

# ***FCC TEST REPORT***

**FCC ID** : U6SJW15829

**Applicant** : **Shenzhen J.W. industries Co.,Ltd.**  
The 3-7 Floor,No.20,Alley No.1,No.2 Liu xian Road, District 71,Baoan,  
Shenzhen, China.

**Equipment Under Test (EUT) :**

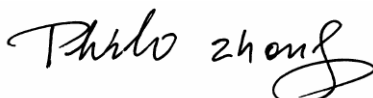
Product description : Remote sensor for Clock - Sound Center/Thermometer - Dig In/Out

Model No. : JW15829

**Standards** : FCC 15 Subpart C Paragraph 15.231(e)

**Date of Test** : August 25,2008

**Test Engineer** : **Nunu.Deng**

**Reviewed By** : 

PERPARED BY:

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

1/F, Fukangtai Building, West Baima Rd., Songgang Street, Baoan District, Shenzhen  
518105, China

Tel: 86-755-27553488

Fax: 86-755-27553868

## 2 Contents

	Page
<b>1 COVER PAGE.....</b>	<b>1</b>
<b>2 CONTENTS.....</b>	<b>2</b>
<b>3 TEST SUMMARY.....</b>	<b>4</b>
<b>4 GENERAL INFORMATION.....</b>	<b>5</b>
4.1 CLIENT INFORMATION .....	5
4.2 GENERAL DESCRIPTION OF E.U.T.....	5
4.3 DETAILS OF E.U.T. ....	5
4.4 DESCRIPTION OF SUPPORT UNITS .....	5
4.5 STANDARDS APPLICABLE FOR TESTING.....	5
4.6 TEST FACILITY.....	6
4.7 TEST LOCATION.....	6
<b>5 EQUIPMENT USED DURING TEST .....</b>	<b>7</b>
<b>6 CONDUCTED EMISSION TEST .....</b>	<b>9</b>
6.1 TEST EQUIPMENT.....	9
6.2 TEST PROCEDURE .....	9
6.3 CONDUCTED TEST SETUP .....	10
6.4 EUT OPERATING CONDITION .....	10
6.5 CONDUCTED EMISSION LIMITS .....	11
6.6 CONDUCTED EMISSION TEST DATA .....	11
<b>7 RADIATION EMISSION TEST.....</b>	<b>12</b>
7.1 TEST EQUIPMENT.....	12
7.2 MEASUREMENT UNCERTAINTY.....	12
7.3 TEST PROCEDURE .....	12
7.4 RADIATED TEST SETUP .....	13
7.5 SPECTRUM ANALYZER SETUP.....	13
7.6 CORRECTED AMPLITUDE & MARGIN CALCULATION .....	14
7.7 SUMMARY OF TEST RESULTS.....	14
7.8 EUT OPERATING CONDITION .....	15
7.9 RADIATED EMISSIONS LIMIT.....	15
7.10 RADIATED EMISSIONS TEST RESULT.....	16
7.10.1 Radiated Emission Test Data .....	16
<b>8 ANTENNA REQUIREMENT.....</b>	<b>18</b>
<b>9 PERIODIC OPERATION.....</b>	<b>19</b>
<b>10 BAND EDGE .....</b>	<b>20</b>
10.1 TEST PROCEDURE .....	20
10.2 BAND EDGE .....	20
10.3 BAND EDGE TEST RESULT .....	21
<b>11 PHOTOGRAPHS OF TESTING.....</b>	<b>22</b>

11.1 RADIATION EMISSION TEST VIEW FOR 30MHZ-1000MHZ.....22

11.2 RADIATION EMISSION TEST VIEW FOR 1GHZ-5GHZ.....22

**12 PHOTOGRAPHS - CONSTRUCTIONAL DETAILS .....23**

12.1 EUT - FRONT VIEW .....23

12.2 EUT - BACK VIEW .....23

12.3 PCB1-FRONT VIEW .....24

12.4 PCB1-BACK VIEW.....24

12.5 PCB2-FRONT VIEW .....25

12.6 PCB2-BACK VIEW.....25

**13 FCC ID LABEL.....26**

3    **Test Summary**

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 5GHz)	FCC PART 15: 2003	ANSI C63.4: 2003	N/A	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2003	ANSI C63.4: 2003	N/A	N/A

## **4 General Information**

### **4.1 Client Information**

Applicant:	Shenzhen J.W. industries Co.,Ltd.
Address:	The 3-7 Floor,No.20,Alley No.1,No.2 Liu xian Road, District 71,Baoan, Shenzhen, China.
Manufacturer:	Shenzhen J.W. industries Co.,Ltd.
Address:	The 3-7 Floor,No.20,Alley No.1,No.2 Liu xian Road, District 71,Baoan, Shenzhen, China.

### **4.2 General Description of E.U.T.**

Product description:	Remote sensor for Clock - Sound Center/Thermometer - Dig In/Out
Model No.:	JW15839

### **4.3 Details of E.U.T.**

Power Supply: DC 3V

### **4.4 Description of Support Units**

The EUT has been tested as an independent unit.

