# TEST REPORT

**FCC Rules Part 15.225**

| | | |
|---|---|---|
| **Report Reference No.....** : | **MTEB24120364-R** | |
| **FCC ID.....** : | **2BNAV-YDKCC13G** | |
| Compiled by ( position+printed name+signature).. : | File administrators Alisa Luo | Alisa Luo |
| Supervised by ( position+printed name+signature).. : | Test Engineer Sunny Deng | Sunny Deng |
| Approved by ( position+printed name+signature).. : | Manager Yvette Zhou | Yvette |
| Date of issue.....: | **Dec.27,2024** | |
| **Representative Laboratory Name. :** | **Shenzhen Most Technology Service Co., Ltd.** | |
| Address..... : | No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China. | |
| **Applicant's name**.....: | **Shenzhen Yuxin iot Technology Co.,LTD.** | |
| Address..... : | Room 502, Building 2, Honghui Industrial Zone, No. 2 Liuxian Third Road, Xingdong Community, Xin'an Street, Bao'an District, Shenzhen City | |
| **Test specification/** Standard.....: | **FCC Rules Part 15.225** | |
| TRF Originator.....: | Shenzhen Most Technology Service Co., Ltd. | |

**Shenzhen Most Technology Service Co., Ltd. All rights reserved.**
This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen Most Technology Service Co., Ltd. is acknowledged as copyright owner and source of the material. Shenzhen Most Technology Service Co., Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

| | |
|---|---|
| **Test item description.....:** | Electric Vehicle AC Charger |
| Trade Mark.....: | goiot |
| Model/Type reference..... : | A09-US48A |
| Listed Models ..... : | A08-US16A, A08-US32A, A08-US40A, A08-US48A, A09-US16A, A09-US32A, A09-US40A |
| Modulation Type..... : | ASK |
| Operation Frequency..... : | 13.56MHz |
| Hardware Version..... | V1.2 |
| Software Version..... | V6 |
| Rating.....: | AC 240V/60Hz |
| Result.....: | PASS |

# TEST REPORT

| | | |
|---|---|---|
| Equipment under Test | : | Electric Vehicle AC Charger |
| Model /Type | : | A09-US48A |
| Listed Models | | A08-US16A, A08-US32A, A08-US40A, A08-US48A, A09-US16A, A09-US32A, A09-US40A |
| Remark | | Only the model A09-US48A was tested, Their electrical circuit design, layout, components used and internal wiring are identical,Only the shape of the shell and the size of the current.The current is regulated through a DIP chip. |
| Applicant | : | **Shenzhen Yuxin iot Technology Co.,LTD.** |
| Address | : | Room 502, Building 2, Honghui Industrial Zone, No. 2 Liuxian Third Road, Xingdong Community, Xin'an Street, Bao'an District, Shenzhen City |
| Manufacturer | : | **Shenzhen Yuxin iot Technology Co.,LTD.** |
| Address | : | Room 502, Building 2, Honghui Industrial Zone, No. 2 Liuxian Third Road, Xingdong Community, Xin'an Street, Bao'an District, Shenzhen City |

| | |
|---|---|
| **Test Result**: | **PASS** |

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

# Contents

1. REVISION HISTORY ..... 4

2. TEST STANDARDS ..... 5

3. SUMMARY ..... 6

3.1. General Remarks ..... 6
3.2. Product Description ..... 6
3.3. Equipment Under Test ..... 6
3.4. Short description of the Equipment under Test (EUT) ..... 6
3.5. EUT operation mode ..... 6
3.6. Block Diagram of Test Setup ..... 6
3.7. Test Item (Equipment Under Test) Description* ..... 7
3.8. Auxiliary Equipment (AE) Description ..... 7
3.9 Antenna Information* ..... 7
3.10. EUT configuration ..... 7
3.11. Modifications ..... 7

4. TEST ENVIRONMENT ..... 8

4.1. Address of the test laboratory ..... 8
4.2. Environmental conditions ..... 8
4.3. Test Description ..... 9
4.4. Statement of the measurement uncertainty ..... 9
4.5. Equipments Used during the Test ..... 10

5. TEST CONDITIONS AND RESULTS ..... 11

5.1. AC Power Conducted Emission ..... 11
5.2. Radiated Emission ..... 14
5.3. 20dB Bandwidth ..... 21
5.4. FREQUENCY TOLERANCE ..... 22
5.5. Antenna Requirement ..... 23

6. TEST SETUP PHOTOS OF THE EUT ..... 24

7. EXTERNAL AND INTERNAL PHOTOS OF THE EUT ..... 25

# 1. Revision History

| Revision | Issue Date | Revisions | Revised By |
|---|---|---|---|
| 00 | 2024-12-27 | Initial Issue | Alisa Luo |
| | | | |
| | | | |

# 2. TEST STANDARDS

The tests were performed according to following standards:

The tests were performed according to following standards:

**FCC Rules Part 15.225:** Operation within the band 13.110-14.010 MHz.

**ANSI C63.10:2013 :** American National Standard for Testing Unlicensed Wireless Devices
**ANSI C63.4: 2014:** –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz
Range of 9 kHz to 40GHz

# 3. SUMMARY

## 3.1. General Remarks

| | | |
|---|---|---|
| Date of receipt of test sample | : | 2024.12.15 |
| | | |
| Testing commenced on | : | 2024.12.16 |
| | | |
| Testing concluded on | : | 2024.12.27 |

## 3.2. Product Description

| | |
|---|---|
| Product Name: | Electric Vehicle AC Charger |
| Model/Type reference: | A09-US48A |
| Power Supply： | AC 240V/60Hz |
| Testing sample ID： | MTYP07783 |
| Modulation: | ASK |
| Operation frequency: | 13.56MHZ |
| Channel number: | 1 (declared by the client) |

## 3.3. Equipment Under Test

## Power supply system utilised

| | | | | | |
|---|---|---|---|---|---|
| Power supply voltage | : | ○ | 230V / 50 Hz | ○ | 120V / 60Hz |
| | | ○ | 12 V DC | ○ | 24 V DC |
| | | ● | Other (specified in blank below) | | |

**AC 240V/60Hz**

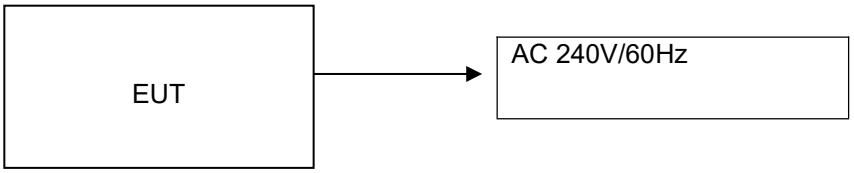
## 3.4. Short description of the Equipment under Test (EUT)

This is a Electric Vehicle AC Charger For more details, refer to the user's manual of the EUT.

