**Shenzhen Huaxia Testing Technology Co., Ltd.**

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

Telephone: +86-755-26648640
Fax: +86-755-26648637
Website: www.cqa-cert.com

Report Template Version: V05
Report Template Revision Date: 2021-11-03

# Test Report

| | |
|---|---|
| **Report No.:** | CQASZ20231001794E-01 |
| **Applicant:** | ZhuoYe ChuangYi Co., Ltd. |
| **Address of Applicant:** | Room 602-1, Building 6, Shenzhen Bay Eco-Tech Park, Nanshan District, Shenzhen, China |

**Equipment Under Test (EUT):**

| | |
|---|---|
| **EUT Name:** | GravaStar 2.4GHz Receiver |
| **Model No.:** | GravaStar M1R |
| **Test Model No.:** | GravaStar M1R |
| **Brand Name:** | GravaStar |
| **FCC ID:** | 2ASXF-M1R |
| **Standards:** | 47 CFR Part 15, Subpart C |
| **Date of Receipt:** | 2023-10-08 |
| **Date of Test:** | 2023-10-08 to 2023-11-09 |
| **Date of Issue:** | 2023-11-09 |
| **Test Result:** | **PASS*** |

***In the configuration tested, the EUT complied with the standards specified above**

***Tested By:*** lewis zhou
***( Lewis Zhou)***

***Reviewed By:*** Timo Lei
***( Timo Lei )***

***Approved By:*** Jack Ai
***( Jack Ai )***

# 1 Version

## Revision History Of Report

| Report No. | Version | Description | Issue Date |
|---|---|---|---|
| CQASZ20231001794E-01 | Rev.01 | Initial report | 2023-11-09 |

# 2 Test Summary

| Test Item | Test Requirement | Test method | Result |
|---|---|---|---|
| **Antenna Requirement** | 47 CFR Part 15, Subpart C Section 15.203 | ANSI C63.10 (2013) | PASS |
| **AC Power Line Conducted Emission** | 47 CFR Part 15, Subpart C Section 15.207 | ANSI C63.10 (2013) | PASS |
| **Field Strength of the Fundamental Signal** | 47 CFR Part 15, Subpart C Section 15.249 (a) | ANSI C63.10 (2013) | PASS |
| **Spurious Emissions** | 47 CFR Part 15, Subpart C Section 15.249 (a)/15.209 | ANSI C63.10 (2013) | PASS |
| **Restricted bands around fundamental frequency (Radiated Emission)** | 47 CFR Part 15, Subpart C Section 15.249(a)/15.205 | ANSI C63.10 (2013) | PASS |
| **20dB Occupied Bandwidth** | 47 CFR Part 15, Subpart C Section 15.215 (c) | ANSI C63.10 (2013) | PASS |

# 3 Contents

# 4 General Information

## 4.1 Client Information

| | |
|---|---|
| Applicant: | ZhuoYe ChuangYi Co., Ltd. |
| Address of Applicant: | Room 602-1, Building 6, Shenzhen Bay Eco-Tech Park, Nanshan District, Shenzhen, China |
| Manufacturer: | ZhuoYe ChuangYi Co., Ltd. |
| Address of Manufacturer: | Room 602-1, Building 6, Shenzhen Bay Eco-Tech Park, Nanshan District, Shenzhen, China |
| Factory: | Dongguan Siliten Electronics Co., Ltd |
| Address of Factory: | Sijia Yewu Industrial Estate, Shijie Town, Dongguan City, Guangdong, China |

## 4.2 General Description of EUT

| | |
|---|---|
| EUT Name: | GravaStar 2.4GHz Receiver |
| Model No.: | GravaStar M1R |
| Test Model No.: | GravaStar M1R |
| Trade Mark: | GravaStar |
| Software Version: | V0120 |
| Hardware Version: | V0.1 |
| Frequency Range: | 2403MHz-2480MHz |
| Modulation Type: | GFSK |
| Number of Channels: | 16 |
| Sample Type: | ☐ Mobile ☒ Portable |
| Test Software of EUT: | nRFgo Studio |
| Antenna Type: | PCB antenna |
| Antenna Gain: | -1.66dBi |
| Power Supply: | Power supply computer |

| Operation Frequency each of channel | | | | | |
|---|---|---|---|---|---|
| Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 1 | 2403MHz | 7 | 2452MHz | 13 | 2470MHz |
| 2 | 2424MHz | 8 | 2458MHz | 14 | 2472MHz |
| 3 | 2442MHz | 9 | 2462MHz | 15 | 2474MHz |
| 4 | 2444MHz | 10 | 2464MHz | 16 | 2480MHz |
| 5 | 2446MHz | 11 | 2466MHz | / | / |
| 6 | 2450MHz | 12 | 2468MHz | / | / |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

| Channel | Frequency |
|---|---|
| The Lowest channel(CH1) | 2403MHz |
| The Middle channel(CH8) | 2458MHz |
| The Highest channel(CH16) | 2480MHz |

## 4.3 Test Environment and Mode

| | |
|---|---|
| **Operating Environment:** | |
| **Radiated Emissions:** | |
| Temperature: | 27 °C |
| Humidity: | 59 % RH |
| Atmospheric Pressure: | 1009mbar |
| | |
| Temperature: | 26 °C |
| Humidity: | 59 % RH |
| Atmospheric Pressure: | 1009mbar |
| **Radio conducted item test (RF Conducted test room):** | |
| Temperature: | 25.3 °C |
| Humidity: | 55 % RH |
| Atmospheric Pressure: | 1009mbar |
| **Test mode:** | |
| Transmitting mode: | Use test software (RF test) to set the lowest frequency, the middle frequency and the highest frequency keep transmitting of the EUT. |

## 4.4 Description of Support Units

The EUT has been tested with associated equipment below.

1）Support equipment

| Description | Manufacturer | Model No. | Certification | Supplied by |
|---|---|---|---|---|
| Computer | Lenovo | Thinkpad | / | CQA |

2) Cable

| Cable No. | Description | Manufacturer | Cable Type/Length | Supplied by |
|---|---|---|---|---|
| / | / | / | / | / |

## 4.5 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 Huaxia Testing Technology 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 **CQA** laboratory is reported:

| Test | Range | Uncertainty | Notes |
|---|---|---|---|
| Radiated Emission | Below 1GHz | 5.12dB | (1) |
| Radiated Emission | Above 1GHz | 4.60dB | (1) |
| Conducted Disturbance | 0.15~30MHz | 3.34dB | (1) |

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

## 4.6 Test Location

All tests were performed at:

Shenzhen Huaxia Testing Technology Co., Ltd.

