# TEST REPORT

| | |
|---|---|
| **Applicant:** | Joy Sky (Far East) Limited |
| **Address of Applicant:** | Room 2301, 23/F Futura Plaza, 111-113 How Ming Street, Kwun Tong, Kowloon, Hong Kong |
| **Manufacturer:** | Joy Sky (Far East) Limited |
| **Address of Manufacturer:** | Room 2301, 23/F Futura Plaza, 111-113 How Ming Street, Kwun Tong, Kowloon, Hong Kong |
| **Equipment Under Test (EUT)** | |
| Product Name: | Bluetooth karaoke party speaker |
| Model No.: | RJK-POP-DUO-PK, RJK-POP-SOLO-BK,RJK-POP-SOLO-PK, RJK-POP-DUO-BK |
| **FCC ID:** | 2AI5N-RJKPOPMIC |
| **Applicable standards:** | FCC CFR Title 47 Part 15 Subpart C Section 15.236 |
| **Date of sample receipt:** | October 09, 2021 |
| **Date of Test:** | October 10-30, 2021 |
| **Date of report issued:** | October 30, 2021 |
| **Test Result :** | PASS * |

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

Authorized Signature:

**Robinson Luo**
**Laboratory Manager**

## 2 Version

| Version No. | Date | Description |
|---|---|---|
| *00* | *October 30, 2021* | *Original* |
| | | |
| | | |
| | | |
| | | |

***Prepared By:*** *Tiger Chen* ***Date:*** *October 30, 2021*

***Project Engineer***

***Check By:*** ***Date:*** *October 30, 2021*

***Reviewer***

# 3 Contents

# 4 Test Summary

| Test Item | Section in CFR 47 | Result |
|---|---|---|
| Antenna Requirement | 15.203 | Pass |
| AC Power Line Conducted Emission | 15.207 | N/A |
| Maximum Radiated Output Power | 15.236(d) | Pass |
| Occupied Bandwidth | 15.236 (f) | Pass |
| Necessary Bandwidth Spurious Emission | 15.236 (g) | Pass |
| Radiated Spurious Emission | 15.236 (g) | Pass |
| Frequency Stability Measurement | 15.236 (f)(3) | Pass |

*Remarks:*

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *N/A: Not applicable.*
3. *Test according to ANSI C63.10:2013*

**Measurement Uncertainty**

| Test Item | Frequency Range | Measurement Uncertainty | Notes |
|---|---|---|---|
| Radiated Emission | 30MHz-200MHz | 3.8039dB | (1) |
| Radiated Emission | 200MHz-1GHz | 3.9679dB | (1) |
| Radiated Emission | 1GHz-18GHz | 4.29dB | (1) |
| Radiated Emission | 18GHz-40GHz | 3.30dB | (1) |
| AC Power Line Conducted Emission | 0.15MHz ~ 30MHz | 3.44dB | (1) |
| Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%. | | | |

# 5 General Information

## 5.1 General Description of EUT

| | |
|---|---|
| Product Name: | Bluetooth karaoke party speaker |
| Model No.: | RJK-POP-DUO-PK, RJK-POP-SOLO-BK,RJK-POP-SOLO-PK, RJK-POP-DUO-BK |
| Test Model No: | RJK-POP-DUO-PK |
| Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is model name for commercial purpose. | |
| Test sample(s) ID: | GTS202110000009-1,-2 |
| Sample(s) Status: | Engineer sample |
| Serial No.: | N/A |
| Hardware Version: | N/A |
| Software Version: | N/A |
| Operation Frequency: | 658MHz, 662MHz |
| Channel numbers: | 2 |
| Modulation type: | FM |
| Antenna Type: | Internal antenna |
| Antenna gain: | -0.62 dBi |
| Power supply: | DC 3.7V by the Li-on battery |

## 5.2 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.*

## 5.3 Description of Support Units

None.

## 5.4 Deviation from Standards

None.

## 5.5 Abnormalities from Standard Conditions

None.

## 5.6 Test Facility

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

● **FCC—Registration No.: 381383**

Designation Number: CN5029

Global United Technology Services 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 files.

● **IC —Registration No.: 9079A**

CAB identifier: CN0091

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

## 5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

# 6 Test Instruments list

| Radiated Emission: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | 3m Semi- Anechoic Chamber | ZhongYu Electron | 9.2(L)*6.2(W)* 6.4(H) | GTS250 | July. 02 2020 | July. 01 2025 |
| 2 | Control Room | ZhongYu Electron | 6.2(L)*2.5(W)* 2.4(H) | GTS251 | N/A | N/A |
| 3 | EMI Test Receiver | Rohde & Schwarz | ESU26 | GTS203 | June. 24 2021 | June. 23 2022 |
| 4 | BiConiLog Antenna | SCHWARZBECK MESS-ELEKTRONIK | VULB9163 | GTS214 | June. 24 2021 | June. 23 2022 |
| 5 | Double -ridged waveguide horn | SCHWARZBECK MESS-ELEKTRONIK | BBHA 9120 D | GTS208 | June. 24 2021 | June. 23 2022 |
| 6 | Horn Antenna | ETS-LINDGREN | 3160 | GTS217 | June. 24 2021 | June. 23 2022 |
| 7 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 8 | Coaxial Cable | GTS | N/A | GTS213 | June. 24 2021 | June. 23 2022 |
| 9 | Coaxial Cable | GTS | N/A | GTS211 | June. 24 2021 | June. 23 2022 |
| 10 | Coaxial cable | GTS | N/A | GTS210 | June. 24 2021 | June. 23 2022 |
| 11 | Coaxial Cable | GTS | N/A | GTS212 | June. 24 2021 | June. 23 2022 |
| 12 | Amplifier(100kHz-3GHz) | HP | 8347A | GTS204 | June. 24 2021 | June. 23 2022 |
| 13 | Amplifier(2GHz-20GHz) | HP | 84722A | GTS206 | June. 24 2021 | June. 23 2022 |
| 14 | Amplifier (18-26GHz) | Rohde & Schwarz | AFS33-18002 650-30-8P-44 | GTS218 | June. 24 2021 | June. 23 2022 |
| 15 | Band filter | Amindeon | 82346 | GTS219 | June. 24 2021 | June. 23 2022 |
| 16 | Power Meter | Anritsu | ML2495A | GTS540 | June. 24 2021 | June. 23 2022 |
| 17 | Power Sensor | Anritsu | MA2411B | GTS541 | June. 24 2021 | June. 23 2022 |
| 18 | Wideband Radio Communication Tester | Rohde & Schwarz | CMW500 | GTS575 | June. 24 2021 | June. 23 2022 |
| 19 | Splitter | Agilent | 11636B | GTS237 | June. 24 2021 | June. 23 2022 |
| 20 | Loop Antenna | ZHINAN | ZN30900A | GTS534 | June. 24 2021 | June. 23 2022 |
| 21 | Breitband hornantenne | SCHWARZBECK | BBHA 9170 | GTS579 | Oct. 17 2021 | Oct. 16 2022 |
| 22 | Amplifier | TDK | PA-02-02 | GTS574 | Oct. 17 2021 | Oct. 16 2022 |
| 23 | Amplifier | TDK | PA-02-03 | GTS576 | Oct. 17 2021 | Oct. 16 2022 |
| 24 | PSA Series Spectrum Analyzer | Rohde & Schwarz | FSP | GTS578 | June. 24 2021 | June. 23 2022 |

