

# FCC Test Report

Client Name : DGL Group LTD.  
Address : 195 Raritan Center Parkway, Edison, New Jersey, United States 08837  
Product Name : REMOTE CONTROL TOYS  
Date : Sept.17, 2021

**Shenzhen Anbotek Compliance Laboratory Limited**



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# TEST REPORT

Applicant : DGL Group LTD.  
Manufacturer : DGL Group LTD.  
Product Name : REMOTE CONTROL TOYS  
Model No. : RSS-AW-ROBO-BTLE, RSS-AW-ROBO-XXX  
Trade Mark : N.A.  
Rating(s) : Input: DC 3V

**Test Standard(s) : FCC Part15 Subpart C, Section 15.235**

**Test Method(s) : ANSI C63.10: 2020**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt

Jul. 29, 2021

Date of Test

Jul. 29~Sept.14, 2021

Prepared By



(Ella Liang)

Approved & Authorized Signer



(Kingkong Jin)



# 1. General Information

## 1.1. Client Information

|              |   |  |
|--------------|---|--|
| Applicant    | : | DGL Group LTD.   |
| Address      | : | 195 Raritan Center Parkway, Edison, New Jersey,United States 08837 |
| Manufacturer | : | DGL Group LTD.   |
| Address      | : | 195 Raritan Center Parkway, Edison, New Jersey,United States 08837 |
| Factory      | : | DGL Group LTD.   |
| Address      | : | 195 Raritan Center Parkway, Edison, New Jersey,United States 08837 |

## 1.2. Description of Device (EUT)

|   |   |   |                  |
|---|---|---|------------------|
| Product Name  | : | REMOTE CONTROL TOYS   |                  |
| Model No.   | : | RSS-AW-ROBO-BTLE, RSS-AW-ROBO-XXX<br>(Note: All samples are the same except the model number and appearance, so we prepare "RSS-AW-ROBO-BTLE" for test only.) |                  |
| Trade Mark  | : | N.A.  |                  |
| Test Power Supply   | : | DC 3V   |                  |
| Product Description   | : | Operation Frequency:  | 49.86MHz         |
|   | : | Number of Channel:  | 1 Channels       |
|   | : | Modulation Type:  | ASK              |
|   | : | Antenna Type:   | Monopole Antenna |
|   | : | Antenna Gain(Peak):   | 0 dBi            |
|   | : | Adapter:  | N/A              |
| <p>Remark: 1) For a more detailed features description, please refer to the manufacturer’s specifications or the User’s Manual.</p> <p>2) This report is for 49.86MHz module.</p> |   |   |                  |

**1.3. Auxiliary Equipment Used During Test**

|     |   |  |
|-----|---|--|
| N/A | : |  |
|-----|---|--|

**1.4. Description of Test Modes**

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|--------------|-------------|
| Mode 1       | On Mode     |

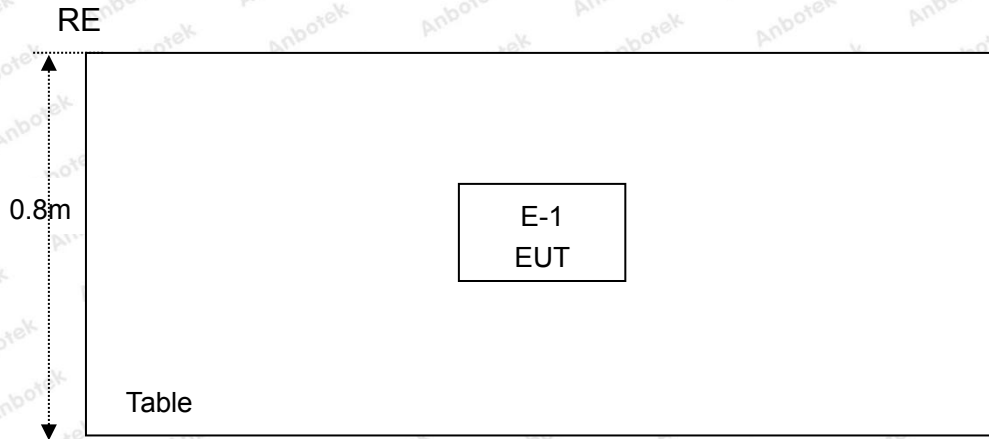
| For Radiated Emission |             |
|-----------------------|-------------|
| Final Test Mode       | Description |
| Mode 1                | On Mode     |

Note: During the test, the EUT was keeping continuous transmission.

**1.5. List of channels**

| Channel | Freq.<br>(MHz) | Note<br>(Modulation Type) |
|---------|----------------|---------------------------|
| 01      | 49.86          | ASK                       |

