

# FCC TEST REPORT

## FCC ID: OXGAL67

|                                                                                                                            |   |                                               |
|----------------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------|
| Product                                                                                                                    | : | Show Home App Laser RGB 3D Hologram Projector |
| Model Name                                                                                                                 | : | AL67-3D                                       |
| Brand                                                                                                                      | : | SHOW HOME                                     |
| Report No.                                                                                                                 | : | PTC18060104201E-FC01                          |
| <b>Prepared for</b>                                                                                                        |   |                                               |
| Willis Electric Co., Ltd.                                                                                                  |   |                                               |
| No.504-1, Chung-Hua Road, Sec.4 Hsin Chu Taiwan                                                                            |   |                                               |
|                                                                                                                            |   |                                               |
| <b>Prepared by</b>                                                                                                         |   |                                               |
| Dongguan Precise Testing & Certification Corp., Ltd.                                                                       |   |                                               |
| Building D, Baoding Technology Park, Guangming Road 2, Guangming Community, Dongcheng District, Dongguan, Guangdong, China |   |                                               |
|                                                                                                                            |   |                                               |

## 1 TEST RESULT CERTIFICATION

Applicant's name : Willis Electric Co., Ltd.

Address : No.504-1, Chung-Hua Road, Sec.4 Hsin Chu Taiwan

Manufacture's name : Kupoint (DongGuan) Electric Co., Ltd

Address : Huai De Industrial Humen Town Dong Guan City Guang Dong Province

Product name : Show Home App Laser RGB 3D Hologram Projector

Model name : AL67-3D

Standards : FCC CFR47 Part 15 Section 15.247

Test procedure : ANSI C63.10:2013

Test Date : June 01, 2018 to June 04, 2018

Date of Issue : June 04, 2018

Test Result : Pass

This device described above has been tested by PTC, 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.

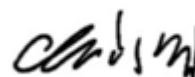
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Test Engineer:



Leo Yang / Engineer

Technical Manager:



Chris Du / Manager

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## 2 Test Summary

| Test Items                  | Test Requirement                 | Result |
|-----------------------------|----------------------------------|--------|
| Conduct Emission            | 15.207                           | PASS   |
| Radiated Spurious Emissions | 15.205(a)<br>15.209<br>15.247(d) | PASS   |
| Conducted Spurious Emission | 15.247(d)                        | N/A    |
| Band edge                   | 15.247(d)<br>15.205(a)           | N/A    |
| 6dB Bandwidth               | 15.247(a)(2)                     | N/A    |
| Maximum Peak Output Power   | 15.247(b)(1)                     | N/A    |
| Power Spectral Density      | 15.247(e)                        | N/A    |
| Antenna Requirement         | 15.203                           | N/A    |

Note: N/A is an abbreviation for Not Applicable.

## Test Site

Dongguan Precise Testing & Certification Corp., Ltd.

Address: Building D, Baoding Technology Park, Guangming Road2, Dongcheng District, Dongguan, Guangdong, China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

Test Lab: Shenzhen BCTC Testing Co., Ltd.

Address: BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China

FCC Registered No.: 712850

Test items: Radiated Spurious Emission(18GHz to 25GHz)

### 3 General Information

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

|                      |   |                                                                                             |
|----------------------|---|---------------------------------------------------------------------------------------------|
| Product Name         | : | Show Home App Laser RGB 3D Hologram Projector                                               |
| Model Name           | : | AL67-3D                                                                                     |
| Bluetooth Version    | : | BLE 4.0                                                                                     |
| Operating frequency  | : | 2402-2480MHz                                                                                |
| Number of Channels   | : | 40                                                                                          |
| Type of Modulation   | : | GFSK                                                                                        |
| Antenna installation | : | Internal PCB Antenna                                                                        |
| Antenna Gain         | : | 0.5dBi                                                                                      |
| Power supply         | : | For Adapter:<br>Model: K25C120200U<br>Input: AC 120V, 50/60Hz, 0.6A<br>Output: DC 12V, 2.0A |
| Hardware Version     | : | AL67_3D_V1                                                                                  |
| Software Version     | : | AL67-3D_V10                                                                                 |

### 3.2 Channel List

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

The EUT has been associated with peripherals pursuant to ANSI C63.10-2013 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The details of test channels and bandwidth were for RF conductive measurement.

Channel List:

| Channel | Frequency (MHz) | Channel   | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|-----------|-----------------|---------|-----------------|
| 00      | <b>2402</b>     | 14        | 2430            | 28      | 2458            |
| 01      | 2404            | 15        | 2432            | 29      | 2460            |
| 02      | 2406            | 16        | 2434            | 30      | 2462            |
| 03      | 2408            | 17        | 2436            | 31      | 2464            |
| 04      | 2410            | 18        | 2438            | 32      | 2466            |
| 05      | 2412            | <b>19</b> | <b>2440</b>     | 33      | 2468            |
| 06      | 2414            | 20        | 2442            | 34      | 2470            |
| 07      | 2416            | 21        | 2444            | 35      | 2472            |
| 08      | 2418            | 22        | 2446            | 36      | 2474            |
| 09      | 2420            | 23        | 2448            | 37      | 2476            |
| 10      | 2422            | 24        | 2450            | 38      | 2478            |
| 11      | 2424            | 25        | 2452            | 39      | <b>2480</b>     |
| 12      | 2426            | 26        | 2454            |         |                 |
| 13      | 2428            | 27        | 2456            |         |                 |

Note:

1. Test of channel was included the lowest 2402MHz, middle 2440MHz and highest frequency 2480MHz in highest data rate and to perform the test, then record on this report.

## 4 Equipment During Test

### 4.1 Equipments List

RF Conducted Test

| Name of Equipment   | Manufacturer    | Model  | Serial No. | Characteristics | Calibration Due |
|---------------------|-----------------|--------|------------|-----------------|-----------------|
| MXG Signal Analyzer | Agilent         | N9020A | MY56070279 | 10Hz-30GHz      | Apr. 07, 2019   |
| Coaxial Cable       | CDS             | 79254  | 46107086   | 10Hz-30GHz      | Oct. 09, 2018   |
| Antenna Connector   | Florida RF Labs | N/A    | RF01#      | N/A             | Aug. 26, 2018   |

Remark: 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.

Radiated Emissions(Test Frequency from 9KHz-18GHz)

| Name of Equipment            | Manufacturer  | Model      | Serial No.   | Characteristics | Calibration Due |
|------------------------------|---------------|------------|--------------|-----------------|-----------------|
| EMI Test Receiver            | Rohde&Schwarz | ESCI       | 101417       | 9KHz-3GHz       | Sep. 03, 2018   |
| Loop Antenna                 | Schwarzbeck   | FMZB 1519  | 012          | 9 KHz -30MHz    | Aug 31, 2018    |
| Bilog Antenna                | SCHWARZBECK   | VULB9160   | 9160-3355    | 25MHz-2GHz      | Aug 31, 2018    |
| Preamplifier (low frequency) | SCHWARZBECK   | BBV 9475   | 9745-0013    | 1MHz-1GHz       | Sep. 03, 2018   |
| Cable                        | Schwarzbeck   | PLF-100    | 549489       | 9KHz-3GHz       | Sep. 03, 2018   |
| Spectrum Analyzer            | Agilent       | E4407B     | MY45109572   | 9KHz-40GHz      | Oct. 13, 2018   |
| Horn Antenna                 | SCHWARZBECK   | 9120D      | 9120D-1246   | 1GHz-18GHz      | Aug. 31, 2018   |
| Power Amplifier              | LUNAR EM      | LNA1G18-40 | J10100000081 | 1GHz-26.5GHz    | Aug. 31, 2018   |
| Cable                        | H+S           | CBL-26     | N/A          | 1GHz-26.5GHz    | Sep. 03, 2018   |