| Conducted Emission | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Shielding Room | ZhongYu Electron | 7.3(L)x3.1(W)x2.9(H) | GTS252 | May.15 2019 | May.14 2022 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | June. 24 2021 | June. 23 2022 |
| 3 | Coaxial Switch | ANRITSU CORP | MP59B | GTS225 | June. 24 2021 | June. 23 2022 |
| 4 | ENV216 2-L-V-NETZNACHB.DE | ROHDE&SCHWARZ | ENV216 | GTS226 | June. 24 2021 | June. 23 2022 |
| 5 | Coaxial Cable | GTS | N/A | GTS227 | N/A | N/A |
| 6 | EMI Test Software | AUDIX | E3 | N/A | N/A | N/A |
| 7 | Thermo meter | KTJ | TA328 | GTS233 | June. 24 2021 | June. 23 2022 |
| 8 | Absorbing clamp | Elektronik-Feinmechanik | MDS21 | GTS229 | June. 24 2021 | June. 23 2022 |
| 9 | ISN | SCHWARZBECK | NTFM 8158 | GTS565 | June. 24 2021 | June. 23 2022 |
| 10 | High voltage probe | SCHWARZBECK | TK9420 | GTS537 | July. 09 2021 | July. 08 2022 |

| RF Conducted Test: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Serial No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | MXA Signal Analyzer | Agilent | N9020A | GTS566 | June. 24 2021 | June. 23 2022 |
| 2 | EMI Test Receiver | R&S | ESCI 7 | GTS552 | June. 24 2021 | June. 23 2022 |
| 3 | Spectrum Analyzer | Agilent | E4440A | GTS533 | June. 24 2021 | June. 23 2022 |
| 4 | MXG vector Signal Generator | Agilent | N5182A | GTS567 | June. 24 2021 | June. 23 2022 |
| 5 | ESG Analog Signal Generator | Agilent | E4428C | GTS568 | June. 24 2021 | June. 23 2022 |
| 6 | USB RF Power Sensor | DARE | RPR3006W | GTS569 | June. 24 2021 | June. 23 2022 |
| 7 | RF Switch Box | Shongyi | RFSW3003328 | GTS571 | June. 24 2021 | June. 23 2022 |
| 8 | Programmable Constant Temp & Humi Test Chamber | WEWON | WHTH-150L-40-880 | GTS572 | June. 24 2021 | June. 23 2022 |
| 9 | Audio Signal Generator | -- | -- | -- | June. 24 2021 | June. 23 2022 |

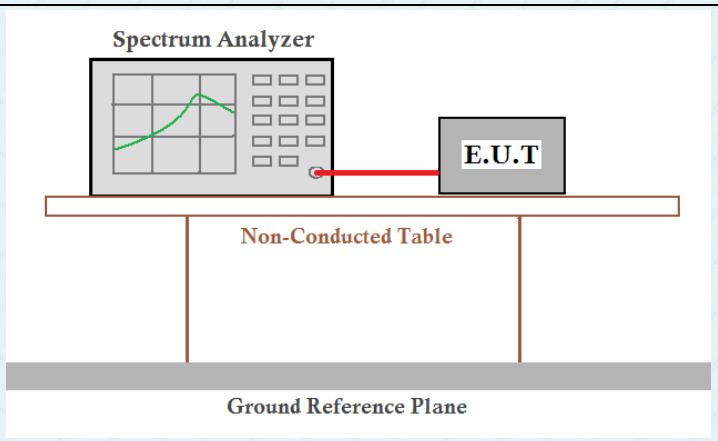
| General used equipment: | | | | | | |
|---|---|---|---|---|---|---|
| **Item** | **Test Equipment** | **Manufacturer** | **Model No.** | **Inventory No.** | **Cal.Date (mm-dd-yy)** | **Cal.Due date (mm-dd-yy)** |
| 1 | Humidity/ Temperature Indicator | KTJ | TA328 | GTS243 | June. 24 2021 | June. 23 2022 |
| 2 | Barometer | ChangChun | DYM3 | GTS255 | June. 24 2021 | June. 23 2022 |

# 7 Test results and Measurement Data

## 7.1 Antenna requirement

| | |
|---|---|
| **Standard requirement:** | FCC Part15 C 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. | |
| **E.U.T Antenna:** | |
| *The antenna is internal antenna, the best case gain of the is -0.62dBi, reference to the appendix II for details* | |

## 7.2 Conducted Peak Output Power

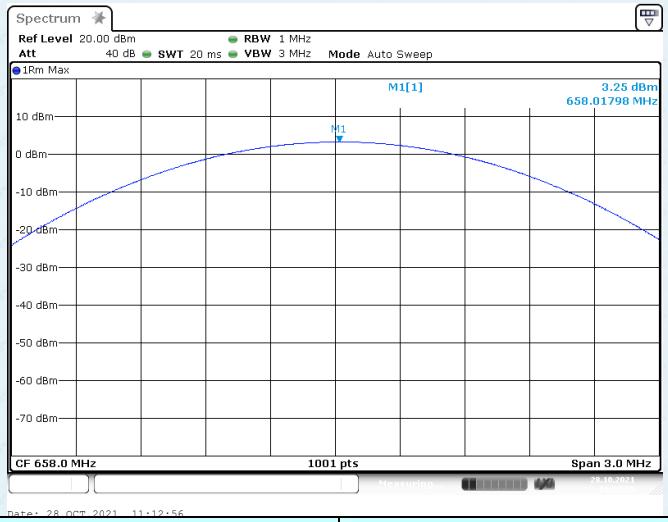
| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.236 (d) |
| Test Method: | ANSI C63.10:2013 |
| Limit: | 20 mW EIRP |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

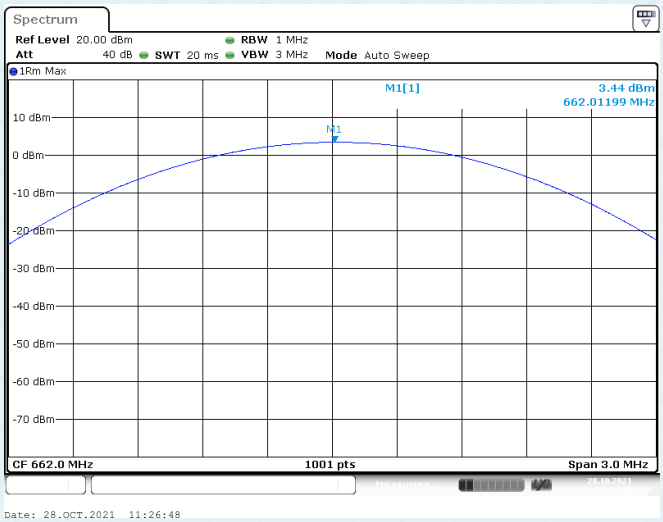
| Test frequency | Conducted Output Power(dBm) | Antenna Gain(dBi) | EIRP(dBm) | EIRP Limit (dBm) | Result |
|---|---|---|---|---|---|
| 658MHz | 3.25 | -0.62 | 2.63 | 13.01 | Pass |
| 662MHz | 3.44 | -0.62 | 2.82 | 13.01 | Pass |