### 1.6. Description Of Test Setup





## 1.7. Test Equipment List

| Item | Equipment                                   | Manufacturer               | Model No.        | Serial No.    | Last Cal.     | Cal. Interval |
|------|---|----------------------------|------------------|---------------|---------------|---------------|
| 1.   | L.I.S.N.<br>Artificial Mains<br>Network     | Rohde & Schwarz            | ENV216           | 100055        | Oct. 26, 2020 | 1 Year        |
| 2.   | EMI Test Receiver                           | Rohde & Schwarz            | ESCI             | 100627        | Oct. 26, 2020 | 1 Year        |
| 3.   | EMI Test Receiver                           | Rohde & Schwarz            | ESR26            | 101481        | Oct. 26, 2020 | 1 Year        |
| 4.   | RF Switching Unit                           | Compliance<br>Direction    | RSU-M2           | 38303         | Oct. 26, 2020 | 1 Year        |
| 5.   | MAX Spectrum<br>Analysis                    | Agilent                    | N9020A           | MY51170037    | Oct. 26, 2020 | 1 Year        |
| 6.   | Preamplifier                                | SKET Electronic            | BK1G18G30<br>D   | KD17503       | Oct. 26, 2020 | 1 Year        |
| 7.   | Double Ridged Horn<br>Antenna               | Instruments<br>corporation | GTH-0118         | 351600        | Nov. 02, 2020 | 2 Year        |
| 8.   | Bilog Broadband<br>Antenna                  | Schwarzbeck                | VULB9163         | VULB 9163-289 | Nov. 02, 2020 | 2 Year        |
| 9.   | Loop Antenna                                | Schwarzbeck                | FMZB1519B        | 00053         | Nov. 02, 2020 | 2 Year        |
| 10.  | Horn Antenna                                | A-INFO                     | LB-180400-<br>KF | J211060628    | Nov. 02, 2020 | 2 Year        |
| 11.  | Pre-amplifier                               | SONOMA                     | 310N             | 186860        | Oct. 26, 2020 | 1 Year        |
| 12.  | EMI Test Software<br>EZ-EMC                 | SHURPLE                    | N/A              | N/A           | N/A           | N/A           |
| 13.  | RF Test Control<br>System                   | YIHENG                     | YH3000           | 2017430       | Oct. 26, 2020 | 1 Year        |
| 14.  | Power Sensor                                | DAER                       | RPR3006W         | 15I00041SN045 | Oct. 26, 2020 | 1 Year        |
| 15.  | Power Sensor                                | DAER                       | RPR3006W         | 15I00041SN046 | Oct. 26, 2020 | 1 Year        |
| 16.  | MXA Spectrum<br>Analysis                    | Agilent                    | N9020A           | MY51170037    | Oct. 26, 2020 | 1 Year        |
| 17.  | MXG RF Vector<br>Signal Generator           | Agilent                    | N5182A           | MY48180656    | Oct. 26, 2020 | 1 Year        |
| 18.  | Signal Generator                            | Agilent                    | E4421B           | MY41000743    | Oct. 26, 2020 | 1 Year        |
| 19.  | DC Power Supply                             | IVYTECH                    | IV3605           | 1804D360510   | Oct. 26, 2020 | 1 Year        |
| 20.  | Constant<br>Temperature<br>Humidity Chamber | ZHONGJIAN                  | ZJ-KHWS80<br>B   | N/A           | Oct. 26, 2020 | 1 Year        |

### 1.8. Measurement Uncertainty

|                        |   |                          |
|------------------------|---|--------------------------|
| Radiation Uncertainty  | : | Ur = 3.9 dB (Horizontal) |
|                        |   | Ur = 3.8 dB (Vertical)   |
| Conduction Uncertainty | : | Uc = 3.4 dB              |

### 1.9. Description of Test Facility

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

#### FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No. 184111, September 30, 2020.

#### ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A, September 30, 2020.

#### Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102



## 2. Summary of Test Results

| Standard Section  | Test Item               | Result |
|---|-------------------------|--------|
| 15.203  | Antenna Requirement     | PASS   |
| 15.207  | Conducted Emission      | N/A    |
| 15.235(a)/15.235(b)/15.209                                  | Spurious Emission       | PASS   |
| 15.215(c)   | 20dB Occupied Bandwidth | PASS   |
| <b>Remark:</b> "N/A" is an abbreviation for Not Applicable. |                         |        |



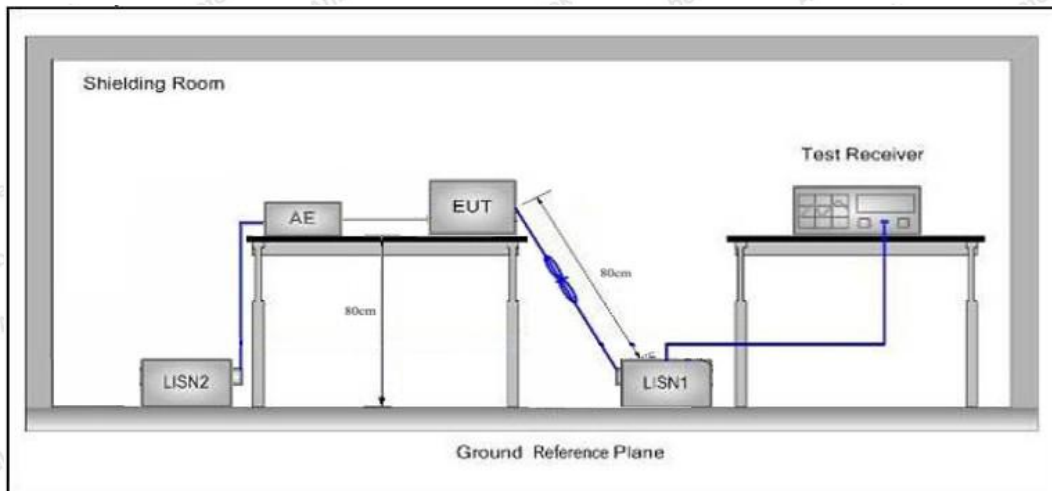
## 3. Conducted Emission Test

### 3.1. Test Standard and Limit

| Test Standard | FCC Part15 Section 15.207 |                                |               |
|---------------|---------------------------|--------------------------------|---------------|
| Test Limit    | Frequency                 | Maximum RF Line Voltage (dBuV) |               |
|               |                           | Quasi-peak Level               | Average Level |
|               | 150kHz~500kHz             | 66 ~ 56 *                      | 56 ~ 46 *     |
|               | 500kHz~5MHz               | 56                             | 46            |
|               | 5MHz~30MHz                | 60                             | 50            |

**Remark:** (1) \*Decreasing linearly with logarithm of the frequency.  
 (2) The lower limit shall apply at the transition frequency.

### 3.2. Test Setup



### 3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2020 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

### 3.4. Test Data

Not applicable for equipment operated with DC power supply.

