

# Ke Mei Ou Laboratory Co., Ltd.

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## ***FCC TEST REPORT***

Under  
FCC 15 Subpart C, Paragraph 15.231

Prepared For :

### **Carrin Electronics Co., Ltd.**

Unit 2105-06, Tower A, Regent Centre, 63 Wo Yi Hop Road,  
Kwai Chung, N.T., Hong Kong

**FCC ID: Q9E-KW9010**

**EUT: LCD Remote Sensor**

**Model: KW9010**

August 29, 2008

**Report Type:** Original Report

**Test Engineer:** Jacky Huang

**Test Date:** August 24, 2008



**Review By:** \_\_\_\_\_  
Apollo Liu / Manager

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## 1. General Information

### 1.1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

### 1.2 Testing Laboratory

#### **SinTek Laboratory Co., Ltd.**

No.7, Xinshidai Industrial, Guantian Village, Shiyao Town, Bao'an District, Shenzhen, Guangdong China..

Tel: +86 755 27608353 Fax: +86 755 27608359

Site on File with the Federal Communications Commission – United States

Registration Number: 963441

### 1.3 Details of Applicant

**Name** : Carrin Electronics Co., Ltd.

**Address** : Unit 2105-06, Tower A, Regent Centre, 63 Wo Yi Hop Road, Kwai Chung, N.T., Hong Kong

**Contact**

**Tel**

**Fax**

### 1.4 Application Details

Date of Receipt of Application : August 22, 2008

Date of Receipt of Test Item : August 24, 2008

Date of Test : August 24~August 29, 2008

### 1.5 Test Item

Manufacturer : Carrin Electronics Manu Factory

Brand Name : N/A

Model No. : KW9010

Description : LCD Remote Sensor

### Additional Information

Frequency : 433.902MHz

Transmission Range : 30 meters (open area).

Number of Channels : 3

Power Supply : DC 1.5V AAA size x 2.

Extreme Temp. Tolerance : -50°C to +70°C

### 1.6 Test Standards

FCC 15 Subpart C, Paragraph 15.231
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Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

## 2. Technical Test

### 2.1 Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.207	Conducted Test	N/A	Complies
FCC Part 15 Subpart C Paragraph 15.231(e) Limit	Field Strength of Fundamental	PASS	Complies
FCC Part 15, Subpart C Paragraph 15.231(e) Limit & Paragraph 15.209	Radiated Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.231Limit	Measured Bandwidth	PASS	Complies

## 3. EUT Modifications

No modification by test lab.

## 4. Conducted Power Line Test

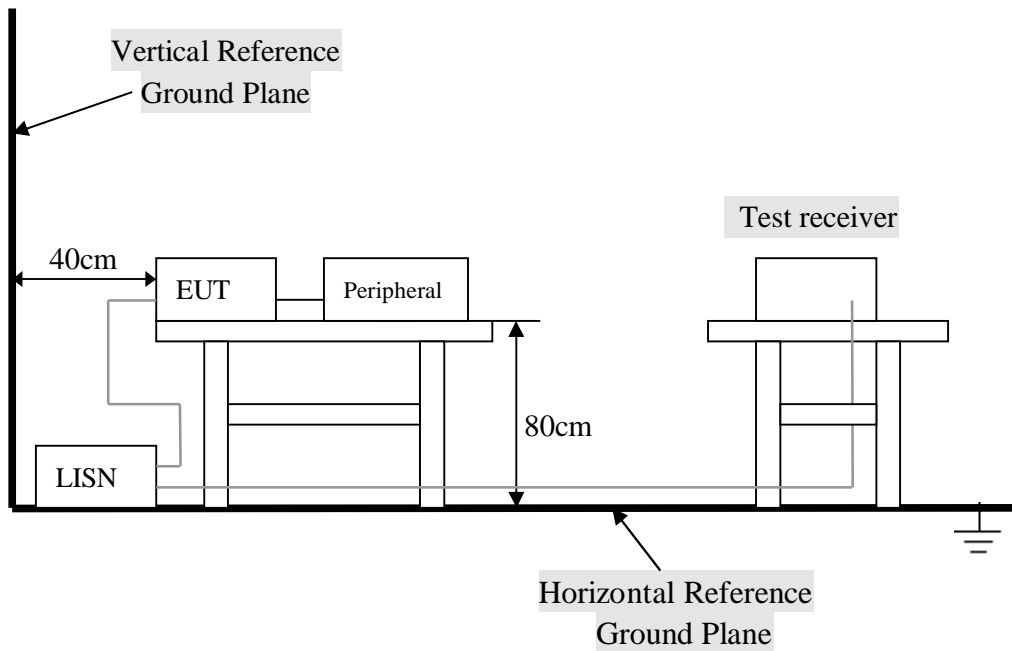
### 4.1 Test Equipment

Please refer to Section 9 this report.

