

# TEST REPORT

**Reference No.** ..... : WTS14S0817694E  
**FCC ID** ..... : 2AATPET632A  
**Applicant**..... : SHENZHEN ECARE ELECTRONICS CO. , LTD  
**Address**..... : 5-6/F., Block B, Huali Industrial Building, District 28, Bao An,  
Shenzhen, Guangdong China  
**Manufacturer** ..... : The same as above  
**Address**..... : The same as above  
**Product Name**..... : BARBECUE THERMOMETER  
**Model No.** ..... : ET-632A  
**Standards**..... : FCC CFR47 Part 15 Section 15.231: 2012  
**Date of Receipt sample** .... : Aug.25, 2014  
**Date of Test**..... : Aug.26-28, 2014  
**Date of Issue**..... : Aug.29, 2014  
**Test Result**..... : **Pass \***

**Remarks:**

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

**Waltek Services (Shenzhen) Co., Ltd.**

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Testing location: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China

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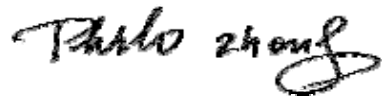
Fax:+86-755-83552400

Compiled by:

Approved by:



Zero Zhou / Project Engineer



Philo Zhong / Manager

## 2 Test Summary

| Test Items                  | Test Requirement                 | Result |
|-----------------------------|----------------------------------|--------|
| Conducted Emissions         | 15.207                           | N/A    |
| Radiated Spurious Emissions | 15.205(a)<br>15.209<br>15.231(e) | PASS   |
| Periodic Operation          | 15.231(e)                        | PASS   |
| 20dB Bandwidth              | 15.231(c)                        | PASS   |
| Antenna Requirement         | 15.203                           | PASS   |

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## 4 General Information

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

|                       |                        |
|-----------------------|------------------------|
| Product Name          | : BARBECUE THERMOMETER |
| Model No.             | : ET-632A              |
| Model Difference      | : N/A                  |
| Type of Modulation    | : ASK                  |
| Frequency Range       | : 433.92 MHz           |
| The Lowest Oscillator | : 32.678kHz            |
| Antenna installation  | : PCB Printed Antenna  |

### 4.2 Details of E.U.T.

|                |                             |
|----------------|-----------------------------|
| Technical Data | : DC 3.0V supply by battery |
|----------------|-----------------------------|

### 4.3 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

Waltek Services (Shenzhen) Co., Ltd. has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration 7760A-1, July 12, 2012.

- **FCC – Registration No.: 880581**

Waltek Services (Shenzhen) Co., Ltd. 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 880581, April 29, 2014.

### 4.4 Test Location

All Emissions tests were performed at:-

Waltek Services (Shenzhen) Co., Ltd. at 1/F, Fukangtai Building, West Baima Rd., Songgang Street, Baoan District, Shenzhen 518105, China.

## 5 Equipment Used during Test

### 5.1 Equipments List

| 3m Semi-anechoic Chamber for Radiation |                            |                      |             |            |                       |                      |
|----------------------------------------|----------------------------|----------------------|-------------|------------|-----------------------|----------------------|
| Item                                   | Equipment                  | Manufacturer         | Model No.   | Serial No. | Last Calibration Date | Calibration Due Date |
| 1                                      | EMC Analyzer               | Agilent              | E7405A      | MY45114943 | Sep.18,2013           | Sep.17,2014          |
| 2                                      | Active Loop Antenna        | Beijing Dazhi        | ZN30900A    | -          | Sep.18,2013           | Sep.17,2014          |
| 3                                      | Trilog Broadband Antenna   | SCHWARZBECK          | VULB9163    | 336        | Sep.18,2013           | Sep.17,2014          |
| 4                                      | Coaxial Cable (below 1GHz) | Top                  | TYPE16(13M) | -          | Sep.18,2013           | Sep.17,2014          |
| 5                                      | Broad-band Horn Antenna    | SCHWARZBECK          | BBHA 9120 D | 667        | Sep.18,2013           | Sep.17,2014          |
| 6                                      | Broad-band Horn Antenna    | SCHWARZBECK          | BBHA 9170   | 335        | Sep.18,2013           | Sep.17,2014          |
| 7                                      | Broadband Preamplifier     | COMPLIANCE DIRECTION | PAP-1G18    | 2004       | Sep.18,2013           | Sep.17,2014          |
| 8                                      | Coaxial Cable (above 1GHz) | Top                  | 1GHz-25GHz  | EW02014-7  | Sep.18,2013           | Sep.17,2014          |

### 5.2 Measurement Uncertainty

| Test Item          | Frequency Range | Uncertainty          | Note |
|--------------------|-----------------|----------------------|------|
| Radiation Emission | 30MHz~1000MHz   | $\pm 5.03\text{dB}$  | (1)  |
|                    | 1000M~5000MHz   | $\pm 5.47\text{ dB}$ | (1)  |