1F., Block A of Tongsheng Technology Building, Huahui Road, Dalang Street, Longhua District, Shenzhen, China

## 4.7 Test Facility

**• A2LA (Certificate No. 4742.01)**
Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 4742.01.

**• FCC Registration No.: 522263**
Shenzhen Huaxia Testing Technology Co., Ltd., Shenzhen 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. Registration No.:522263

## 4.8 Deviation from Standards

None.

## 4.9 Abnormalities from Standard Conditions

None.

## 4.10 Other Information Requested by the Customer

None.

## 4.11 Equipment List

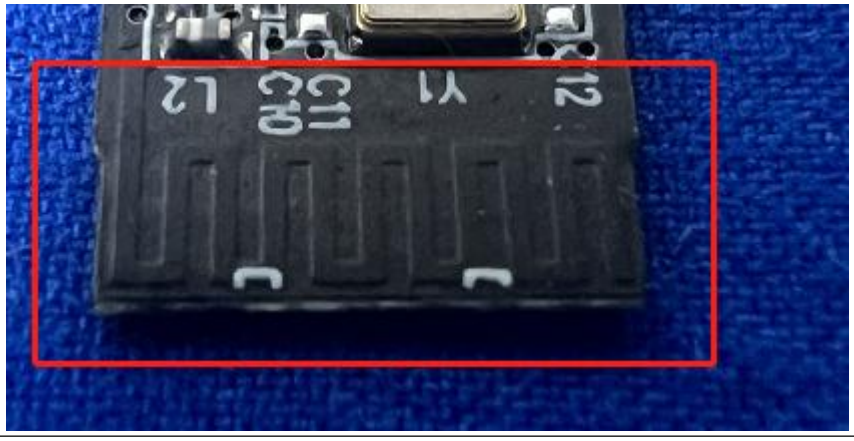
| Test Equipment | Manufacturer | Model No. | Instrument No. | Calibration Date | Calibration Due Date |
|---|---|---|---|---|---|
| EMI Test Receiver | R&S | ESR7 | CQA-005 | 2023/09/08 | 2024/09/07 |
| Spectrum analyzer | R&S | FSU26 | CQA-038 | 2023/09/08 | 2024/09/07 |
| Preamplifier | MITEQ | AFS4-00010300-18-10P-4 | CQA-035 | 2023/09/08 | 2024/09/07 |
| Preamplifier | MITEQ | AMF-6D-02001800-29-20P | CQA-036 | 2023/09/08 | 2024/09/07 |
| Loop antenna | Schwarzbeck | FMZB1516 | CQA-087 | 2021/09/16 | 2024/09/15 |
| Bilog Antenna | R&S | HL562 | CQA-011 | 2021/09/16 | 2024/09/15 |
| Horn Antenna | R&S | HF906 | CQA-012 | 2021/09/16 | 2024/09/15 |
| Horn Antenna | Schwarzbeck | BBHA 9170 | CQA-088 | 2021/09/16 | 2024/09/15 |
| Coaxial Cable (Above 1GHz) | CQA | N/A | C019 | 2023/09/08 | 2024/09/07 |
| Coaxial Cable (Below 1GHz) | CQA | N/A | C020 | 2023/09/08 | 2024/09/07 |
| Antenna Connector | CQA | RFC-01 | CQA-080 | 2023/09/08 | 2024/09/07 |
| RF cable(9KHz~40GHz) | CQA | RF-01 | CQA-079 | 2023/09/08 | 2024/09/07 |
| Power divider | MIDWEST | PWD-2533-02-SMA-79 | CQA-067 | 2023/09/08 | 2024/09/07 |
| EMI Test Receiver | R&S | ESPI3 | CQA-013 | 2023/09/08 | 2024/09/07 |
| LISN | R&S | ENV216 | CQA-003 | 2023/09/08 | 2024/09/07 |
| Coaxial cable | CQA | N/A | CQA-C009 | 2023/09/08 | 2024/09/07 |

Note:

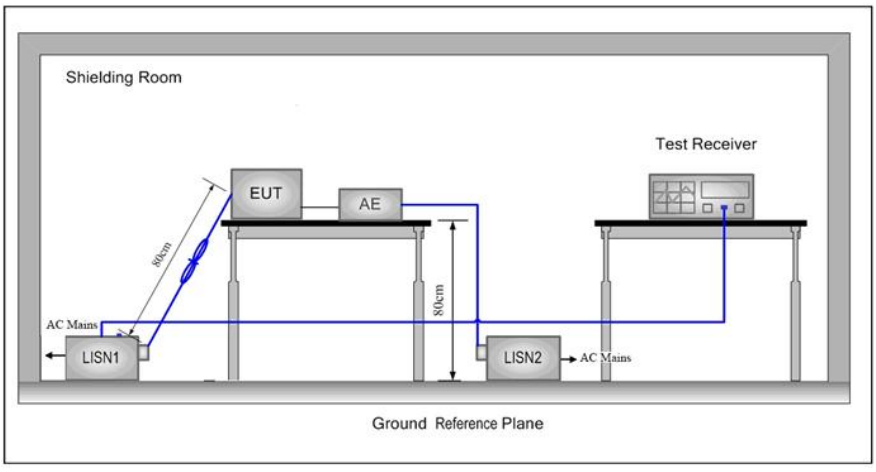
The temporary antenna connector is soldered on the pcb board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

# 5 Test results and Measurement Data

## 5.1 Antenna Requirement

| | |
|---|---|
| **Standard requirement:** | 47 CFR Part 15C Section 15.203 |
| 15.203 requirement:<br>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. | |
| **EUT Antenna:** |  |
| The antenna is PCB antenna.<br>The connection/connection type between the antenna to the EUT's antenna port is: permanently attachment<br>This is either permanently attachment or a unique coupling that satisfies the requirement. | |