## 3.5. EUT operation mode

| Channel | Freq.(MHz) | Note(Modulation Type) |
|---|---|---|
| 1 | 13.56MHz | ASK |

## 3.6. Block Diagram of Test Setup



## 3.7. Test Item (Equipment Under Test) Description*

| Short designation | EUT Name | EUT Description | Serial number | Hardware status | Software status |
|---|---|---|---|---|---|
| EUT A | / | / | / | / | / |
| EUT B | / | / | / | / | / |
| EUT C | / | / | / | / | / |

*: declared by the applicant. According to customers information EUTs A and B are the same devices.Only the secondary screen size is different

## 3.8. Auxiliary Equipment (AE) Description

| AE short designation | EUT Name (if available) | EUT Description | Serial number (if available) | Software (if used) |
|---|---|---|---|---|
| AE 1 | / | / | / | / |
| AE 2 | / | / | / | / |

## 3.9 Antenna Information*

| Short designation | Antenna Name | Antenna Type | Frequency Range | Serial number | Antenna Peak Gain |
|---|---|---|---|---|---|
| Antenna 1 | --- | / | PCB Antenna | 13.56MHZ | 2.5dBi |
| Antenna 2 | / | / | / | / | / |
| | | | | | |

*: declared by the applicant.

## 3.10. EUT configuration

**The following peripheral devices and interface cables were connected during the measurement:**

●- supplied by the manufacturer

○- Supplied by the lab

| | | | |
|---|---|---|---|
| ● | ADAPTER 1 | M/N: | / |
| | | Manufacturer: | / |

## 3.11. Modifications

No modifications were implemented to meet testing criteria.

# 4. TEST ENVIRONMENT

## 4.1. Address of the test laboratory

**Shenzhen Most Technology Service Co., Ltd.**
No.5, 2nd Langshan Road, North District, Hi-tech Industrial Park, Nanshan, Shenzhen, Guangdong, China.
The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

## Test Facility

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

## FCC-Registration No.: 0031192610

Shenzhen Most Technology Service Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

## A2LA-Lab Cert. No.: 6343.01

Shenzhen Most Technology Service Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

## 4.2. Environmental conditions

Radiated Emission:

| | |
|---|---|
| Temperature: | 23 ° C |
| | |
| Humidity: | 48 % |
| | |
| Atmospheric pressure: | 950-1050mbar |

Conducted testing：

| | |
|---|---|
| Temperature: | 24 ° C |
| | |
| Humidity: | 45 % |
| | |
| Atmospheric pressure: | 950-1050mbar |

## 4.3. Test Description

| FCC and IC Requirements | | |
|---|---|---|
| FCC Part 15.203 | Antenna Requirement | PASS |
| FCC Part 15.207 | AC Power Conducted Emission | PASS |
| FCC Part 15.209&15.205 (a) &15.225(a,b,c,d) | Spurious Emissions | PASS |
| FCC Part 15.215 (c) &15.225 | 20dB Occupied Bandwidth | PASS |
| FCC Part 15.225(e) | Frequency Tolerance | PASS |

Remark:
1. The measurement uncertainty is not included in the test result.
2. NA = Not Applicable; NP = Not Performed

## 4.4. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Most Technology Service Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Most Technology Service Co., Ltd. is reported:

| Test | Range | Measurement Uncertainty | Notes |
|---|---|---|---|
| Radiated Emission | 30~1000MHz | 4.10 dB | (1) |
| Radiated Emission | 1~18GHz | 4.32 dB | (1) |
| Radiated Emission | 18-40GHz | 5.54 dB | (1) |
| Conducted Disturbance | 0.15~30MHz | 3.12 dB | (1) |
| 20dB Occupied Bandwidth | / | 5% | (1) |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 4.5. Equipments Used during the Test

5.

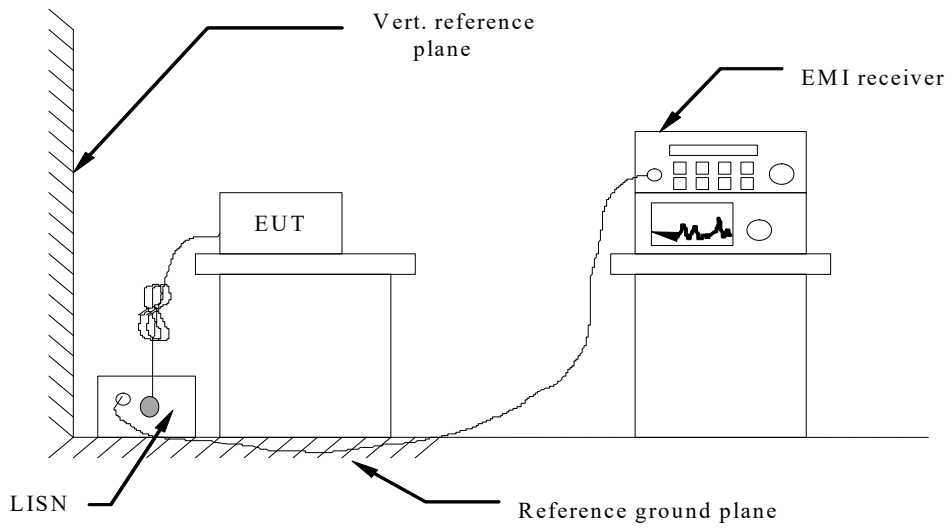
| Item | Equipment | Manufacturer | Model No. | Serial No. | Firmware versions | Last Cal. | Cal. Interval |
|---|---|---|---|---|---|---|---|
| 1. | L.I.S.N. | R&S | ENV216 | 100093 | / | 2024/03/15 | 1 Year |
| 2 | Three-phase artificial power network | Schwarzback Mess | NNLK8129 | 8129178 | / | 2024/03/15 | 1 Year |
| 3. | Receiver | R&S | ESCI | 100492 | V3.0-10-2 | 2024/03/15 | 1 Year |
| 4 | Receiver | R&S | ESPI | 101202 | V3.0-10-2 | 2024/03/15 | 1 Year |
| 5 | Spectrum analyzer | Agilent | 9020A | MT-E306 | A14.16 | 2024/03/15 | 1 Year |
| 6 | Bilong Antenna | Sunol Sciences | JB3 | A121206 | / | 2024/08/15 | 1 Year |
| 7 | Horn antenna | HF Antenna | HF Antenna | MT-E158 | / | 2024/03/15 | 1 Year |
| 8 | Loop antenna | Beijing Daze | ZN30900B | / | / | 2024/03/15 | 1 Year |
| 9 | Horn antenna | R&S | OBH100400 | 26999002 | / | 2024/03/15 | 1 Year |
| 10 | Wireless Communication Test Set | R&S | CMW500 | / | CMW-BASE-3.7.21 | 2024/03/15 | 1 Year |
| 11 | Spectrum analyzer | R&S | FSP | 100019 | V4.40 SP2 | 2024/03/15 | 1 Year |
| 12 | High gain antenna | Schwarzbeck | LB-180400KF | MT-E389 | / | 2024/03/15 | 1 Year |
| 13 | Preamplifier | Schwarzbeck | BBV 9743 | MT-E390 | / | 2024/03/15 | 1 Year |
| 14 | Pre-amplifier | EMCI | EMC051845SE | MT-E391 | / | 2024/03/15 | 1 Year |
| 15 | Pre-amplifier | Agilent | 83051A | MT-E392 | / | 2024/03/15 | 1 Year |
| 16 | High pass filter unit | Tonscend | JS0806-F | MT-E393 | / | 2024/03/15 | 1 Year |
| 17 | RF Cable(below1GHz) | Times | 9kHz-1GHz | MT-E394 | / | 2024/03/15 | 1 Year |
| 18 | RF Cable(above 1GHz) | Times | 1-40G | MT-E395 | / | 2024/03/15 | 1 Year |
| 19 | RF Cable (9KHz-40GHz) | Tonscend | 170660 | N/A | / | 2024/03/15 | 1 Year |