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

### 5.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

## 6 Radiation Emission Test

|                       |                                     |
|-----------------------|-------------------------------------|
| Test Requirement:     | FCC Part15 Paragraph 15.231         |
| Test Method:          | Based on FCC Part15 Paragraph 15.33 |
| Frequency Range:      | 32.678kHz to 5GHz                   |
| Measurement Distance: | 3m                                  |
| Test Result:          | PASS                                |

### 6.1 EUT Operation:

#### Operating Environment:

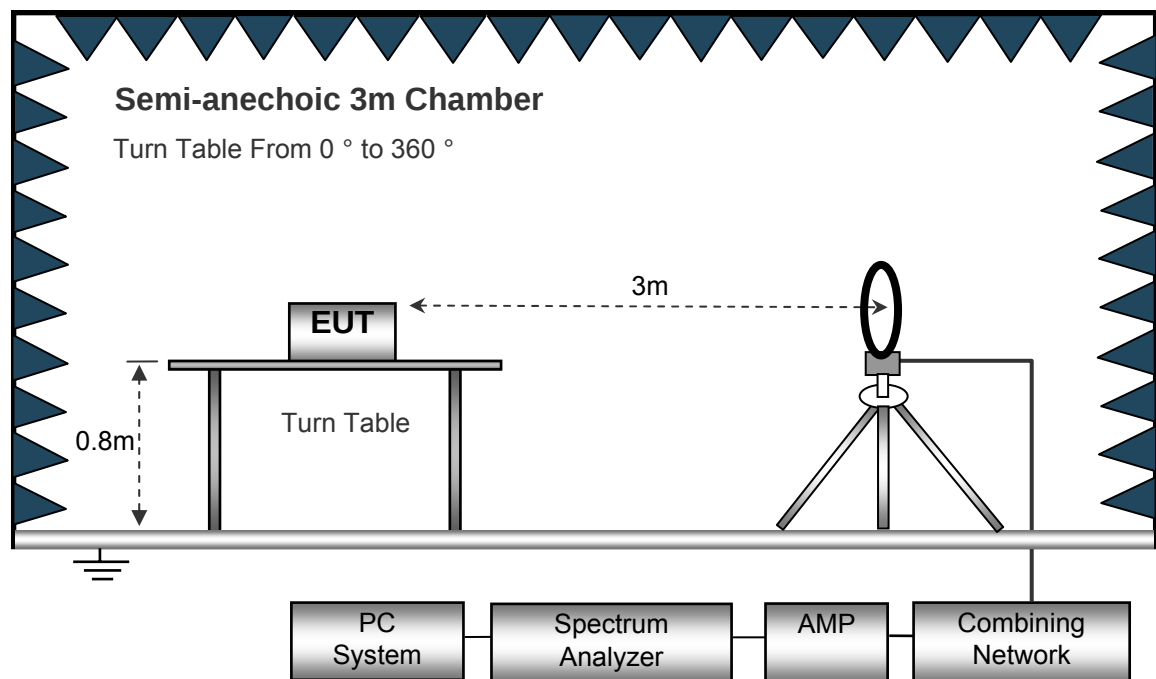
|                       |           |
|-----------------------|-----------|
| Temperature:          | 23.5 °C   |
| Humidity:             | 52.1 % RH |
| Atmospheric Pressure: | 101.0 kPa |

#### Operation Mode:

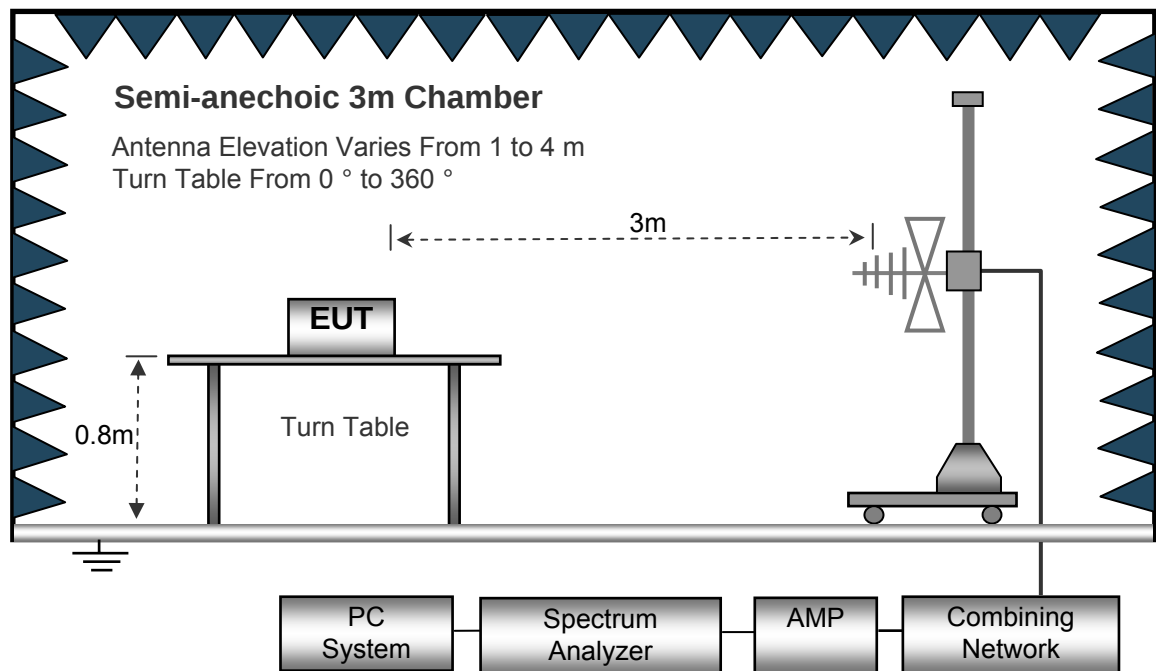
The EUT was tested in Transmitting mode, and the test data were shown as follow.

