

# FCC TEST REPORT

## FCC ID: OXGAL69-RX

Product : Garden Laser Projector

Model Name : AL69-RX

Brand : 

Report No. : PT800190151217E-FC02

### Prepared for

Willis Electric Co., Ltd.  
No.504-1, Chung-Hua Road, Sec.4,  
Hsin Chu, Taiwan

### Prepared by

DongGuan Precise Testing Service Co.,Ltd.  
Building D, Baoding Technology Park, Guangming Road 2, Guangming Community  
Dongcheng District, Dongguan, Guangdong, China

## TEST RESULT CERTIFICATION

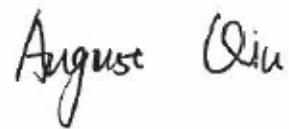
Applicant's name : Willis Electric Co., Ltd.  
Address : No.504-1, Chung-Hua Road, Sec.4, Hsin Chu, Taiwan  
Manufacture's name : Kupoint (DongGuan) Electric Co., Ltd  
Address : Huai De Industrial Humen Town Dong Guan City Guang Dong  
Provience  
Product name : Garden Laser Projector  
Model name : AL69-RX  
Standards : FCC CFR47 Part 15 Section B  
Test procedure : ANSI C63.4:2014  
Test Date : Dec. 31, 2015 - Jan. 16, 2016  
Date of Issue : Jan. 22, 2016  
Test Result : Pass

This device described above has been tested by PTS, 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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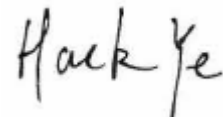
Testing Engineer

August Qiu



Technical Manager

Hack Ye



Authorized Signatory

Chris Du



## Contents

|                                            | <b>Page</b> |
|--------------------------------------------|-------------|
| <b>2 TEST SUMMARY.....</b>                 | <b>4</b>    |
| <b>3 GENERAL INFORMATION.....</b>          | <b>5</b>    |
| 3.1 GENERAL DESCRIPTION OF E.U.T.....      | 5           |
| 3.2 TEST MODE.....                         | 5           |
| 3.3 CONFIGURATION OF SYSTEM .....          | 5           |
| <b>4 EQUIPMENT DURING TEST .....</b>       | <b>6</b>    |
| 4.1 EQUIPMENTS LIST.....                   | 6           |
| 4.2 DESCRIPTION OF SUPPORT UNITS.....      | 6           |
| 4.3 MEASUREMENT UNCERTAINTY .....          | 7           |
| <b>5 CONDUCTED EMISSION.....</b>           | <b>8</b>    |
| 5.1 E.U.T. OPERATION.....                  | 8           |
| 5.2 EUT SETUP .....                        | 8           |
| 5.3 MEASUREMENT DESCRIPTION.....           | 9           |
| 5.4 CONDUCTED EMISSION TEST RESULT .....   | 9           |
| <b>6 RADIATED SPURIOUS EMISSIONS .....</b> | <b>11</b>   |
| 6.1 EUT OPERATION .....                    | 11          |
| 6.2 TEST SETUP.....                        | 12          |
| 6.3 SPECTRUM ANALYZER SETUP.....           | 13          |
| 6.4 TEST PROCEDURE .....                   | 13          |
| 6.5 SUMMARY OF TEST RESULTS.....           | 14          |
| <b>7 TEST SETUP .....</b>                  | <b>17</b>   |
| <b>8 EUT PHOTOS.....</b>                   | <b>19</b>   |

## 2 Test Summary

| Test Item                                          | Test Requirement          | Class   | Test Method      | Test Result |
|----------------------------------------------------|---------------------------|---------|------------------|-------------|
| Power Line Conducted Emission<br>(150kHz to 30MHz) | FCC PART 15,<br>SUBPART B | Class B | ANSI C63.4: 2014 | Pass        |
| Radiated Emission<br>(30MHz to 1GHz)               | FCC PART 15,<br>SUBPART B | Class B | ANSI C63.4: 2014 | Pass        |
| Radiated Emission<br>(Above 1GHz)                  | FCC PART 15,<br>SUBPART B | Class B | ANSI C63.4: 2014 | Pass        |

Remark:

N/A: Not Applicable

### 3 General Information

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

Product Name : Garden Laser Projector

Model Name : AL69-RX

Brand : **showlights**

Model Description : N/A

Receiving frequency : 433.92MHz

Remark : The device is a receiver, It only can receive signal

Type of Modulation : ASK

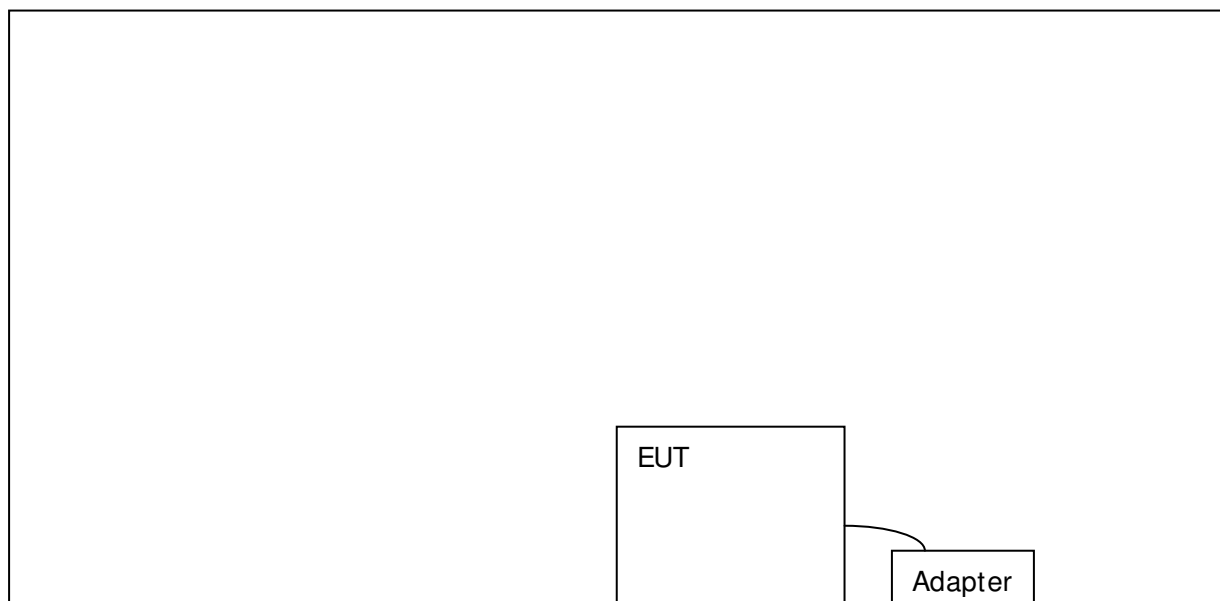
Power supply : Output: DC 12V,2A Input:AC120V,0.6A Max power by Adapter

#### 3.2 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

| Test Item           | Test Mode |
|---------------------|-----------|
| Conduction Emission | Receiving |
| Radiated Emission   | Receiving |