### **4.5 Standards Applicable for Testing**

The customer requested FCC tests for a Remote sensor for Clock - Sound Center/Thermometer - Dig In/Out. The standards used were FCC 15 Paragraph 15.231(e), Paragraph 15.205, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35.

#### 4.6 Test Facility

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

- **IC – Registration No.:IC7760**

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 IC7760, July 24, 2008.

- **FCC – Registration No.: 880581**

Waltek Services(Shenzhen) Co., Ltd. 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, June 24, 2008. compliance

#### 4.7 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

Equipment	Brand Name	Model	Related standards	Cal.Intal Months	Last Cal. Date	Serial No
<b>3m Semi-anechoic chamber</b>						
EMC Analyzer	Agilent	E7405A	ISO9001:2000	12	Aug-08	MY45114943
Active Loop Antenna	Beijing Dazhi	ZN30900A	ISO 9001	12	Jul -08	-
Trilog Broadband Antenne	SCHWARZBECK MESS-ELEKTROM	VULB9163	EN/ISO/IEC 17025 DIN EN ISO9001	12	Aug-08	336
Broad-band Horn Antenna	SCHWARZBECK MESS-ELEKTROM	BBHA 9120 D	EN/ISO/IEC 17025 DIN EN ISO9001	12	Aug-08	667
Broadband Preamplifier	SCHWARZBECK MESS-ELEKTROM	BBV 9718	EN/ISO/IEC 17025 DIN EN ISO9001	12	Aug-08	9718-148
10m Coaxial Cable with N- male Connectors usable up to 18GHz,	SCHWARZBECK MESS-ELEKTROM	AK 9515 H	EN/ISO/IEC 17025 DIN EN ISO9001	12	Aug-08	-
10m 50 Ohm Coaxial Cable with N- plug,individual length,usable up to 3(5)GHz, Connectors	SCHWARZBECK MESS-ELEKTROM	AK 9513	EN/ISO/IEC 17025 DIN EN ISO9001	12	Aug-08	-
Positioning Controller	C&C LAB	CC-C-IF	ISO9001	12	Aug-08	MF7802108
Color Monitor	SUNSP0	SP-14C	ISO9001	12	Aug-08	-
<b>EMI Shielded Room</b>						
Test Receiver	ROHDE&SCHWAR Z	ESPI	ISO9001	12	Jul-08	101155
Two-Line V- Network	ROHDE&SCHWAR Z	ENV216	ISO9001 EN/ISO/IEC 17025	12	Jul-08	100115

Absorbing Clamp	ROHDE&SCHWAR Z	MDS-21	ISO9001 EN/ISO/IEC 17025	12	Jul-08	100205
10m 50 Ohm Coaxial Cable with N- plug,individual length,usable up to 3(5)GHz, Connectors	SCHWARZBECK MESS-ELEKTROM	AK 9514	EN/ISO/IEC 17025 DIN EN ISO9001	12	Aug-08	-



6    **Conducted Emission Test**

Product Name:	Remote sensor for    Clock - Sound Center/Thermometer - Dig In/Out
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15    Paragraph 15.207
Test Date:	.....
Frequency Range:	150kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1    **Test Equipment**

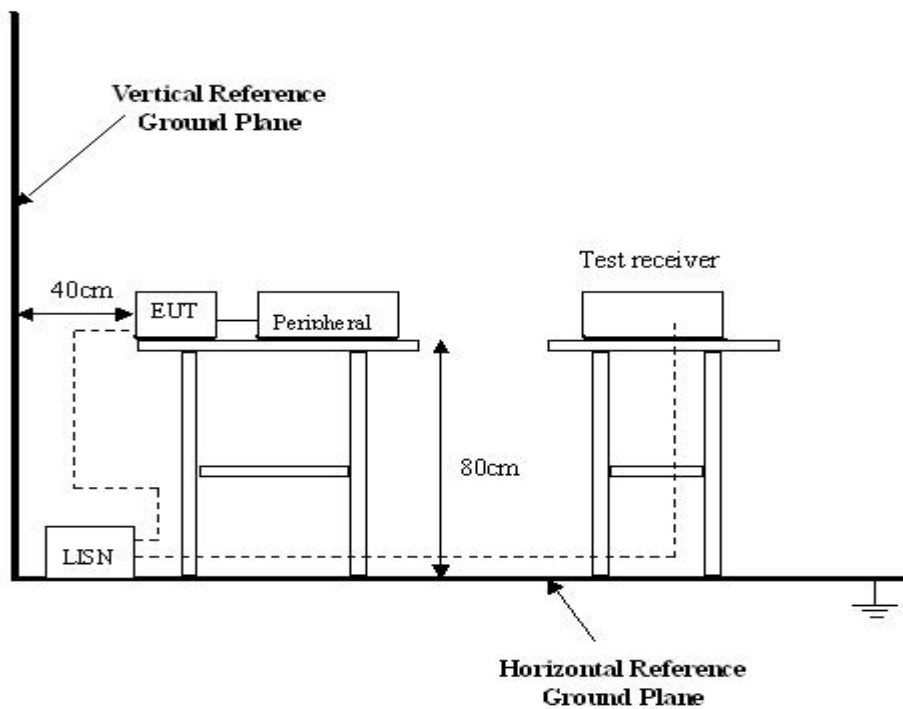
Please refer to Section 5 this report.