### 6.2 Test Setup

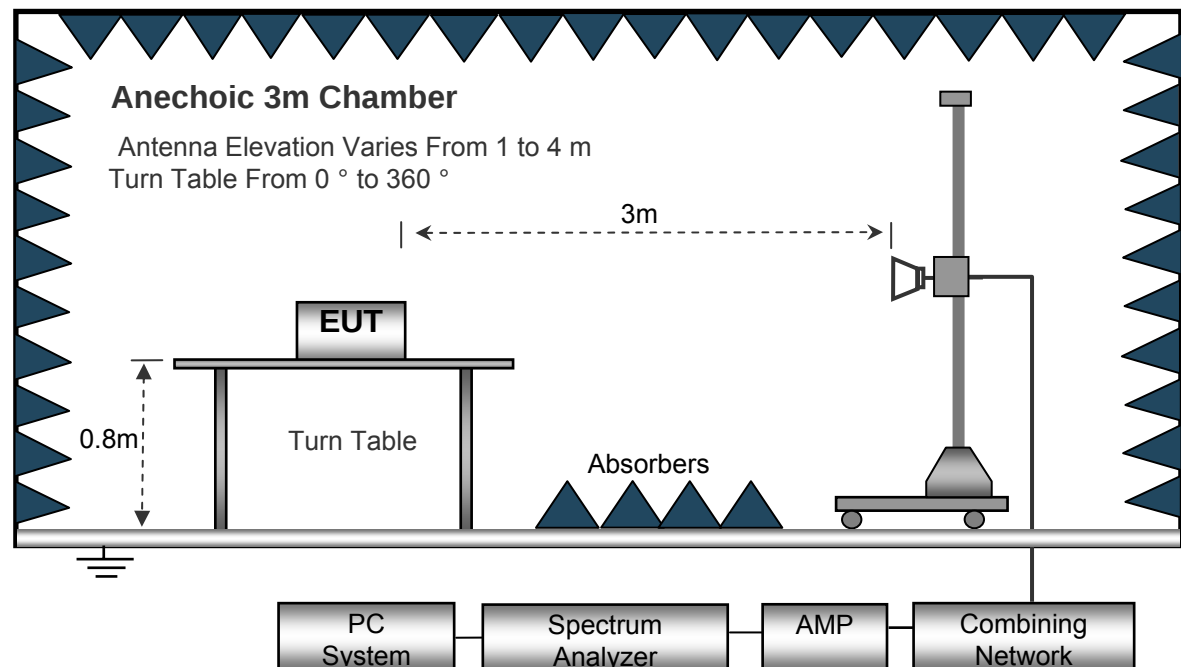
The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.  
The test setup for emission measurement below 30MHz.



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

According to FCC Part15 Rules, the system was tested 32.678kHz to 5000MHz.

#### Below 30MHz

Sweep Speed .....Auto  
 IF Bandwidth .....10kHz  
 Video Bandwidth.....10kHz  
 Resolution Bandwidth.....10kHz

#### 30MHz ~ 1GHz

Sweep Speed .....Auto  
 Detector .....PK  
 Resolution Bandwidth.....100kHz  
 Video Bandwidth.....300kHz

#### Above 1GHz

Sweep Speed .....Auto  
 Detector .....PK  
 Resolution Bandwidth.....1MHz  
 Video Bandwidth.....3MHz

### 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.
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 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain the "Margin" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