## 4. Radiation Spurious Emission and Band Edge

### 4.1. Test Standard and Limit

| Test Standard | FCC Part15 C Section 15.235(a)/15.235(b)/15.209 |                                  |                |            |                          |
|---------------|---|----------------------------------|----------------|------------|--------------------------|
| Test Limit    | Frequency (MHz)                                 | Field strength (microvolt/meter) | Limit (dBuV/m) | Remark     | Measurement distance (m) |
|               | 0.009MHz~0.490MHz                               | 2400/F(kHz)                      | -              | -          | 300                      |
|               | 0.490MHz-1.705MHz                               | 24000/F(kHz)                     | -              | -          | 30                       |
|               | 1.705MHz-30MHz                                  | 30                               | -              | -          | 30                       |
|               | 30MHz~88MHz                                     | 100                              | 40.0           | Quasi-peak | 3                        |
|               | 88MHz~216MHz                                    | 150                              | 43.5           | Quasi-peak | 3                        |
|               | 216MHz~960MHz                                   | 200                              | 46.0           | Quasi-peak | 3                        |
|               | 960MHz~1000MHz                                  | 500                              | 54.0           | Quasi-peak | 3                        |
|               | Above 1000MHz                                   | 500                              | 54.0           | Average    | 3                        |
| -             |   | 74.0                             | Peak           | 3          |                          |

**Remark:**

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

(a) The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

(b) The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the unmodulated carrier or to the general limits in §15.209, whichever permits the higher emission levels. The field strength of any emissions removed by more than 10 kHz from the band edges shall not exceed the general radiated emission limits in §15.209. All signals exceeding 20 microvolts/meter at 3 meters shall be reported in the application for certification.