6. Note: The Cal.Interval was one year.

# 5. TEST CONDITIONS AND RESULTS

## 5.1. AC Power Conducted Emission

**TEST CONFIGURATION**




**TEST PROCEDURE**

1 The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10-2013.
2 Support equipment, if needed, was placed as per ANSI C63.10-2013
3 All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10-2013
4 The EUT received AC 240V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5 All support equipments received AC power from a second LISN, if any.
6 The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7 Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8 During the above scans, the emissions were maximized by cable manipulation.

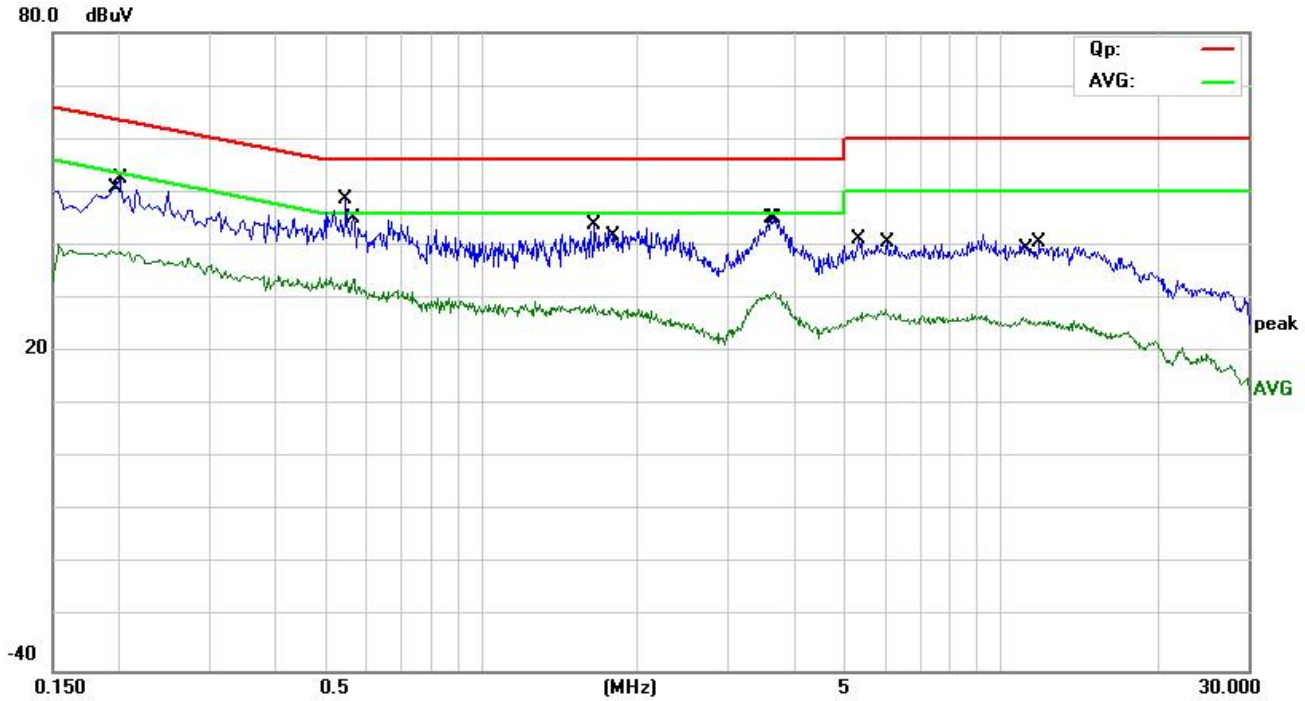
**AC Power Conducted Emission Limit**

For unintentional device, according to RSS Gen 8.8 and § 15.207(a) Line Conducted Emission Limits is as following:

| Frequency (MHz) | Maximum RF Line Voltage | |
|---|---|---|
| | Quasi-Peak Level dB(μV) | Average Level dB(μV) |
| 0.15 ~ 0.50 | 66 ~ 56* | 56 ~ 46* |
| 0.50 ~ 5.00 | 56 | 46 |
| 5.00 ~ 30.00 | 60 | 50 |

**TEST RESULTS**
Pass
Remark: only the worst test data is shown

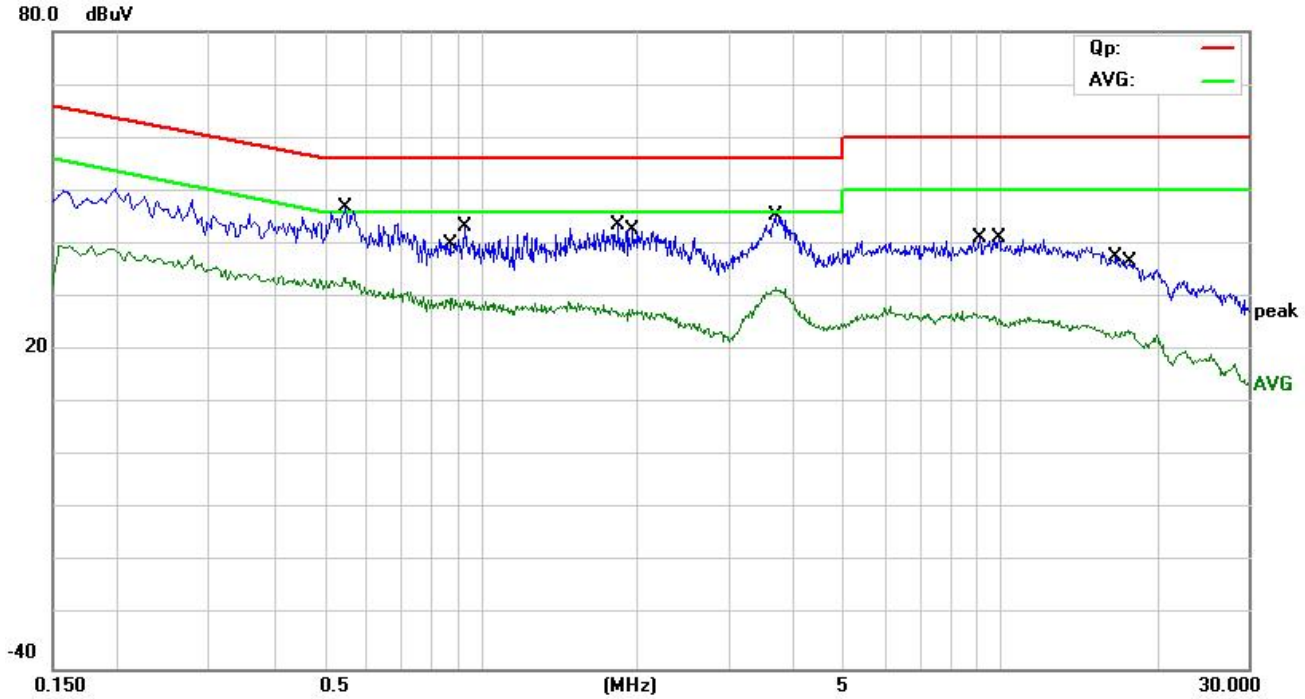
| Power Supply | AC 240V/60Hz | Line | L1 |
|---|---|---|---|