**Test plot as follows:**

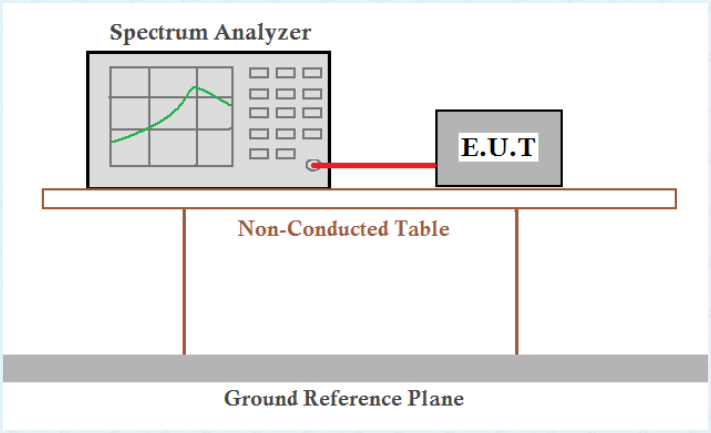
| Test frequency: | 658MHz |
|---|---|




| Test frequency: | 662MHz |
|---|---|



## 7.3 Occupied Bandwidth

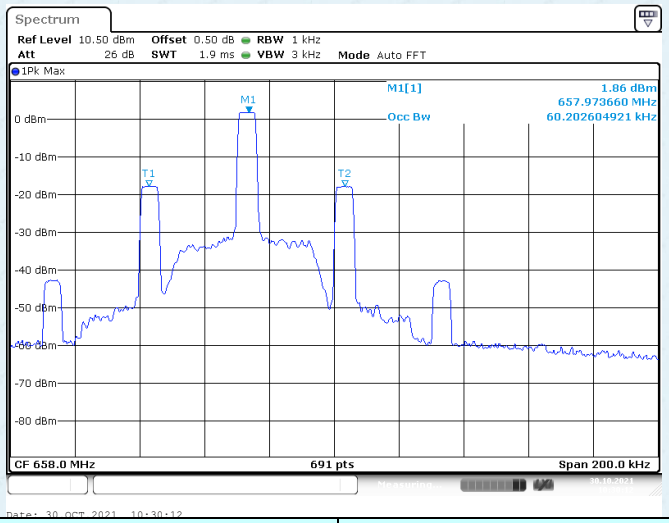
| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.236 (f) |
| Test Method: | ANSI C63.10:2013 |
| Limit: | Not exceed 200kHz |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

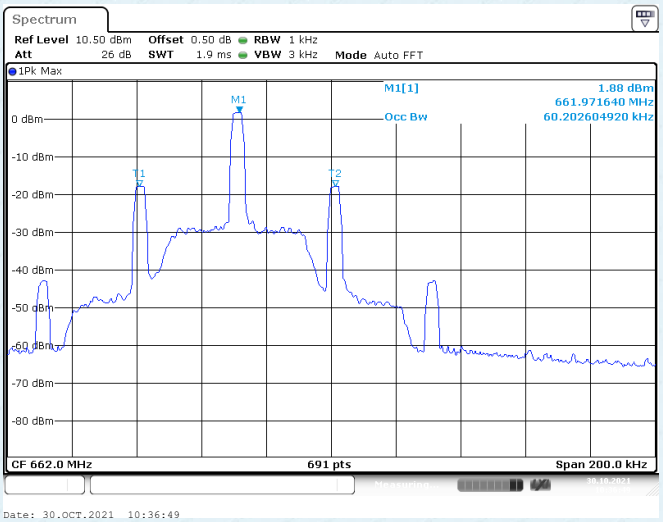
| Test frequency | Occupied Bandwidth (kHz) | Limit (kHz) | Result |
|---|---|---|---|
| 658MHz | 60.203 | 200.00 | Pass |
| 662MHz | 60.203 | 200.00 | Pass |

**Test plot as follows:**

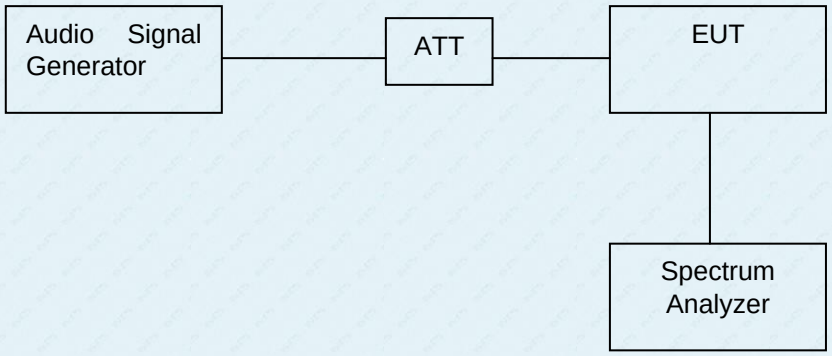
| Test frequency: | 658MHz |
|---|---|




| Test frequency: | 662MHz |
|---|---|

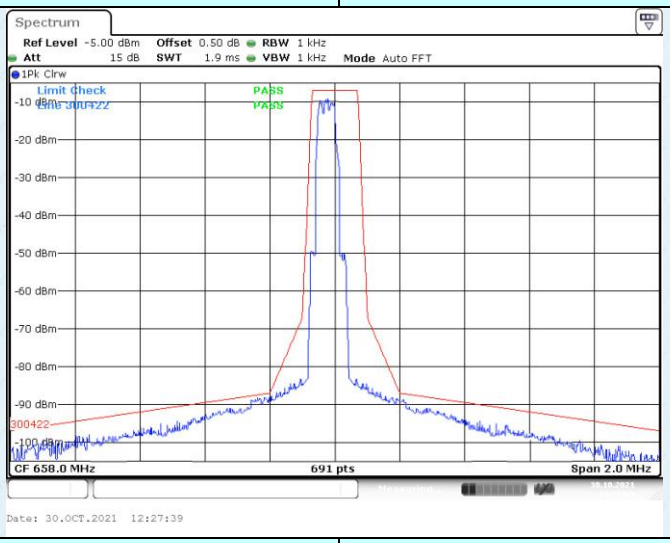


## 7.4 Necessary Bandwidth Spurious Emission

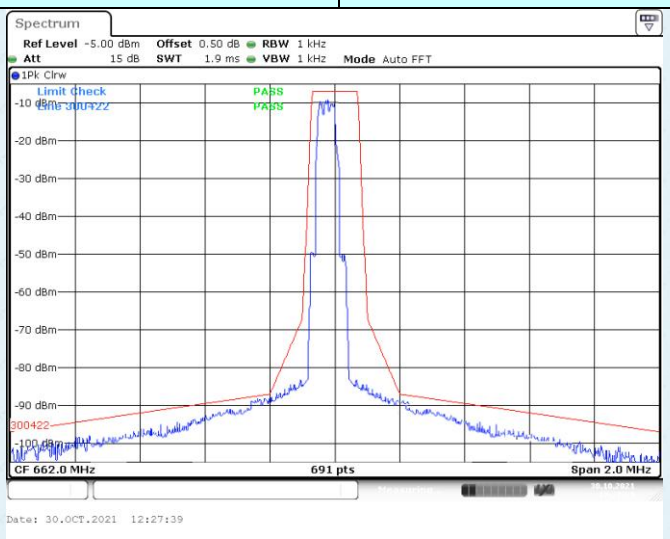
| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.236 (g) |
| Test Method: | ANSI C63.10:2013 |
| Receiver setup: | RBW=100KHz, VBW=300KHz, detector=Peak |
| Limit: | Emissions within the band from one megahertz below to one megahertz above the carrier frequency shall comply with the emission mask in § 8.3 of ETSI EN 300 422-1 V1.4.2 (2011-08) |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Transmitting mode with modulation |
| Test results: | Pass |

**Test plot as follows:**

| Test frequency: | 658MHz |
|---|---|




| Test frequency: | 662MHz |
|---|---|



### 7.4.1 Radiated Emission

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.236(g) |
| Test Method: | ANSI C63.10:2013 |
| Test Frequency Range: | 9kHz-7GHz |
| Test site: | Measurement Distance: 3m |