## 4.2. Test Setup

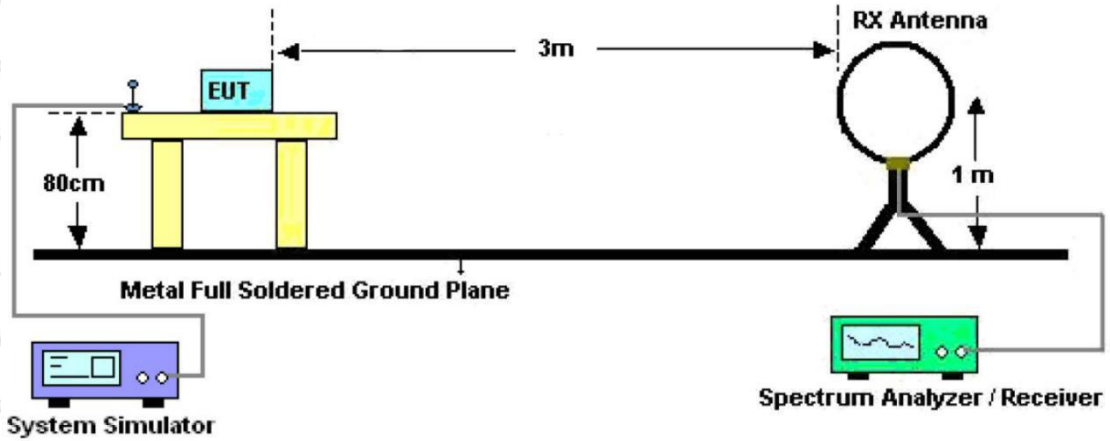


Figure 1. Below 30MHz

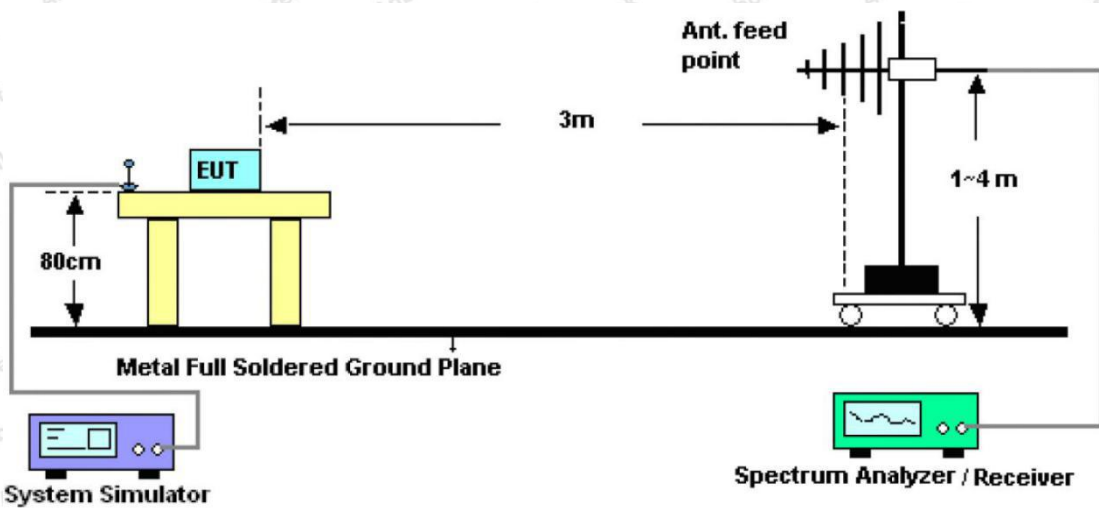


Figure 2. 30MHz to 1GHz

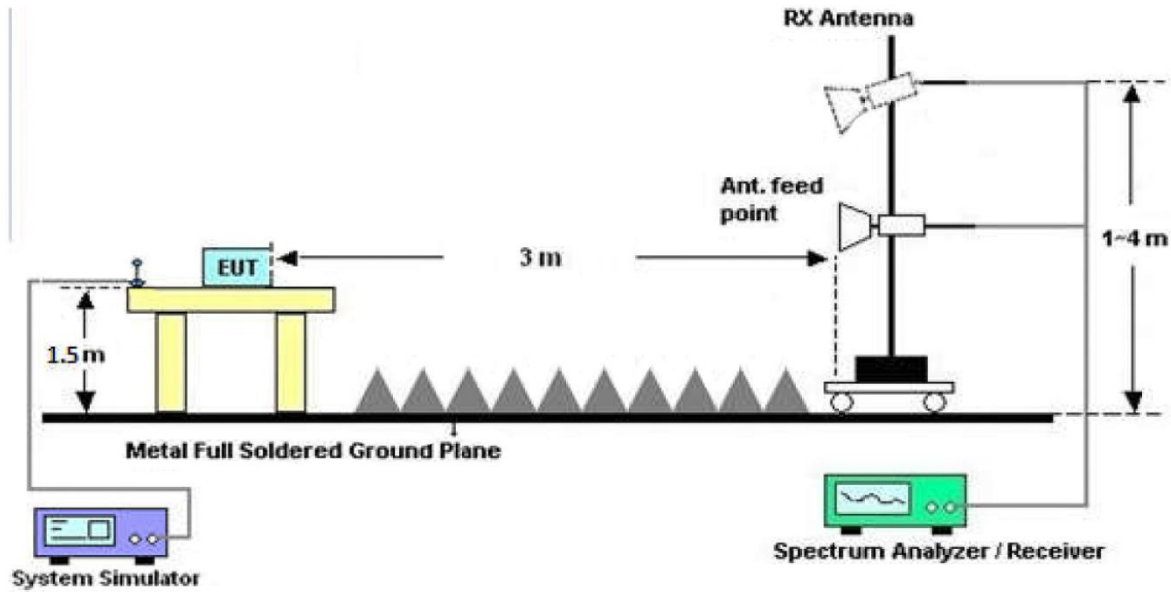


Figure 3. Above 1 GHz

### 4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9\*6\*6 Chamber. The device is evaluated in xyz orientation.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz, Set the spectrum analyzer as:

RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

### 4.4. Test Data

#### PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

**Test Results (Fundamental)**

| Mode    | Freq. (MHz) | Antenna Pol. | Readin (dBuV/m) | Cable Loss (dB) | Ant Factor (dB) | Amplifier (dB) | Results (dBuV/m) | Limits (dBuV/m) | Det. Mode |
|---------|-------------|--------------|-----------------|-----------------|-----------------|----------------|------------------|-----------------|-----------|
| TX Mode | 49.86       | H            | 88.50           | 1.52            | -15.91          | 31.45          | 42.66            | 100             | PK        |
|         | 49.86       | H            | 78.00           | 1.52            | -15.91          | 31.45          | 32.16            | 80              | AV        |
|         | 49.86       | V            | 86.23           | 1.52            | -15.91          | 31.45          | 40.39            | 100             | PK        |
|         | 49.86       | V            | 75.64           | 1.52            | -15.91          | 31.45          | 29.80            | 80              | AV        |

Remark:

1. Result = Reading + Cable Loss +Ant Factor –Amplifier



**Test Results (30~1000MHz)**

Standard: FCC PART 15C

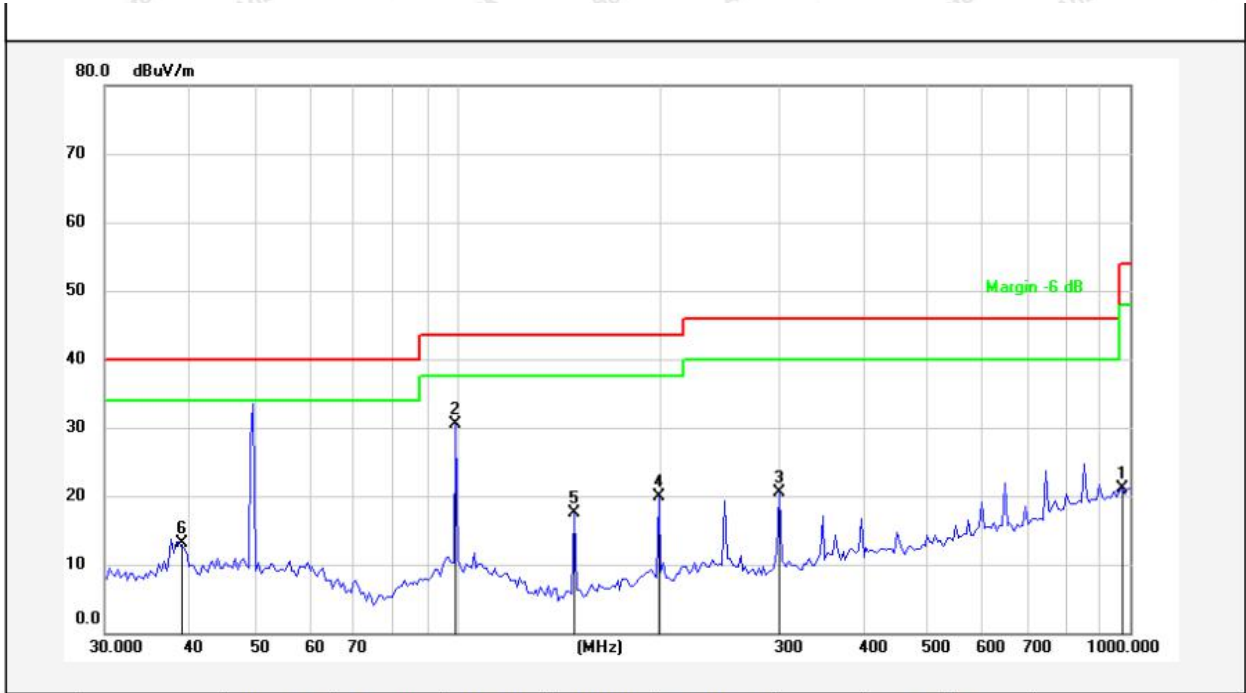
Temp.(°C)/Hum.(%RH): 24.2°C/57%RH

Test Mode: On Mode

Power Source: DC 3V

Polarization: Horizontal

Note:



| No. | Freq. (MHz) | Reading (dBuV) | Factor ( ) | Result (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Detector | Height (cm) | degree (deg) | Remark |
|-----|-------------|----------------|------------|-----------------|----------------|-----------------|----------|-------------|--------------|--------|
| 1   | 974.0434    | 27.94          | -6.89      | 21.05           | 54.00          | -32.95          | peak     |             |              |        |
| 2   | 99.7026     | 46.16          | -15.71     | 30.45           | 43.50          | -13.05          | peak     |             |              |        |
| 3   | 300.8942    | 37.50          | -17.08     | 20.42           | 46.00          | -25.58          | peak     |             |              |        |
| 4   | 199.2855    | 37.75          | -17.81     | 19.94           | 43.50          | -23.56          | peak     |             |              |        |
| 5   | 149.2238    | 37.92          | -20.37     | 17.55           | 43.50          | -25.95          | peak     |             |              |        |
| 6   | 38.6839     | 29.04          | -15.91     | 13.13           | 40.00          | -26.87          | peak     |             |              |        |