## 6.6 Summary of Test Results

### Test Frequency :Below 30MHz

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

### Test Frequency : 30MHz ~ 5GHz

| Frequency | Receiver Reading | Detector    | Turn table Angle | RX Antenna |       | Corrected Factor | Corrected Amplitude | FCC Part 15.231/15.209/205 |        |
|-----------|------------------|-------------|------------------|------------|-------|------------------|---------------------|----------------------------|--------|
|           |                  |             |                  | Height     | Polar |                  |                     | Limit                      | Margin |
| (MHz)     | (dBμV)           | (PK/QP/Ave) | Degree           | (m)        | (H/V) | (dB)             | (dBμV/m)            | (dBμV/m)                   | (dB)   |
| 433.92    | 55.77            | PK          | 150              | 1.1        | H     | 19.68            | 75.45               | 92.87                      | -25.77 |
| 433.92    | 48.26            | PK          | 100              | 1.4        | V     | 19.68            | 67.94               | 92.87                      | -27.50 |
| 867.84    | 22.36            | PK          | 243              | 1.7        | H     | 29.71            | 52.07               | 72.87                      | -22.47 |
| 867.84    | 22.55            | PK          | 330              | 1.2        | V     | 29.71            | 52.26               | 72.87                      | -22.56 |
| 1301.76   | 55.21            | PK          | 154              | 1.2        | H     | -16.38           | 38.83               | 74.00                      | -38.05 |
| 1301.76   | 54.89            | PK          | 128              | 1.9        | V     | -16.38           | 38.51               | 74.00                      | -39.49 |
| 2725.20   | 57.97            | PK          | 241              | 1.5        | H     | -14.87           | 43.10               | 74.00                      | -37.48 |
| 2725.20   | 57.36            | PK          | 344              | 1.1        | V     | -14.87           | 42.49               | 74.00                      | -37.60 |

**AV = Peak +20Log<sub>10</sub>(duty cycle) =PK+(-7.89)** [refer to section 7 for more detail]

| Frequency | PK       | Turn table Angle | RX Antenna |       | Duty cycle Factor | AV       | FCC Part 15.231/209/205 |        |
|-----------|----------|------------------|------------|-------|-------------------|----------|-------------------------|--------|
|           |          |                  | Height     | Polar |                   |          | Limit                   | Margin |
| (MHz)     | (dBμV/m) | Degree           | (m)        | (H/V) | (dB)              | (dBμV/m) | (dBμV/m)                | (dB)   |
| 433.92    | 75.45    | 150              | 1.1        | H     | -7.89             | 67.56    | 72.87                   | -5.31  |
| 433.92    | 67.94    | 100              | 1.4        | V     | -7.89             | 60.05    | 72.87                   | -12.82 |
| 867.84    | 52.07    | 243              | 1.7        | H     | -7.89             | 44.18    | 52.87                   | -8.69  |
| 867.84    | 52.26    | 330              | 1.2        | V     | -7.89             | 44.37    | 52.87                   | -8.50  |
| 1301.76   | 38.83    | 154              | 1.2        | H     | -7.89             | 30.94    | 54.00                   | -23.06 |
| 1301.76   | 38.51    | 128              | 1.9        | V     | -7.89             | 30.62    | 54.00                   | -23.38 |
| 2725.20   | 43.10    | 241              | 1.5        | H     | -7.89             | 35.21    | 54.00                   | -18.79 |
| 2725.20   | 42.49    | 344              | 1.1        | V     | -7.89             | 34.60    | 54.00                   | -19.40 |

7 Periodic Operation

The duty cycle was determined by the following equation:  
To calculate the actual field intensity, The duty cycle correction factor in decibel is needed for later use and can be obtained from following conversion

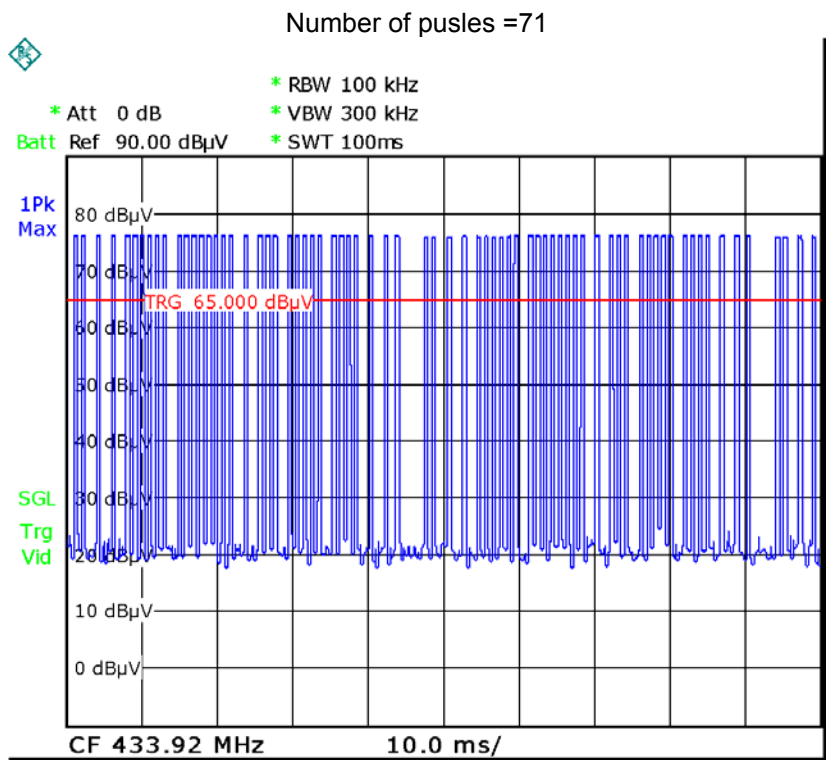
Duty Cycle(%)=Total On interval in a complete pulse train/ Length of a complete pulse train \* %  
Duty Cycle Correction Factor(dB)=20 \* Log<sub>10</sub>(Duty Cycle(%))