Receiver setup:

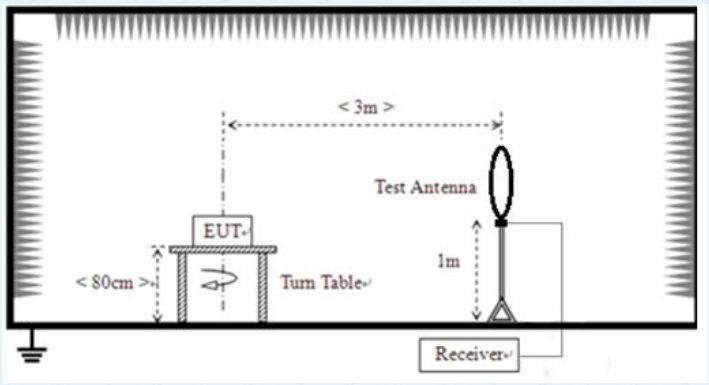
| Frequency | Detector | RBW | VBW | Value |
|---|---|---|---|---|
| 9KHz-150KHz | Quasi-peak | 200Hz | 600Hz | Quasi-peak |
| 150KHz-30MHz | Quasi-peak | 9KHz | 30KHz | Quasi-peak |
| 30MHz-1GHz | Quasi-peak | 120KHz | 300KHz | Quasi-peak |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak |
| | Peak | 1MHz | 10Hz | Average |

Limit:

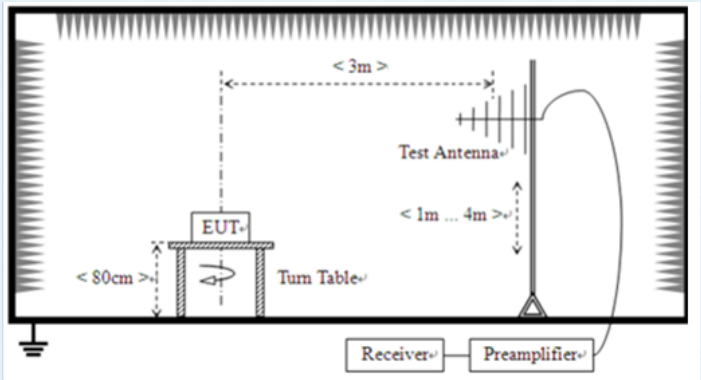
| State | Frequency | | |
|---|---|---|---|
| | 47MHz-74MHz | Other frequencies below 1000MHz | Other frequencies above 1000MHz |
| | 87.5MHz-137MHz | | |
| | 174MHz-230MHz | | |
| | 470MHz-862MHz | | |
| Transmitting | 4nW(-54dBm) | 250nW(-36dBm) | 1Mw(-30dBm) |
| Idle | 2nW | 2nW | 20nW |

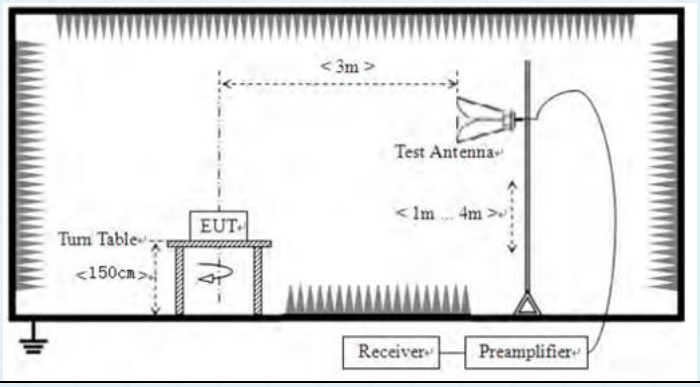
Test setup:

For radiated emissions from 9kHz to 30MHz




For radiated emissions from 30MHz to1GHz



| | |
|---|---|
| | For radiated emissions above 1GHz<br>  <br> |
| Test Procedure: | 1. The EUT was placed on the top of a rotating table (0.8m for below 1G and 1.5m for above 1G) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.<br>2. 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>3. 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>4. 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 and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.<br>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.<br>6. 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. |
| Test Instruments: | Refer to section 6.0 for details |
| Test mode: | Refer to section 5.2 for details |
| Test results: | Pass |

**Measurement Data**

| Test environment: | Temp.: | 25 °C | Humid.: | 52% | Press.: | 1012mbar |
|---|---|---|---|---|---|---|
| Test voltage: | DC 3.7V | | | | | |
| Test results: | Pass | | | | | |

**Measurement data:**

*Remarks:*

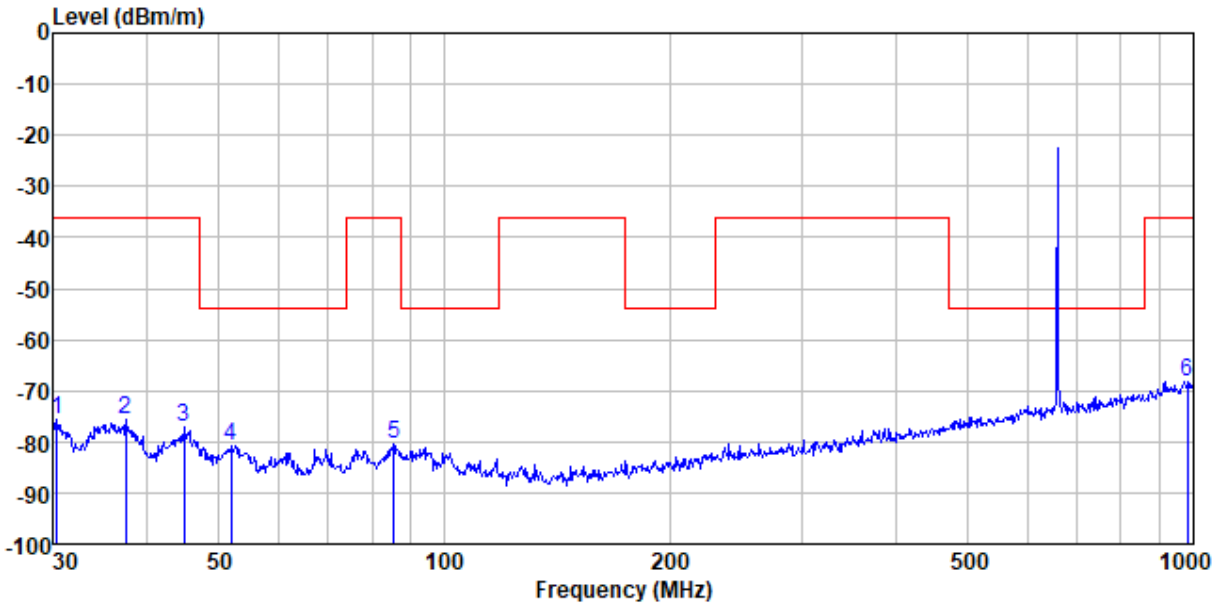
*1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