#### 3.3 Configuration of System



## 4 Equipment During Test

### 4.1 Equipments List

| Radiated Emissions  |                           |               |           |            |                  |                  |                    |
|---------------------|---------------------------|---------------|-----------|------------|------------------|------------------|--------------------|
| Item                | Kind of Equipment         | Manufacturer  | Type No.  | Serial No. | Last calibration | Calibrated until | Calibration period |
| 1                   | EMI Test Receiver         | Rohde&Schwarz | ESCI      | 101417     | July 15, 2015    | July 14, 2016    | 1 year             |
| 2                   | EMC Analyzer (9k~26.5GHz) | Agilent       | E4407B    | MY45109572 | Aug.04, 2015     | Aug.03, 2016     | 1 year             |
| 3                   | Trilog Broadband Antenna  | SCHWARZBECK   | VULB9160  | 9160-3355  | July 15, 2015    | July 14, 2016    | 1 year             |
| 4                   | Amplifier                 | EM            | EM-30180  | 060538     | July 15, 2015    | July 14, 2016    | 1 year             |
| 5                   | Horn Antenna              | SCHWARZBECK   | BBHA9120D | 9120D-1246 | July 15, 2015    | July 14, 2016    | 1 year             |
| 6                   | Coaxial Cable(below 1GHz) | LARGE         | CALB1     | -          | July 15, 2015    | July 14, 2016    | 1 year             |
| 7                   | Coaxial Cable(above 1GHz) | LARGE         | CALB2     | -          | July 15, 2015    | July 14, 2016    | 1 year             |
| Conducted Emissions |                           |               |           |            |                  |                  |                    |
| Item                | Kind of Equipment         | Manufacturer  | Type No.  | Serial No. | Last calibration | Calibrated until | Calibration period |
| 1                   | EMI Test Receiver         | R&S           | ESCI      | 101155     | July 15, 2015    | July 14, 2016    | 1 year             |
| 2                   | LISN                      | SCHWARZBECK   | NSLK 8128 | 8128-289   | July 15, 2015    | July 14, 2016    | 1 year             |
| 3                   | Coaxial Cable             | LARGE         | RF300     | -          | July 15, 2015    | July 14, 2016    | 1 year             |

### 4.2 Description of Support Units

| Equipment           | Manufacturer | Model No. | Series No. |
|---------------------|--------------|-----------|------------|
| AC power line(1.5m) | Cold come    | JYD-20    | C-2201     |

### 4.3 Measurement Uncertainty

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

## 5 Conducted Emission

|                   |                                                 |
|-------------------|-------------------------------------------------|
| Test Requirement: | : FCC CFR 47 Part 15 Section 15.107             |
| Test Method:      | : ANSI C63.4:2014                               |
| Frequency Range:  | : 150kHz to 30MHz                               |
| Class/Severity:   | : Class B                                       |
| Limit:            | : 66-56 dB $\mu$ V between 0.15MHz & 0.5MHz     |
|                   | : 56 dB $\mu$ V between 0.5MHz & 5MHz           |
|                   | : 60 dB $\mu$ V between 5MHz & 30MHz            |
| Detector:         | : Peak for pre-scan (9kHz Resolution Bandwidth) |

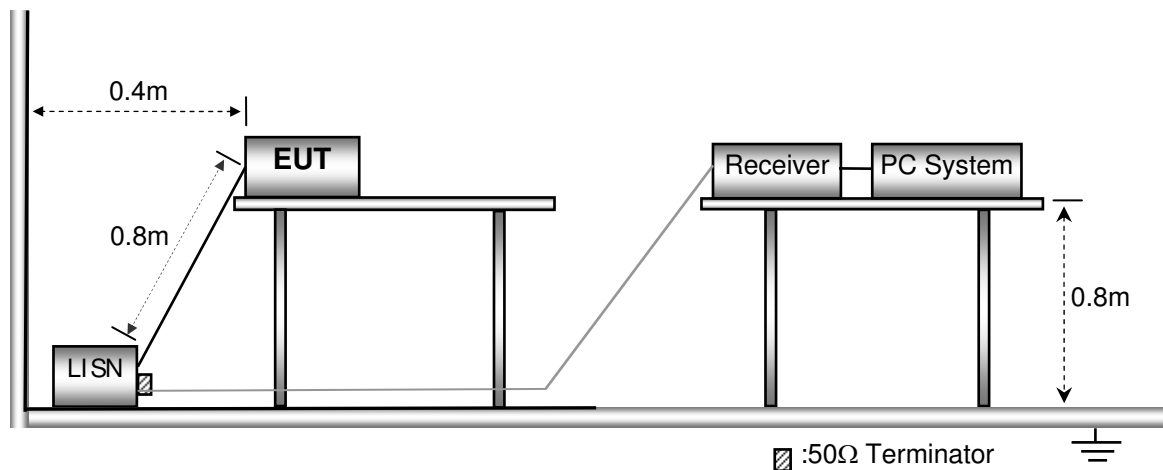
### 5.1 E.U.T. Operation

Operating Environment :

|                       |                        |
|-----------------------|------------------------|
| Temperature:          | : 25.5 °C              |
| Humidity:             | : 51 % RH              |
| Atmospheric Pressure: | : 101.2kPa             |
| EUT Operation :       | : Refer to section 3.2 |

### 5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2014.

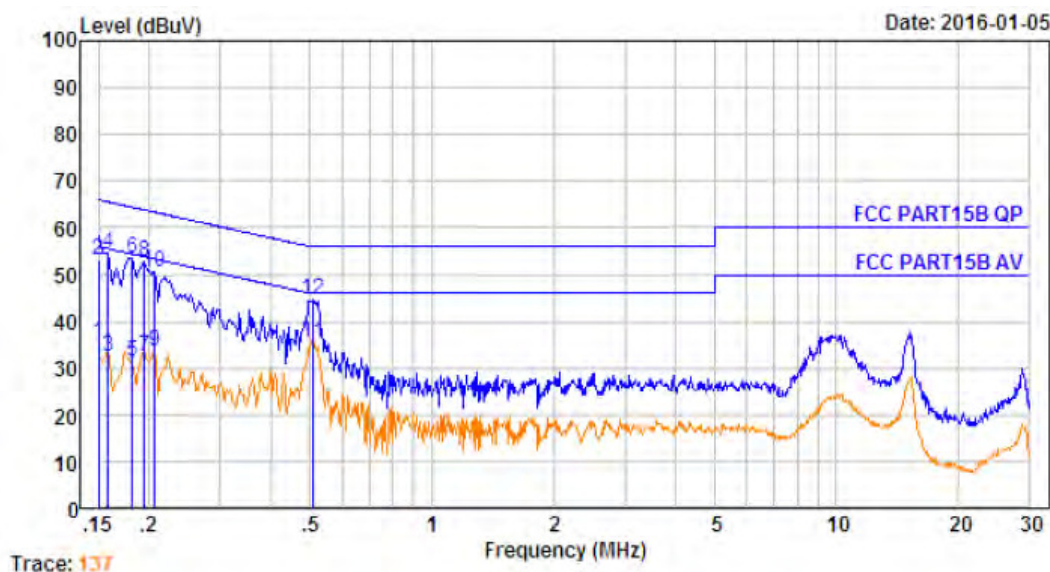


### 5.3 Measurement Description

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.