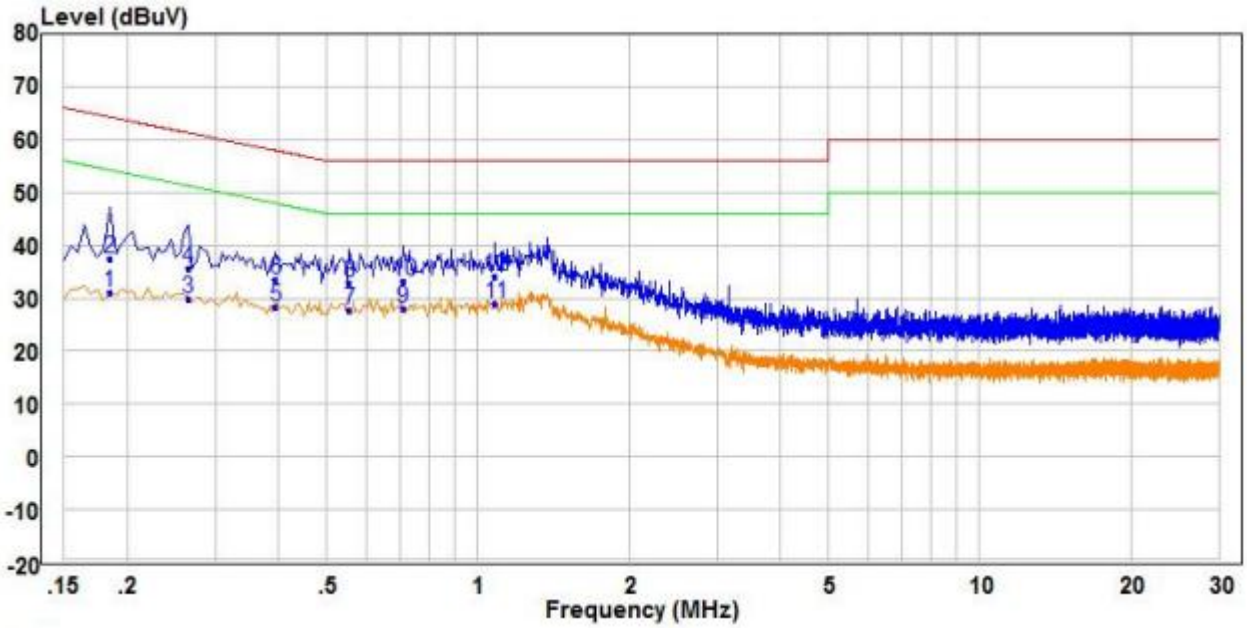
## 5.2 Conducted Emissions

| | |
|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.207 |
| Test Method: | ANSI C63.10: 2013 |
| Test Frequency Range: | 150kHz to 30MHz |
| Limit: | Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average<br>0.15-0.5: 66 to 56* / 56 to 46*<br>0.5-5: 56 / 46<br>5-30: 60 / 50<br>* Decreases with the logarithm of the frequency. |
| Test Procedure: | 1) The mains terminal disturbance voltage test was conducted in a shielded room.<br>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.<br>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.<br>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.<br>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. |
| Test Setup: |  |

| | |
|---|---|
| Test Mode: | Charge +Transmitting mode. |
| Final Test Mode: | Charge +Transmitting mode |
| Test Results: | Pass |

**Measurement Data:**

Live line:




| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | | |
| 1 | 0.185 | 21.68 | 9.49 | 31.17 | 54.26 | -23.09 | Average | Line |
| 2 | 0.185 | 27.91 | 9.49 | 37.40 | 64.26 | -26.86 | QP | Line |
| 3 | 0.265 | 20.47 | 9.49 | 29.96 | 51.27 | -21.31 | Average | Line |
| 4 | 0.265 | 26.01 | 9.49 | 35.50 | 61.27 | -25.77 | QP | Line |
| 5 | 0.395 | 18.83 | 9.51 | 28.34 | 47.96 | -19.62 | Average | Line |
| 6 | 0.395 | 24.02 | 9.51 | 33.53 | 57.96 | -24.43 | QP | Line |
| 7 | 0.555 | 18.20 | 9.63 | 27.83 | 46.00 | -18.17 | Average | Line |
| 8 | 0.555 | 23.29 | 9.63 | 32.92 | 56.00 | -23.08 | QP | Line |
| 9 | 0.710 | 18.26 | 9.85 | 28.11 | 46.00 | -17.89 | Average | Line |
| 10 | 0.710 | 23.44 | 9.85 | 33.29 | 56.00 | -22.71 | QP | Line |
| 11 PP | 1.085 | 19.42 | 9.52 | 28.94 | 46.00 | -17.06 | Average | Line |
| 12 QP | 1.085 | 24.54 | 9.52 | 34.06 | 56.00 | -21.94 | QP | Line |

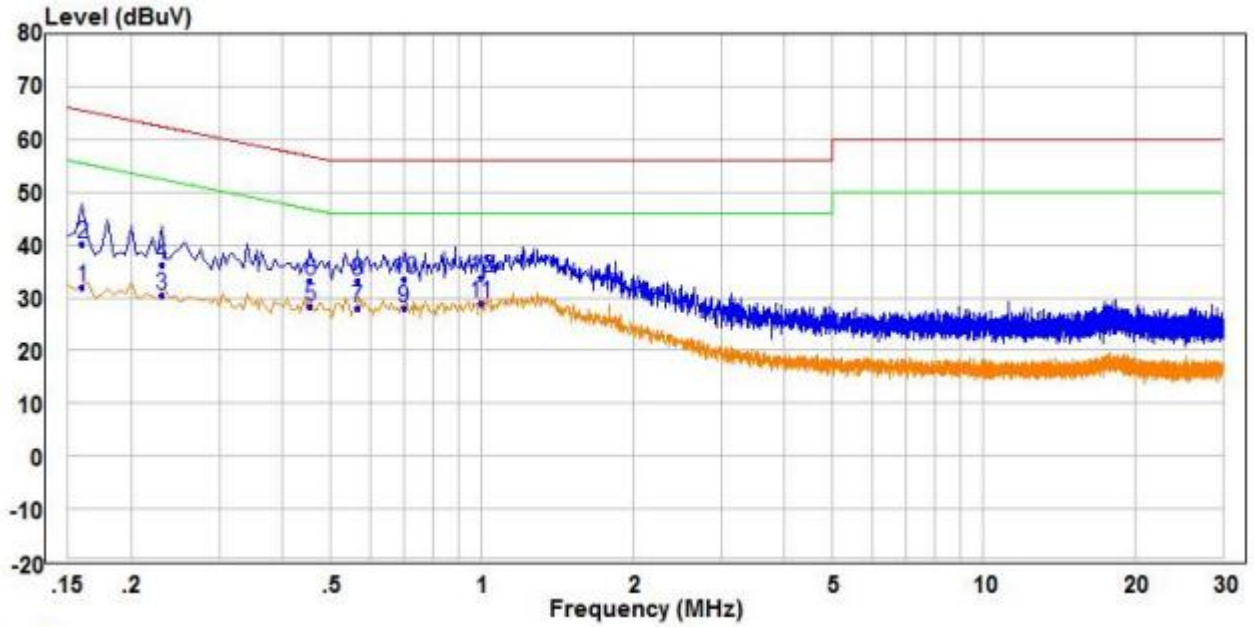
Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.