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.1955 | 29.25 | 9.60 | 38.85 | 53.80 | -14.95 | AVG | |
| 2 | | 0.2020 | 42.92 | 9.60 | 52.52 | 63.53 | -11.01 | QP | |
| 3 | * | 0.5500 | 39.16 | 9.59 | 48.75 | 56.00 | -7.25 | QP | |
| 4 | | 0.5700 | 23.96 | 9.59 | 33.55 | 46.00 | -12.45 | AVG | |
| 5 | | 1.6540 | 34.15 | 9.60 | 43.75 | 56.00 | -12.25 | QP | |
| 6 | | 1.7900 | 18.75 | 9.60 | 28.35 | 46.00 | -17.65 | AVG | |
| 7 | | 3.6100 | 35.47 | 9.62 | 45.09 | 56.00 | -10.91 | QP | |
| 8 | | 3.6700 | 21.53 | 9.62 | 31.15 | 46.00 | -14.85 | AVG | |
| 9 | | 5.3380 | 31.53 | 9.63 | 41.16 | 60.00 | -18.84 | QP | |
| 10 | | 6.0140 | 18.25 | 9.64 | 27.89 | 50.00 | -22.11 | AVG | |
| 11 | | 11.2260 | 16.37 | 9.69 | 26.06 | 50.00 | -23.94 | AVG | |
| 12 | | 11.9060 | 30.92 | 9.69 | 40.61 | 60.00 | -19.39 | QP | |

*:Maximum data x:Over limit !:over margin

| Power Supply | AC 240V/60Hz | Line | L2 |
|---|---|---|---|



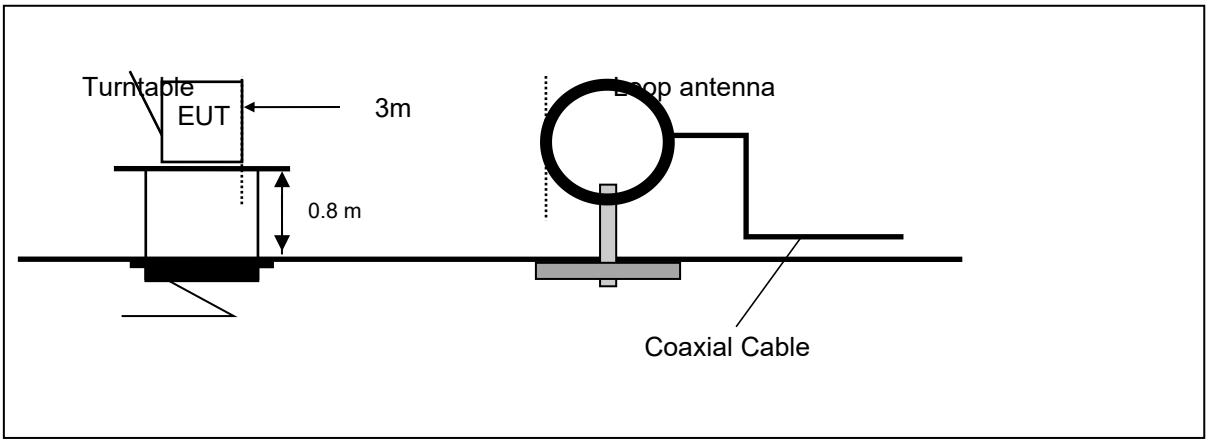

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | Detector | Comment |
| 1 | | 0.5460 | 24.07 | 9.59 | 33.66 | 46.00 | -12.34 | AVG | |
| 2 | * | 0.5500 | 37.36 | 9.59 | 46.95 | 56.00 | -9.05 | QP | |
| 3 | | 0.8740 | 20.20 | 9.60 | 29.80 | 46.00 | -16.20 | AVG | |
| 4 | | 0.9380 | 33.57 | 9.60 | 43.17 | 56.00 | -12.83 | QP | |
| 5 | | 1.8460 | 33.95 | 9.60 | 43.55 | 56.00 | -12.45 | QP | |
| 6 | | 1.9380 | 18.00 | 9.60 | 27.60 | 46.00 | -18.40 | AVG | |
| 7 | | 3.6900 | 35.82 | 9.62 | 45.44 | 56.00 | -10.56 | QP | |
| 8 | | 3.7140 | 22.08 | 9.62 | 31.70 | 46.00 | -14.30 | AVG | |
| 9 | | 9.1340 | 16.90 | 9.68 | 26.58 | 50.00 | -23.42 | AVG | |
| 10 | | 9.9300 | 31.55 | 9.69 | 41.24 | 60.00 | -18.76 | QP | |
| 11 | | 16.6740 | 27.77 | 9.71 | 37.48 | 60.00 | -22.52 | QP | |
| 12 | | 17.6060 | 13.97 | 9.72 | 23.69 | 50.00 | -26.31 | AVG | |