6.2    **Test Procedure**

1. The EUT was tested according to ANSI C63.4: 2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. 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.

### 6.3 Conducted Test Setup

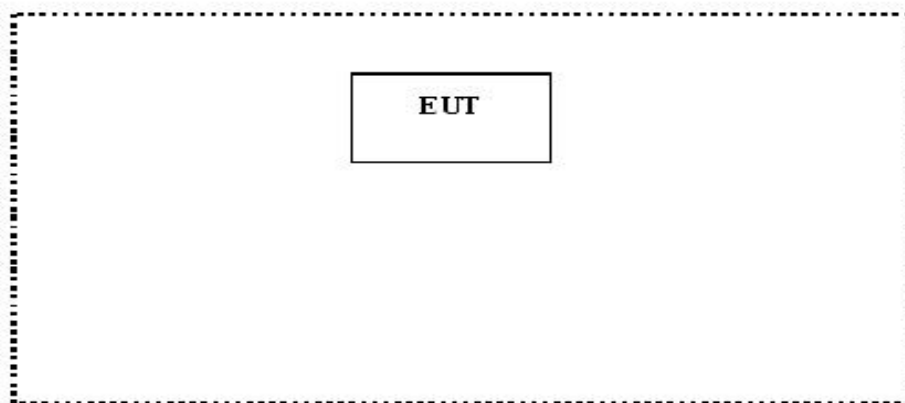
The conducted emission tests were performed using the setup accordance with the ANSI C63.4: 2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



### 6.4 EUT Operating Condition

Operating condition is according to ANSI C63.4: 2003.

- Setup the EUT and simulators as shown on follow.
- Enable RF signal and confirm EUT active.
- Modulate output capacity of EUT up to specification.



## **6.5 Conducted Emission Limits**

66-56 dB $\mu$ V/m between 0.15MHz & 0.5MHz

56 dB $\mu$ V/m between 0.5MHz & 5MHz

60 dB $\mu$ V/m between 5MHz & 30MHz

**Note:** In the above limits, the tighter limit applies at the band edges.

## **6.6 Conducted Emission Test Data**

Owing to the DC operation of EUT, this test is not performed.

## 7 Radiation Emission Test

Product Name:	Remote sensor for Clock - Sound Center/Thermometer - Dig In/Out
Test Requirement:	FCC Part15 Paragraph 15.231(e)
Test Method:	Based on FCC Part15 Paragraph 15.33
Test Date:	August 25,2008
Frequency Range:	30MHz to 5GHz
Measurement Distance:	3m

### 7.1 Test Equipment

Please refer to Section 5 this report.

### 7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

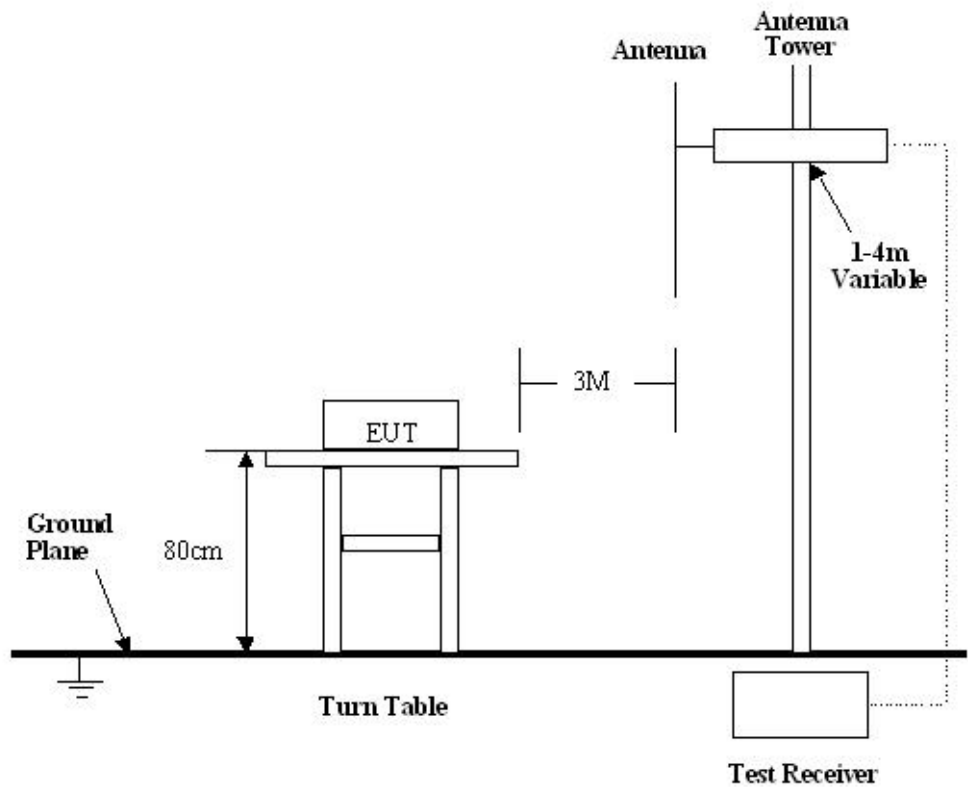
Based on ANSI C63.4: 2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Waltek EMC Lab is +2.9 dB.