3. If the Peak value under Average limit, the Average value is not recorded in the report.

Neutral line:




| | | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | | |
| 1 | | 0.160 | 22.20 | 9.68 | 31.88 | 55.46 | -23.58 | Average | Neutral |
| 2 | | 0.160 | 30.44 | 9.68 | 40.12 | 65.46 | -25.34 | QP | Neutral |
| 3 | | 0.230 | 21.03 | 9.56 | 30.59 | 52.45 | -21.86 | Average | Neutral |
| 4 | | 0.230 | 26.67 | 9.56 | 36.23 | 62.45 | -26.22 | QP | Neutral |
| 5 | | 0.455 | 18.61 | 9.66 | 28.27 | 46.78 | -18.51 | Average | Neutral |
| 6 | | 0.455 | 23.61 | 9.66 | 33.27 | 56.78 | -23.51 | QP | Neutral |
| 7 | | 0.565 | 18.33 | 9.77 | 28.10 | 46.00 | -17.90 | Average | Neutral |
| 8 | | 0.565 | 23.50 | 9.77 | 33.27 | 56.00 | -22.73 | QP | Neutral |
| 9 | | 0.700 | 18.28 | 9.90 | 28.18 | 46.00 | -17.82 | Average | Neutral |
| 10 | | 0.700 | 23.46 | 9.90 | 33.36 | 56.00 | -22.64 | QP | Neutral |
| 11 | PP | 0.995 | 19.15 | 9.70 | 28.85 | 46.00 | -17.15 | Average | Neutral |
| 12 | QP | 0.995 | 24.04 | 9.70 | 33.74 | 56.00 | -22.26 | QP | Neutral |

Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
3. If the Peak value under Average limit, the Average value is not recorded in the report.

## 5.3 Radiated Emission

<table>
<tr><td>Test Requirement:</td><td>47 CFR Part 15C Section 15.249 and 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<tr><td>0.009MHz-0.090MHz</td><td>Peak</td><td>10kHz</td><td>30KHz</td><td>Peak</td></tr>
<tr><td>0.009MHz-0.090MHz</td><td>Average</td><td>10kHz</td><td>30KHz</td><td>Average</td></tr>
<tr><td>0.090MHz-0.110MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30KHz</td><td>Quasi-peak</td></tr>
<tr><td>0.110MHz-0.490MHz</td><td>Peak</td><td>10kHz</td><td>30KHz</td><td>Peak</td></tr>
<tr><td>0.110MHz-0.490MHz</td><td>Average</td><td>10kHz</td><td>30KHz</td><td>Average</td></tr>
<tr><td>0.490MHz -30MHz</td><td>Quasi-peak</td><td>10kHz</td><td>30kHz</td><td>Quasi-peak</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100 kHz</td><td>300KHz</td><td>Quasi-peak</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>Peak</td><td>1MHz</td><td>10Hz</td><td>Average</td></tr>
</table>
Note: For fundamental frequency, RBW=5MHz, VBW=5MHz, Peak detector is for PK value, RMS detector is for Average value.
</td></tr>
<tr><td>Limit:<br>(Spurious Emissions and band edge)</td><td>
<table>
<tr><th>Frequency</th><th>Field strength (microvolt/meter)</th><th>Limit (dBuV/m )</th><th>Remark</th><th>Measurement distance (m)</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(kHz)</td><td>-</td><td>-</td><td>300</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(kHz)</td><td>-</td><td>-</td><td>30</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>-</td><td>-</td><td>30</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>40.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>43.5</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>46.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>54.0</td><td>Quasi-peak</td><td>3</td></tr>
<tr><td>Above 1GHz</td><td>500</td><td>54.0</td><td>Average</td><td>3</td></tr>
</table>
Note: 1) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.<br>2) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.
</td></tr>
<tr><td>Limit:<br>(Field strength of the fundamental signal)</td><td>
<table>
<tr><th>Frequency</th><th>Limit (dBuV/m @3m)</th><th>Remark</th></tr>
<tr><td rowspan="2">2400MHz-2483.5MHz</td><td>94.0</td><td>Average Value</td></tr>
<tr><td>114.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
</table>