*:Maximum data x:Over limit !:over margin

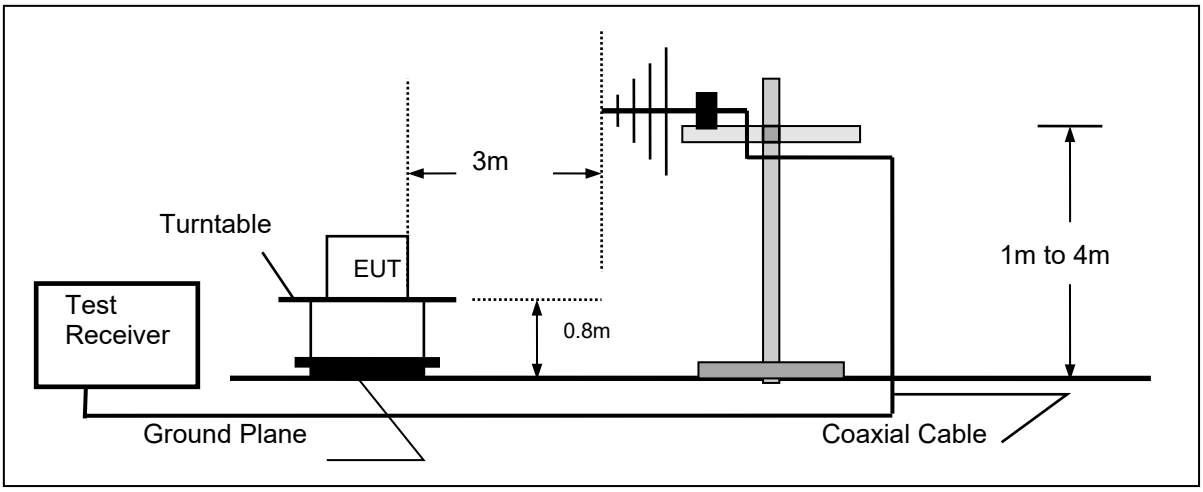
## 5.2. Radiated Emission

**TEST CONFIGURATION**

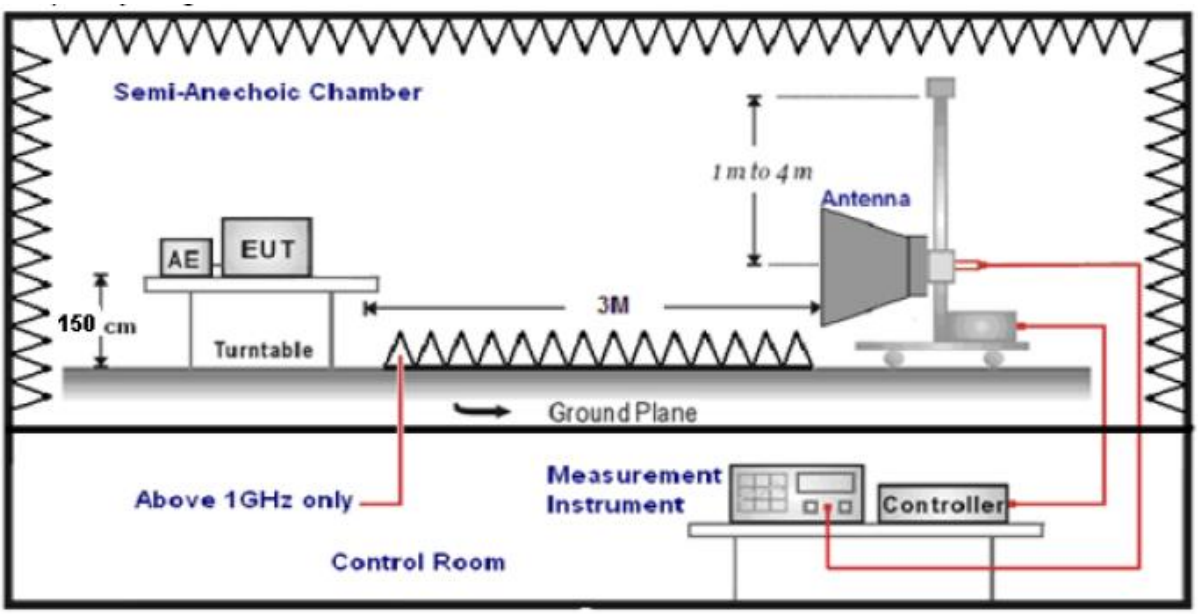
Frequency range 9 KHz – 30MHz




Frequency range 30MHz – 1000MHz




Frequency range above 1GHz-25GHz



**TEST PROCEDURE**

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –1GHz;the EUT was placed on a turn table which is 1.5m above ground plane when testing frequency range 1GHz – 25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 32.768KHz and maximum operation frequency was 2480MHz.so radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

| Test Frequency range | Test Antenna Type | Test Distance |
|---|---|---|
| 9KHz-30MHz | Active Loop Antenna | 3 |
| 30MHz-1GHz | Ultra-Broadband Antenna | 3 |
| 1GHz-18GHz | Double Ridged Horn Antenna | 3 |
| 18GHz-25GHz | Horn Anternna | 1 |

7. Setting test receiver/spectrum as following table states:

| Test Frequency range | Test Receiver/Spectrum Setting | Detector |
|---|---|---|
| 9KHz-150KHz | RBW=200Hz/VBW=3KHz,Sweep time=Auto | QP |
| 150KHz-30MHz | RBW=9KHz/VBW=100KHz,Sweep time=Auto | QP |
| 30MHz-1GHz | RBW=120KHz/VBW=1000KHz,Sweep time=Auto | QP |
| 1GHz-40GHz | Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto<br>Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto | Peak |

**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 = RA + AF + CL - AG**

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

Transd=AF +CL-AG

**RADIATION LIMIT**

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission out of authorized band shall not exceed the following table at a 3 meters measurement distance.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission

Unwanted emissions that fall into restricted bands shall comply with the limits specified in RSS-Gen; and Unwanted emissions that do not fall within the restricted frequency bands shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

| Frequency (MHz) | Distance (Meters) | Radiated (dBμV/m) | Radiated (μV/m) |
|---|---|---|---|
| 0.009-0.49 | 3 | 20log(2400/F(KHz))+40log(300/3) | 2400/F(KHz) |
| 0.49-1.705 | 3 | 20log(24000/F(KHz))+ 40log(30/3) | 24000/F(KHz) |
| 1.705-30 | 3 | 20log(30)+ 40log(30/3) | 30 |
| 30-88 | 3 | 49.0 | 100 |
| 88-216 | 3 | 53.5 | 150 |
| 216-960 | 3 | 56.0 | 200 |
| Above 960 | 3 | 64.0 | 500 |

**According to FCC Part 15.205,Rastricted bands**

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| 10.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.215-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | (2) |
| 13.36-13.41 | | | |

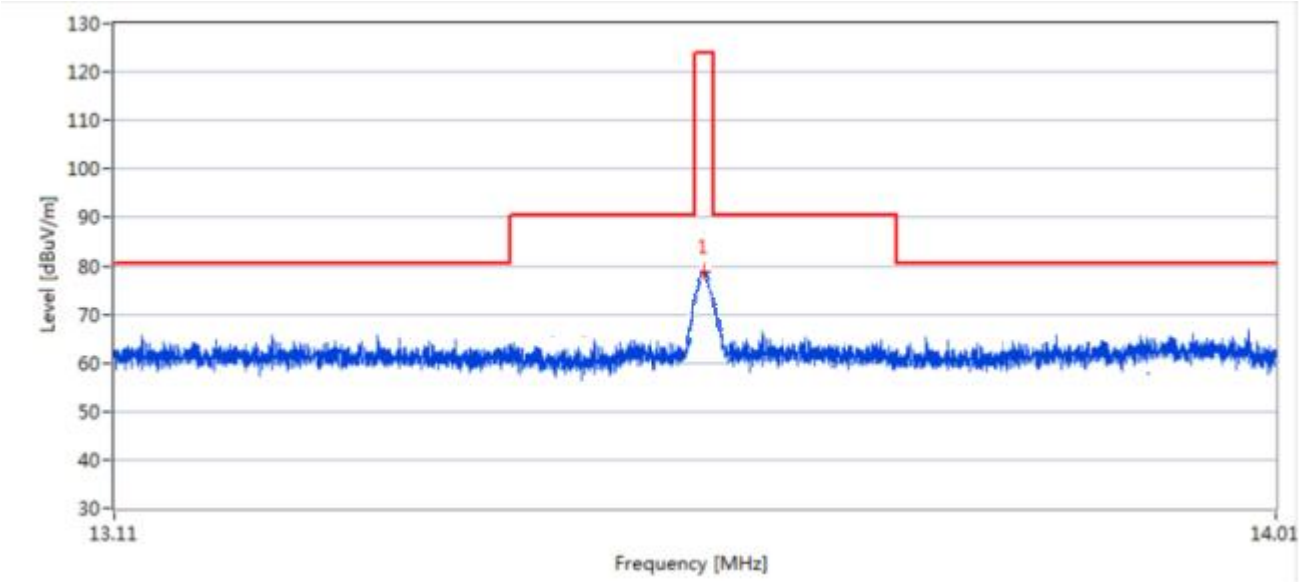
**LIMITS OF RADIATED EMISSION MEASUREMENT ( FCC 15.225)**