### 7.3 Test Procedure

1. New battery were installed in the equipment under test for radiated emissions test.
2. This is a handheld device, The radiation emission should be tested under 3-axes position (lying, side and stand). After pre-test, It was found that the worse radiation emission was get at the lying position.
3. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
4. All data was recorded in the peak detection mode.
5. The EUT was under working mode during the final qualification test and the configuration was used to represent the worst case results.

7.4 Radiated 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 specification used in this report was the FCC Part15 Paragraph 15.231(e), Paragraph 15.209 limits.



7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.231(e) Rules, the system was tested to 5000 MHz.

Start Frequency .....30 MHz  
Stop Frequency .....1000 MHz  
Sweep Speed Auto  
IF Bandwidth .....120 kHz  
Video Bandwidth .....100 kHz  
Quasi-Peak Adapter Bandwidth .....120 kHz  
Quasi-Peak Adapter Mode.....Normal  
Resolution Bandwidth .....100 kHz

Start Frequency .....	1GHz
Stop Frequency .....	5GHz
Sweep Speed	Auto
IF Bandwidth .....	120 kHz
Video Bandwidth .....	1 MHz
Quasi-Peak Adapter Bandwidth .....	120 kHz
Quasi-Peak Adapter Mode.....	Normal
Resolution Bandwidth .....	1MHz

7.6 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:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

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

7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.231(e) standards.

7.8 EUT Operating Condition

Same as section 6.4 of this report.

7.9 Radiated Emissions Limit

Fundamental frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of spurious emissions (microvolts/meter)
40. 66-40. 70.....	1, 000.....	100
70-130.....	1, 250.....	125
130-174.....	\1\ 1, 250 to 3, 750	\1\ 125 to 375
174-260.....	3, 750.....	375
260-470.....	\1\ 3, 750 to 12, 500.	\1\ 375 to 1, 250
Above 470.....	12, 500.....	1, 250

**7.10 Radiated Emissions Test Result**

Formula of conversion factors:the field strength at 3m was established by adding  
The meter reading of the spectrum analyzer (which is set to read in units of dBuV)  
To the antenna correction factor supplied by the antenna manufacturer. The antenna  
Correction factors are stated in terms of dB.The gain of the pressletor was accounted  
For in the spectrum analyser meter reading.

Example:

Freq(MHz) Meter Reading +ACF=FS  
33            20dBuV+10.36dB=30.36dBuV/m @3m

**7.10.1 Radiated Emission Test Data**

Test Item:	Radiated Emission Test Data
Test Voltage:	DC 3V
Test Mode:	TX On
Temperature:	24 °C
Humidity:	52%RH
Test Result:	PASS



Frequency (MHz)	Detector	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
433.92	PK	Vertical	52..17	72.87	20.7	1.5	80
433.92	PK	Horizontal	59.65	72.87	13.22	1.5	60
867.831	PK	Vertical	33.71	52.87	19.16	2.0	60
1301.76	PK	Vertical	32.90	54.00	21.1	1.0	100
1735.58	PK	Vertical	29.15	54.00	24.85	1.5	100
2169.60	PK	Vertical	29.33	54.00	24.67	1.5	100
2603.52	PK	Vertical	28.79	54.00	25.21	1.0	90
3037.44	PK	Vertical	28.90	54.00	25.1	1.4	90
3471.36	PK	Vertical	28.10	54.00	25.9	1.6	90
3905.28	PK	Vertical	29.37	54.00	24.63	1.5	60
4339.20	PK	Vertical	28.59	54.00	25.41	1.0	60
867.831	PK	Horizontal	33.25	52.87	19.62	1.2	80
1301.76	PK	Horizontal	35.09	54.00	18.91	1.0	60
1735.58	PK	Horizontal	29.47	54.00	24.53	1.5	45
2169.60	PK	Horizontal	29.31	54.00	24.69	1.5	100
2603.52	PK	Horizontal	28.80	54.00	25.2	1.6	80
3037.44	PK	Horizontal	28.60	54.00	25.4	1.5	100
3471.36	PK	Horizontal	28.72	54.00	25.28	1.5	100
3905.28	PK	Horizontal	28.94	54.00	25.06	1.5	100
4339.20	PK	Horizontal	28.39	54.00	25.61	1.4	90

Where F is the frequency in MHz, The formulas for calculating the maximum permitted fundamental field strengths are as follows:

- (1). For the band 130-174MHz, uV/m at 3 meters =  $22.72727(F) - 2454.545$ ;
- (2). For the band 260-470MHz, uV/m at 3 meters =  $16.6667(F) - 2833.3333$ .