**Test Results (30~1000MHz)**

Standard: FCC PART 15C

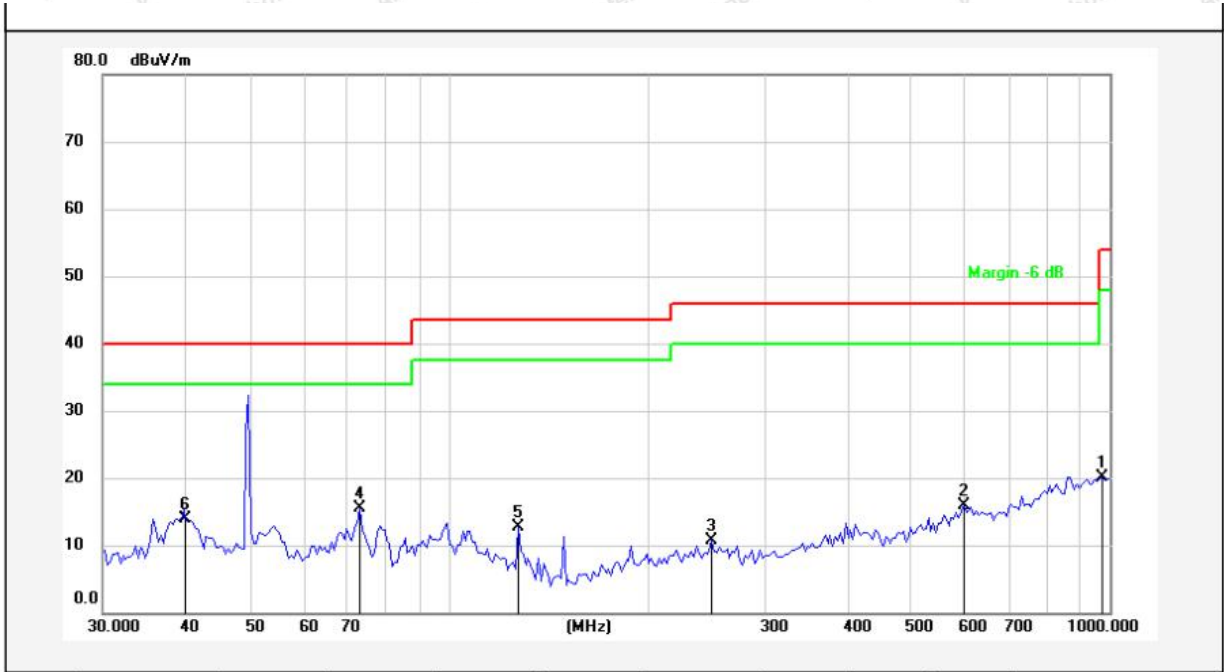
Temp.(°C)/Hum.(%RH): 24.2°C/57%RH

Test Mode: On Mode

Power Source: DC 3V

Polarization: Vertical

Note:



| No. | Freq. (MHz) | Reading (dBuV) | Factor ( ) | Result (dBuV/m) | Limit (dBuV/m) | Over Limit (dB) | Detector | Height (cm) | degree (deg) | Remark |
|-----|-------------|----------------|------------|-----------------|----------------|-----------------|----------|-------------|--------------|--------|
| 1   | 974.0434    | 26.99          | -6.89      | 20.10           | 54.00          | -33.90          | peak     |             |              |        |
| 2   | 601.4265    | 27.95          | -12.11     | 15.84           | 46.00          | -30.16          | peak     |             |              |        |
| 3   | 250.3009    | 26.85          | -16.19     | 10.66           | 46.00          | -35.34          | peak     |             |              |        |
| 4   | 73.3593     | 36.51          | -20.95     | 15.56           | 40.00          | -24.44          | peak     |             |              |        |
| 5   | 127.4407    | 32.14          | -19.39     | 12.75           | 43.50          | -30.75          | peak     |             |              |        |
| 6   | 40.0643     | 29.43          | -15.57     | 13.86           | 40.00          | -26.14          | peak     |             |              |        |

Remark:

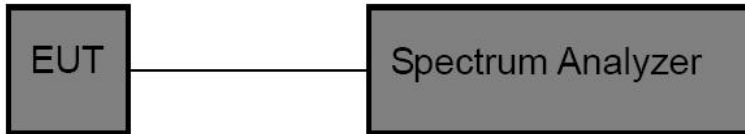
1. Results = Reading + Cable Loss +Ant Factor –Amplifier

## 5. 20DB Occupy Bandwidth Test

### 5.1. Test Standard and Limit

According to FCC section 15.215(c), the 20dB bandwidth should be contained within the frequency band designated in the rule section under which the EUT is operated, it was measured with a spectrum analyzer connected the EUT while the EUT is operating in transmission mode.