(a)The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters, equal to 124dBuV/m at 3 meters.
(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters, equal to 90.5dBuV/m at 3 meters.
c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters, equal to 80.5dBuV/m at 3 meters..
(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

**TEST RESULTS (BELOW 30MHz)**
1: This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2: Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.

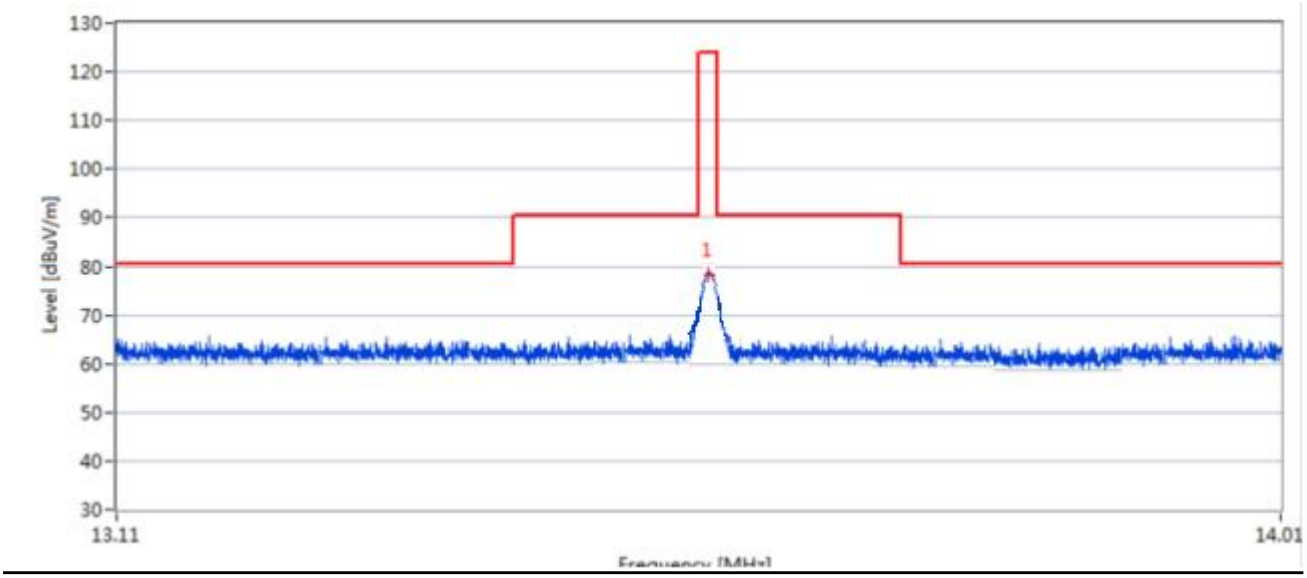
Remark: only the worst test data is shown

**X**



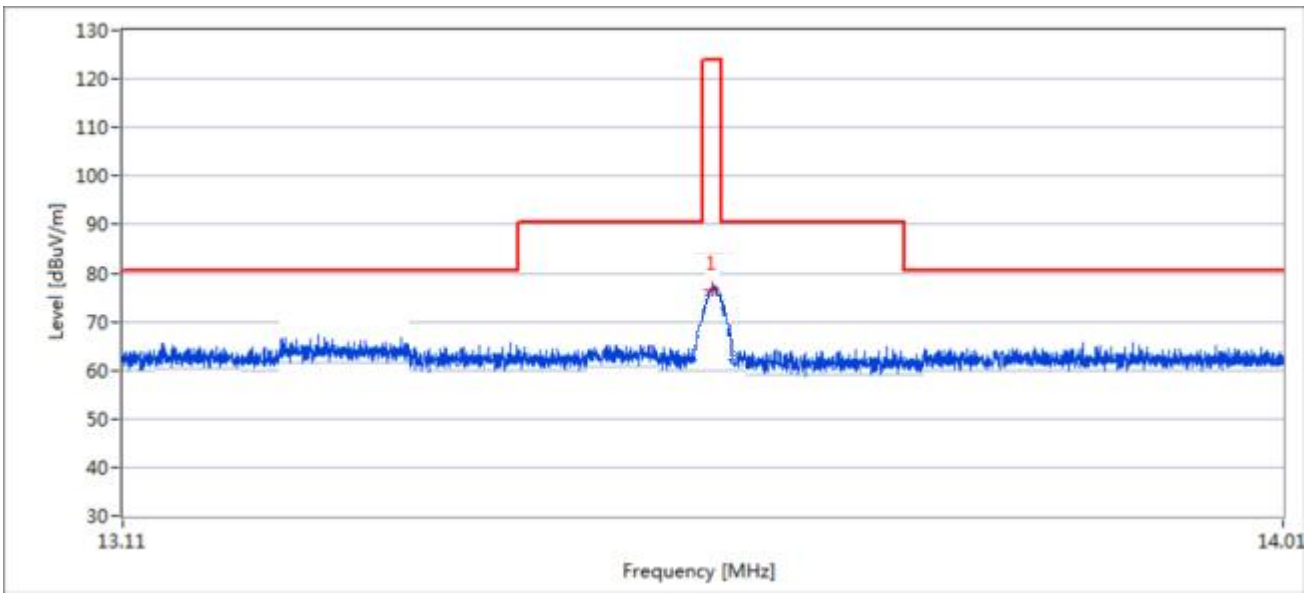

| Frequency | Pre-scan Level MaxPeak | Final Test Level MaxPeak | Limit MaxPeak | Margin |
|---|---|---|---|---|
| MHz | dBuV/m | dBuV/m | dBuV/m | dB |
| 13.56 | 79.5 | 79.5 | 124.0 | 45.8 |

**Y**




| Frequency | Pre-scan Level MaxPeak | Final Test Level MaxPeak | Limit MaxPeak | Margin |
|---|---|---|---|---|
| MHz | dBuV/m | dBuV/m | dBuV/m | dB |
| 13.56 | 78.9 | 78.9 | 124.0 | 46.5 |