| Test Setup: | |
|---|---|

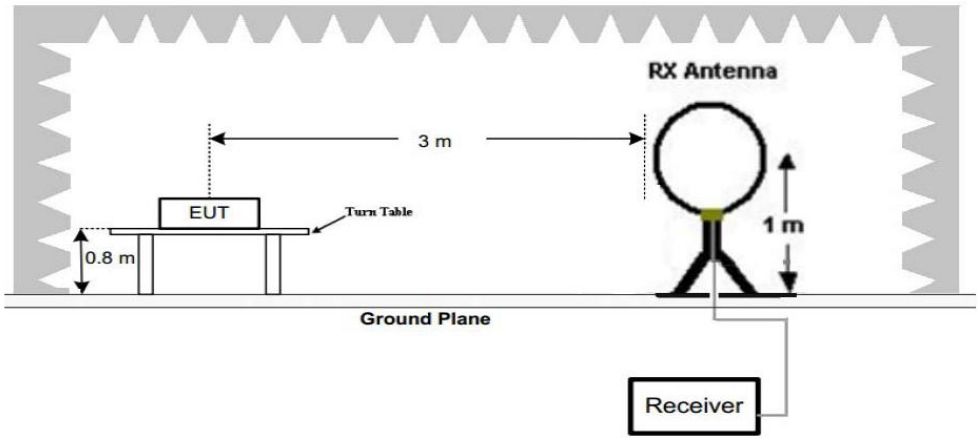



Figure 1. Below 30MHz

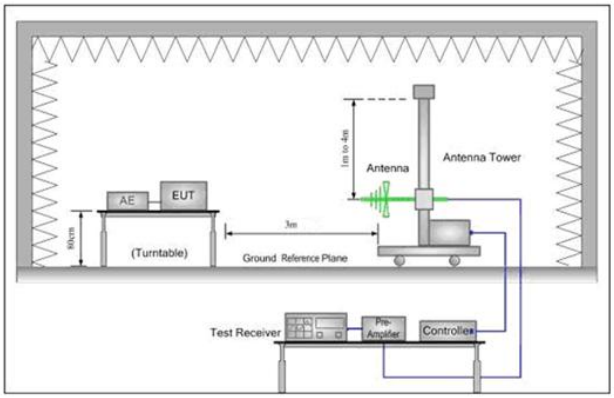



Figure 2. 30MHz to 1GHz

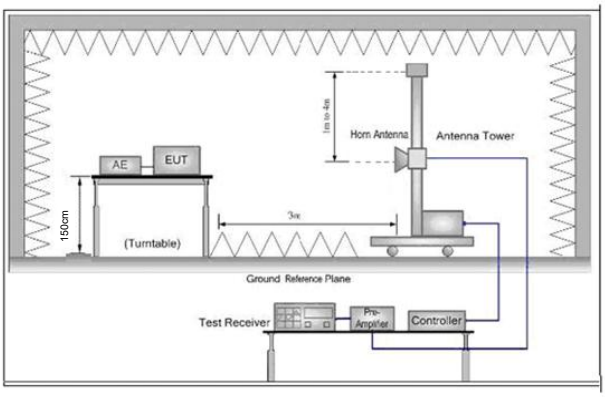


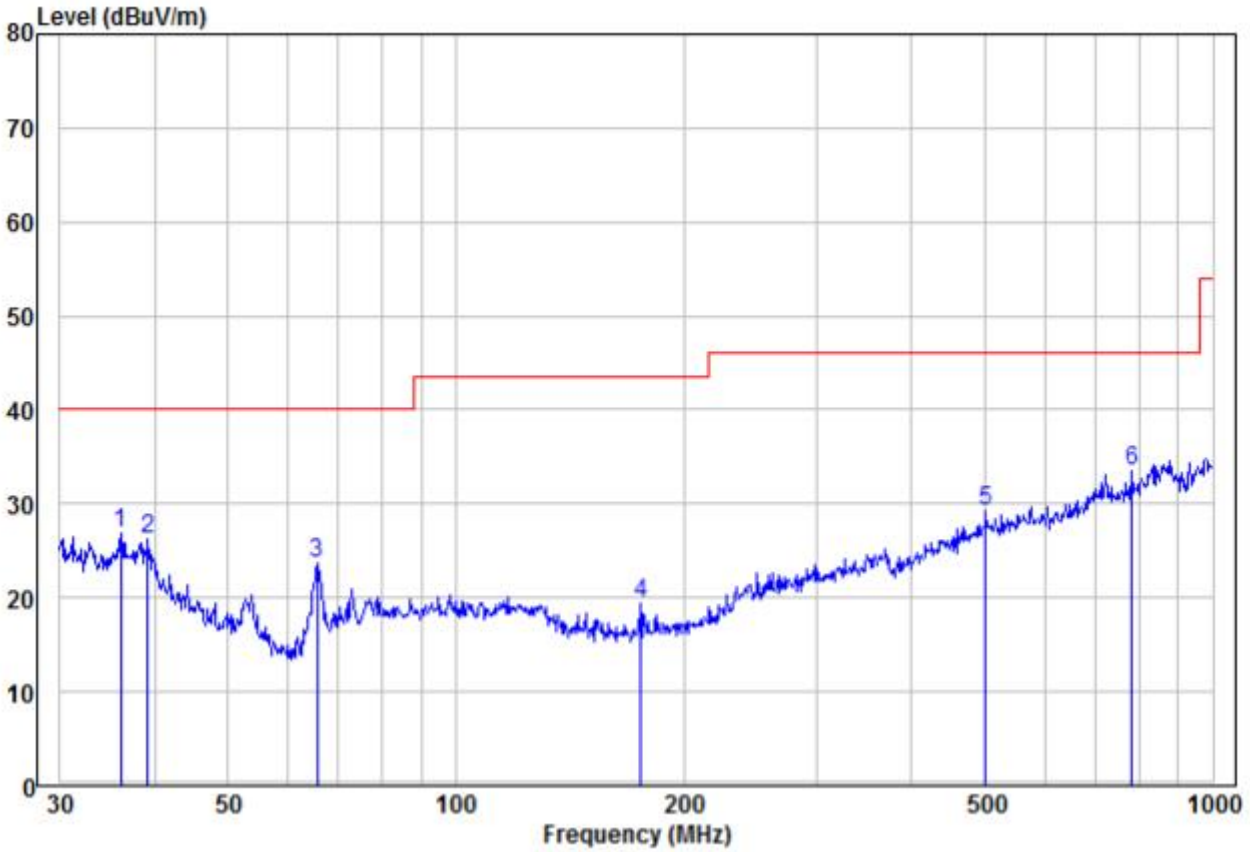

Figure 3. Above 1 GHz

| Test Procedure: | a. 1) Below 1G: The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>2) Above 1G: The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>Note: For the radiated emission test above 1GHz:<br>Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.<br>b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.<br>c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.<br>d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table |
|---|---|

| | |
|---|---|
| | was turned from 0 degrees to 360 degrees to find the maximum reading.<br>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.<br>g. Test the EUT in the lowest channel,the middle channel,the Highest channel<br>h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode,And found the X axis positioning which it is worse case.<br>i. Repeat above procedures until all frequencies measured was complete. |
| Exploratory Test Mode: | Transmitting mode, Charge + Transmitting mode. |
| Final Test Mode: | Pretest the EUT at Transmitting mode and Charge + Transmitting mode, found the Charge + Transmitting mode which it is worse case.<br>For below 1GHz part, through pre-scan, the worst case is the lowest channel.<br>Only the worst case is recorded in the report. |
| Test Results: | Pass |