### 5.4 Conducted Emission Test Result

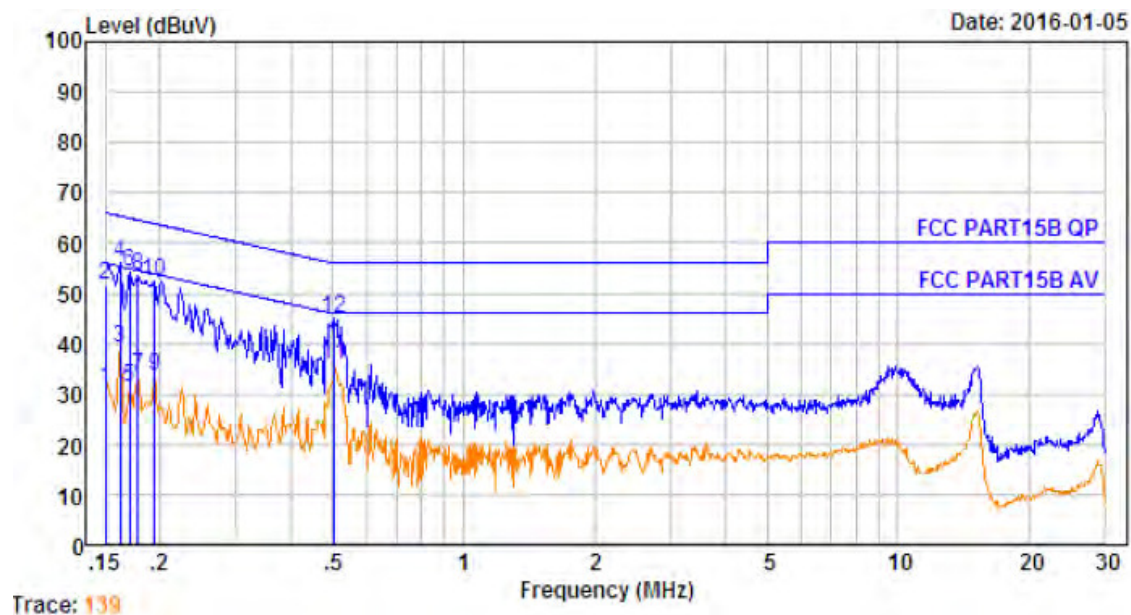
Live line:



| 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.  | 0.150       | 10.60               | 0.60                | 24.30                       | 35.50                     | 55.99         | -20.49              | Average |
| 2.  | 0.150       | 10.60               | 0.60                | 42.10                       | 53.30                     | 65.99         | -12.69              | QP      |
| 3.  | 0.158       | 10.60               | 0.60                | 21.42                       | 32.62                     | 55.56         | -22.94              | Average |
| 4.  | 0.158       | 10.60               | 0.60                | 43.42                       | 54.62                     | 65.56         | -10.94              | QP      |
| 5.  | 0.182       | 10.61               | 0.60                | 20.25                       | 31.46                     | 54.42         | -22.96              | Average |
| 6.  | 0.182       | 10.61               | 0.60                | 42.25                       | 53.46                     | 64.42         | -10.96              | QP      |
| 7.  | 0.194       | 10.61               | 0.60                | 21.44                       | 32.65                     | 53.84         | -21.19              | Average |
| 8.  | 0.194       | 10.61               | 0.60                | 41.44                       | 52.65                     | 63.84         | -11.19              | QP      |
| 9.  | 0.206       | 10.61               | 0.60                | 22.43                       | 33.64                     | 53.36         | -19.72              | Average |
| 10. | 0.206       | 10.61               | 0.60                | 39.43                       | 50.64                     | 63.36         | -12.72              | QP      |
| 11. | 0.510       | 10.65               | 0.60                | 24.23                       | 35.48                     | 46.00         | -10.52              | Average |
| 12. | 0.510       | 10.65               | 0.60                | 33.23                       | 44.48                     | 56.00         | -11.52              | QP      |



Neutral line:



| 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.  | 0.150       | 10.60               | 0.60                | 19.79                       | 30.99                     | 56.00         | -25.01              | Average |
| 2.  | 0.150       | 10.60               | 0.60                | 40.30                       | 51.50                     | 66.00         | -14.50              | QP      |
| 3.  | 0.162       | 10.60               | 0.60                | 27.73                       | 38.93                     | 55.34         | -16.41              | Average |
| 4.  | 0.162       | 10.60               | 0.60                | 44.73                       | 55.93                     | 65.34         | -9.41               | QP      |
| 5.  | 0.170       | 10.60               | 0.60                | 20.14                       | 31.34                     | 54.94         | -23.60              | Average |
| 6.  | 0.170       | 10.60               | 0.60                | 43.14                       | 54.34                     | 64.94         | -10.60              | QP      |
| 7.  | 0.178       | 10.61               | 0.60                | 22.31                       | 33.52                     | 54.59         | -21.07              | Average |
| 8.  | 0.178       | 10.61               | 0.60                | 42.31                       | 53.52                     | 64.59         | -11.07              | QP      |
| 9.  | 0.194       | 10.61               | 0.60                | 22.20                       | 33.41                     | 53.84         | -20.43              | Average |
| 10. | 0.194       | 10.61               | 0.60                | 41.20                       | 52.41                     | 63.84         | -11.43              | QP      |
| 11. | 0.502       | 10.65               | 0.60                | 24.72                       | 35.97                     | 46.00         | -10.03              | Average |
| 12. | 0.502       | 10.65               | 0.60                | 33.72                       | 44.97                     | 56.00         | -11.03              | QP      |

## 6 Radiated Spurious Emissions

Test Requirement: : FCC CFR47 Part 15 Section 15.109

Test Method: : ANSI C63.4:2014

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           |
| 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