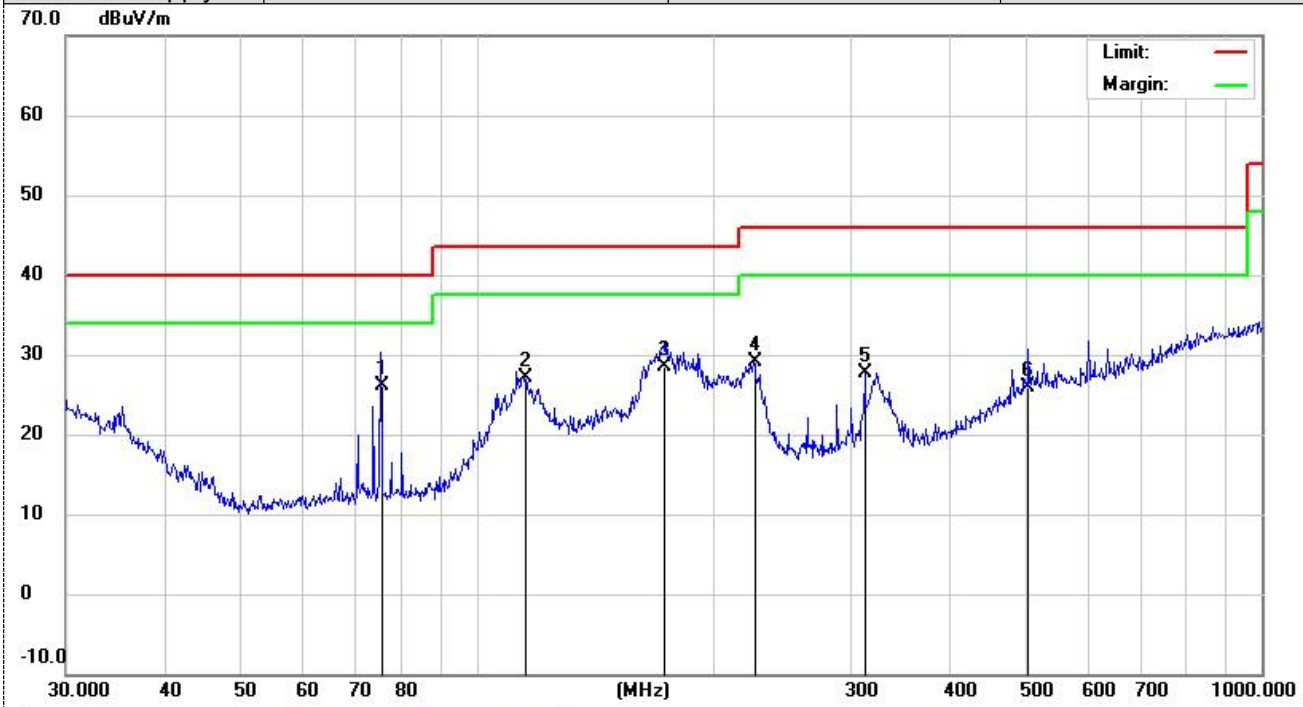
**Z**




| Frequency | Pre-scan Level MaxPeak | Final Test Level MaxPeak | Limit MaxPeak | Margin |
|---|---|---|---|---|
| MHz | dBuV/m | dBuV/m | dBuV/m | dB |
| 13.56 | 78.6 | 78.6 | 124.0 | 51.5 |

**For 30MHz-1GHz**

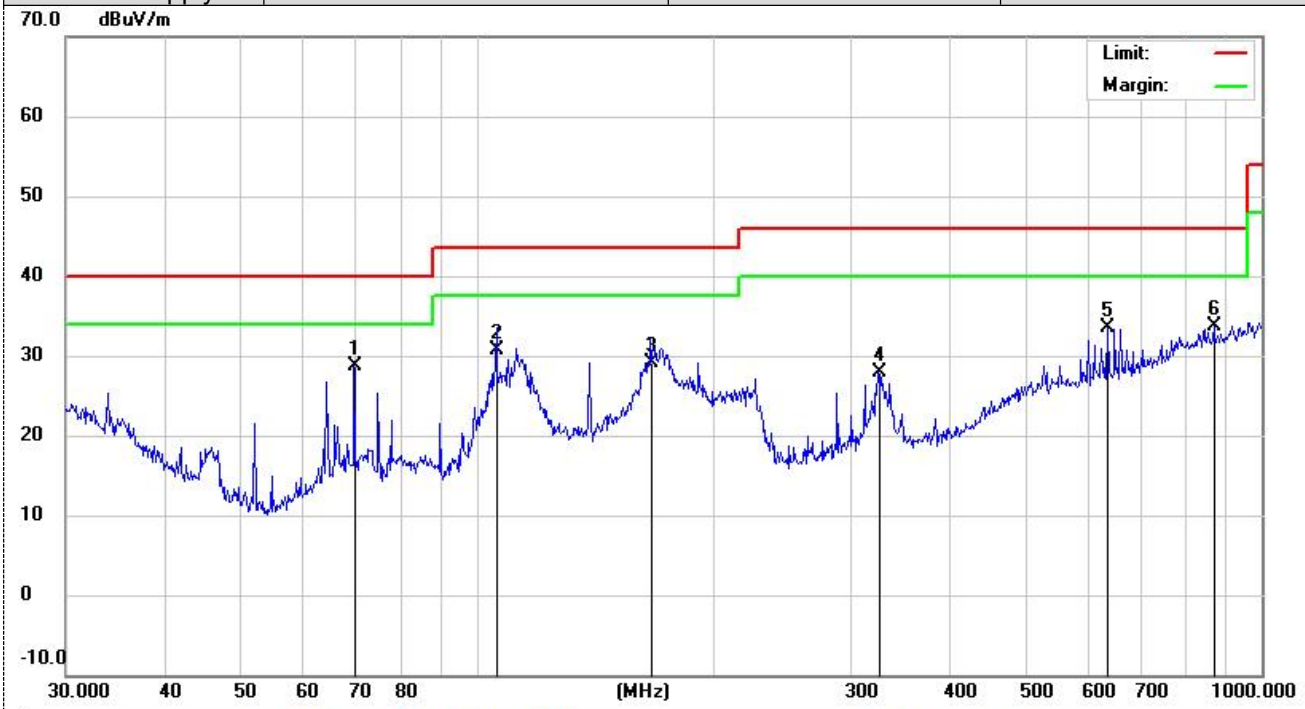
| Power Supply | AC 240V/60Hz | Polarization | Horizontal |
|---|---|---|---|




| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 75.4464 | 16.32 | 9.74 | 26.06 | 40.00 | -13.94 | QP | 200 | 30 | |
| 2 | | 114.9169 | 11.88 | 15.24 | 27.12 | 43.50 | -16.38 | QP | 200 | 90 | |
| 3 | | 173.8135 | 11.57 | 16.84 | 28.41 | 43.50 | -15.09 | QP | 200 | 150 | |
| 4 | | 225.3080 | 14.54 | 14.49 | 29.03 | 46.00 | -16.97 | QP | 200 | 190 | |
| 5 | | 312.1794 | 11.90 | 15.73 | 27.63 | 46.00 | -18.37 | QP | 200 | 240 | |
| 6 | | 504.7062 | 3.15 | 22.75 | 25.90 | 46.00 | -20.10 | QP | 200 | 300 | |