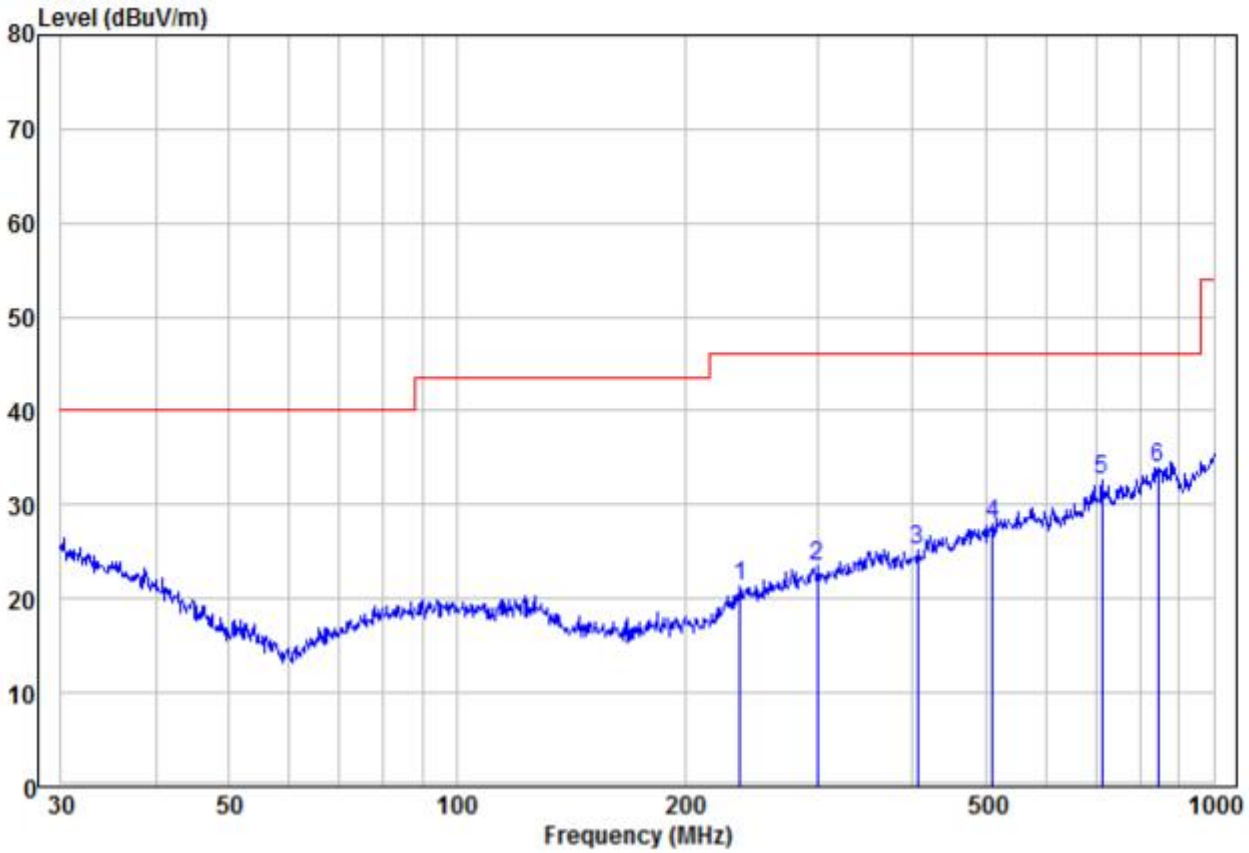
**Measurement Data**

| 30MHz~1GHz | | |
|---|---|---|
| Test mode: | Transmitting | Vertical |




| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 36.13 | 12.78 | 14.19 | 26.97 | 40.00 | -13.03 | Peak | VERTICAL |
| 2 | 39.16 | 13.10 | 13.10 | 26.20 | 40.00 | -13.80 | Peak | VERTICAL |
| 3 | 65.57 | 16.91 | 6.77 | 23.68 | 40.00 | -16.32 | Peak | VERTICAL |
| 4 | 175.65 | 11.34 | 8.03 | 19.37 | 43.50 | -24.13 | Peak | VERTICAL |
| 5 | 501.18 | 10.99 | 18.29 | 29.28 | 46.00 | -16.72 | Peak | VERTICAL |
| 6 pp | 782.35 | 11.43 | 22.17 | 33.60 | 46.00 | -12.40 | Peak | VERTICAL |

| Test mode: | Transmitting | Horizontal |
|---|---|---|




| | Freq | Read Level | Factor | Level | Limit Line | Over Limit | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | |
| 1 | 236.64 | 10.19 | 11.19 | 21.38 | 46.00 | -24.62 | Peak | HORIZONTAL |
| 2 | 299.32 | 9.77 | 13.71 | 23.48 | 46.00 | -22.52 | Peak | HORIZONTAL |
| 3 | 406.09 | 9.80 | 15.35 | 25.15 | 46.00 | -20.85 | Peak | HORIZONTAL |
| 4 | 510.04 | 9.55 | 18.38 | 27.93 | 46.00 | -18.07 | Peak | HORIZONTAL |
| 5 | 711.67 | 11.38 | 21.17 | 32.55 | 46.00 | -13.45 | Peak | HORIZONTAL |
| 6 pp | 845.09 | 9.84 | 24.08 | 33.92 | 46.00 | -12.08 | Peak | HORIZONTAL |

| Above 1GHz | | | |
|---|---|---|---|
| Test mode: | Transmitting | Test channel: | Lowest |

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Over (dB) | Detector Type | Ant. Pol. H/V |
|---|---|---|---|---|---|---|---|
| 2390 | 61.14 | -9.2 | 51.94 | 74 | -22.06 | Peak | H |
| 2390 | 44.66 | -9.2 | 35.46 | 54 | -18.54 | AVG | H |
| 2400 | 46.24 | -9.39 | 36.85 | 74 | -37.15 | Peak | H |
| 2400 | 44.41 | -9.39 | 35.02 | 54 | -18.98 | AVG | H |
| 2403 | 98.32 | -9.33 | 88.99 | 114 | -25.01 | peak | H |
| 2403 | 97.48 | -9.33 | 88.15 | 94 | -5.85 | AVG | H |
| 4806 | 56.62 | -4.28 | 52.34 | 74 | -21.66 | peak | H |
| 4806 | 41.77 | -4.28 | 37.49 | 54 | -16.51 | AVG | H |
| 7209 | 51.18 | 1.13 | 52.31 | 74 | -21.69 | peak | H |
| 7209 | 35.69 | 1.13 | 36.82 | 54 | -17.18 | AVG | H |
| 2390 | 61.76 | -9.2 | 52.56 | 74 | -21.44 | peak | V |
| 2390 | 43.67 | -9.2 | 34.47 | 54 | -19.53 | AVG | V |
| 2400 | 60.50 | -9.39 | 51.11 | 74 | -22.89 | peak | V |
| 2400 | 46.54 | -9.39 | 37.15 | 54 | -16.85 | AVG | V |
| 2403 | 96.13 | -9.33 | 86.80 | 114 | -27.20 | peak | V |
| 2403 | 91.01 | -9.33 | 81.68 | 94 | -12.32 | AVG | V |
| 4806 | 55.83 | -4.28 | 51.55 | 74 | -22.45 | peak | V |
| 4806 | 41.81 | -4.28 | 37.53 | 54 | -16.47 | AVG | V |
| 7209 | 52.35 | 1.13 | 53.48 | 74 | -20.52 | peak | V |
| 7209 | 37.11 | 1.13 | 38.24 | 54 | -15.76 | AVG | V |

| Test mode: | Transmitting | Test channel: | Middle |
|---|---|---|---|

| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Over (dB) | Detector Type | Ant. Pol. H/V |
|---|---|---|---|---|---|---|---|
| 2458 | 99.26 | -9.37 | 89.89 | 114 | -24.11 | peak | H |
| 2458 | 98.05 | -9.37 | 88.68 | 94 | -5.32 | AVG | H |
| 4916 | 56.32 | -4.14 | 52.18 | 74 | -21.82 | peak | H |
| 4916 | 41.97 | -4.14 | 37.83 | 54 | -16.17 | AVG | H |
| 7374 | 53.39 | 0.56 | 53.95 | 74 | -20.05 | peak | H |
| 7374 | 37.57 | 0.56 | 38.13 | 54 | -15.87 | AVG | H |
| 2458 | 96.24 | -9.36 | 86.88 | 114 | -27.12 | peak | V |
| 2458 | 94.20 | -9.36 | 84.84 | 94 | -9.16 | AVG | V |
| 4916 | 55.77 | -4.14 | 51.63 | 74 | -22.37 | peak | V |
| 4916 | 43.41 | -4.14 | 39.27 | 54 | -14.73 | AVG | V |
| 7374 | 53.22 | 0.56 | 53.78 | 74 | -20.22 | peak | V |
| 7374 | 36.78 | 0.56 | 37.34 | 54 | -16.66 | AVG | V |