Radiated Emission (Test Frequency from 18GHz-25GHz)

| Name of Equipment | Manufacturer | Model     | Serial No. | Characteristics | Calibration Due |
|-------------------|--------------|-----------|------------|-----------------|-----------------|
| Spectrum Analyzer | Agilent      | E4407B    | MY45109572 | 9KHz-26.5GHz    | 2018.08.26      |
| Test Receiver     | R&S          | ESPI      | 101396     | 9KHz-7GHz       | 2018.08.26      |
| Horn Antenna      | SCHWARZBECK  | BBHA 9170 | 9170-181   | 14GHz-40GHz     | 2018.09.02      |
| Amplifier         | SCHWARZBECK  | BBV 9721  | 9721-205   | 18GHz-40GHz     | 2018.08.26      |
| RF Cable          | R&S          | R204      | R21X       | 1GHz-40GHz      | 2018.08.26      |

Conducted Emissions

| Name of Equipment        | Manufacturer  | Model  | Serial No. | Characteristics | Calibration Due |
|--------------------------|---------------|--------|------------|-----------------|-----------------|
| EMI Test Receiver        | Rohde&Schwarz | ESCI   | 101417     | 9KHz-3GHz       | Sep. 03, 2018   |
| Artificial Mains Network | Rohde&Schwarz | L2-16B | 000WX31025 | 9KHz-300MHz     | Sep. 03, 2018   |
| Artificial Mains Network | Rohde&Schwarz | ENV216 | 101342     | 9KHz-300MHz     | Sep. 03, 2018   |



## 4.2 Measurement Uncertainty

| Parameter                                                                                       | Uncertainty              |
|-------------------------------------------------------------------------------------------------|--------------------------|
| RF output power, conducted                                                                      | $\pm 1.0\text{dB}$       |
| Power Spectral Density, conducted                                                               | $\pm 2.2\text{dB}$       |
| Radio Frequency                                                                                 | $\pm 1 \times 10^{-6}$   |
| Bandwidth                                                                                       | $\pm 1.5 \times 10^{-6}$ |
| Time                                                                                            | $\pm 2\%$                |
| Duty Cycle                                                                                      | $\pm 2\%$                |
| Temperature                                                                                     | $\pm 1^{\circ}\text{C}$  |
| Humidity                                                                                        | $\pm 5\%$                |
| DC and low frequency voltages                                                                   | $\pm 3\%$                |
| Conducted Emissions (150kHz~30MHz)                                                              | $\pm 3.64\text{dB}$      |
| Radiated Emission(30MHz~1GHz)                                                                   | $\pm 5.03\text{dB}$      |
| Radiated Emission(1GHz~25GHz)                                                                   | $\pm 4.74\text{dB}$      |
| Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95% |                          |



PRECISE TESTING

Report No.: PTC18060104201E-FC01

### 4.3 Description of Support Units

| Equipment | Model No. | Series No. |
|-----------|-----------|------------|
| N/A       | N/A       | N/A        |

## 5 Conducted Emission

|                  |                                     |
|------------------|-------------------------------------|
| Test Requirement | : FCC CFR 47 Part 15 Section 15.207 |
| Test Method      | : ANSI C63.10: 2013                 |
| Test Result      | : PASS                              |
| Frequency Range  | : 150kHz to 30MHz                   |
| Class/Severity   | : Class B                           |

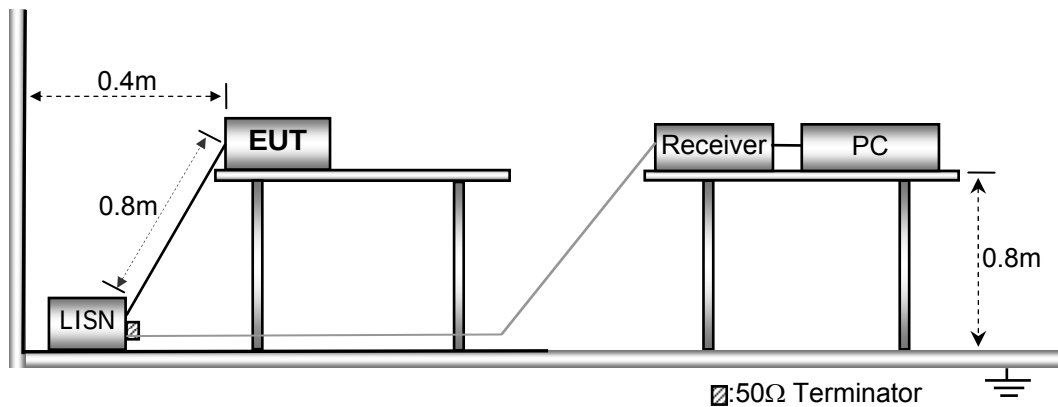
### 5.1 E.U.T. Operation

Operating Environment :

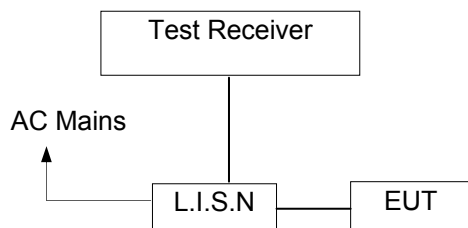
|                      |            |
|----------------------|------------|
| Temperature          | : 25.5 °C  |
| Humidity             | : 51 % RH  |
| Atmospheric Pressure | : 101.2kPa |

### 5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.



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



### 5.4 Measurement Procedure

1. The EUT was placed on a table, which is 0.8m 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.

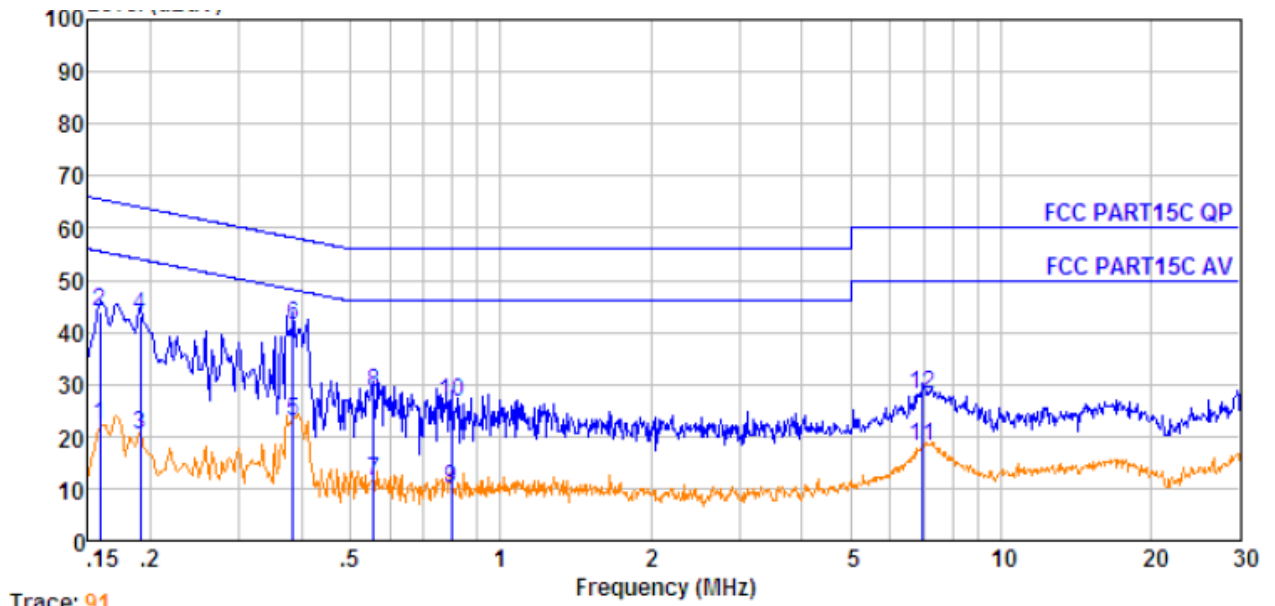
All the modulation modes were tested the data of the worst mode (GFSK TX 2402MHz) are recorded in the following pages and the others modulation methods do not exceed the limits.