Sample calculation of limit @ 433.92MHz

$16.6667(433.92) - 2833.333 = 4893.68 \text{ V/m}$

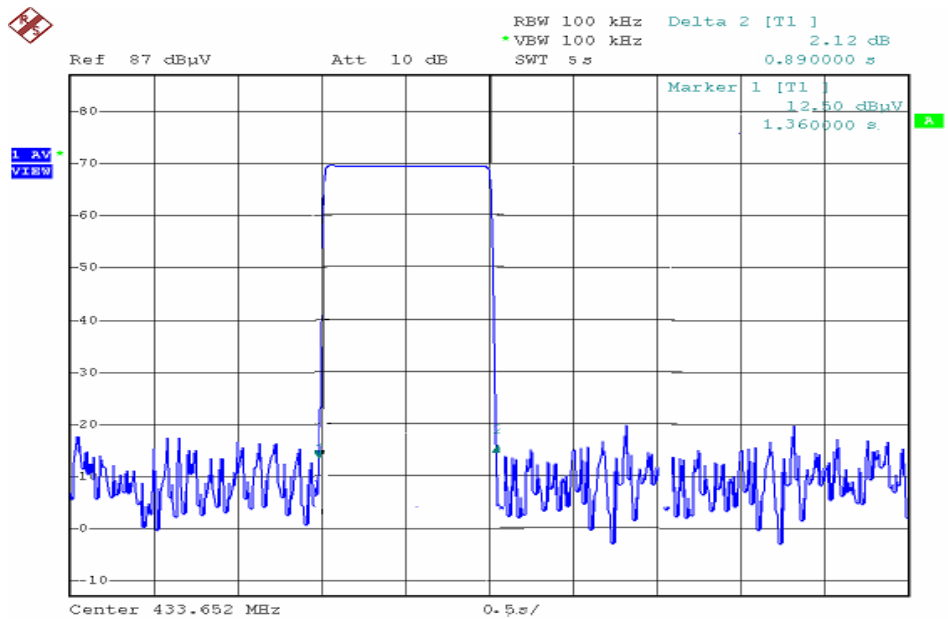
$20\log(4893.68) = 72.8664 \text{ dBuV/m limit @ 433.92MHz}$

## **8 Antenna Requirement.**

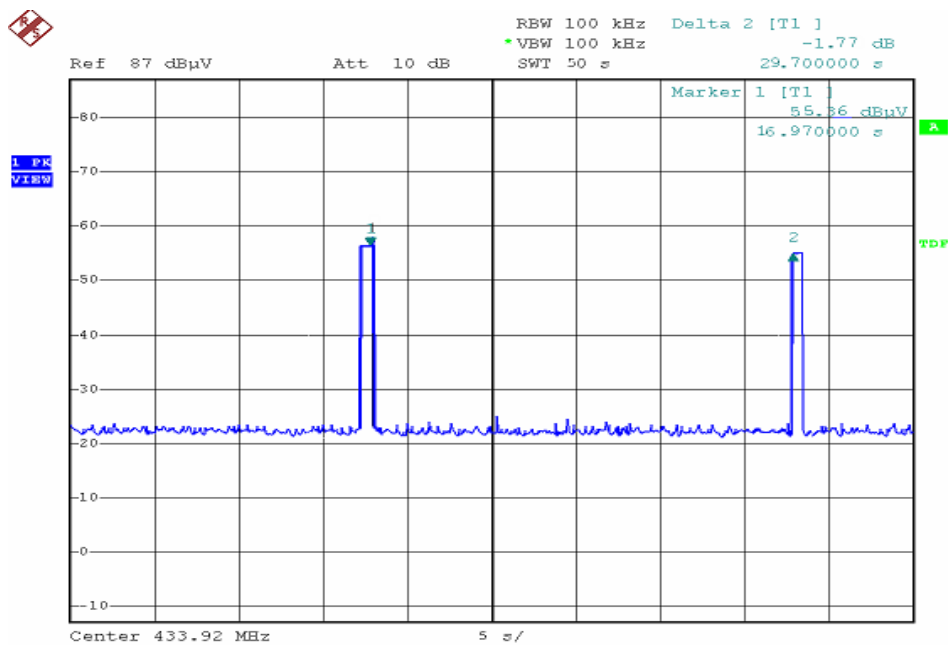
According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna to the intentional radiator shall be considered sufficient to comply with the provisions of this section. This product has a permanent antenna, fulfill the requirement of this section

## 9 Periodic Operation

Refer to the plot (as below),We find each the duration transmission for the device is about 0.89seconds and silent period between transmissions is about 29.7seconds,This device does meet the FCC requirement.