| Test mode: | Transmitting | Test channel: | Highest |
|---|---|---|---|

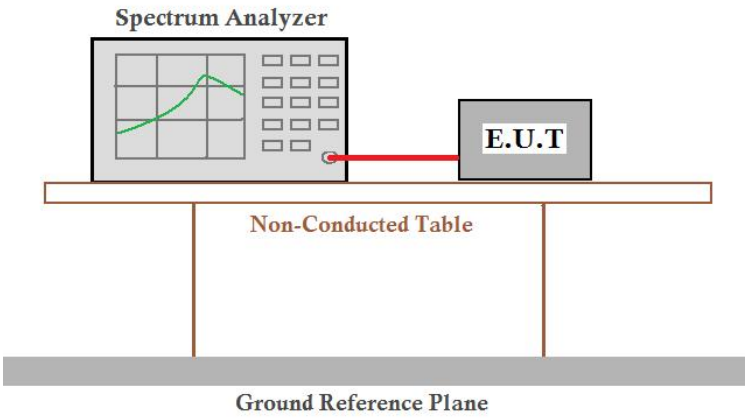
| Frequency (MHz) | Meter Reading (dBμV) | Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Over (dB) | Detector Type | Ant. Pol. H/V |
|---|---|---|---|---|---|---|---|
| 2480 | 99.89 | -9.23 | 90.66 | 114 | -23.34 | peak | **H** |
| 2480 | 98.52 | -9.23 | 89.29 | 94 | -4.71 | AVG | H |
| 2483.5 | 59.96 | -9.29 | 50.67 | 74 | -23.33 | Peak | H |
| 2483.5 | 45.45 | -9.29 | 36.16 | 54 | -17.84 | AVG | H |
| 4960 | 55.40 | -4.03 | 51.37 | 74 | -22.63 | peak | H |
| 4960 | 42.19 | -4.03 | 38.16 | 54 | -15.84 | AVG | H |
| 7440 | 52.98 | 1.68 | 54.66 | 74 | -19.34 | peak | H |
| 7440 | 37.71 | 1.68 | 39.39 | 54 | -14.61 | AVG | H |
| 2480 | 95.63 | -9.23 | 86.40 | 114 | -27.60 | peak | V |
| 2480 | 92.56 | -9.23 | 83.33 | 94 | -10.67 | AVG | V |
| 2483.5 | 62.46 | -9.29 | 53.17 | 74 | -20.83 | peak | V |
| 2483.5 | 43.31 | -9.29 | 34.02 | 54 | -19.98 | AVG | V |
| 4960 | 55.59 | -4.03 | 51.56 | 74 | -22.44 | peak | V |
| 4960 | 42.80 | -4.03 | 38.77 | 54 | -15.23 | AVG | V |
| 7440 | 51.31 | 1.68 | 52.99 | 74 | -21.01 | peak | V |
| 7440 | 37.05 | 1.68 | 38.73 | 54 | -15.27 | AVG | V |

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level =Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

2) Scan from 9kHz to 25GHz,The disturbance above 10GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported .

## 5.4 20dB Bandwidth

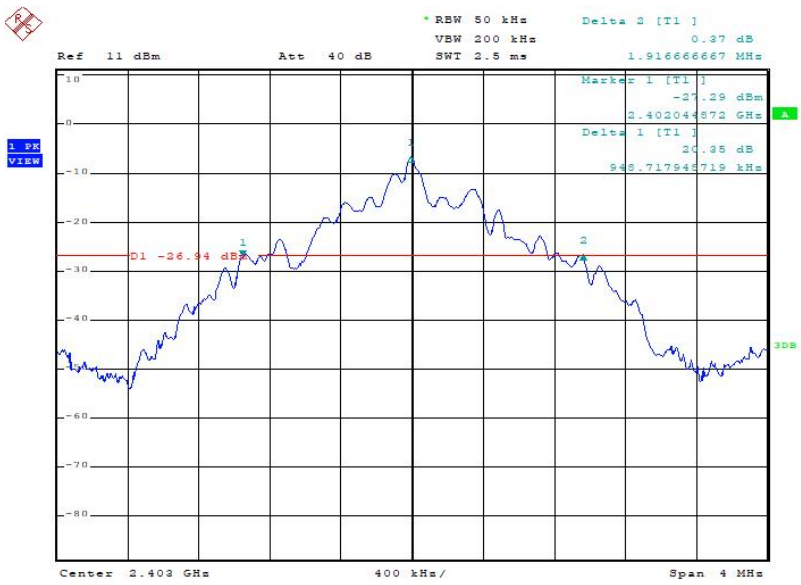
| | |
|---|---|
| Test Requirement: | 47 CFR Part 15C Section 15.215 |
| Test Method: | ANSI C63.10:2013 |
| Test Setup: |  |
| Test Mode: | Transmitting with GFSK modulation. |
| Limit: | N/A |
| Test Results: | Pass |

**Measurement Data**

| Test channel | 20dB bandwidth (MHz) | Results |
|---|---|---|
| Lowest | 1.92 | Pass |
| Middle | 1.93 | Pass |
| Highest | 1.92 | Pass |