PRECISE TESTING

Report No.: PTC18060104201E-FC01

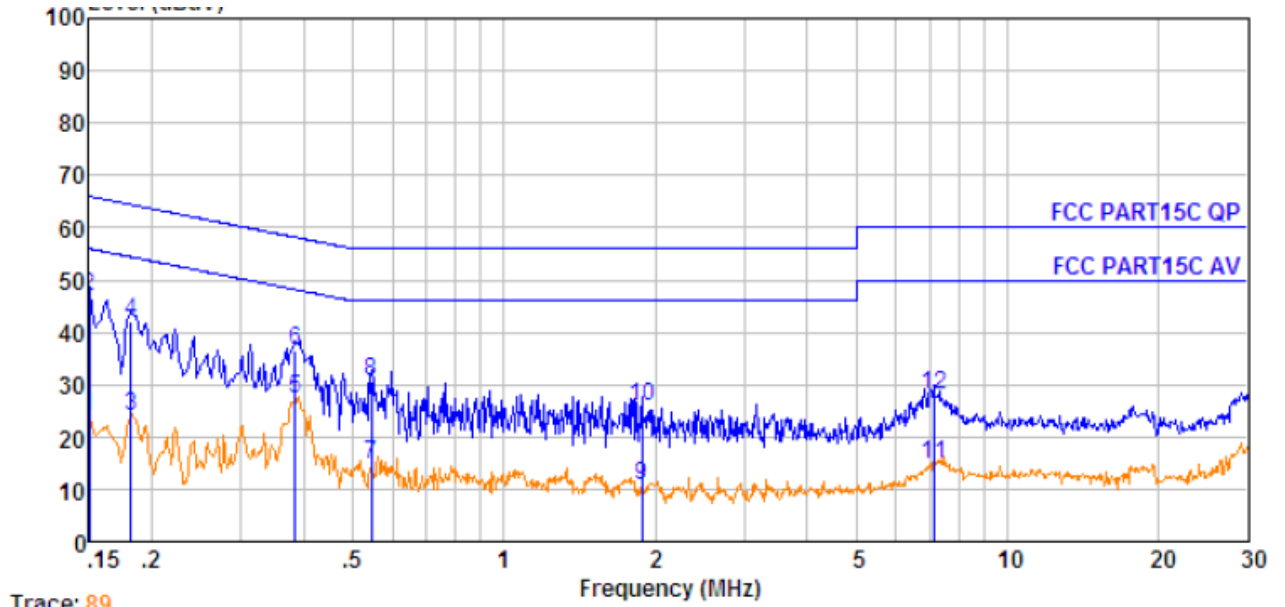
Line-AC 120V/60Hz



| No. | Freq<br>MHz | Cable<br>Loss<br>dB | AMN<br>Factor<br>dB | Receiver<br>Reading<br>dBuV | Emission<br>Level<br>dBuV | Limit<br>dBuV | Over<br>Limit<br>dB | Remark  |
|-----|-------------|---------------------|---------------------|-----------------------------|---------------------------|---------------|---------------------|---------|
| 1.  | 0.158       | 0.22                | 9.51                | 12.56                       | 22.29                     | 55.56         | -33.27              | Average |
| 2.  | 0.158       | 0.22                | 9.51                | 34.14                       | 43.87                     | 65.56         | -21.69              | QP      |
| 3.  | 0.190       | 0.27                | 9.57                | 10.38                       | 20.22                     | 54.02         | -33.80              | Average |
| 4.  | 0.190       | 0.27                | 9.57                | 33.41                       | 43.25                     | 64.02         | -20.77              | QP      |
| 5.  | 0.385       | 0.40                | 9.73                | 12.64                       | 22.77                     | 48.17         | -25.40              | Average |
| 6.  | 0.385       | 0.40                | 9.73                | 31.16                       | 41.29                     | 58.17         | -16.88              | QP      |
| 7.  | 0.558       | 0.43                | 9.79                | 1.29                        | 11.51                     | 46.00         | -34.49              | Average |
| 8.  | 0.558       | 0.43                | 9.79                | 18.21                       | 28.43                     | 56.00         | -27.57              | QP      |
| 9.  | 0.796       | 0.45                | 9.81                | -0.42                       | 9.84                      | 46.00         | -36.16              | Average |
| 10. | 0.796       | 0.45                | 9.81                | 16.43                       | 26.69                     | 56.00         | -29.31              | QP      |
| 11. | 6.988       | 0.55                | 9.99                | 7.60                        | 18.14                     | 50.00         | -31.86              | Average |
| 12. | 6.988       | 0.55                | 9.99                | 17.43                       | 27.97                     | 60.00         | -32.03              | QP      |



Neutral-AC 120V/60Hz



| No. | Freq MHz | Cable Loss dB | AMN Factor dB | Receiver Reading dBuV | Emission Level dBuV | Limit dBuV | Over Limit dB | Remark  |
|-----|----------|---------------|---------------|-----------------------|---------------------|------------|---------------|---------|
| 1.  | 0.150    | 0.21          | 9.53          | 14.10                 | 23.84               | 56.00      | -32.16        | Average |
| 2.  | 0.150    | 0.21          | 9.53          | 37.14                 | 46.88               | 66.00      | -19.12        | QP      |
| 3.  | 0.182    | 0.25          | 9.59          | 14.10                 | 23.94               | 54.42      | -30.48        | Average |
| 4.  | 0.182    | 0.25          | 9.59          | 32.36                 | 42.20               | 64.42      | -22.22        | QP      |
| 5.  | 0.385    | 0.40          | 9.76          | 17.08                 | 27.24               | 48.17      | -20.93        | Average |
| 6.  | 0.385    | 0.40          | 9.76          | 26.21                 | 36.37               | 58.17      | -21.80        | QP      |
| 7.  | 0.546    | 0.43          | 9.82          | 4.41                  | 14.66               | 46.00      | -31.34        | Average |
| 8.  | 0.546    | 0.43          | 9.82          | 20.41                 | 30.66               | 56.00      | -25.34        | QP      |
| 9.  | 1.878    | 0.47          | 9.88          | 0.39                  | 10.74               | 46.00      | -35.26        | Average |
| 10. | 1.878    | 0.47          | 9.88          | 15.41                 | 25.76               | 56.00      | -30.24        | QP      |
| 11. | 7.137    | 0.55          | 9.99          | 4.38                  | 14.92               | 50.00      | -35.08        | Average |
| 12. | 7.137    | 0.55          | 9.99          | 17.55                 | 28.09               | 60.00      | -31.91        | QP      |

## 6 Radiated Spurious Emissions

Test Requirement : FCC CFR47 Part 15 Section 15.209 & 15.247  
 Test Method : ANSI C63.10:2013  
 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                                         | $20\log^{(500)}$                      |