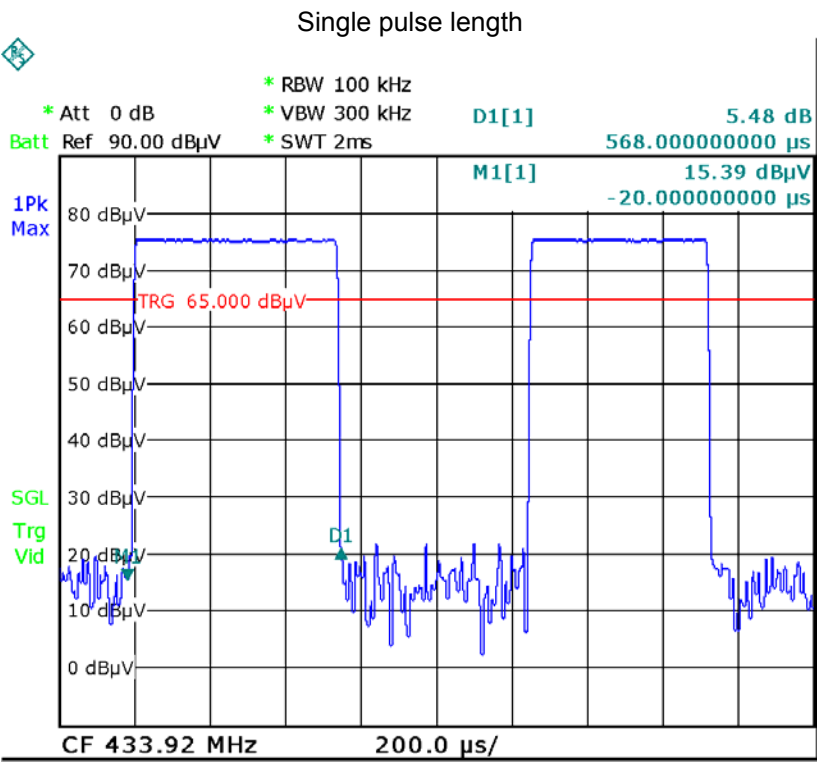
|                                              |                    |
|----------------------------------------------|--------------------|
| Total transmission time(ms)                  | 71*0.568ms=40.33ms |
| Length of a complete transmission period(ms) | 100                |
| Duty Cycle(%)                                | 40.33              |
| Duty Cycle Correction Factor(dB)             | -7.89              |

Refer to the duty cycle plot (as below), This device meets the FCC requirement.

Length of a complete pulse train:

Remark: FCC part15.35(c) required that a complete pulse train is more than 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.