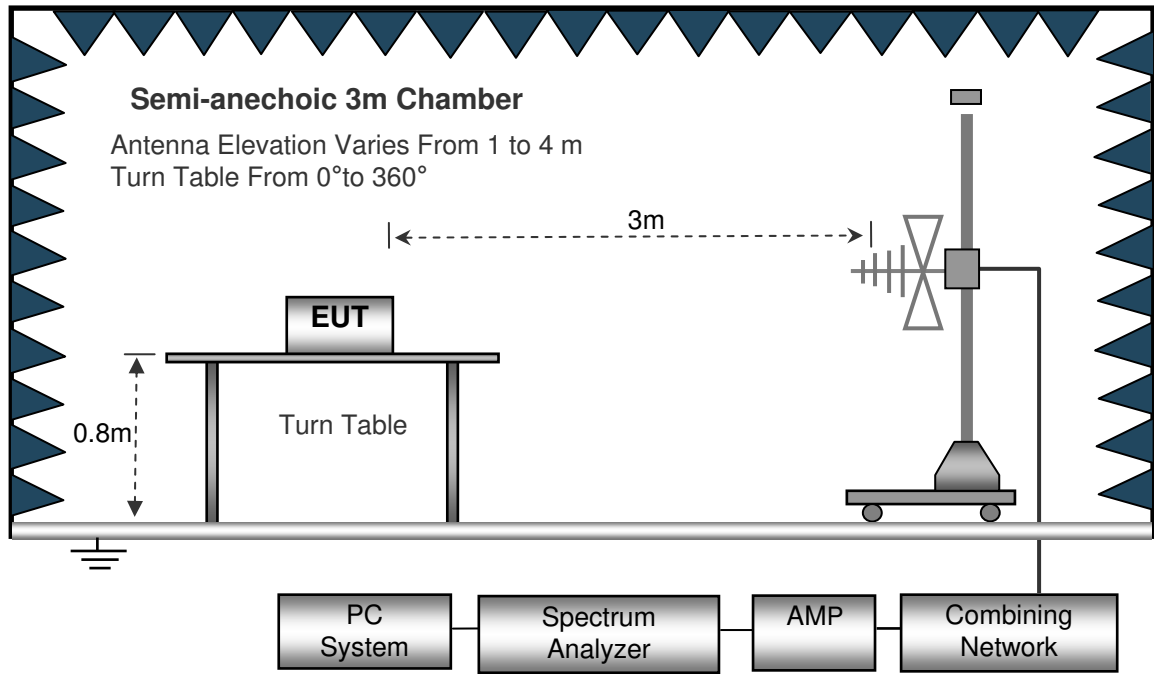
Atmospheric Pressure: : 101.2kPa

EUT Operation : : Refer to section 3.2

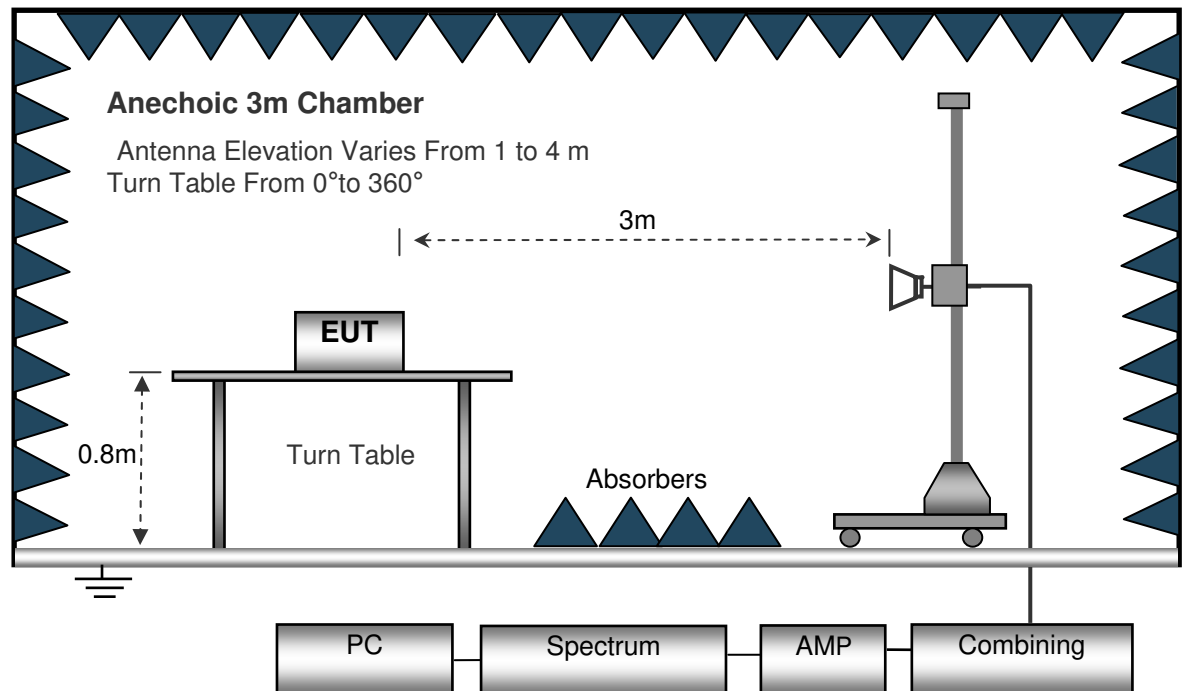
## 6.2 Test Setup

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

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

30MHz ~ 1GHz

|                      |          |
|----------------------|----------|
| Sweep Speed          | : Auto   |
| Detector             | : PK     |
| Resolution Bandwidth | : 100kHz |
| Video Bandwidth      | : 300kHz |
| Detector             | : QP     |
| Resolution Bandwidth | : 120kHz |
| Video Bandwidth      | : 300kHz |

Above 1GHz

|                      |        |
|----------------------|--------|
| Sweep Speed          | : Auto |
| Detector             | : PK   |
| Resolution Bandwidth | : 1MHz |
| Video Bandwidth      | : 3MHz |
| Detector             | : AV   |
| Resolution Bandwidth | : 1MHz |
| Video Bandwidth      | : 10Hz |

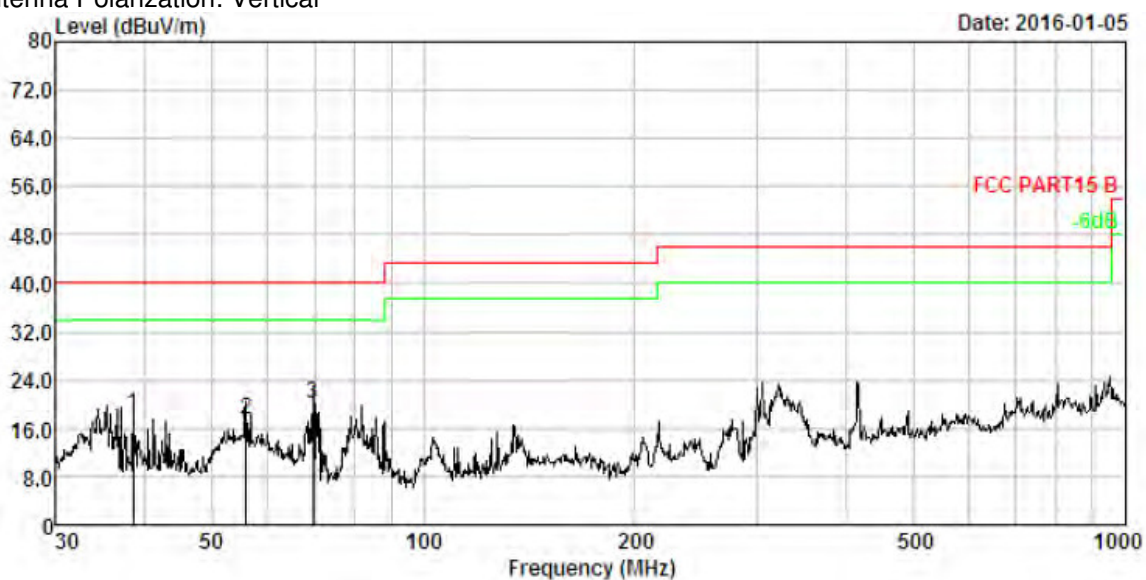
### 6.4 Test Procedure

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

## 6.5 Summary of Test Results

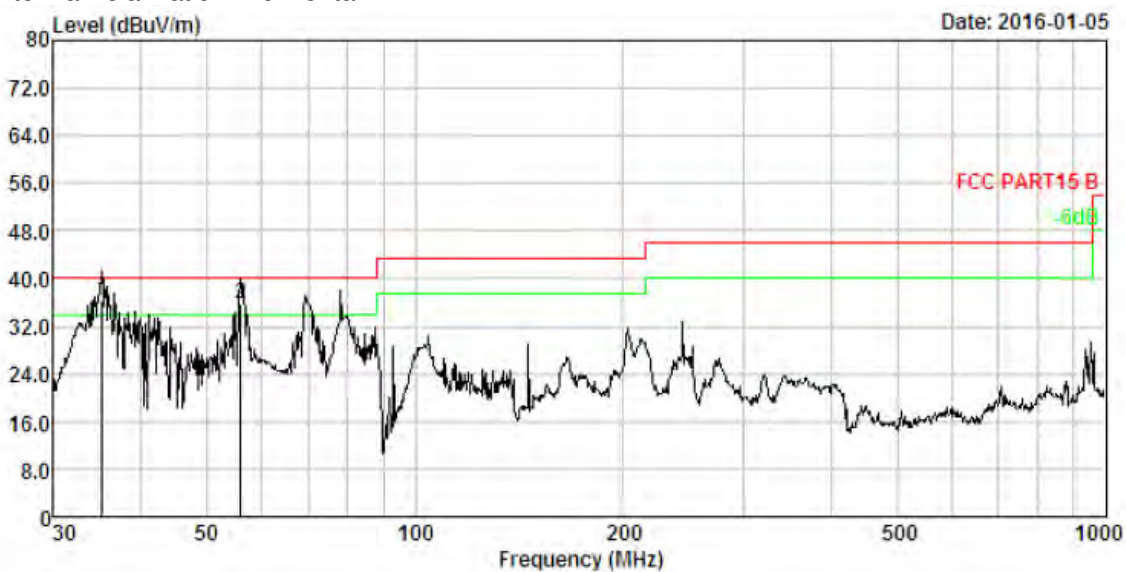
Test Frequency: 30MHz ~ 1GHz

Antenna Polarization: Vertical



| 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.  | 38.616      | 1.28                | 13.60                 | 33.55                       | 30.06                  | 18.37                       | 40.00           | -21.63              | QP     |
| 2.  | 56.001      | 1.62                | 11.96                 | 33.90                       | 30.19                  | 17.29                       | 40.00           | -22.71              | QP     |
| 3.  | 69.600      | 1.82                | 10.13                 | 38.24                       | 30.26                  | 19.93                       | 40.00           | -20.07              | QP     |