### 6.1 EUT Operation

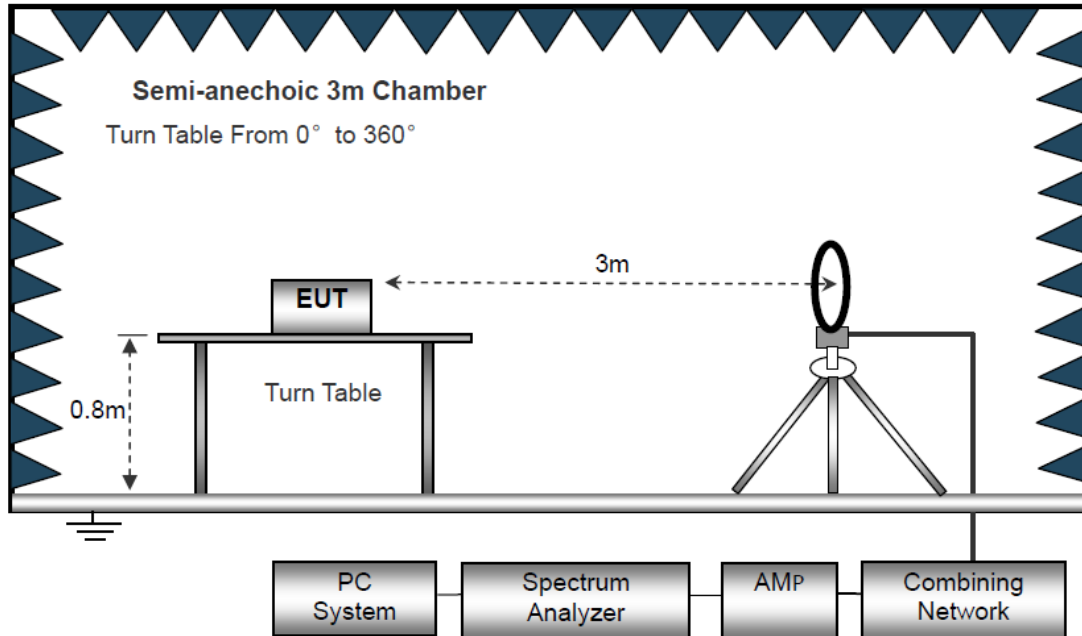
Operating Environment :

Temperature : 23.5 °C  
 Humidity : 51.1 % RH  
 Atmospheric Pressure : 101.2kPa

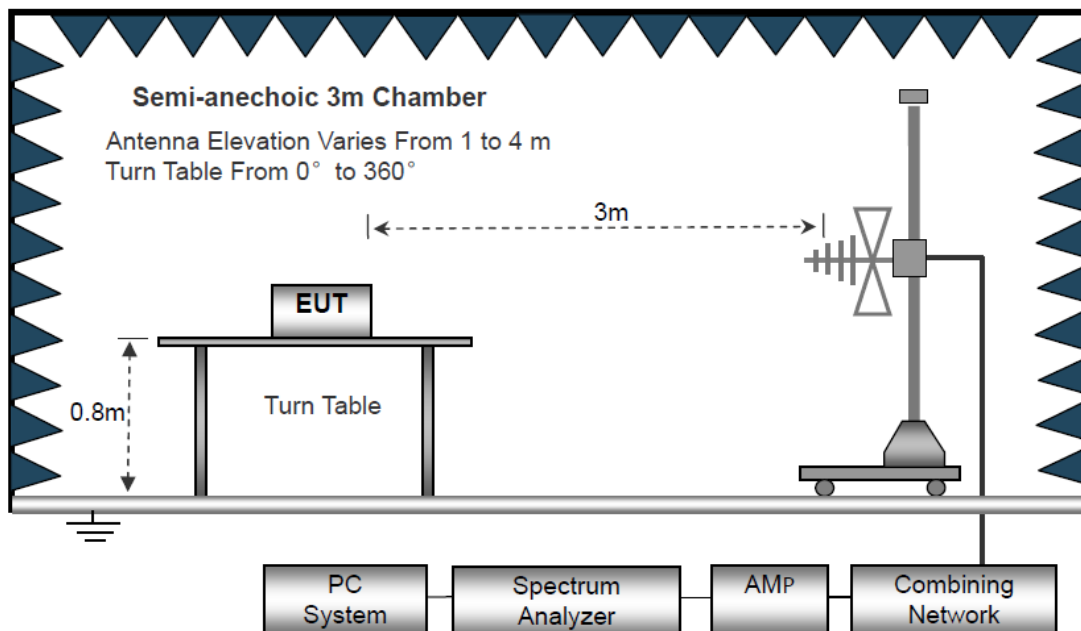
## 6.2 Test Setup

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

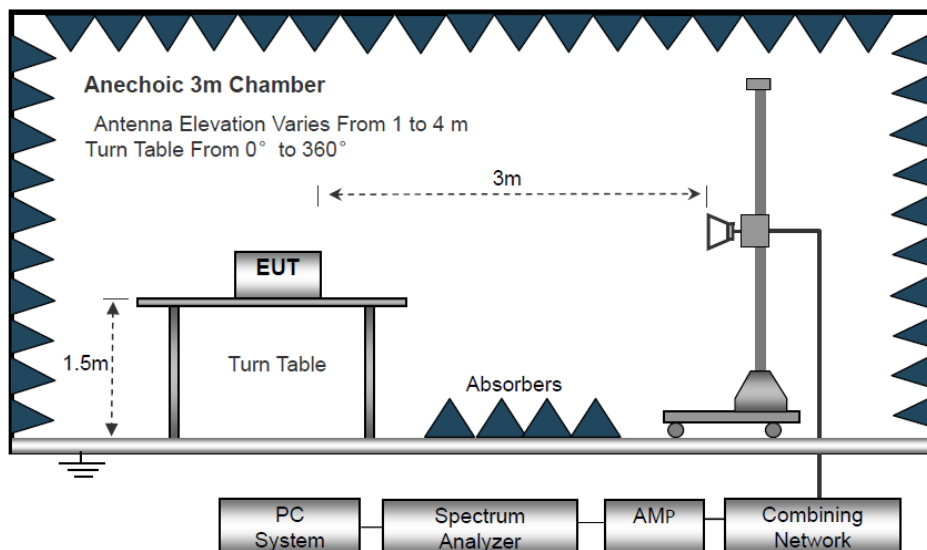
The test setup for emission measurement below 30MHz



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. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2013.
2. 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.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.
7. Test Procedure of measurement (For Above 1GHz):
  - 1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).
  - 2) Change the antenna polarization and repeat 1) with vertical polarization.
  - 3) Make a hardcopy of the spectrum.
  - 4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
  - 5) Change the analyser mode to Clear/ Write and found the cone of emission.
  - 6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.
  - 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.
  - 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.
8. 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.

For Average Measurement:

VBW=10Hz, when duty cycle is no less than 98 percent.

VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

| Band      | Duty Cycle(%) | T( $\mu$ s) | 1/T(KHz) | Average Correction Factor | VBW Setting |
|-----------|---------------|-------------|----------|---------------------------|-------------|
| 2402-2480 | 100           | -           | -        | 0                         | 10Hz        |

## 6.5 Summary of Test Results

### Test Frequency: 9KHz-30MHz

| Freq.<br>(MHz) | Ant.Pol.<br>H/V | Emission Level<br>(dBuV/m) | Limit 3m<br>(dBuV/m) | Over<br>(dB) |
|----------------|-----------------|----------------------------|----------------------|--------------|
| --             | --              | --                         | --                   | >20          |

#### Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor =  $40\log(\text{Specific distance} / \text{test distance})$  (dB);

Limit line = Specific limits (dBuV) + distance extrapolation factor.