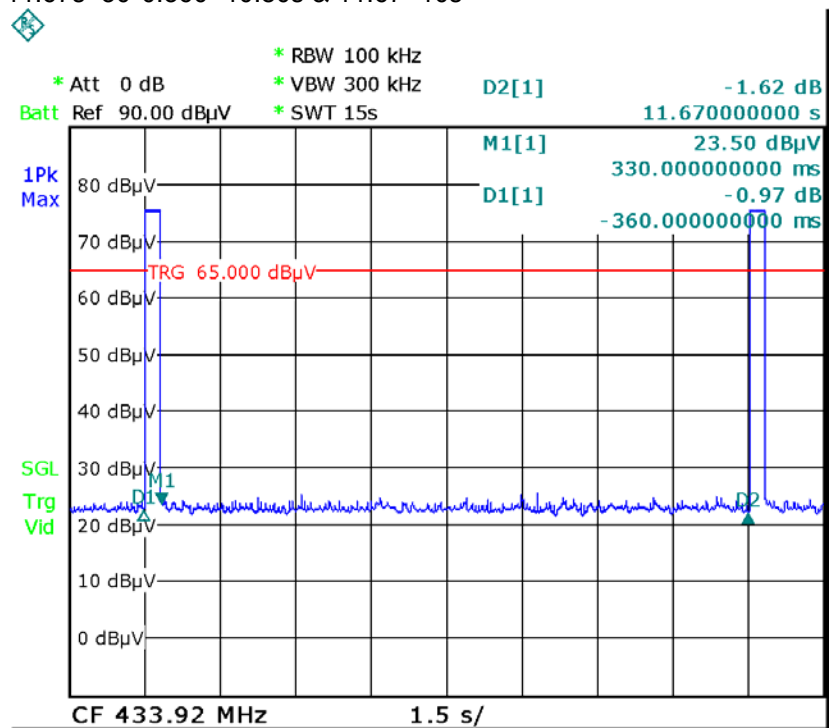


FCC Part15.231(e) In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

Result:PASS

The duration of each transmission is 0.360ms<1s,

The silent period is 11.67s>30\*0.360=10.80s & 11.67>10s



8 20dB Bandwidth

|                   |                                                                                                                                                                                                                                                 |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Requirement: | FCC Part15 C                                                                                                                                                                                                                                    |
| Test Method:      | FCC Part15 Paragraph 15.231(c)                                                                                                                                                                                                                  |
| Limit             | The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. |

8.1 Test Procedure

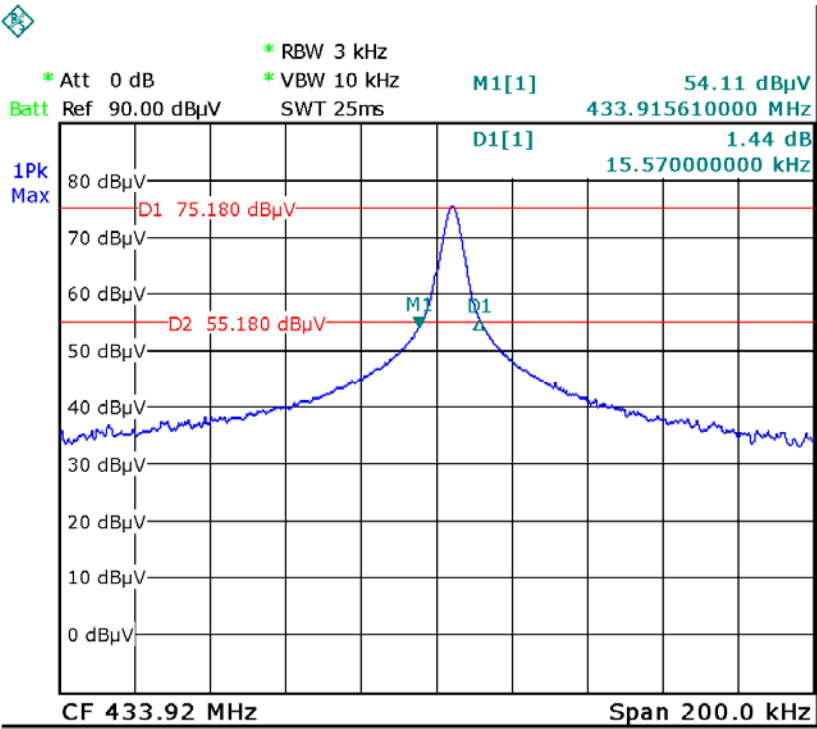
1. The transmitter output (antenna port) was connected to the spectrum analyzer.EUT and its simulators are placed on a table, let EUT working in test mode,then test it.
2. The bandwidth of the fundamental frequency was measure by spectrum analyser with 3kHz RBW and 10kHz VBW.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

8.2 Test Result

| Frequency (MHz) | Bandwidth Emission (kHz) | Limit (kHz) | Result |
|-----------------|--------------------------|-------------|--------|
| 433.92          | 15.57                    | 1084.80     | Pass   |

Limit=Center Frequency\*0.25%

Test Plot



## **9 Antenna Requirement**

According to the FCC Part 15 Paragraph 15.203, 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 to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product use a permanent PCB printed antenna, fulfill the requirement of this section