■ **9kHz~30MHz**

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

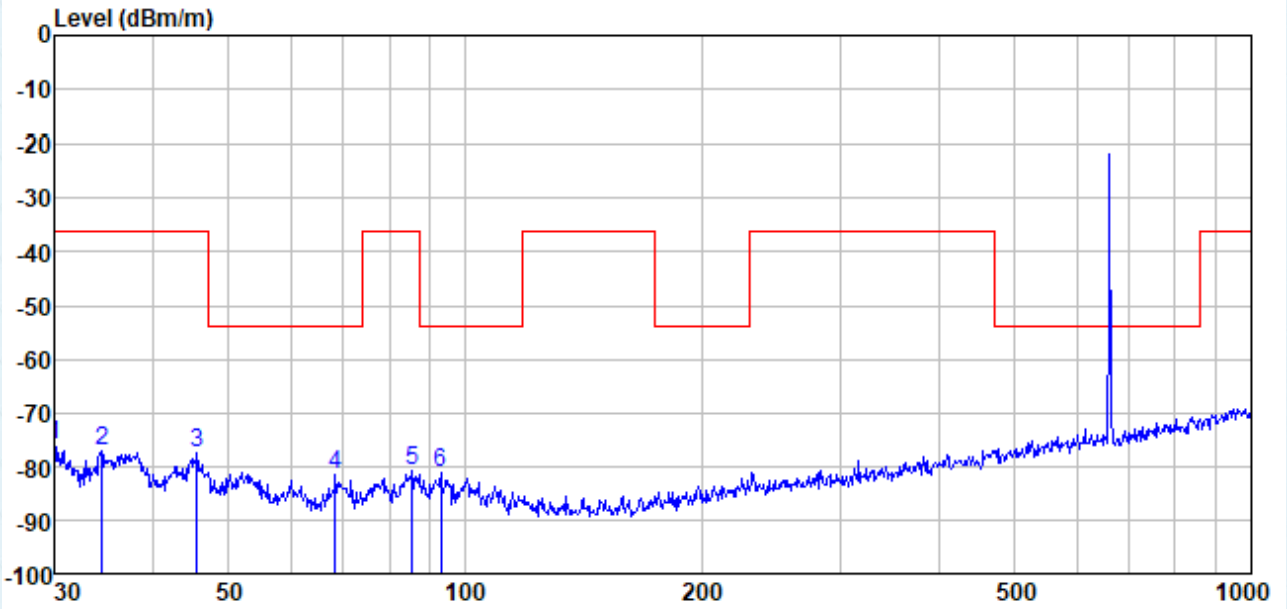
**Below 1GHz**
**Horizontal:**

| Test frequency: | 658MHz |
|---|---|




| | Freq | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBm | dB/m | dB | dB | dBm/m | dBm/m | dB | |
| 1 | 30.424 | -67.15 | 25.89 | 35.03 | 0.56 | -75.73 | -36.00 | -39.73 | QP |
| 2 | 37.548 | -66.38 | 25.44 | 35.52 | 0.64 | -75.82 | -36.00 | -39.82 | QP |
| 3 | 44.901 | -67.35 | 25.44 | 35.93 | 0.72 | -77.12 | -36.00 | -41.12 | QP |
| 4 | 51.843 | -70.68 | 25.44 | 36.21 | 0.79 | -80.66 | -54.00 | -26.66 | QP |
| 5 | 85.598 | -66.64 | 21.65 | 36.60 | 1.07 | -80.52 | -36.00 | -44.52 | QP |
| 6 | 982.620 | -71.59 | 35.81 | 37.52 | 5.16 | -68.14 | -36.00 | -32.14 | QP |

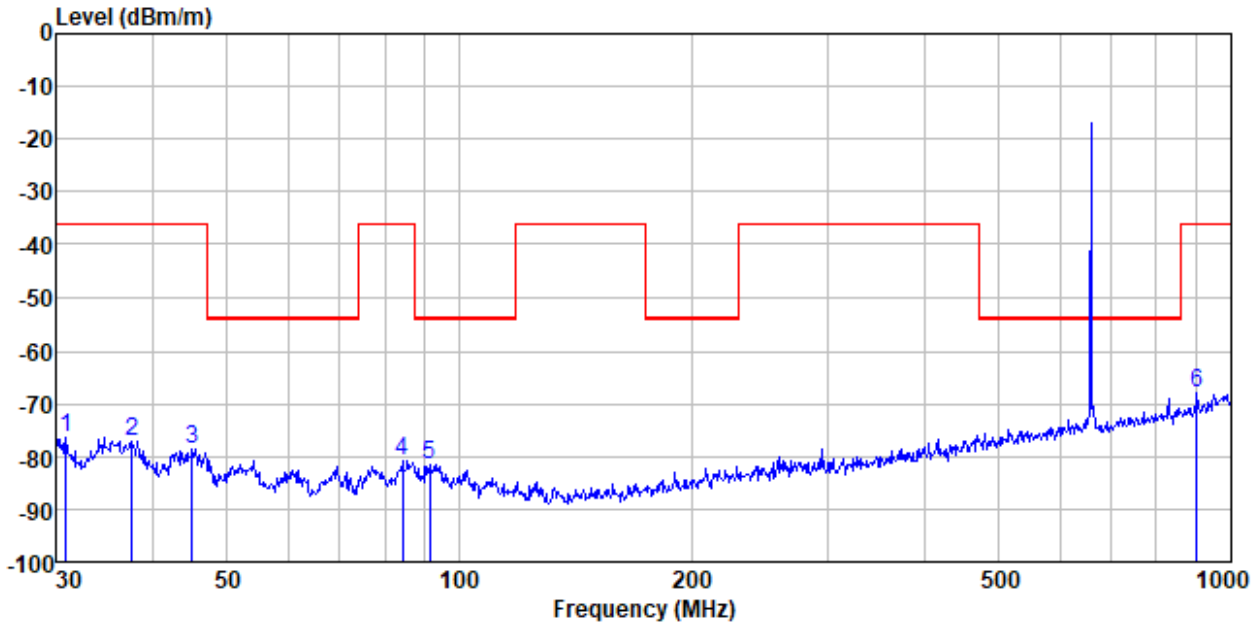
| Test frequency: | 662MHz |
|---|---|




| | Freq | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Limit Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBm | dB/m | dB | dB | dBm/m | dBm/m | dB | |
| 1 | 30.000 | -67.31 | 25.89 | 35.00 | 0.55 | -75.87 | -36.00 | -39.87 | QP |
| 2 | 34.517 | -68.15 | 25.89 | 35.32 | 0.60 | -76.98 | -36.00 | -40.98 | QP |
| 3 | 45.535 | -67.80 | 25.44 | 35.96 | 0.72 | -77.60 | -36.00 | -41.60 | QP |
| 4 | 68.391 | -67.60 | 21.65 | 36.42 | 0.93 | -81.44 | -54.00 | -27.44 | QP |
| 5 | 85.598 | -66.90 | 21.65 | 36.60 | 1.07 | -80.78 | -36.00 | -44.78 | QP |
| 6 | 93.113 | -70.93 | 25.13 | 36.66 | 1.14 | -81.32 | -54.00 | -27.32 | QP |