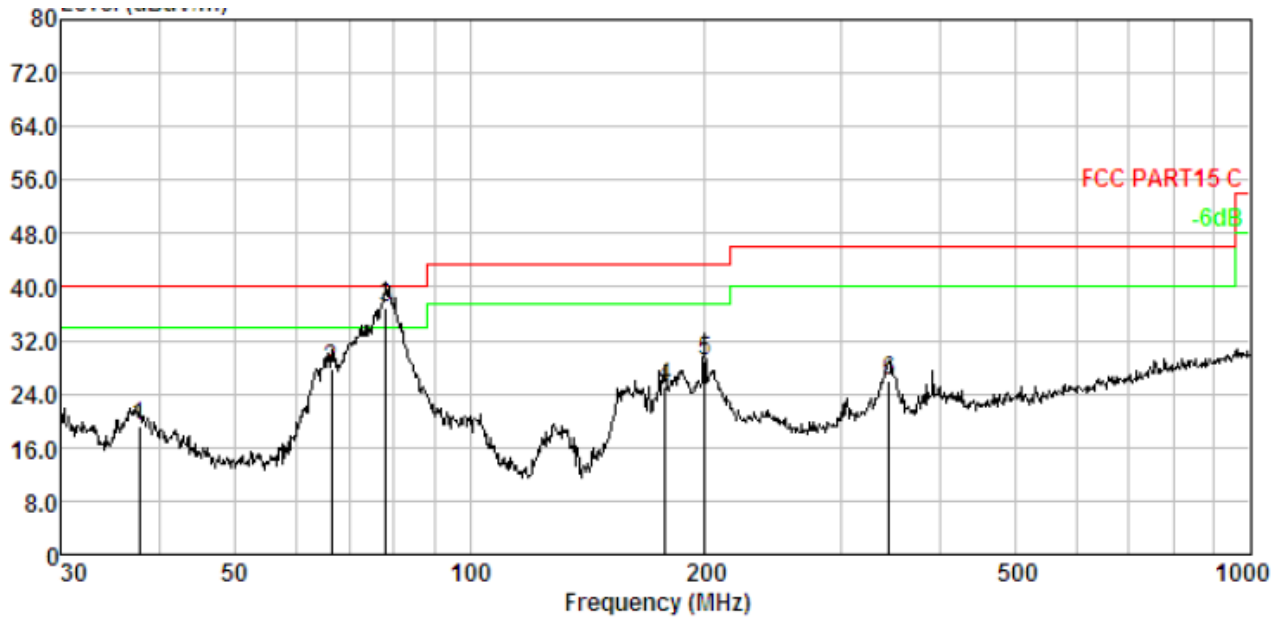
### Test Frequency: 30MHz ~ 1GHz

Pass.

Please refer to the following test plots for the worst test mode (GFSK (CH00: 2402MHz)).



Antenna Polarization: Horizontal GFSK(CH00: 2402MHz)

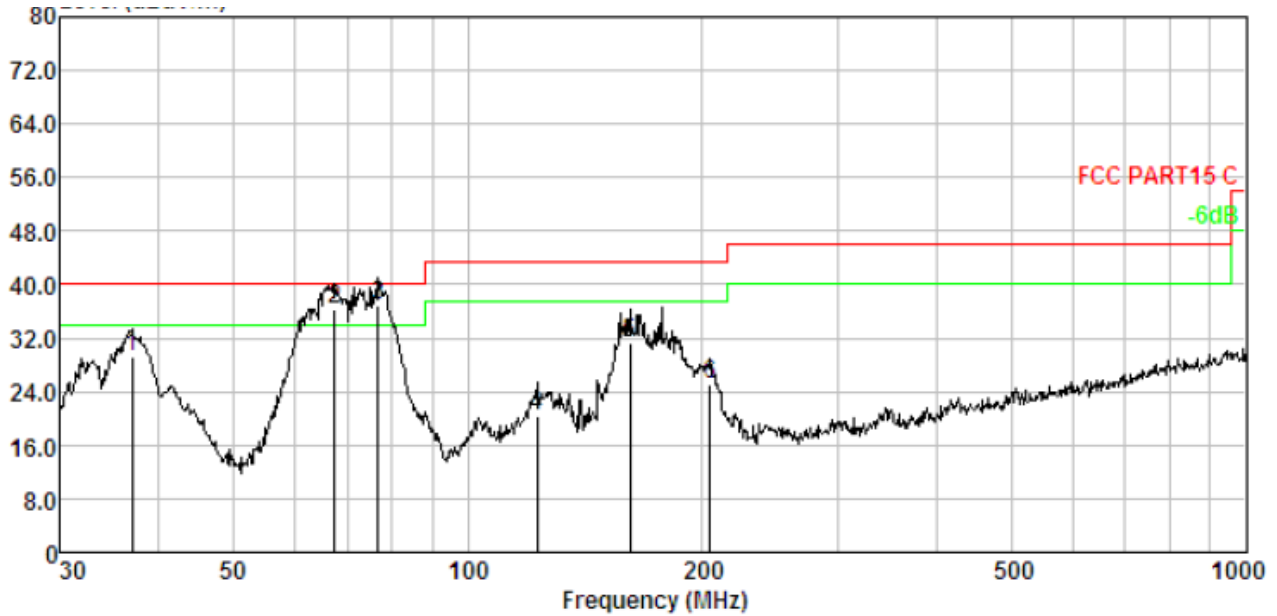


| No. | Freq<br>MHz | Cable<br>Loss<br>dB | ANT<br>Factor<br>dB/m | Receiver<br>Reading<br>dBuV | Preamp<br>Factor<br>dB | Emission<br>Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>Limit<br>dB | Remark |
|-----|-------------|---------------------|-----------------------|-----------------------------|------------------------|-----------------------------|-----------------|---------------------|--------|
| 1.  | 37.680      | 1.26                | 13.52                 | 34.44                       | 30.05                  | 19.17                       | 40.00           | -20.83              | QP     |
| 2.  | 66.499      | 1.78                | 11.27                 | 45.04                       | 30.25                  | 27.84                       | 40.00           | -12.16              | QP     |
| 3.  | 78.139      | 1.92                | 9.17                  | 56.08                       | 30.30                  | 36.87                       | 40.00           | -3.13               | QP     |
| 4.  | 178.133     | 2.67                | 12.60                 | 40.54                       | 30.59                  | 25.22                       | 43.50           | -18.28              | QP     |
| 5.  | 199.986     | 2.77                | 10.38                 | 46.52                       | 30.63                  | 29.04                       | 43.50           | -14.46              | QP     |
| 6.  | 344.386     | 3.26                | 14.16                 | 39.38                       | 30.82                  | 25.98                       | 46.00           | -20.02              | QP     |

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



Antenna Polarization: Vertical GFSK(CH00: 2402MHz)



| No. | Freq<br>MHz | Cable<br>Loss<br>dB | ANT<br>Factor<br>dB/m | Receiver<br>Reading<br>dBuV | Preamp<br>Factor<br>dB | Emission<br>Level<br>dBuV/m | Limit<br>dBuV/m | Over<br>Limit<br>dB | Remark |
|-----|-------------|---------------------|-----------------------|-----------------------------|------------------------|-----------------------------|-----------------|---------------------|--------|
| 1.  | 37.025      | 1.25                | 13.49                 | 44.62                       | 30.04                  | 29.32                       | 40.00           | -10.68              | QP     |
| 2.  | 67.438      | 1.79                | 10.92                 | 53.82                       | 30.25                  | 36.28                       | 40.00           | -3.72               | QP     |
| 3.  | 76.781      | 1.91                | 9.47                  | 55.83                       | 30.30                  | 36.91                       | 40.00           | -3.09               | QP     |
| 4.  | 122.834     | 2.33                | 12.20                 | 36.26                       | 30.46                  | 20.33                       | 43.50           | -23.17              | QP     |
| 5.  | 161.474     | 2.58                | 13.80                 | 45.45                       | 30.56                  | 31.27                       | 43.50           | -12.23              | QP     |
| 6.  | 204.955     | 2.79                | 10.48                 | 42.32                       | 30.64                  | 24.95                       | 43.50           | -18.55              | QP     |