### 5.2. Test Setup



### 5.3. Test Procedure

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 3kHz RBW and  $VBW \geq 3 * RBW$ . The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

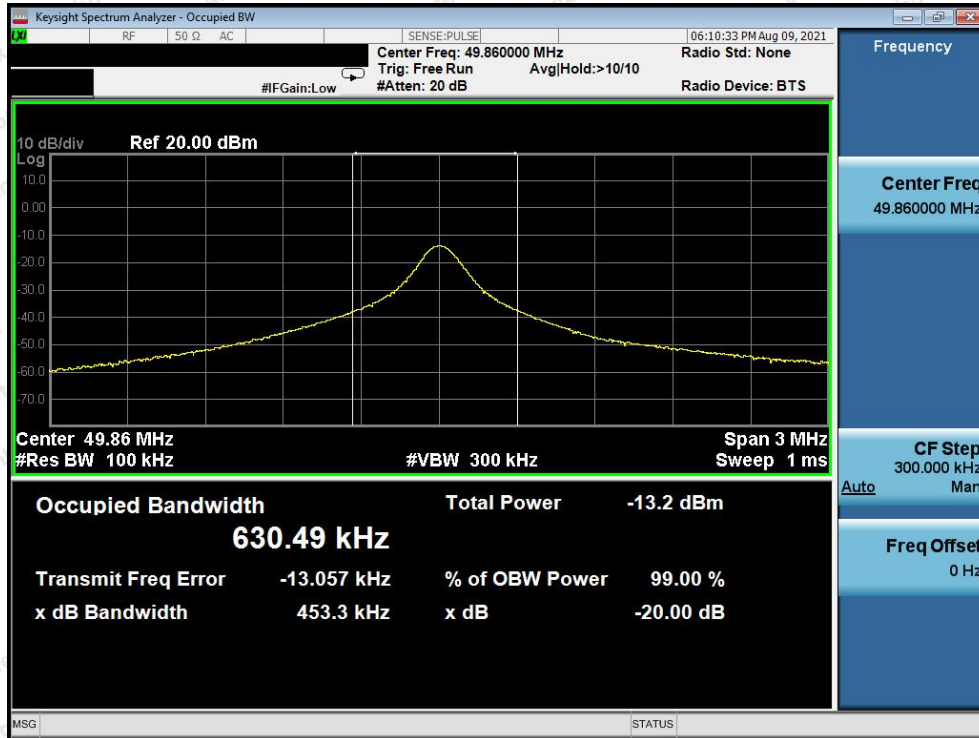
### 5.4. Test Data

Test Item : 20dB Bandwidth  
 Test Voltage : DC 3V  
 Test Result : PASS

Test Mode : Continuously transmitting  
 Temperature : 24°C  
 Humidity : 55%RH

| Freq.<br>(MHz) | Bandwidth (kHz) | Results |
|----------------|-----------------|---------|
| 49.86          | 453.3           | PASS    |





49.86MHz

## 6. Antenna Requirement

### 6.1. Test Standard and Requirement

|               |   |
|---------------|---|
| Test Standard | FCC Part15 Section 15.203   |
| Requirement   | 1) 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.<br>Antenna requirement must meet at least one of the following:<br>1) Antenna must be permanently attached to device.<br>2) The antenna must use a unique type of connector to attach to the device.<br>3) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device. |

### 6.2. Antenna Connected Construction

The antenna is a Monopole Antenna which permanently attached, and the best case gain of the antenna is 0 dBi. It complies with the standard requirement.