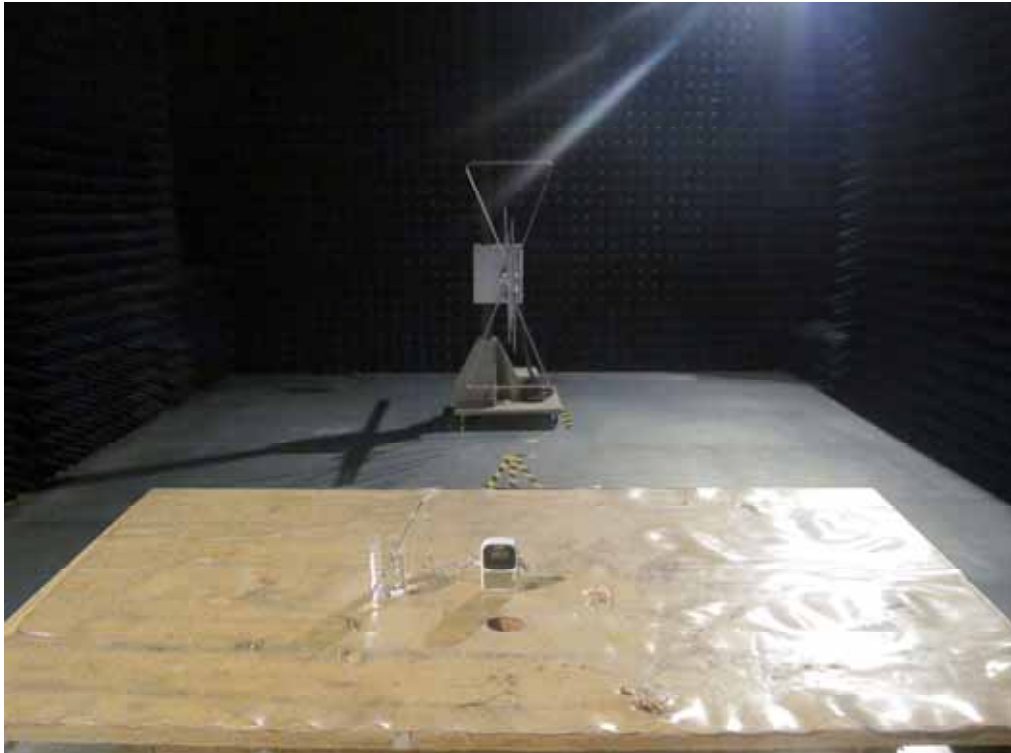
## 10 Photographs of Testing

### 10.1 Radiation Emission Test Setup

Below 30MHz



From 30MHz to 1GHz



Above 1GHz



## 11 Photographs - Constructional Details

### 