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



## Test Frequency 1GHz-18GHz:

### GFSK Low Channel (2402MHz)

| Frequency (MHz) | S.A Reading (dBuV) | Detector (PK/AV) | Polarity (H/V) | Ant. Factor (dB/m) | Cable Loss (dB) | Pre-Amp. Gain (dB) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|-----------------|--------------------|------------------|----------------|--------------------|-----------------|--------------------|-------------------------|----------------|-------------|
| 4804            | 29.35              | AV               | V              | 8.16               | 9.11            | 12.04              | 34.58                   | 54             | -19.42      |
| 4804            | 30.14              | AV               | H              | 8.16               | 9.11            | 12.04              | 35.37                   | 54             | -18.63      |
| 4804            | 28.43              | PK               | V              | 8.16               | 9.11            | 12.04              | 33.66                   | 74             | -40.34      |
| 4804            | 31.25              | PK               | H              | 8.16               | 9.11            | 12.04              | 36.48                   | 74             | -37.52      |
| 16325           | 30.18              | AV               | V              | 8.63               | 11.03           | 7.68               | 42.16                   | 54             | -11.84      |
| 16325           | 29.65              | AV               | H              | 8.63               | 11.03           | 7.68               | 41.63                   | 54             | -12.37      |
| 16325           | 33.06              | PK               | V              | 8.63               | 11.03           | 7.68               | 45.04                   | 74             | -28.96      |
| 16325           | 32.48              | PK               | H              | 8.63               | 11.03           | 7.68               | 44.46                   | 74             | -29.54      |

### GFSK Middle Channel (2440MHz)

| Frequency (MHz) | S.A Reading (dBuV) | Detector (PK/AV) | Polarity (H/V) | Ant. Factor (dB/m) | Cable Loss (dB) | Pre-Amp. Gain (dB) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|-----------------|--------------------|------------------|----------------|--------------------|-----------------|--------------------|-------------------------|----------------|-------------|
| 4880            | 30.23              | AV               | V              | 9.09               | 10.35           | 7.82               | 41.85                   | 54             | -12.15      |
| 4880            | 31.45              | AV               | H              | 9.09               | 10.35           | 7.82               | 43.07                   | 54             | -10.93      |
| 4880            | 29.05              | PK               | V              | 9.09               | 10.35           | 7.82               | 40.67                   | 74             | -33.33      |
| 4880            | 29.18              | PK               | H              | 9.09               | 10.35           | 7.82               | 40.8                    | 74             | -33.2       |
| 17004           | 30.46              | AV               | V              | 8.74               | 10.49           | 11.06              | 38.63                   | 54             | -15.37      |
| 17004           | 31.29              | AV               | H              | 8.74               | 10.49           | 11.06              | 39.46                   | 54             | -14.54      |
| 17004           | 31.48              | PK               | V              | 8.74               | 10.49           | 11.06              | 39.65                   | 74             | -34.35      |
| 17004           | 32.08              | PK               | H              | 8.74               | 10.49           | 11.06              | 40.25                   | 74             | -33.75      |

### GFSK High Channel (2480MHz)

| Frequency (MHz) | S.A Reading (dBuV) | Detector (PK/AV) | Polarity (H/V) | Ant. Factor (dB/m) | Cable Loss (dB) | Pre-Amp. Gain (dB) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) |
|-----------------|--------------------|------------------|----------------|--------------------|-----------------|--------------------|-------------------------|----------------|-------------|
| 4960            | 30.32              | AV               | V              | 9.52               | 10.84           | 11.69              | 38.99                   | 54             | -15.01      |
| 4960            | 31.08              | AV               | H              | 9.52               | 10.84           | 11.69              | 39.75                   | 54             | -14.25      |
| 4960            | 29.46              | PK               | V              | 9.52               | 10.84           | 11.69              | 38.13                   | 74             | -35.87      |
| 4960            | 31.05              | PK               | H              | 9.52               | 10.84           | 11.69              | 39.72                   | 74             | -34.28      |
| 16958           | 32.61              | AV               | V              | 11.06              | 9.62            | 10.02              | 43.27                   | 54             | -10.73      |
| 16958           | 29.58              | AV               | H              | 11.06              | 9.62            | 10.02              | 40.24                   | 54             | -13.76      |
| 16958           | 27.04              | PK               | V              | 11.06              | 9.62            | 10.02              | 37.70                   | 74             | -36.30      |
| 16958           | 28.14              | PK               | H              | 11.06              | 9.62            | 10.02              | 38.80                   | 74             | -35.20      |

Note: 1. The testing has been conformed to  $10 \times 2480\text{MHz} = 24800\text{MHz}$ .

2. All other emissions more than 30dB below the limit.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.  
Emission Level = Reading + Factor  
Margin=Emission Level-Limit

**Test Frequency: From 18GHz to 25GHz**

The measurements were more than 20dB below the limit and not reported.

## 7 Test Setup

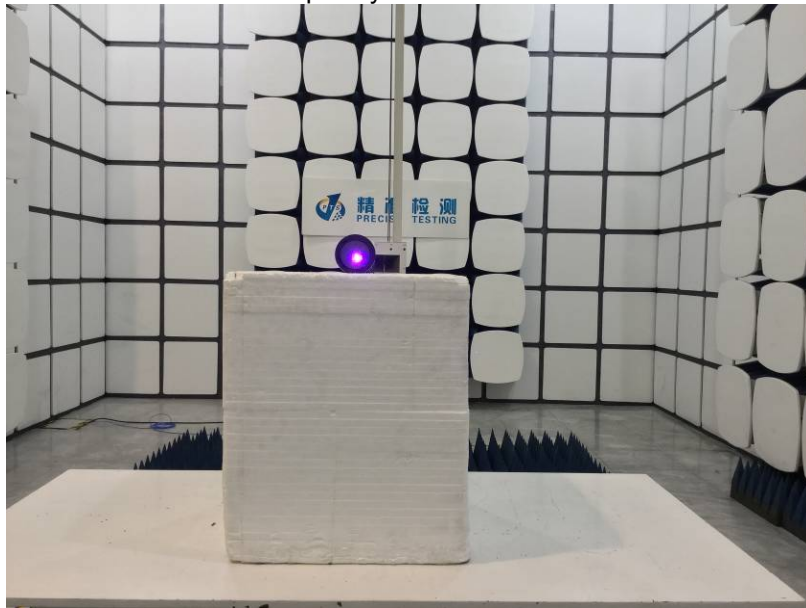
### Conducted Emissions



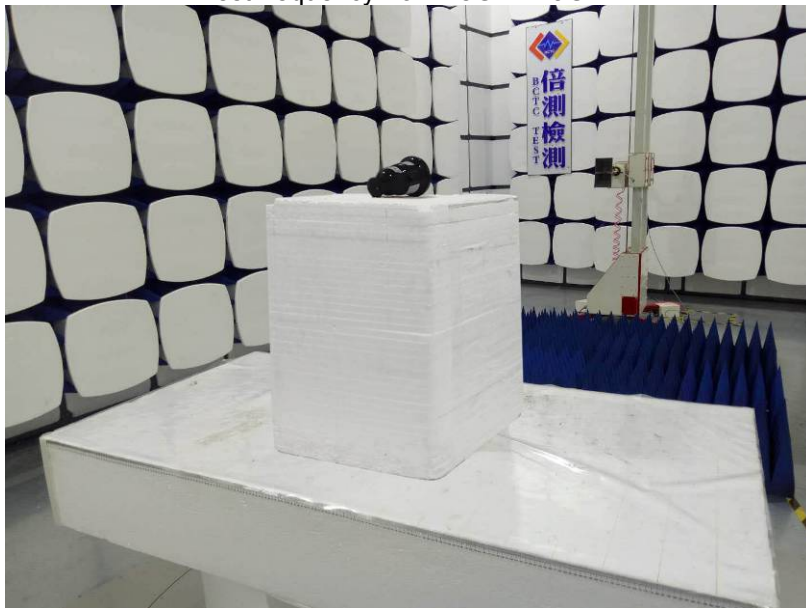
### Radiated Spurious Emissions Test Frequency From 30MHz-1000MHz