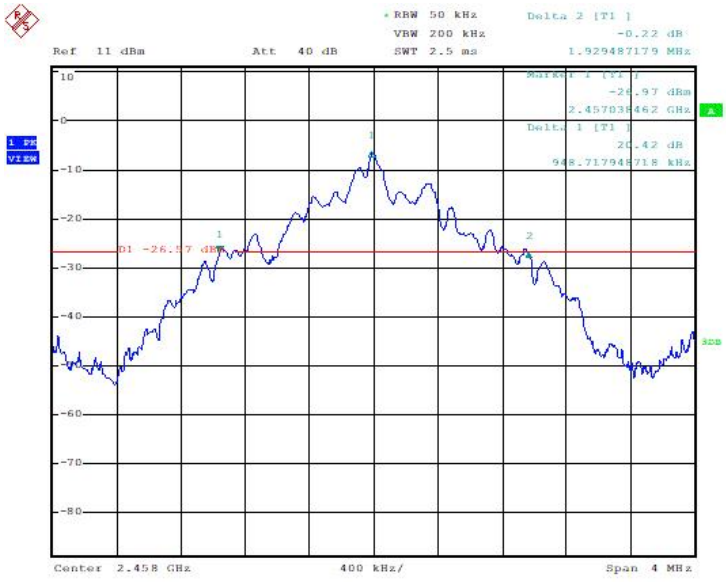
**Test plot as follows:**

| Test channel: | Lowest |
|---|---|



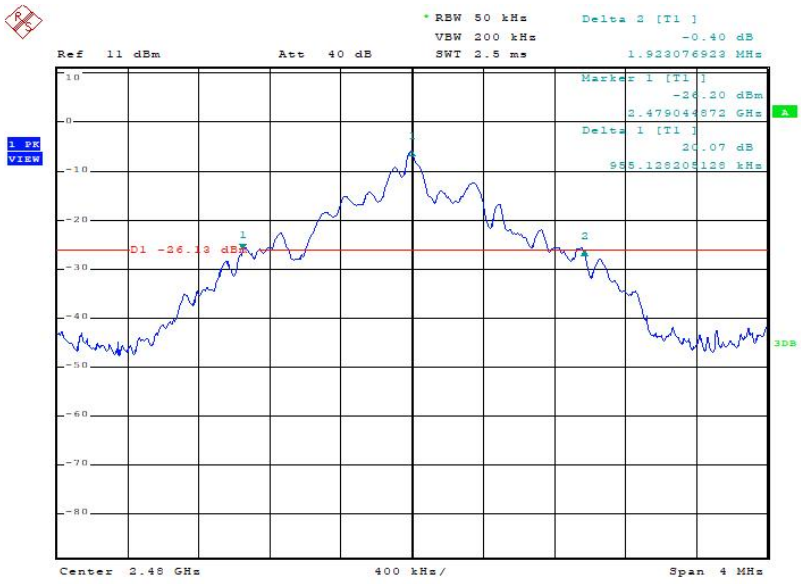

Date: 27.OCT.2023 17:51:39

| Test channel: | Middle |
|---|---|




Date: 24.OCT.2023 17:28:39

| Test channel: | Highest |
|---|---|

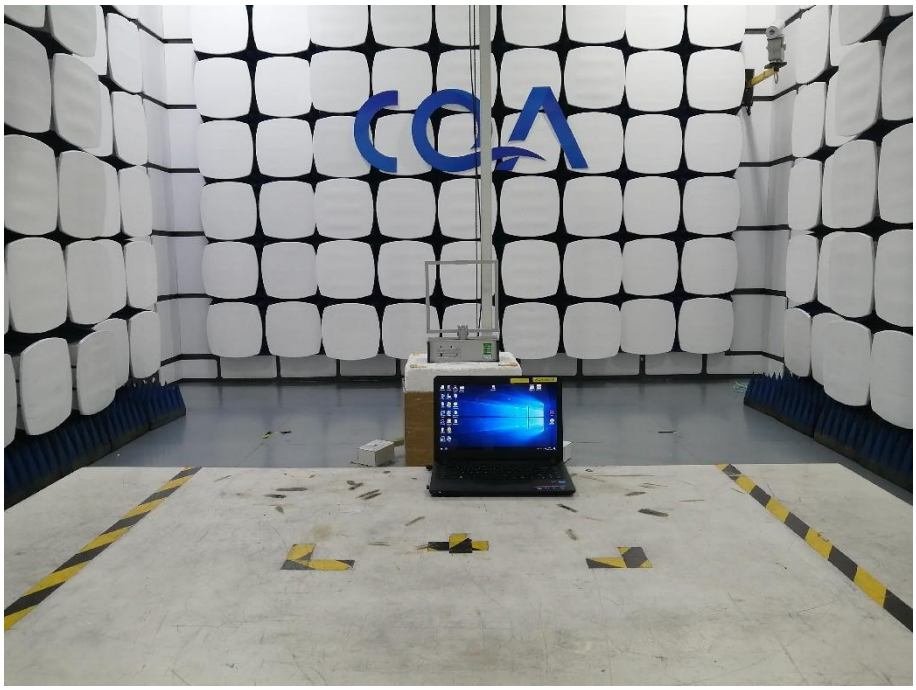



Date: 27.OCT.2023 17:49:33

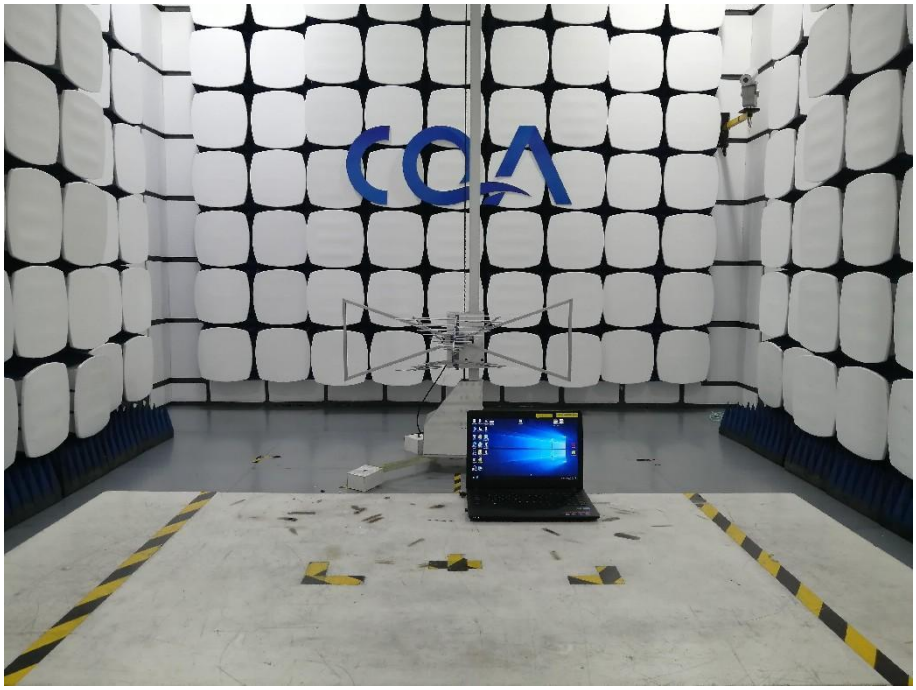
# 6 Photographs

## 6.1 Radiated Emission Test Setup

9kHz~30MHz



30MHz~1GHz:



Above 1GHz:

## 6.2 Conducted Emission Test Setup

## 6.3 EUT Constructional Details