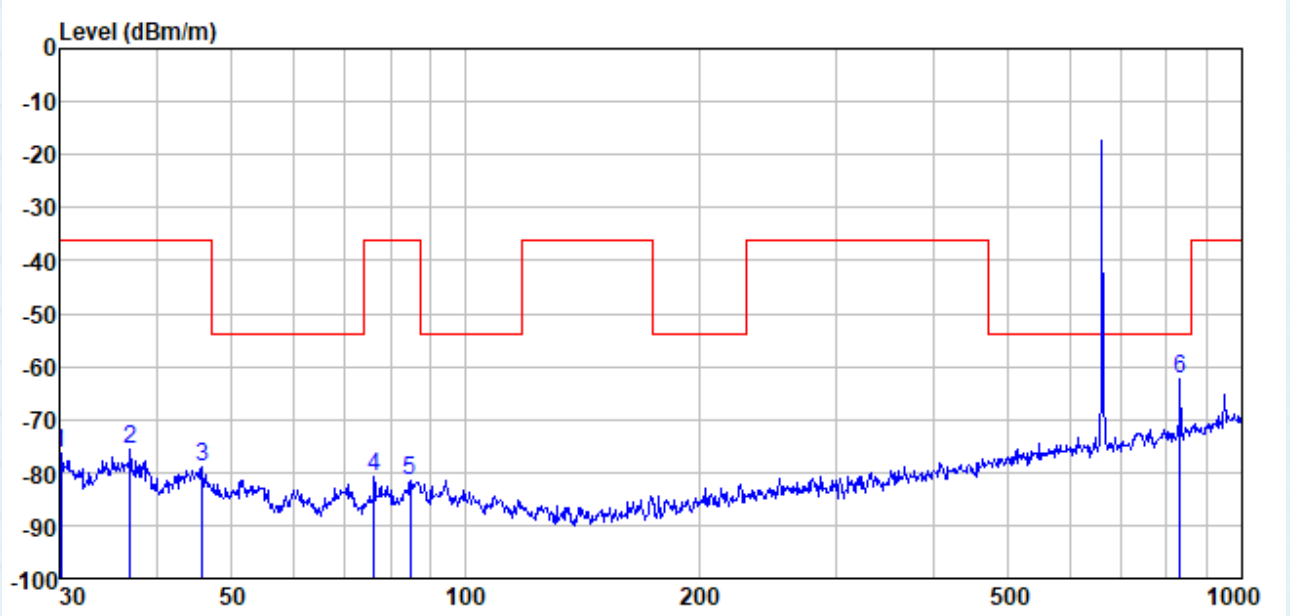
**Vertical:**

| Test frequency: | 658MHz |
|---|---|




| | Freq | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBm | dB/m | dB | dB | dBm/m | dBm/m | dB | |
| 1 | 30.962 | -67.85 | 25.89 | 35.07 | 0.56 | -76.47 | -36.00 | -40.47 | QP |
| 2 | 37.680 | -67.56 | 25.44 | 35.53 | 0.64 | -77.01 | -36.00 | -41.01 | QP |
| 3 | 45.058 | -68.79 | 25.44 | 35.94 | 0.72 | -78.57 | -36.00 | -42.57 | QP |
| 4 | 84.405 | -66.81 | 21.65 | 36.59 | 1.07 | -80.68 | -36.00 | -44.68 | QP |
| 5 | 91.495 | -71.10 | 25.13 | 36.65 | 1.12 | -81.50 | -54.00 | -27.50 | QP |
| 6 | 903.309 | -69.60 | 34.26 | 37.60 | 4.87 | -68.07 | -36.00 | -32.07 | QP |

| Test frequency: | 662MHz |
|---|---|

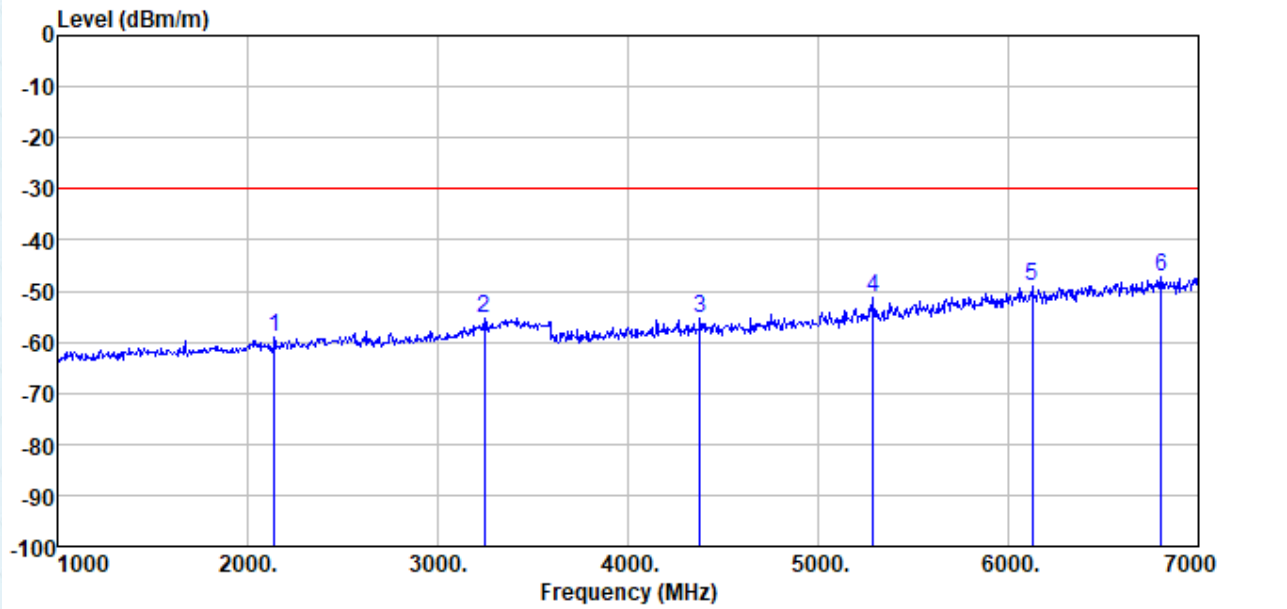



| | Freq | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBm | dB/m | dB | dB | dBm/m | dBm/m | dB | |
| 1 | 30.105 | -67.69 | 25.89 | 35.01 | 0.55 | -76.26 | -36.00 | -40.26 | QP |
| 2 | 37.025 | -66.52 | 25.89 | 35.49 | 0.63 | -75.49 | -36.00 | -39.49 | QP |
| 3 | 45.855 | -69.22 | 25.44 | 35.98 | 0.73 | -79.03 | -36.00 | -43.03 | QP |
| 4 | 76.244 | -66.98 | 21.65 | 36.51 | 1.00 | -80.84 | -36.00 | -44.84 | QP |
| 5 | 84.999 | -67.86 | 21.65 | 36.59 | 1.07 | -81.73 | -36.00 | -45.73 | QP |
| 6 | 833.317 | -62.77 | 33.62 | 37.61 | 4.58 | -62.18 | -54.00 | -8.18 | QP |