### 4.2 Test Procedure

The EUT was tested according to ANSI C63.4 - 2001. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 uHenry as specified by section 5.1 of ANSI C63.4 - 2001. cables and peripherals were moved to find the maximum emission levels for each frequency.

### 4.3 Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.

#### 4.4 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. EUT was used 2 x AAA 1.5V batteries. Press any key of the EUT. Once the button releasing, the transmission will be stopped within 1 second. The EUT transmitted continuously and the duty cycle of transmitting was set to worst case condition (100% duty cycle), which provided by manufacturer during all the tests. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

##### A. EUT

Device	Manufacturer	Model #	FCC ID
LCD Remote Sensor	Carrin Electronics Manu Factory	KW9010	Q9E-KW9010

##### B. Internal Devices

Device	Manufacturer	Model #	FCCID / DoC
N/A			

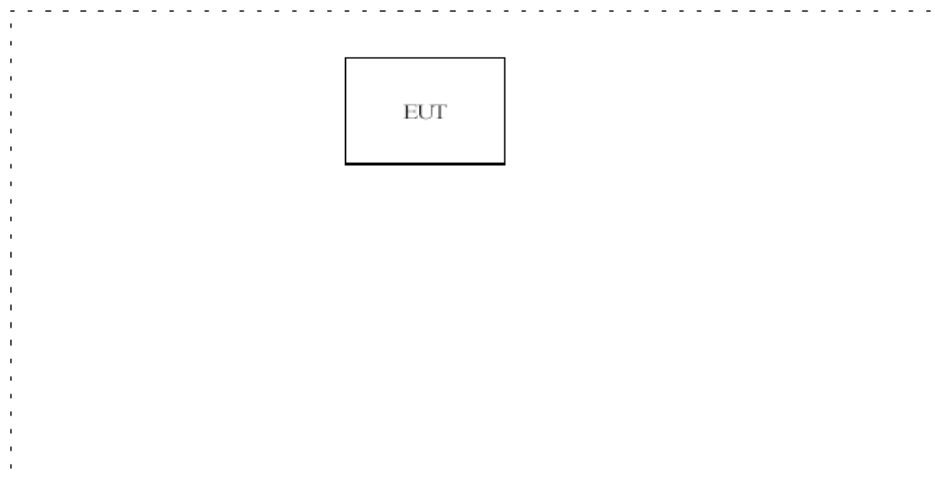
##### C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
N/A				

## 4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 2001.

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



## 4. 6 Conducted Power Line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency Range (MHz)	Class A QP/AV	Class B QP/AV
0.15 – 0.5	79/66	66-56/56-46
0.5 – 5.0	73/60	56/46
5.0 - 30	73/60	60/50