Test frequency from 1GHz-18GHz

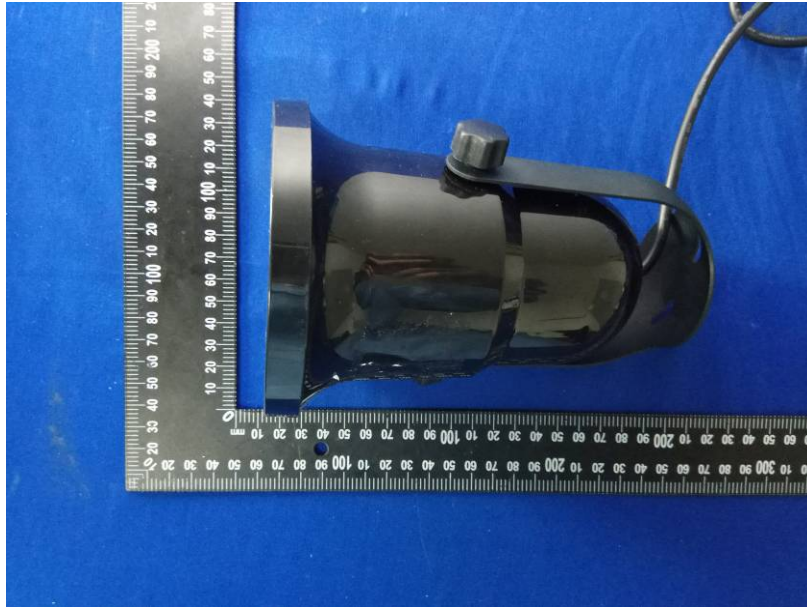


Test frequency from 18GHz-25GHz

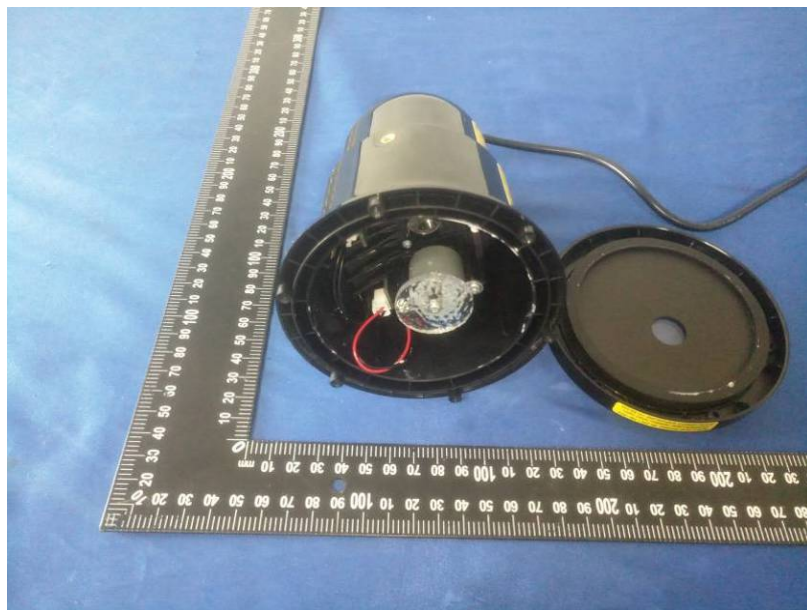


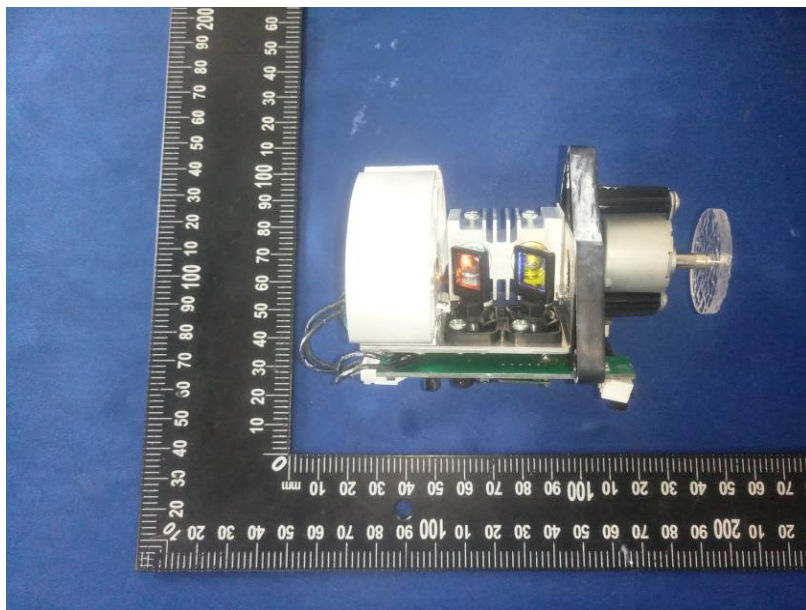
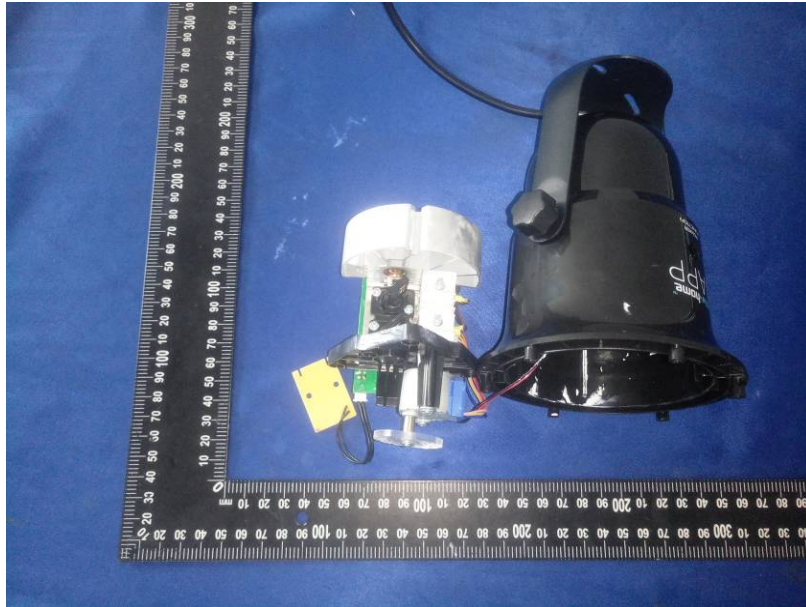
## 8 EUT Photos