C



## 10 Band Edge

Test Requirement:	FCC Part15 C
Test Method:	Based on FCC Part15 Paragraph 15.231
Test Date:	August 25,2008
Test mode:	TX On
Temperature:	24 °C
Humidity:	52%RH

### 10.1 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 100KHz RBW and 100KHz VBW.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power 20dB.

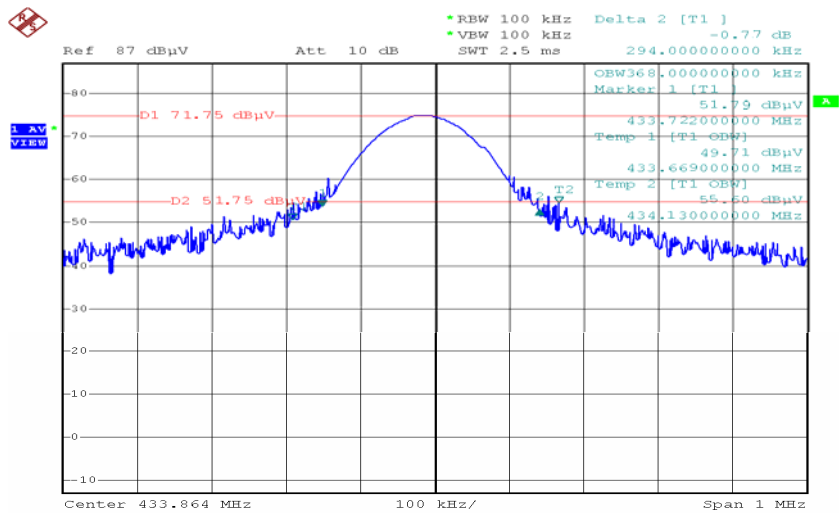
### 10.2 Band Edge

Requirements: 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. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Frequency (MHz)	Bandwidth Emission (KHz)	Limit (KHz)	Result
433.92	294	1084.8	Pass