■ **Above 1GHz**

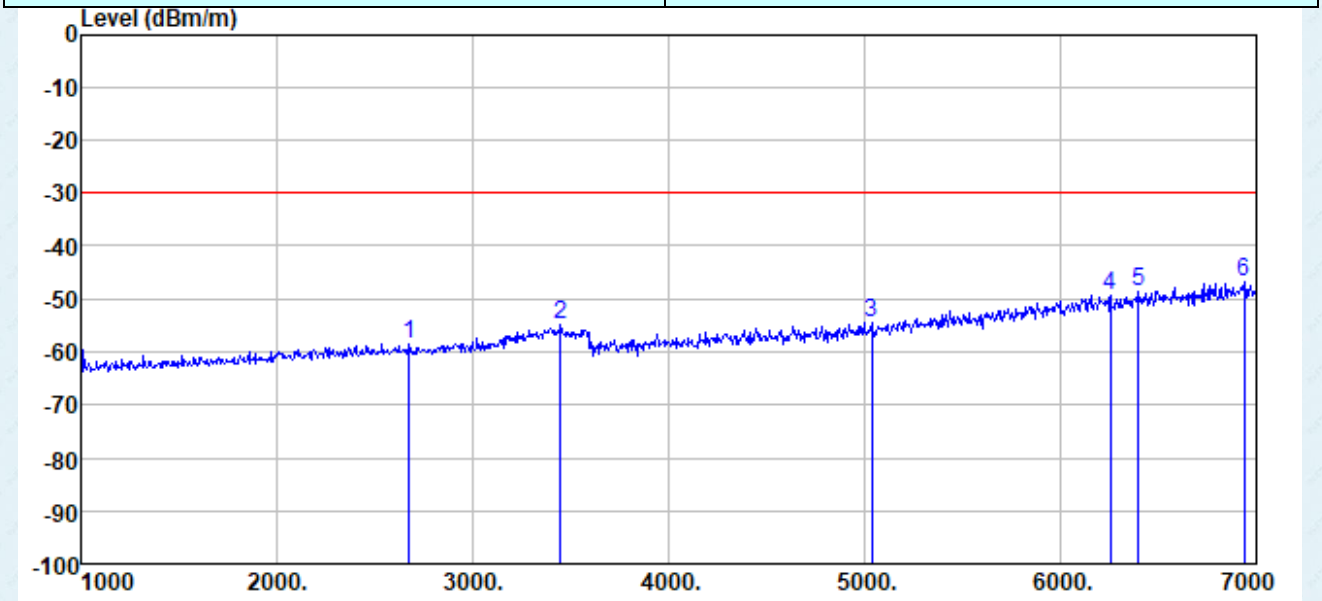
**Horizontal:**

| Test frequency: | 658MHz |
|---|---|




| | Freq | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBm | dB/m | dB | dB | dBm/m | dBm/m | dB | |
| 1 | 2140.000 | -69.67 | 41.29 | 36.63 | 5.92 | -59.09 | -30.00 | -29.09 | Peak |
| 2 | 3244.000 | -68.24 | 42.56 | 37.33 | 7.60 | -55.41 | -30.00 | -25.41 | Peak |
| 3 | 4378.000 | -71.11 | 44.22 | 37.56 | 9.03 | -55.42 | -30.00 | -25.42 | Peak |
| 4 | 5290.000 | -69.74 | 46.03 | 37.38 | 9.74 | -51.35 | -30.00 | -21.35 | Peak |
| 5 | 6124.000 | -71.15 | 47.87 | 36.31 | 10.38 | -49.21 | -30.00 | -19.21 | Peak |
| 6 | 6802.000 | -71.21 | 49.00 | 35.83 | 10.90 | -47.14 | -30.00 | -17.14 | Peak |

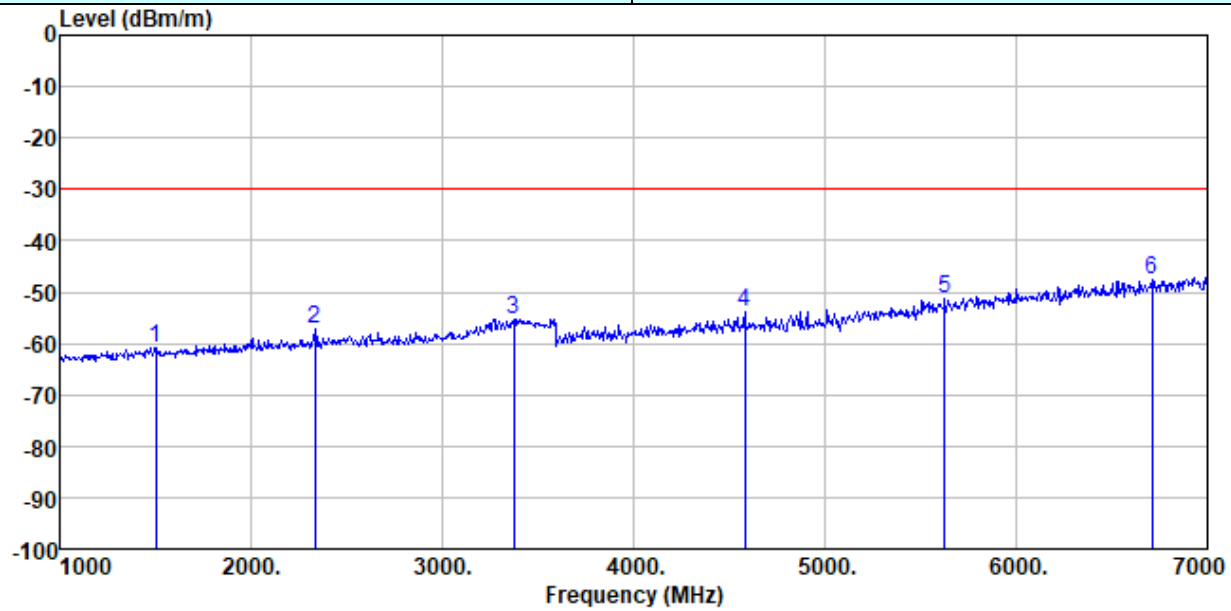
| Test frequency: | 662MHz |
|---|---|




| | Freq | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBm | dB/m | dB | dB | dBm/m | dBm/m | dB | |
| 1 | 2674.000 | -70.12 | 41.86 | 37.07 | 6.73 | -58.60 | -30.00 | -28.60 | Peak |
| 2 | 3448.000 | -68.50 | 42.81 | 37.35 | 7.91 | -55.13 | -30.00 | -25.13 | Peak |
| 3 | 5038.000 | -71.78 | 45.40 | 37.76 | 9.54 | -54.60 | -30.00 | -24.60 | Peak |
| 4 | 6256.000 | -71.92 | 48.10 | 36.22 | 10.48 | -49.56 | -30.00 | -19.56 | Peak |
| 5 | 6400.000 | -71.48 | 48.36 | 36.11 | 10.59 | -48.64 | -30.00 | -18.64 | Peak |
| 6 | 6940.000 | -71.32 | 49.26 | 35.74 | 11.00 | -46.80 | -30.00 | -16.80 | Peak |