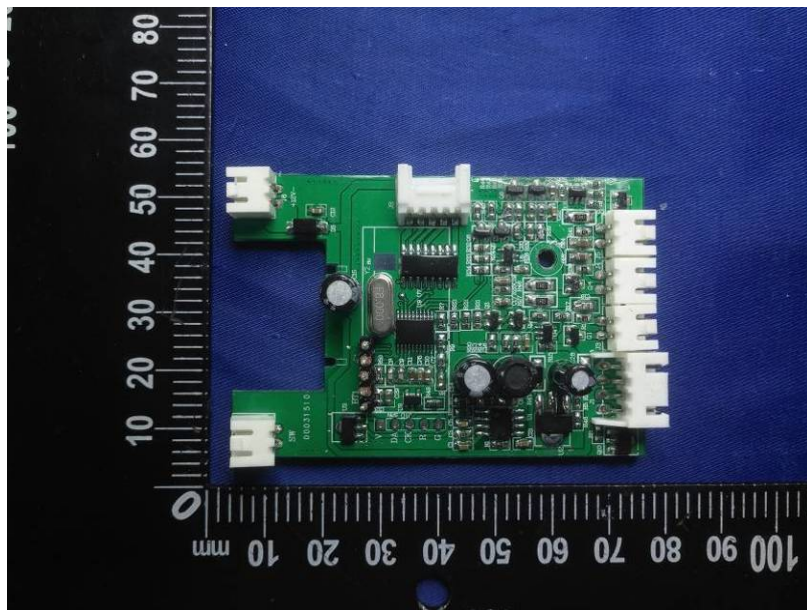


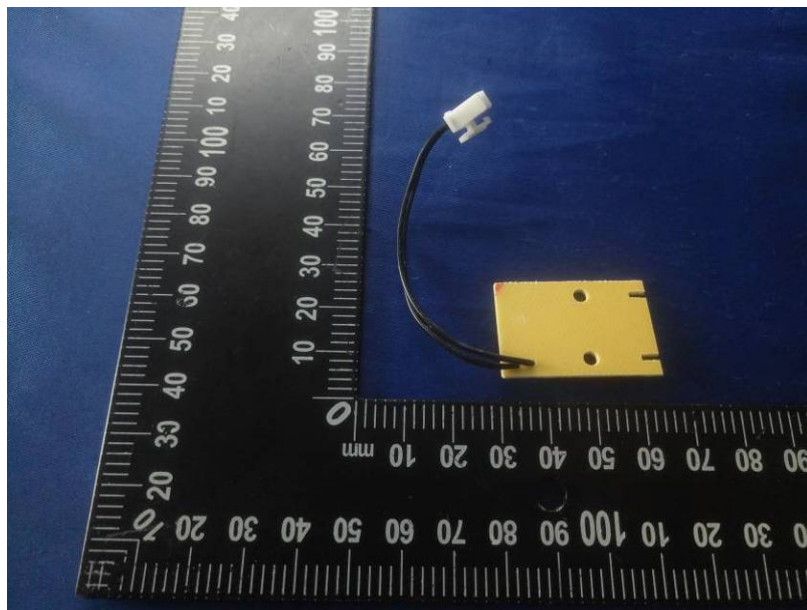
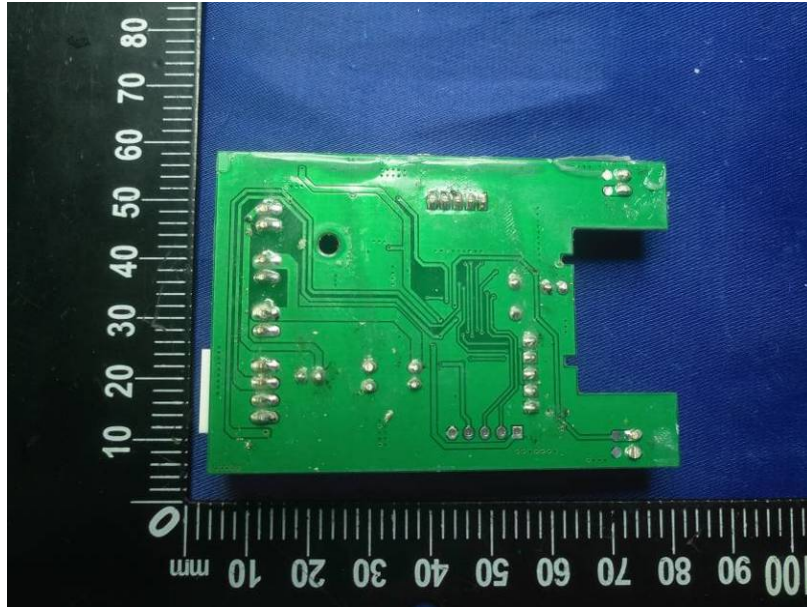


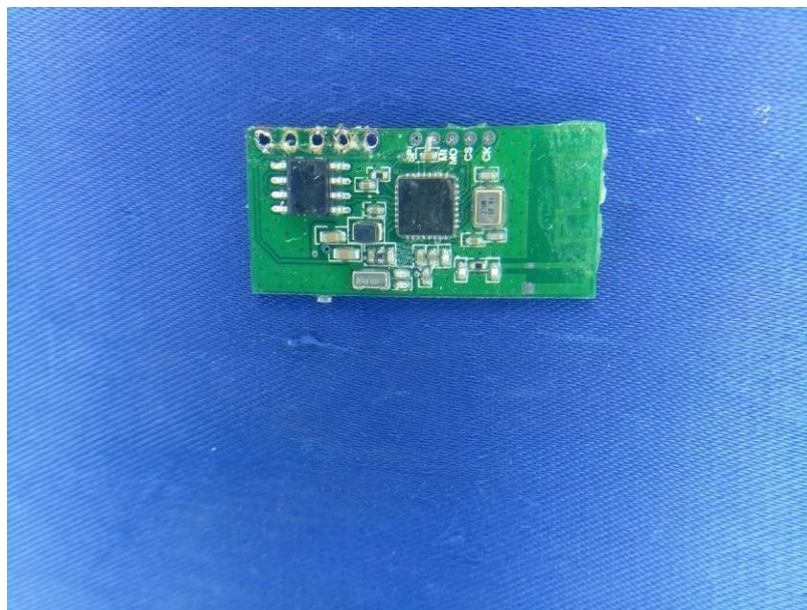
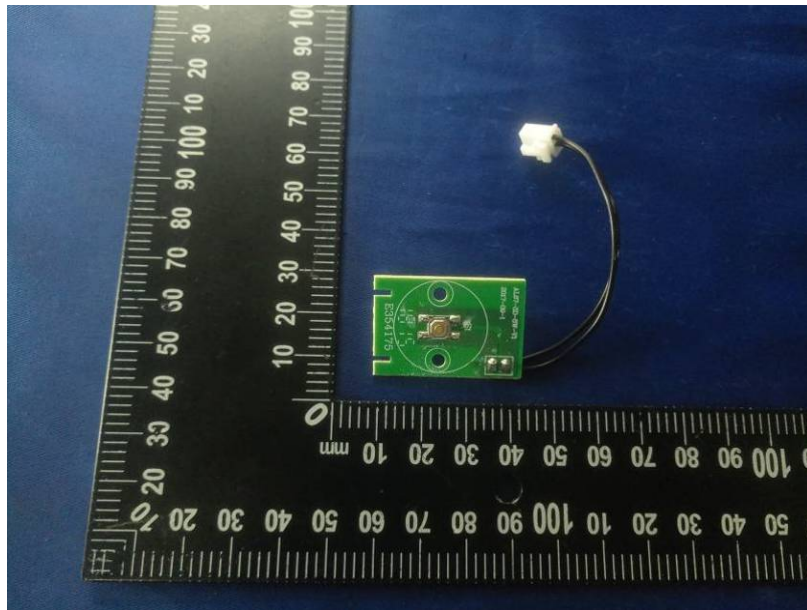


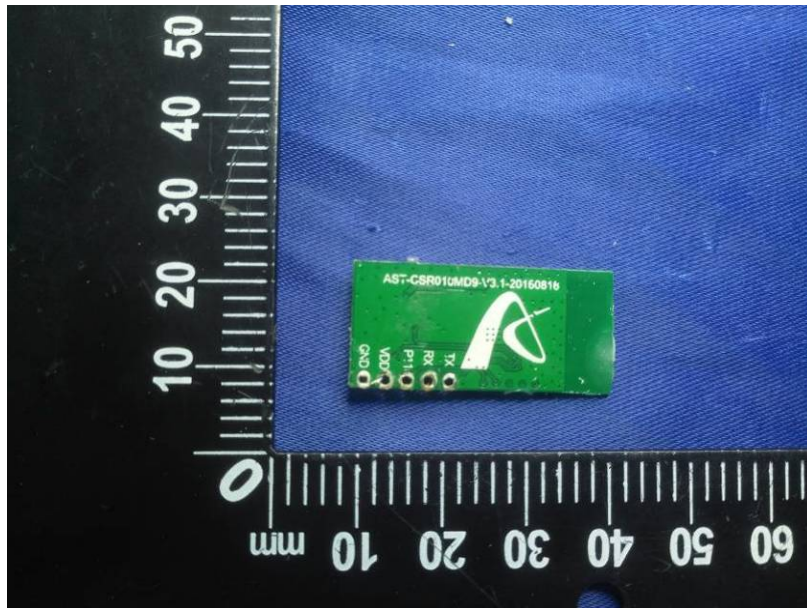












\*\*\*\*\*THE END REPORT\*\*\*\*\*