Antenna Polarization: Horizontal



| 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.  | 35.251      | 1.20                | 13.41                 | 51.67                       | 30.03                  | 36.25                       | 40.00           | -3.75               | QP     |
| 2.  | 56.001      | 1.62                | 11.96                 | 52.47                       | 30.19                  | 35.86                       | 40.00           | -4.14               | QP     |

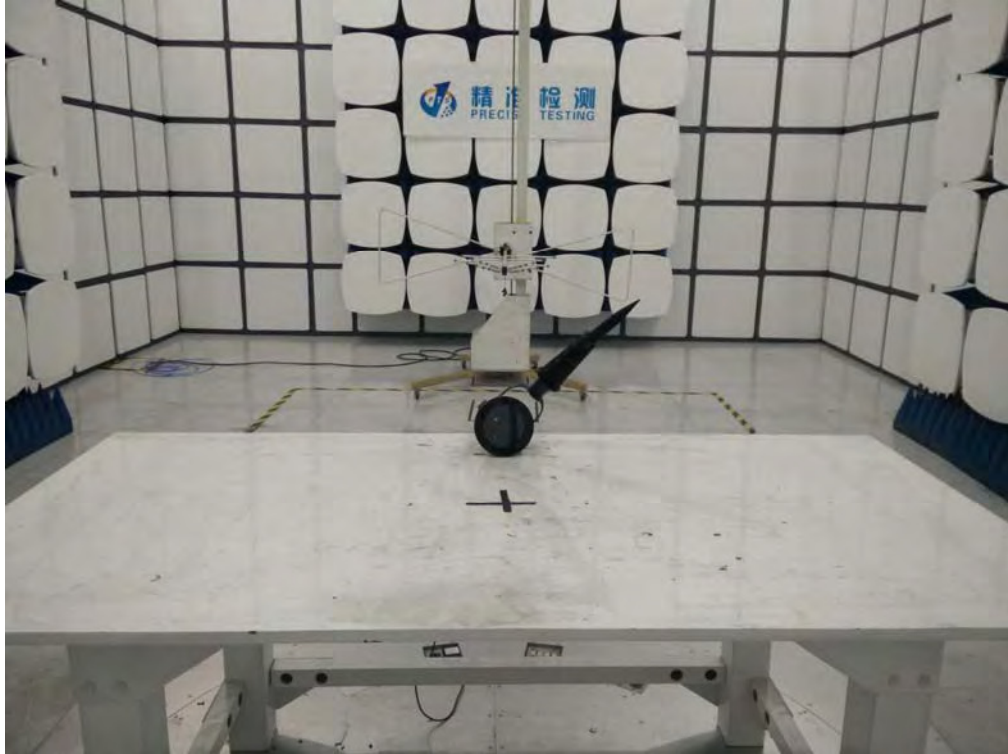
**Test Frequency: Above 1GHz**

| Frequency<br>(MHz) | Meter Reading<br>(dBμV) | Factor<br>(dB) | Emission Level<br>(dBμV/m) | Limits<br>(dBμV/m) | Margin<br>(dB) | Detector<br>Type | Comment    |
|--------------------|-------------------------|----------------|----------------------------|--------------------|----------------|------------------|------------|
| 1126.62            | 67.41                   | -19.14         | 48.27                      | 74                 | -25.73         | peak             | Vertical   |
| 1596.31            | 60.49                   | -16.43         | 44.06                      | 74                 | -29.94         | peak             | Vertical   |
| 3041.55            | 61.27                   | -11.63         | 49.64                      | 74                 | -24.36         | peak             | Vertical   |
| 4805.79            | 55.68                   | -3.64          | 52.04                      | 74                 | -21.96         | peak             | Vertical   |
| 1128.16            | 71.82                   | -19.14         | 52.68                      | 74                 | -21.32         | peak             | Horizontal |
| 1593.27            | 66.66                   | -16.43         | 50.23                      | 74                 | -23.77         | peak             | Horizontal |
| 3042.50            | 59.33                   | -11.63         | 47.7                       | 74                 | -26.3          | peak             | Horizontal |
| 4802.42            | 51.24                   | -3.64          | 47.6                       | 74                 | -26.4          | peak             | Horizontal |

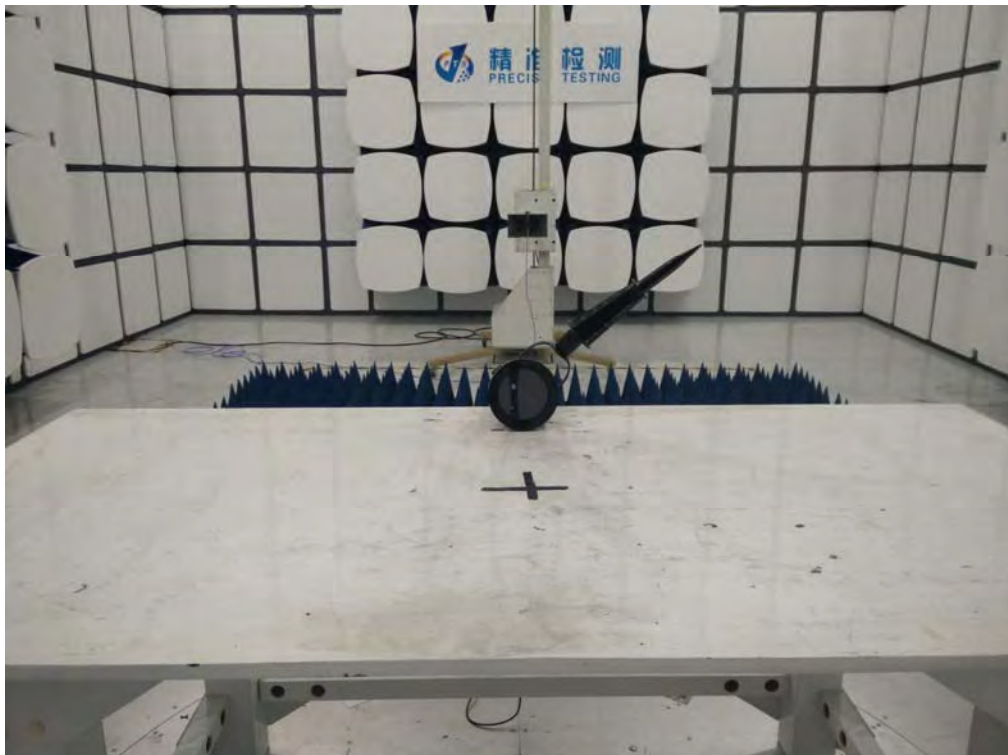
Remark: The PK levels of the emissions are below the AV limit (54dBμV/m), it is no need to test the AV value of the emission.