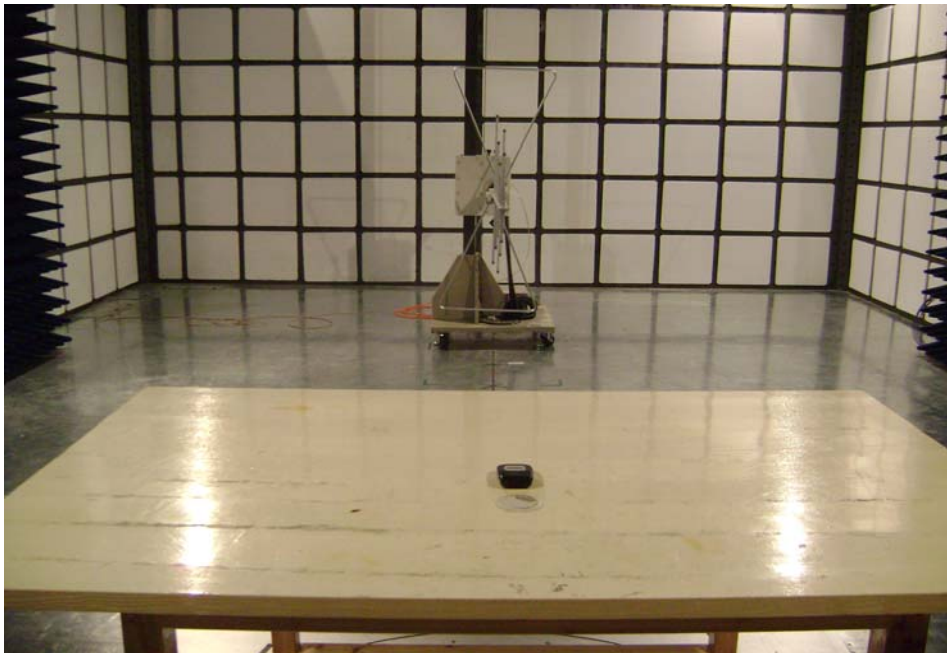
10.3 Band Edge Test Result

433.92MHz TX

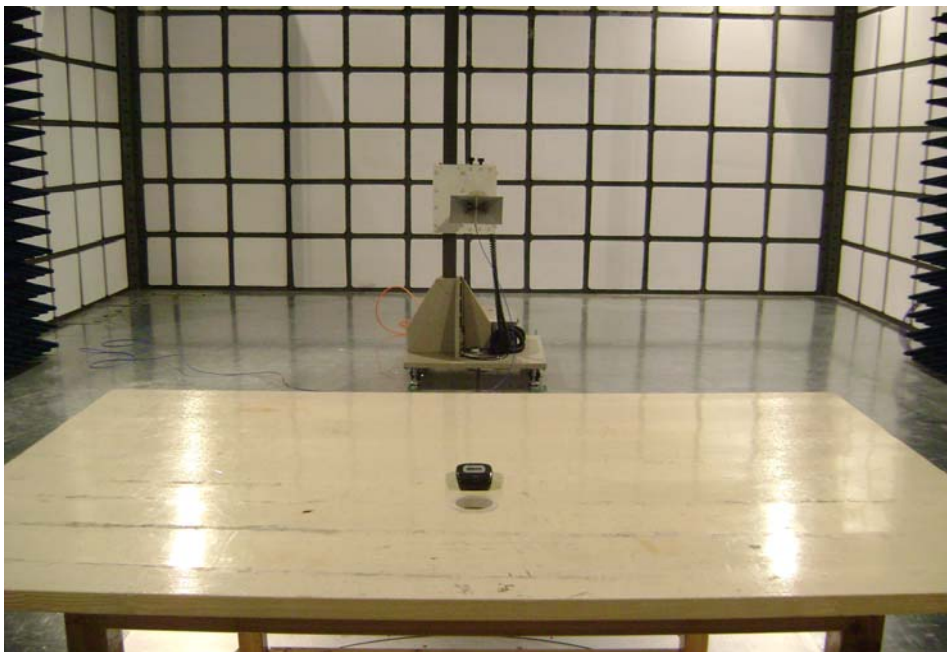


## 11 Photographs of Testing

### 11.1 Radiation Emission Test View For 30MHz-1000MHz



### 11.2 Radiation Emission Test View For 1GHz-5GHz



## 12 Photographs - Constructional Details

### 12.1 EUT - Front View

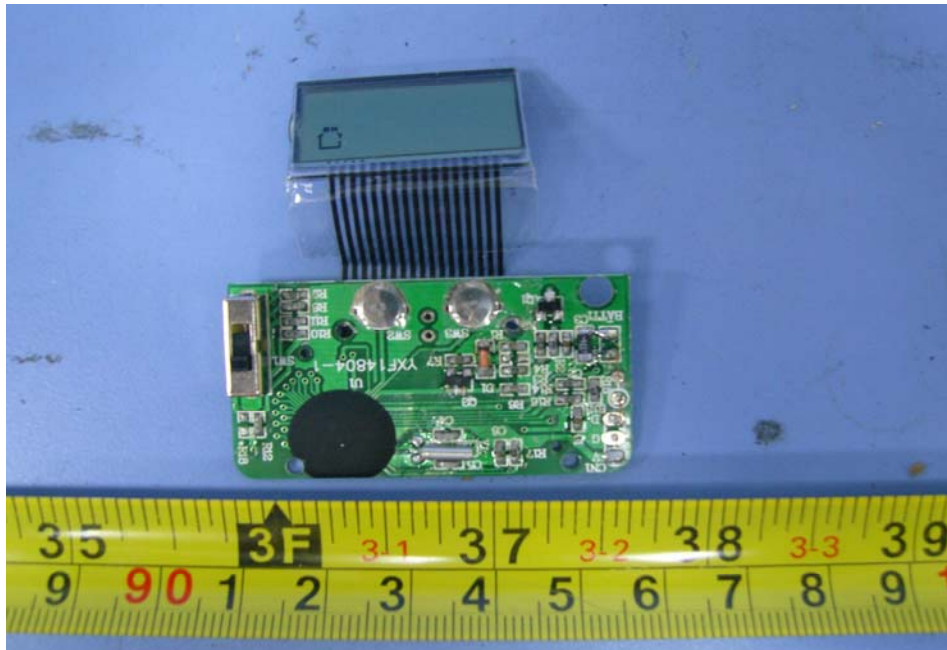


### 12.2 EUT - Back View

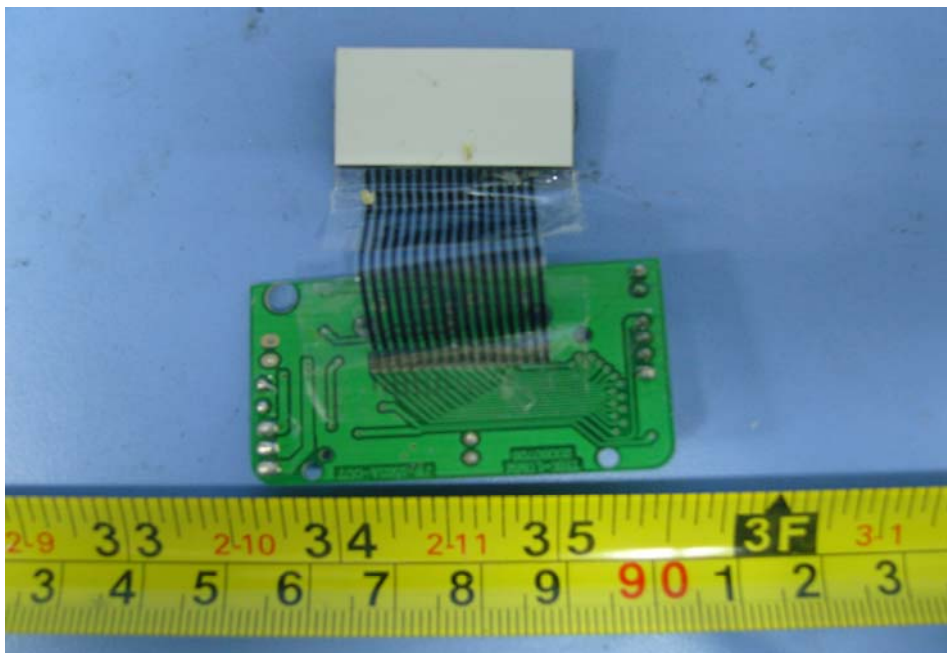