## APPENDIX I -- TEST SETUP PHOTOGRAPH

Photo of Radiation Emission Test



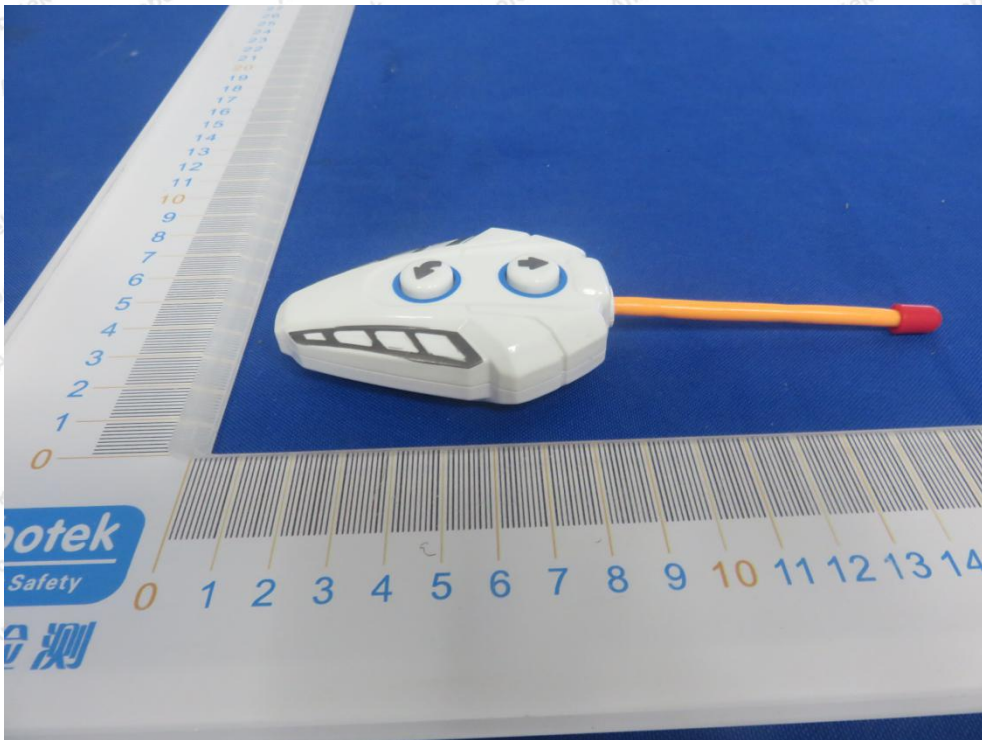


## APPENDIX II -- EXTERNAL PHOTOGRAPH

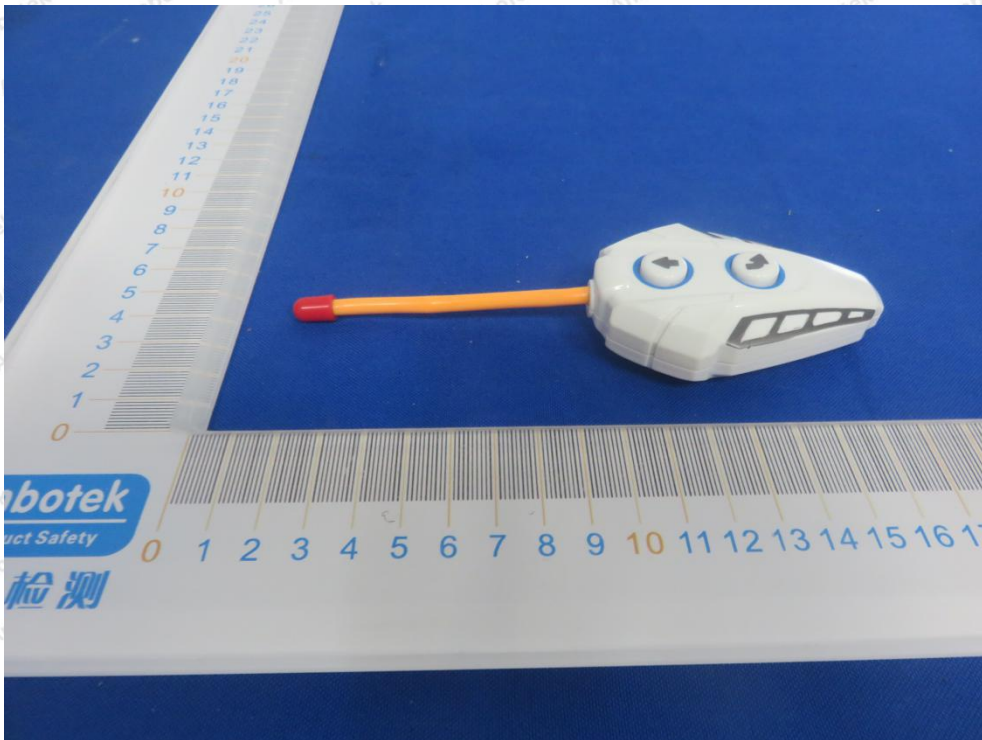








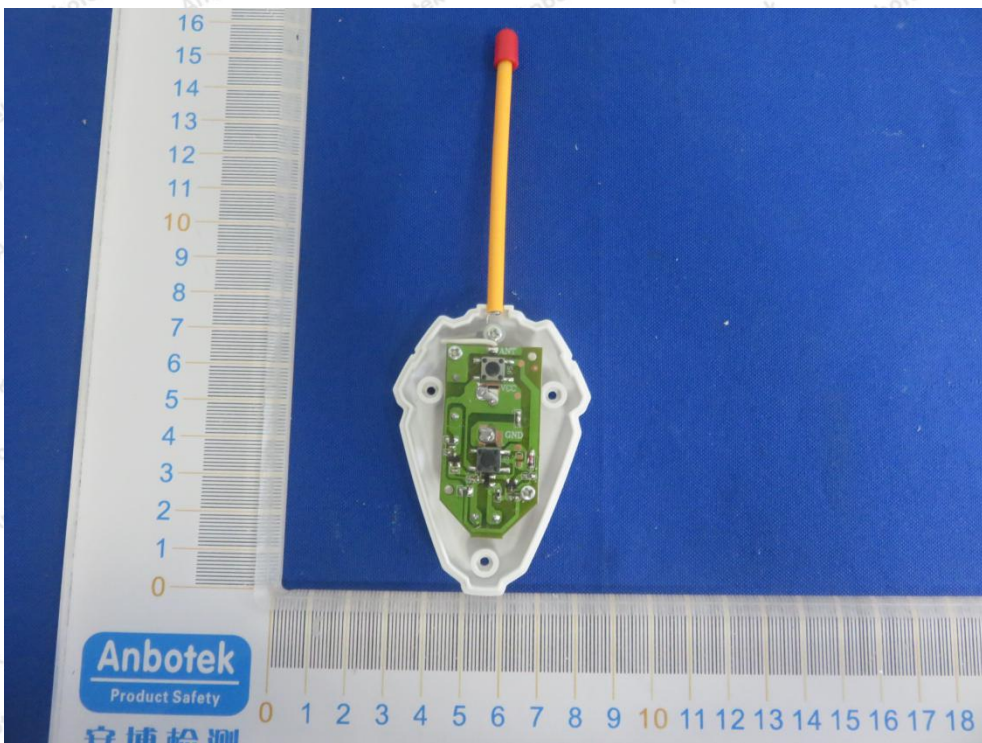
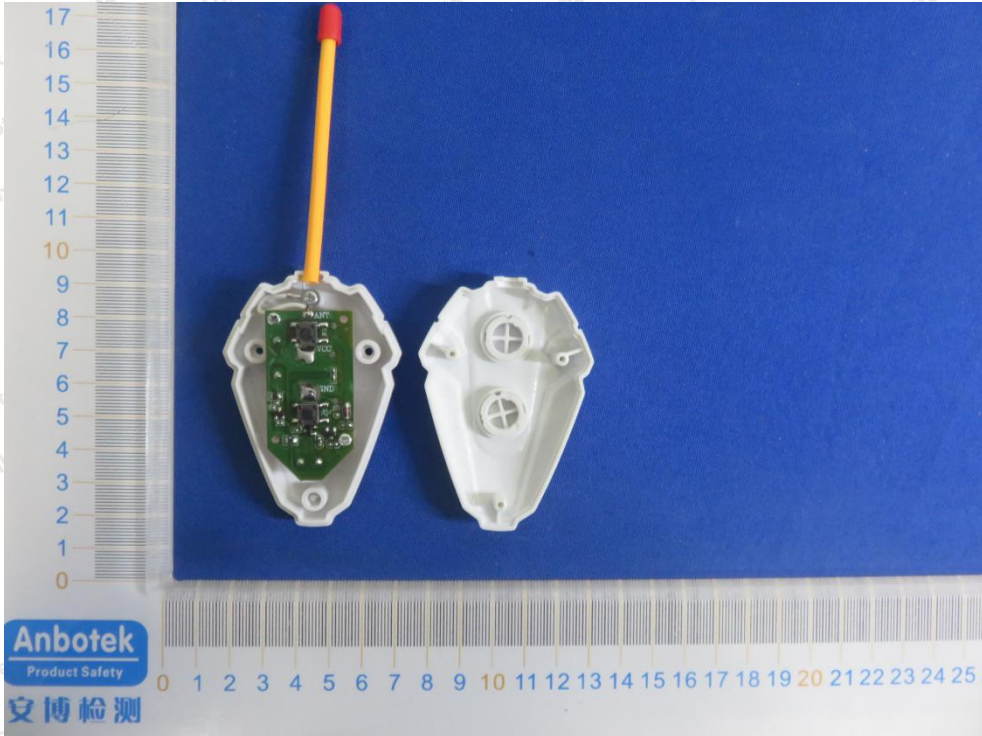