## 7 Test Setup

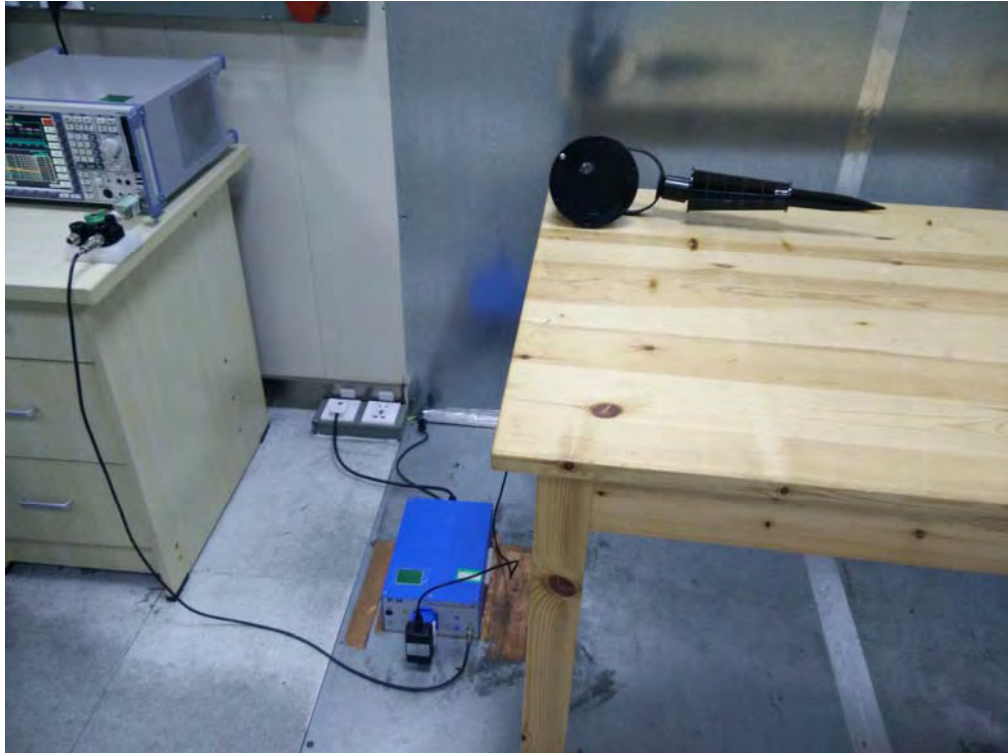
Radiated Emission  
From 30MHz-1000MHz



Above 1GHz



CONDUCTED EMISSION TEST



## 8 EUT Photos

### External Photos



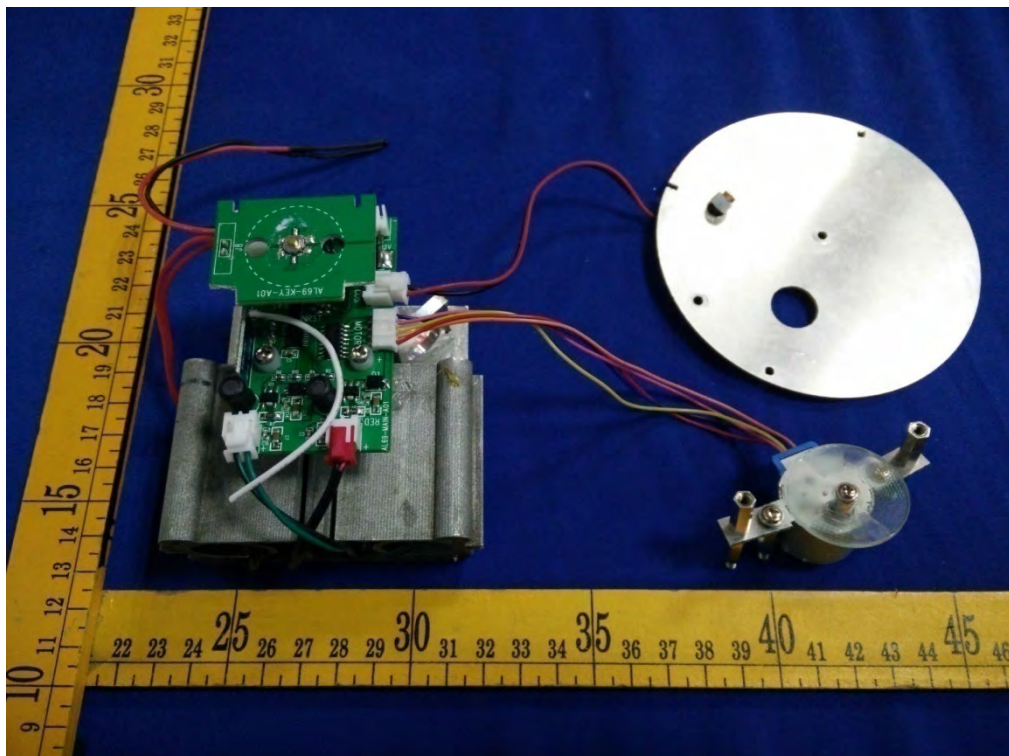
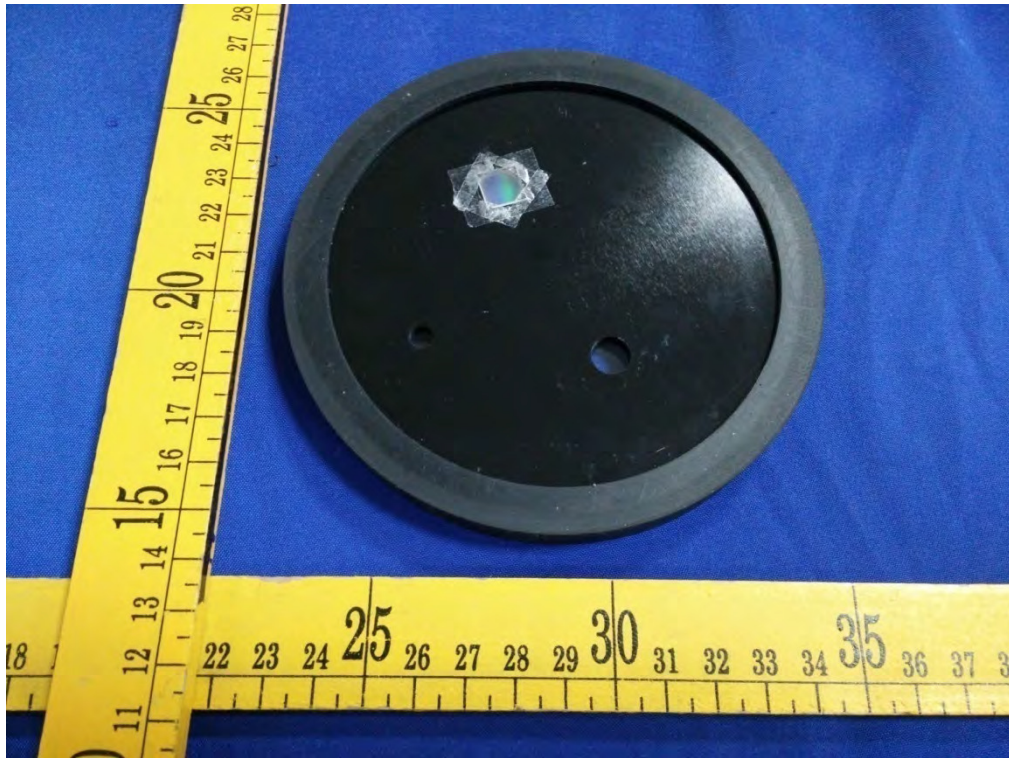