11.1 EUT - Appearance View

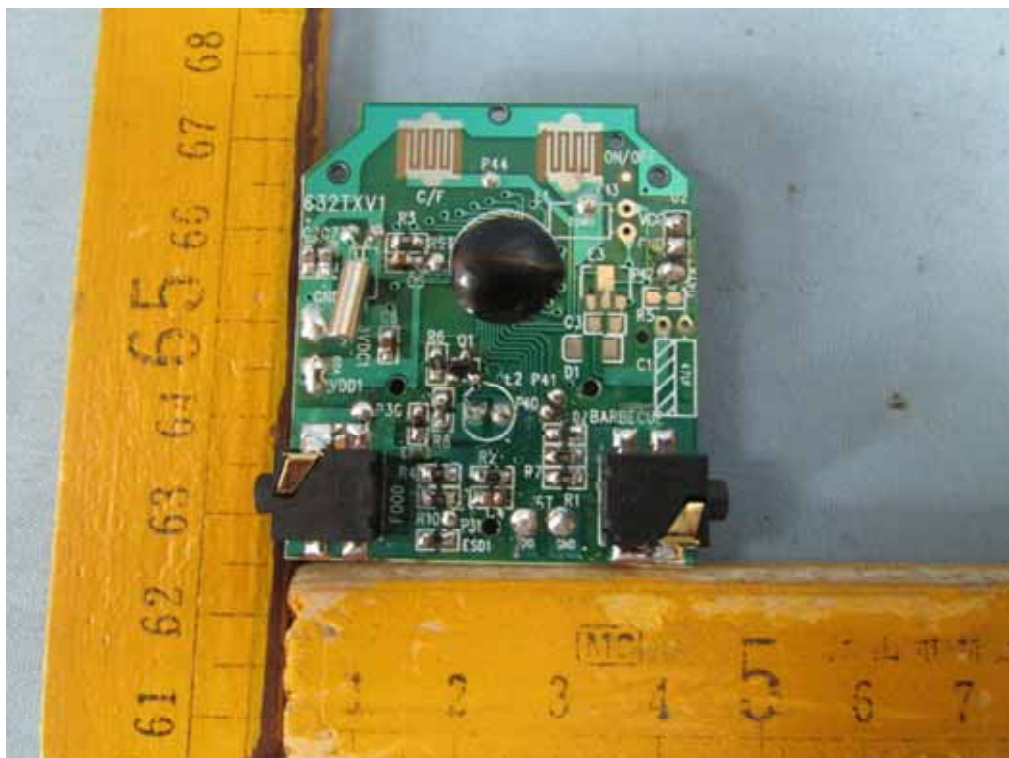


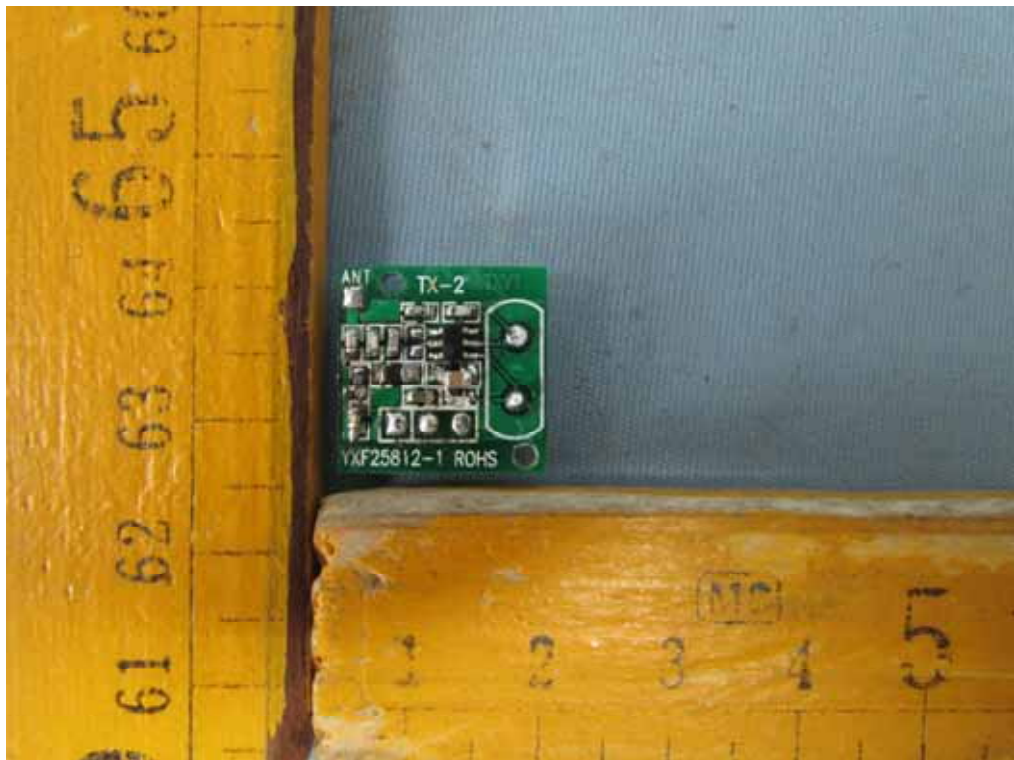
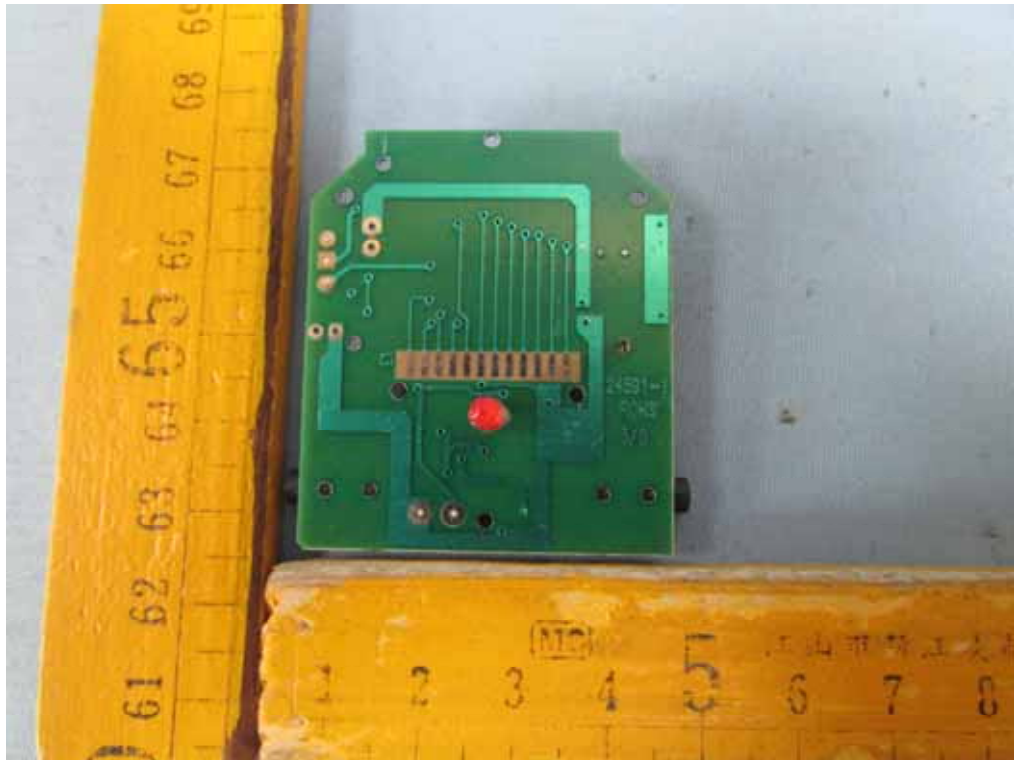






## 11.2 EUT- Internal View







====End of Report=====