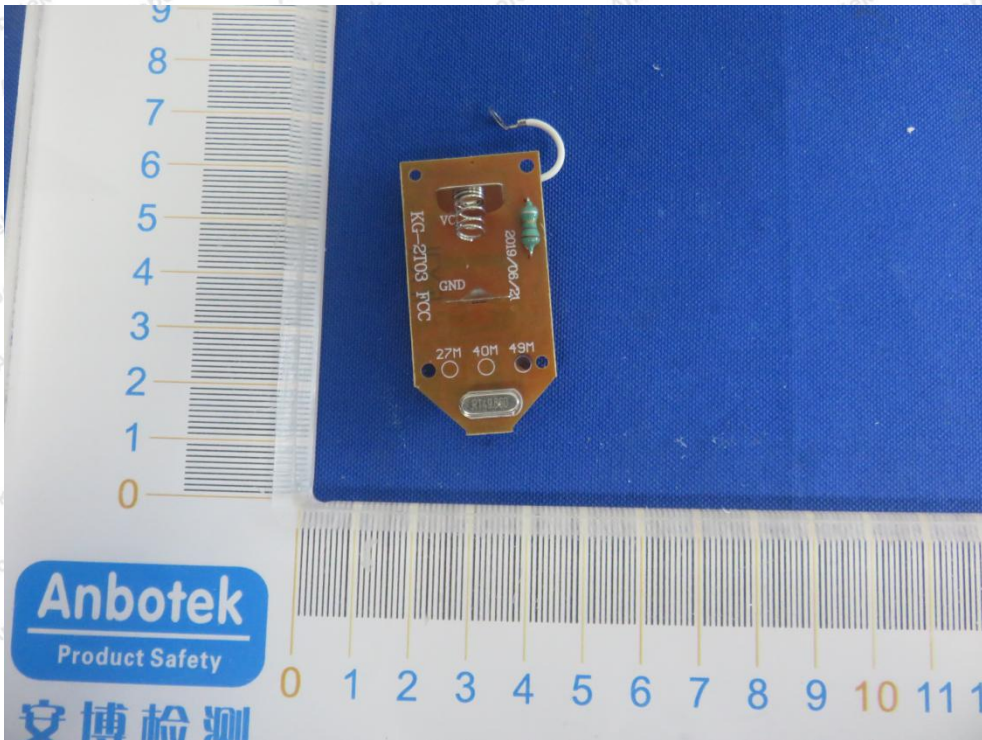
## APPENDIX III -- INTERNAL PHOTOGRAPH





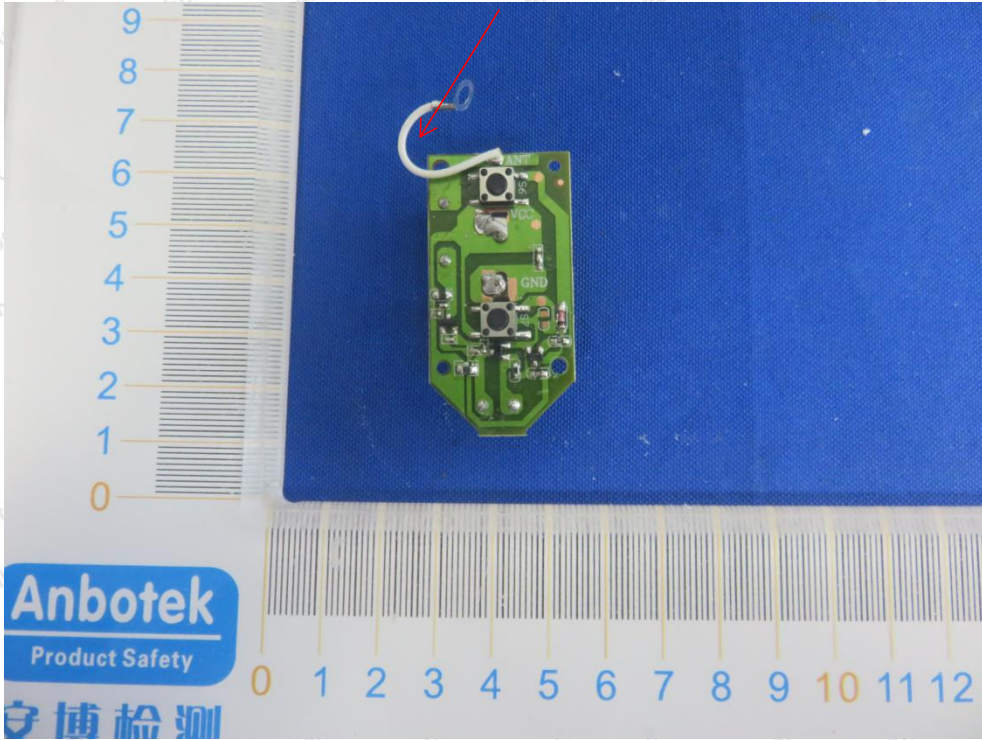








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