*:Maximum data x:Over limit !:over margin

| Power Supply | AC 240V/60Hz | Polarization | Vertical |
|---|---|---|---|

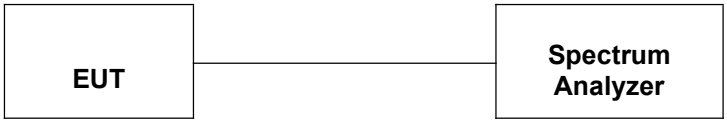



| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over | | Antenna Height | Table Degree | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | Detector | cm | degree | Comment |
| 1 | * | 69.8450 | 19.51 | 9.29 | 28.80 | 40.00 | -11.20 | QP | 100 | 30 | |
| 2 | | 106.0126 | 16.42 | 14.26 | 30.68 | 43.50 | -12.82 | QP | 100 | 50 | |
| 3 | | 166.6514 | 12.06 | 17.08 | 29.14 | 43.50 | -14.36 | QP | 100 | 230 | |
| 4 | | 324.4561 | 11.94 | 15.96 | 27.90 | 46.00 | -18.10 | QP | 100 | 120 | |
| 5 | | 636.1340 | 9.29 | 24.27 | 33.56 | 46.00 | -12.44 | QP | 100 | 170 | |
| 6 | | 869.1302 | 5.04 | 28.66 | 33.70 | 46.00 | -12.30 | QP | 100 | 230 | |

*:Maximum data x:Over limit !:over margin

## 5.3. 20dB Bandwidth

**TEST CONFIGURATION**




**TEST PROCEDURE**

The 20dB bandwidth and 99% bandwidth is measured with a spectrum analyzer connected via a receive antenna placed near the EUT while the EUT is operating in transmission mode.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

The occupied bandwidth (OBW), that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission

**TEST RESULTS**

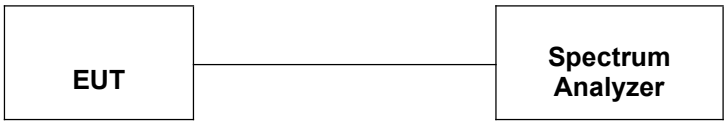
| Modulation | Channel Frequency (MHz) | 20dB bandwidth (KHz) | Result |
|---|---|---|---|
| ASK | 13.56 | 27.9 | Pass |

**Test plot as follows:**

*ASK Modulation*

## 5.4. FREQUENCY TOLERANCE

**TEST CONFIGURATION**




**TEST PROCEDURE**

The EUT was placed on a turn table which is 0.8m above ground plane.

Set EUT as normal operation
Set SPA Center Frequency = fundamental frequency, RBW, VBW= 10kHz, Span=100K
Set SPA Max hold. Mark peak.

**TEST RESULTS**

| Power Supply | Temperature(℃) | Measured Frequency (MHz) | Frequency Error (MHz) | Result(ppm) | Part 15.225 Limit |
|---|---|---|---|---|---|
| DC 264V | -20 | 13.560023 | 0.000023 | 1.70 | +/- 0.01%(100ppm) |
| | 20 | 13.560078 | 0.000078 | 5.75 | +/- 0.01%(100ppm) |
| | 50 | 13.560074 | 0.000074 | 5.44 | +/- 0.01%(100ppm) |
| DC 240V | -20 | 13.560026 | 0.000026 | 1.92 | +/- 0.01%(100ppm) |
| | 20 | 13.560046 | 0.000046 | 3.38 | +/- 0.01%(100ppm) |
| | 50 | 13.560068 | 0.000068 | 5.02 | +/- 0.01%(100ppm) |
| DC 216V | -20 | 13.560072 | 0.000072 | 5.32 | +/- 0.01%(100ppm) |
| | 20 | 13.560069 | 0.000069 | 5.10 | +/- 0.01%(100ppm) |
| | 50 | 13.560038 | 0.000038 | 2.79 | +/- 0.01%(100ppm) |

## 5.5. Antenna Requirement

**Standard Applicable**

**For intentional device, according to FCC 47 CFR Section 15.203:**

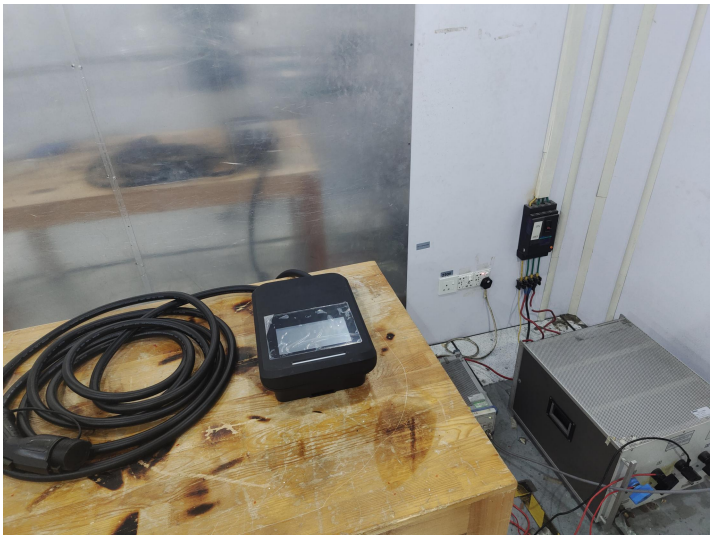
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit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

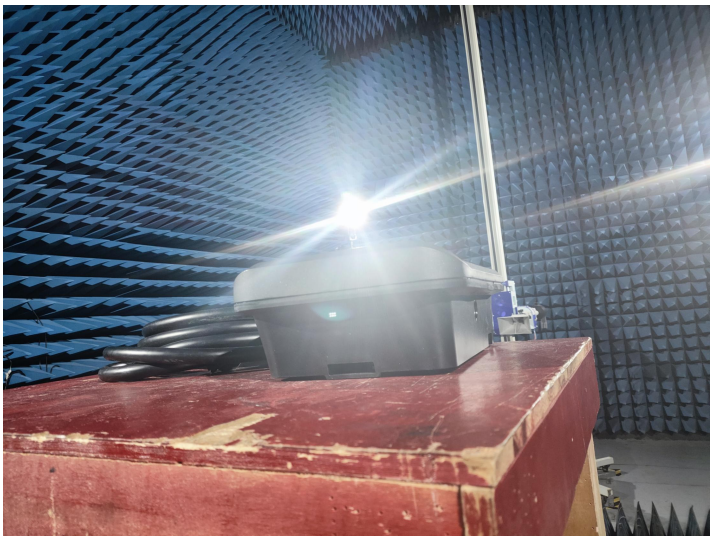
**Test Result:**

The EUT has a built in antenna which is integrated inside the enclosure, this is permanently attached antenna and meets the requirements of this section.

Results: Compliance.

# 6. Test Setup Photos of the EUT





# 7. External and Internal Photos of the EUT

See related photo report.

**.....End of Report.....**