### 12.3 PCB1-Front View

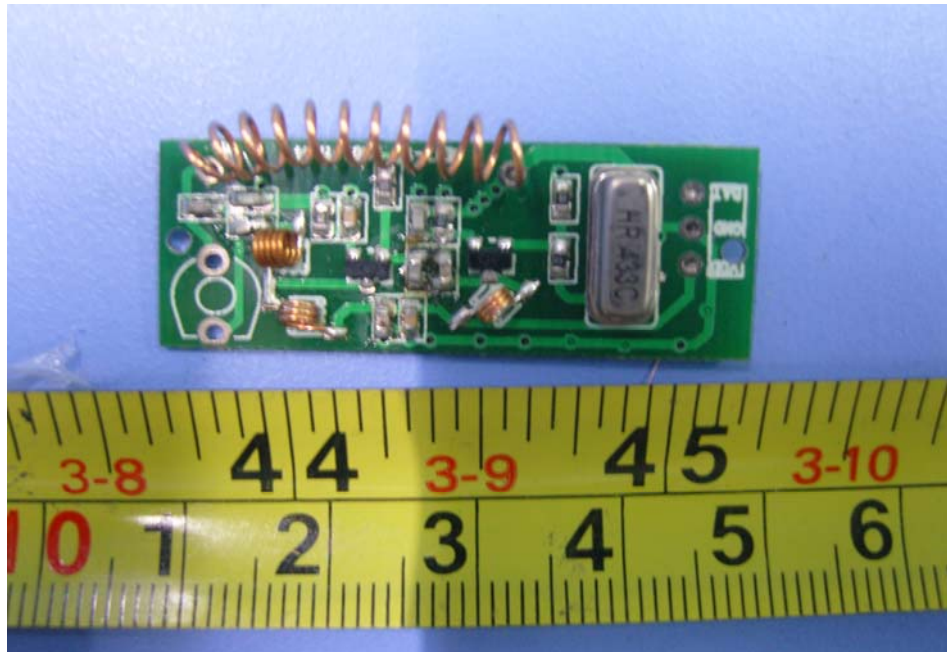


### 12.4 PCB1-Back View

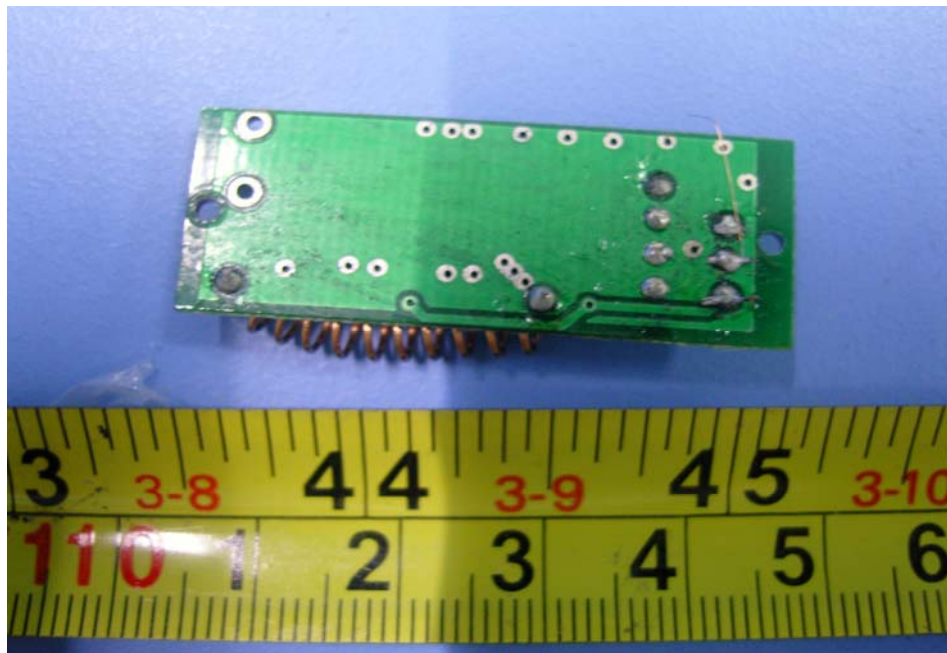




### 12.5 PCB2-Front View



### 12.6 PCB2-Back View



### 13 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference,and (2) this device must accept any interference received, including interference that may cause undesired operation

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT  
EUT Bottom View/proposed FCC Label Location

