -14.07      | QP       |

Remark: Emission Level = Reading + Cable Loss + ANT Factor

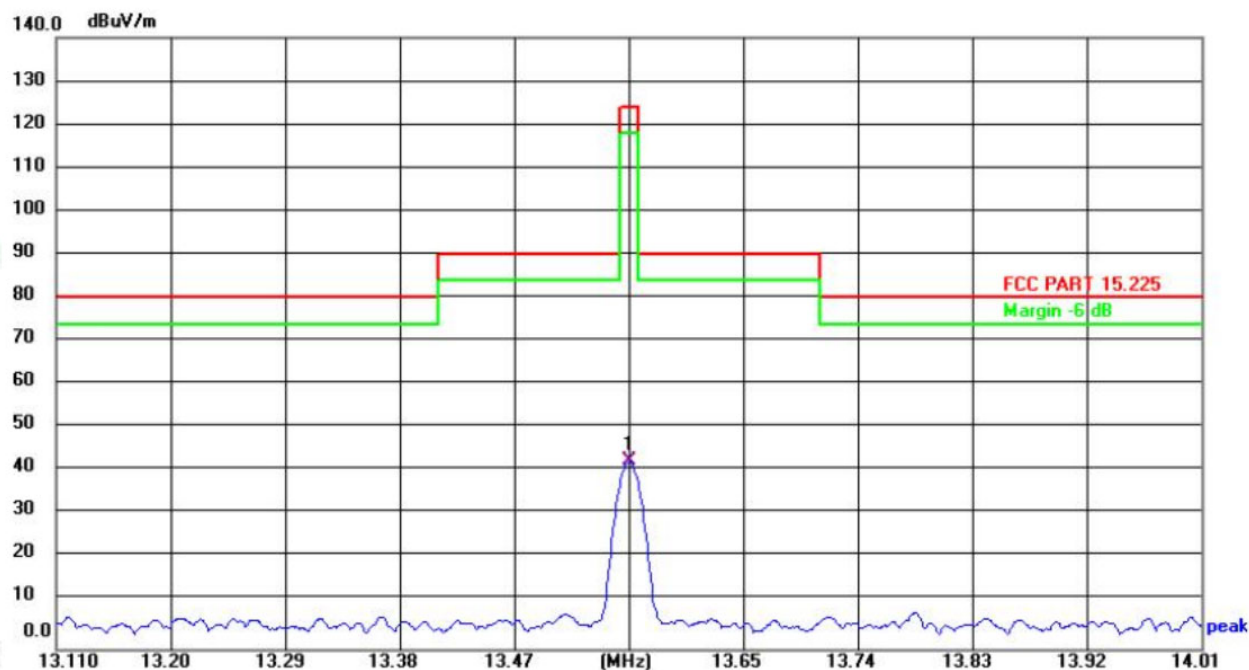
## Test plot for Vertical



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|----------|
| 1   | 38.6160         | 50.38          | -15.38        | 35.00          | 40.00          | -5.00       | QP       |
| 2   | 51.3004         | 49.26          | -14.32        | 34.94          | 40.00          | -5.06       | QP       |
| 3   | 108.2664        | 48.23          | -15.71        | 32.52          | 43.50          | -10.98      | QP       |
| 4   | 127.6645        | 49.05          | -18.58        | 30.47          | 43.50          | -13.03      | QP       |
| 5   | 163.1817        | 51.07          | -18.63        | 32.44          | 43.50          | -11.06      | QP       |
| 6   | 183.2005        | 51.40          | -17.28        | 34.12          | 43.50          | -9.38       | QP       |

Remark: Emission Level = Reading + Cable Loss + ANT Factor

## Restricted Spurious Emission



| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Deterctor | P/F |
|-----|-----------------|----------------|---------------|----------------|----------------|-------------|-----------|-----|
| 1   | 13.5600         | 81.42          | -28.33        | 53.09          | 124.00         | -80.92      | peak      | P   |

Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier.

Margin = Measurement Level - Limit

All emissions emit from non-NFC function of digital unintentional emissions. All NFC's spurious emissions are below 20dB of limits.

## 7 20dB&99% Bandwidth Measurement

Test Requirement : FCC CFR47 Part 15 Section 15.215

Test Method : ANSI C63.10:2020

Test Limit /

### 7.1 Test Procedure

1. Set RBW = 1% to 5% of the OBW
2. Set the video bandwidth (VBW) = 3\*RBW.
3. Detector = Peak.
4. Trace mode = max hold
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20dB relative to the maximum level measured in the fundamental emission.

### 7.2 Test Result

| Modulation | Frequency (MHz) | 20dB bandwidth (Hz) | 99%dB bandwidth (Hz) | Result |
|------------|-----------------|---------------------|----------------------|--------|
| ASK        | 13.56           | 114                 | 251                  | Pass   |



## 8 FREQUENCY STABILITY

Test Requirement : FCC CFR47 Part 15 Section 15.225(e)  
Test Method : ANSI C63.10:2020  
Test Limit : the carrier frequency stability shall not exceed  $\pm 100$  ppm

### 8.1 Test Procedure

1. The equipment under test was connected to an external DC power supply and input rated voltage.
2. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators.
3. The EUT was placed inside the temperature chamber.
4. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency.

Turn EUT off and set the chamber temperature to  $-20^{\circ}\text{C}$ . After the temperature stabilized for approximately 30 minutes recorded the frequency.

Repeat step measure with  $10^{\circ}\text{C}$  increased per stage until the highest temperature of  $+50^{\circ}\text{C}$  reached.

Reduce the input voltage to specified extreme voltage variation ( $\pm 15\%$ ) or endpoint, record the maximum frequency change.

### 8.2 Test Result

| Reference Frequency: 13.56MHz |                       |                      |                                  |                      |                  |
|-------------------------------|-----------------------|----------------------|----------------------------------|----------------------|------------------|
| Voltage<br>( V )              | Temperature<br>( °C ) | Frequency<br>( KHz ) | Frequency<br>Deviation<br>( Hz ) | Deviation<br>( ppm ) | Limit<br>( ppm ) |
| 120                           | +20(Ref)              | 13.560105            | 0.000095                         | 7.01                 | ±100             |
|                               | -20                   | 13.560064            | 0.000024                         | 1.77                 | ±100             |
|                               | -10                   | 13.560188            | 0.000168                         | 12.39                | ±100             |
|                               | 0                     | 13.560132            | 0.000112                         | 8.26                 | ±100             |
|                               | +10                   | 13.560106            | 0.000066                         | 4.87                 | ±100             |
|                               | +20                   | 13.560092            | 0.000052                         | 3.83                 | ±100             |
|                               | +25                   | 13.560144            | 0.000134                         | 9.88                 | ±100             |
|                               | +30                   | 13.560152            | 0.000112                         | 8.26                 | ±100             |
|                               | +40                   | 13.560179            | 0.000129                         | 9.51                 | ±100             |
|                               | +50                   | 13.560064            | 0.000014                         | 1.03                 | ±100             |
| 132                           | +20                   | 13.560033            | 0.000013                         | 0.96                 | ±100             |
| 108                           | +20                   | 13.560109            | 0.000079                         | 5.83                 | ±100             |

## **9 Antenna Application**

### **9.1 Antenna Requirement**

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### **9.2 Result**

The antenna is coil Antenna which permanently attached, and the best case gain of the antenna is 0 dBi. It complies with the standard requirement.

## 10 Test Setup &EUT Photos

Reference to the attachment for details.

\*\*\*\*\*THE END REPORT\*\*\*\*\*