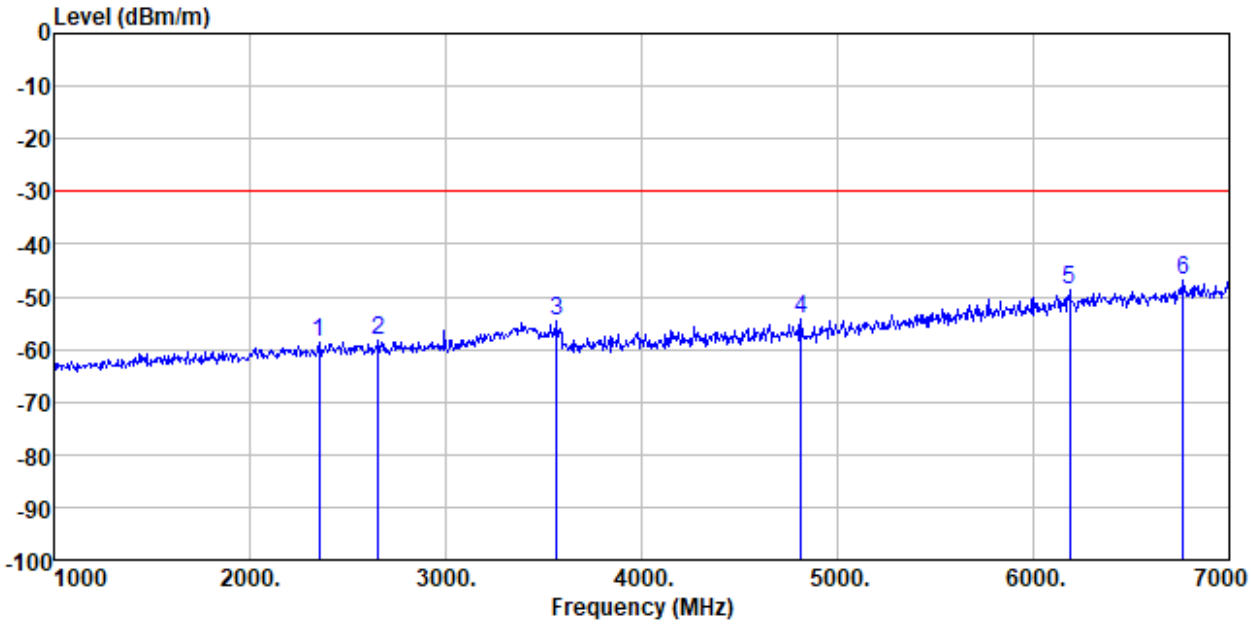
**Vertical:**

| Test frequency: | 658MHz |
|---|---|




| | Freq | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBm | dB/m | dB | dB | dBm/m | dBm/m | dB | |
| 1 | 1504.000 | -70.42 | 40.58 | 36.17 | 5.04 | -60.97 | -30.00 | -30.97 | Peak |
| 2 | 2332.000 | -68.24 | 41.49 | 36.80 | 6.21 | -57.34 | -30.00 | -27.34 | Peak |
| 3 | 3376.000 | -68.35 | 42.72 | 37.34 | 7.80 | -55.17 | -30.00 | -25.17 | Peak |
| 4 | 4582.000 | -69.92 | 44.55 | 37.64 | 9.19 | -53.82 | -30.00 | -23.82 | Peak |
| 5 | 5626.000 | -71.20 | 46.80 | 36.89 | 10.00 | -51.29 | -30.00 | -21.29 | Peak |
| 6 | 6712.000 | -71.26 | 48.89 | 35.88 | 10.83 | -47.42 | -30.00 | -17.42 | Peak |

| Test frequency: | 662MHz |
|---|---|

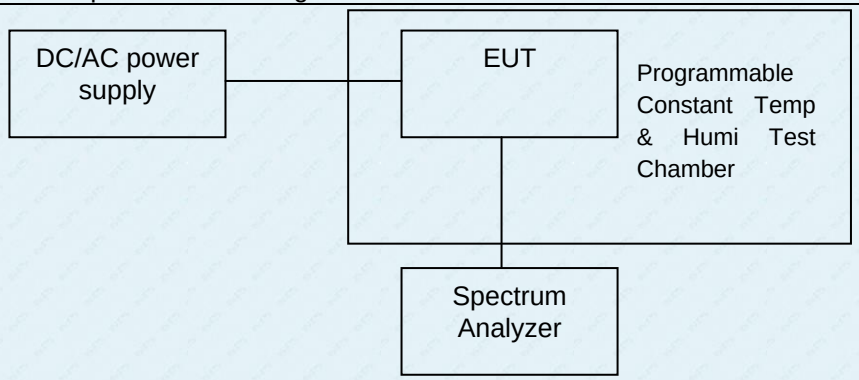



| | Freq | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Level | Limit Line | Over Limit | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBm | dB/m | dB | dB | dBm/m | dBm/m | dB | |
| 1 | 2356.000 | -69.47 | 41.53 | 36.82 | 6.25 | -58.51 | -30.00 | -28.51 | Peak |
| 2 | 2656.000 | -69.97 | 41.84 | 37.06 | 6.71 | -58.48 | -30.00 | -28.48 | Peak |
| 3 | 3568.000 | -68.44 | 42.97 | 37.36 | 8.09 | -54.74 | -30.00 | -24.74 | Peak |
| 4 | 4816.000 | -70.99 | 44.99 | 37.73 | 9.37 | -54.36 | -30.00 | -24.36 | Peak |
| 5 | 6184.000 | -70.76 | 47.99 | 36.27 | 10.43 | -48.61 | -30.00 | -18.61 | Peak |
| 6 | 6766.000 | -70.73 | 48.96 | 35.86 | 10.87 | -46.76 | -30.00 | -16.76 | Peak |

*Remarks:*

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

### 7.4.2 Frequency Stability Measurement

| | |
|---|---|
| Test Requirement: | FCC Part15 C Section 15.236 (f)(3) |
| Test Method: | ANSI C63.10:2013 |
| Limit: | The frequency tolerance of the carrier signal shall be maintained within ±0.005% of the operating frequency over a temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. |
| Test setup: |  |
| Test Instruments: | Refer to section 6.0 for details |
| Test results: | Pass |

**Measurement data:**

| Temperature (℃) | Voltage (VDC) | Declared Frequency(MHz) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Limit (Hz) | Result |
|---|---|---|---|---|---|---|
| 50 | 3.7V | 658.000000 | 657.976000 | 24000 | 32900 | Pass |
| 40 | | 658.000000 | 657.975000 | 25000 | 32900 | Pass |
| 30 | | 658.000000 | 657.976000 | 24000 | 32900 | Pass |
| 20 | | 658.000000 | 657.977000 | 23000 | 32900 | Pass |
| 10 | | 658.000000 | 657.977000 | 23000 | 32900 | Pass |
| 0 | | 658.000000 | 657.974000 | 26000 | 32900 | Pass |
| -10 | | 658.000000 | 657.975000 | 25000 | 32900 | Pass |
| -20 | | 658.000000 | 657.976000 | 24000 | 32900 | Pass |
| 20 | 3.145 | 658.000000 | 657.977000 | 23000 | 32900 | Pass |
| | 3.7 | 658.000000 | 657.977000 | 23000 | 32900 | Pass |
| | 4.255 | 658.000000 | 657.977000 | 23000 | 32900 | Pass |

Remark:
1. Declared Frequency: Manufacturer's declared frequency
2. Limit = 0.00005 * Declared Frequency(Hz)
3. Delta Frequency(Hz) = Declared Frequency(Hz) - Measurement Frequency(Hz)

| Temperature (℃) | Voltage (VDC) | Declared Frequency(MHz) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Limit (Hz) | Result |
|---|---|---|---|---|---|---|
| 50 | 3.7V | 662.000000 | 661.970000 | 30000 | 33100 | Pass |
| 40 | | 662.000000 | 661.972000 | 28000 | 33100 | Pass |
| 30 | | 662.000000 | 661.971000 | 29000 | 33100 | Pass |
| 20 | | 662.000000 | 661.971000 | 29000 | 33100 | Pass |
| 10 | | 662.000000 | 661.971000 | 29000 | 33100 | Pass |
| 0 | | 662.000000 | 661.971000 | 29000 | 33100 | Pass |
| -10 | | 662.000000 | 661.970000 | 30000 | 33100 | Pass |
| -20 | | 662.000000 | 661.971000 | 29000 | 33100 | Pass |
| 20 | 3.145 | 662.000000 | 661.972000 | 28000 | 33100 | Pass |
| | 3.7 | 662.000000 | 661.971000 | 29000 | 33100 | Pass |
| | 4.255 | 662.000000 | 661.972000 | 28000 | 33100 | Pass |

Remark:
1. Declared Frequency: Manufacturer's declared frequency
2. Limit = 0.00005 * Declared Frequency(Hz)
3. Delta Frequency(Hz) = Declared Frequency(Hz) - Measurement Frequency(Hz)

# 8 Test Setup Photo

Reference to the **appendix I** for details.

# 9 EUT Constructional Details

Reference to the **appendix II** for details.

------End------