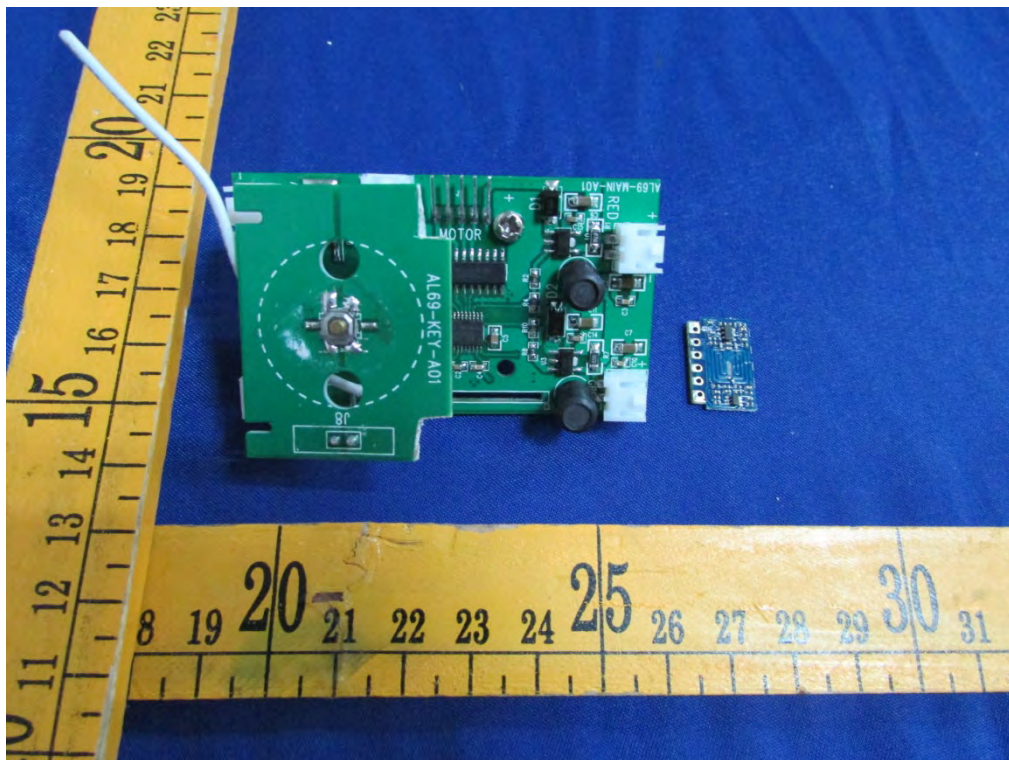
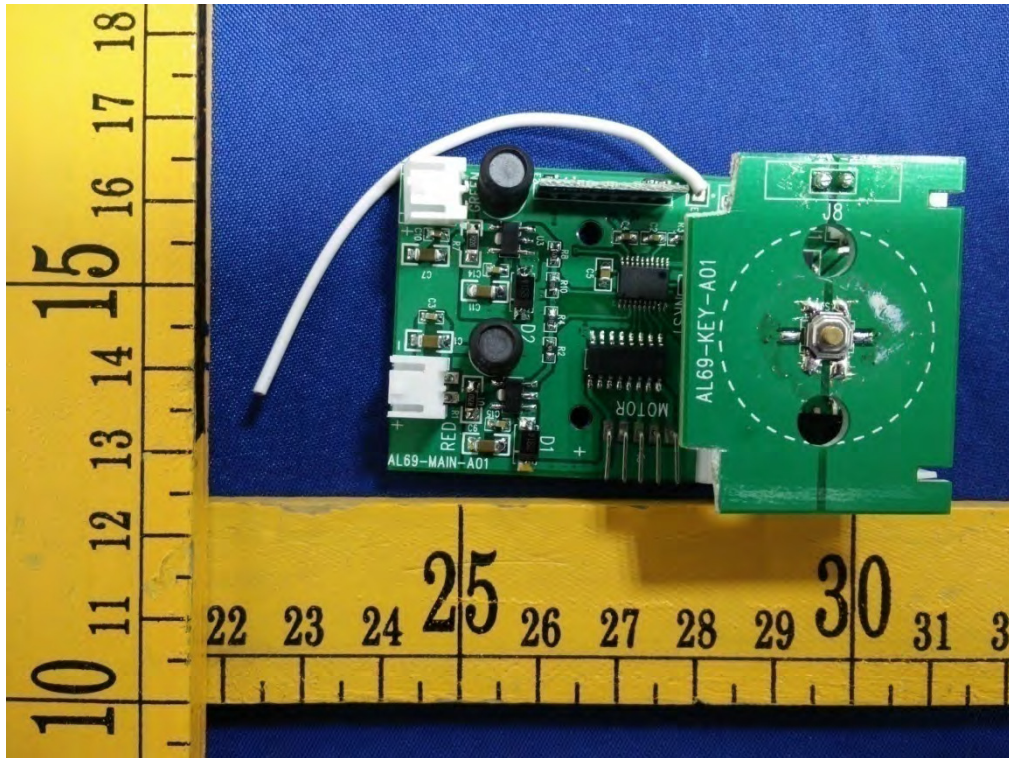


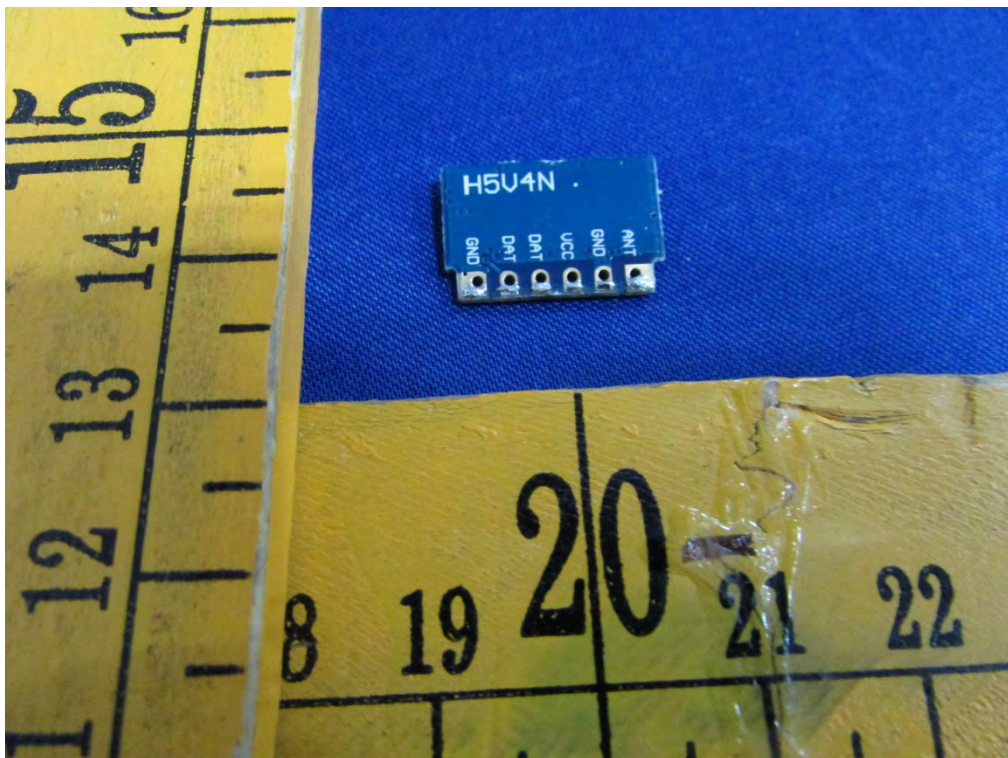
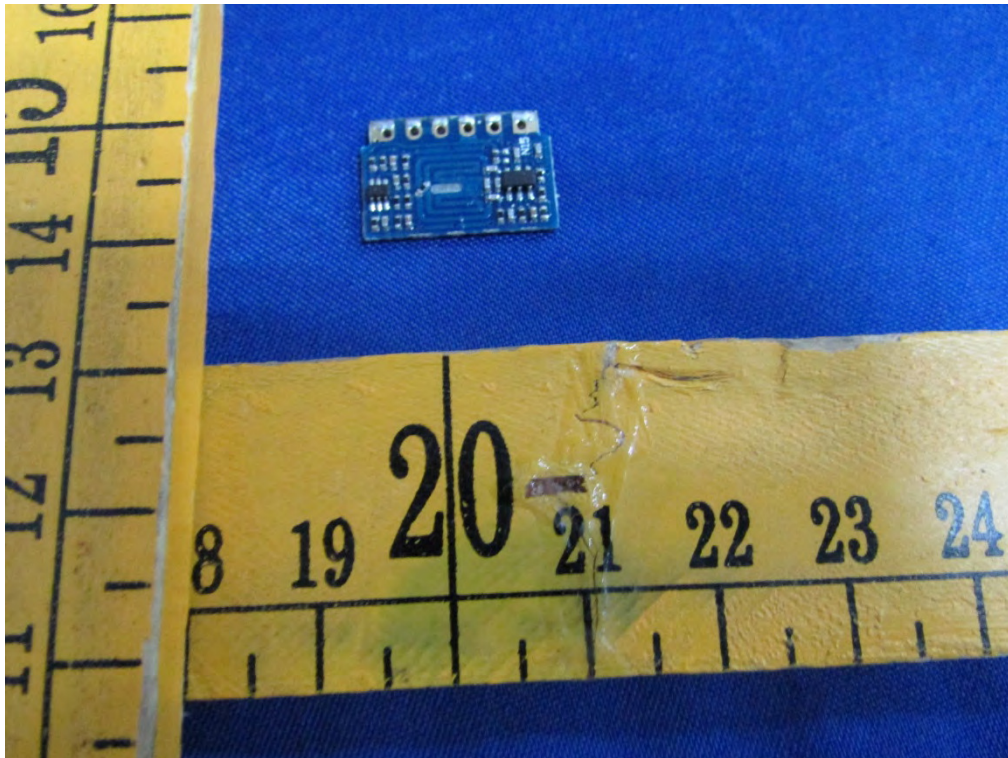


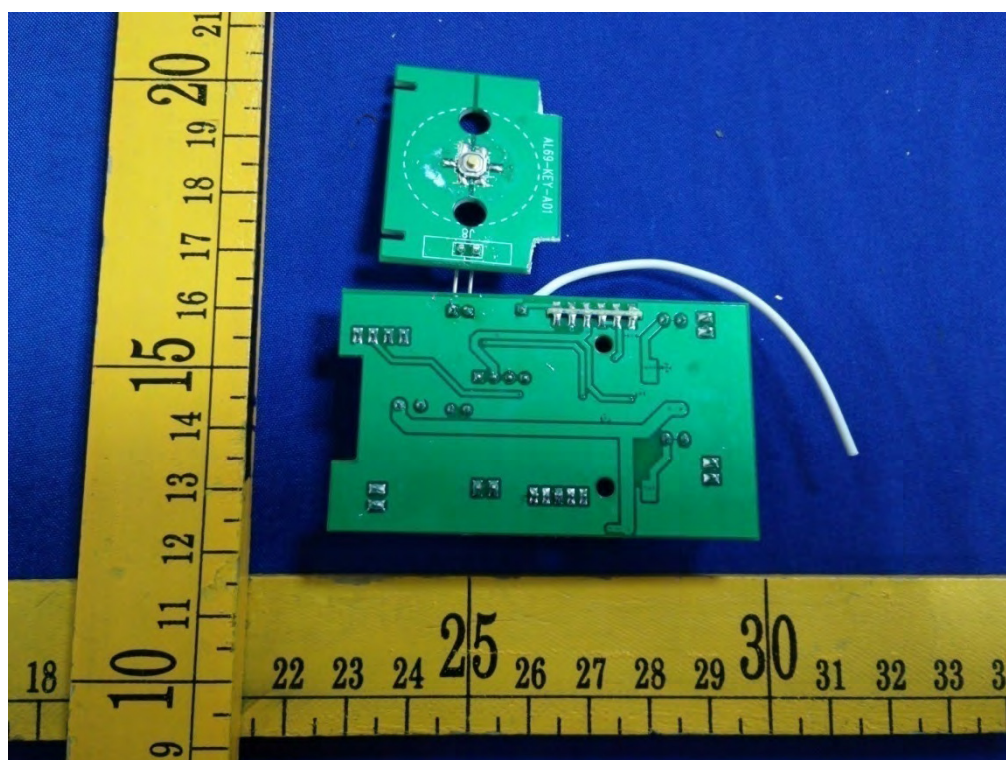
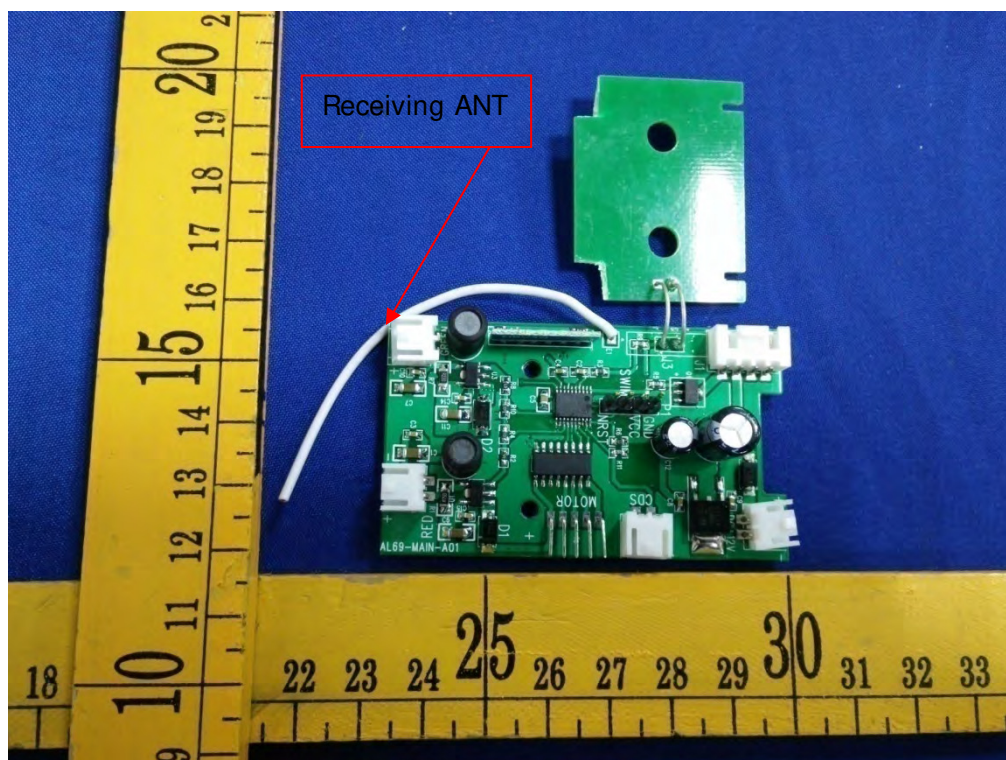
Internal Photos











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