**NOTE** : In the above table, the tighter limit applies at the band edges.

## 4. 7 Conducted Power Line Test Result

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

## 5. Radiated Emission Test

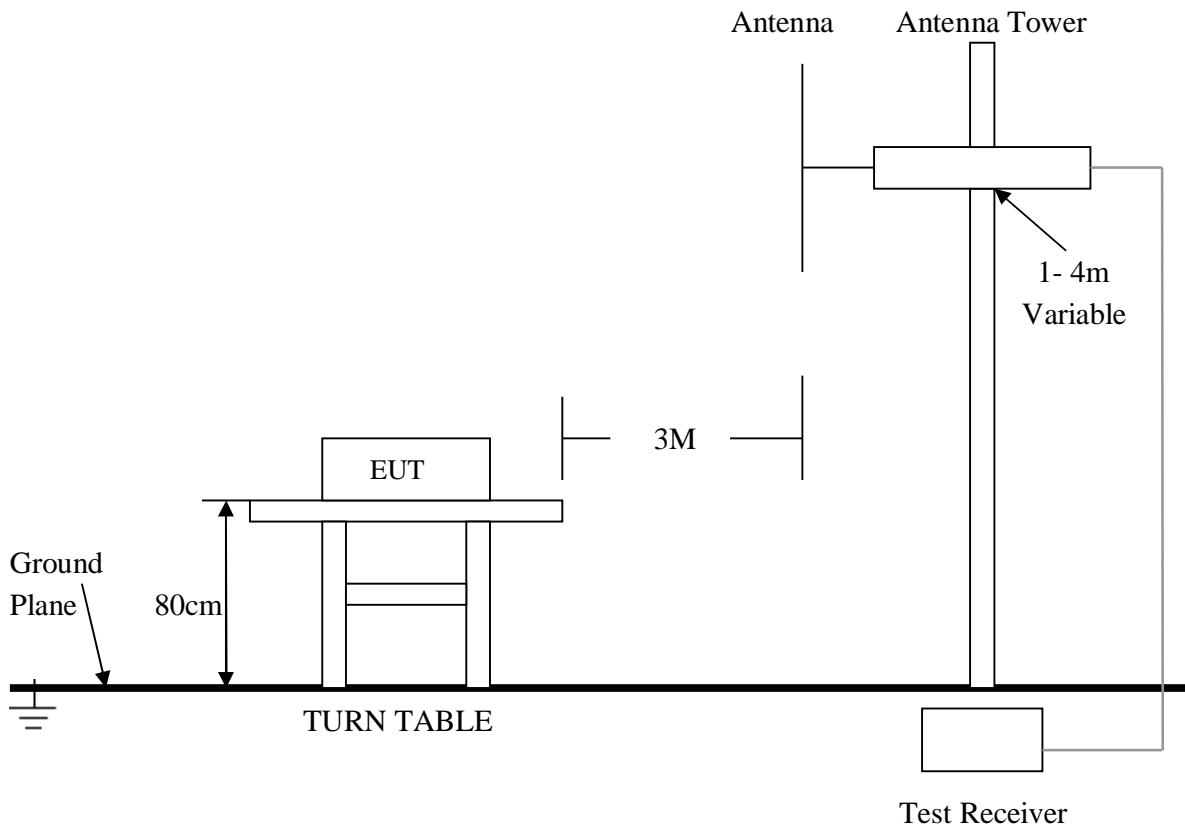
### 5.1 Test Equipment

Please refer to Section 9 this report.

### 5.2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2003.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
3. The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "QP" in the data table.
6. The antenna polarization : Vertical polarization and Horizontal polarization.

### 5.3 Radiated Test Setup



For the actual test configuration , please refer to the related items – Photos of Testing.



## 5.4 Configuration of The EUT

Same as section 4 . 4 of this report

## 5.5 EUT Operating Condition

Same as section 4 . 5 of this report.

## 5.6 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below :

### A. FCC Part 15 Subpart C Paragraph 15.231(e) Limit

Fundamental Frequency (MHz)	Field Strength of Fundamental (3m)		Field Strength of Harmonics (3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
433.908	4398.38	72.9	439.8	52.9

- Note:**
- (1) RF Voltage (dBuV) = 20 log RF Voltage (uV)
  - (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
  - (3) The emission limit in this paragraph is based on measurement instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

### B. Frequencies in restricted band are complied to limit on Paragraph 15.209.

Frequency (MHz)	Distance (m)	Field Strength (dBuV/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
ABOVE 960	3	54.0

- Note:**
- (1) RF Voltage (dBuV) = 20 log RF Voltage (uV)
  - (2) In the Above Table, the tighter limit applies at the band edges.
  - (3) Distance refers to the distance in meters between the measuring instrument antenna and the

## 5.7 Radiated Emission Test Result

### A. Fundamental Radiated Emission Data

Product	: LCD Remote Sensor	Test Mode	: Normal
Test Item	: Fundamental Radiated Emission Data	Temperature	: 25 °C
Test Voltage	: DC 3V (Power by Battery)	Humidity	: 56%RH
Test Result	: <b>PASS</b>		

Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
433.902	67.2	HORIZ	72.9	-5.7
433.902	60.5	VERT	72.9	-12.4

**Note:**

- (1) All Readings are Peak value.
- (2) Emission Level = Reading Level + Probe Factor + Cable Loss.
- (3) The average measurement was not performed when the peak measured data under the limit of average detection.

### B. General Radiated Emission Data & Harmonics Radiated Emission Data

Product	: LCD Remote Sensor	Test Mode	: Normal
Test Item	: General Radiated Emission Data & Harmonics Radiated Emission Data	Temperature	: 25 °C
Test Voltage	: DC 3V (Power by Battery)	Humidity	: 56%RH
Test Result	: <b>PASS</b>		

Freq. (MHz)	Emission Peak (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
46.120	30.4	HORIZ	40.0	-9.6
54.240	31.6	VERT	40.0	-8.4
124.960	33.3	HORIZ	43.5	-10.2
266.080	28.2	VERT	43.5	-15.3
867.816	31.4	HORZ	52.9	-21.5
867.816	29.6	VERT	52.9	-23.3
1735.632	35.2	HORIZ	52.9	-17.7
1735.632	32.1	VERT	52.9	-20.8
2169.540	36.5	HORIZ	52.9	-16.4
2169.540	34.8	VERT	52.9	-18.1

**Note:**

- (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
- (2) Emission Level = Reading Level + Probe Factor + Cable Loss.

## 6. Band Edge

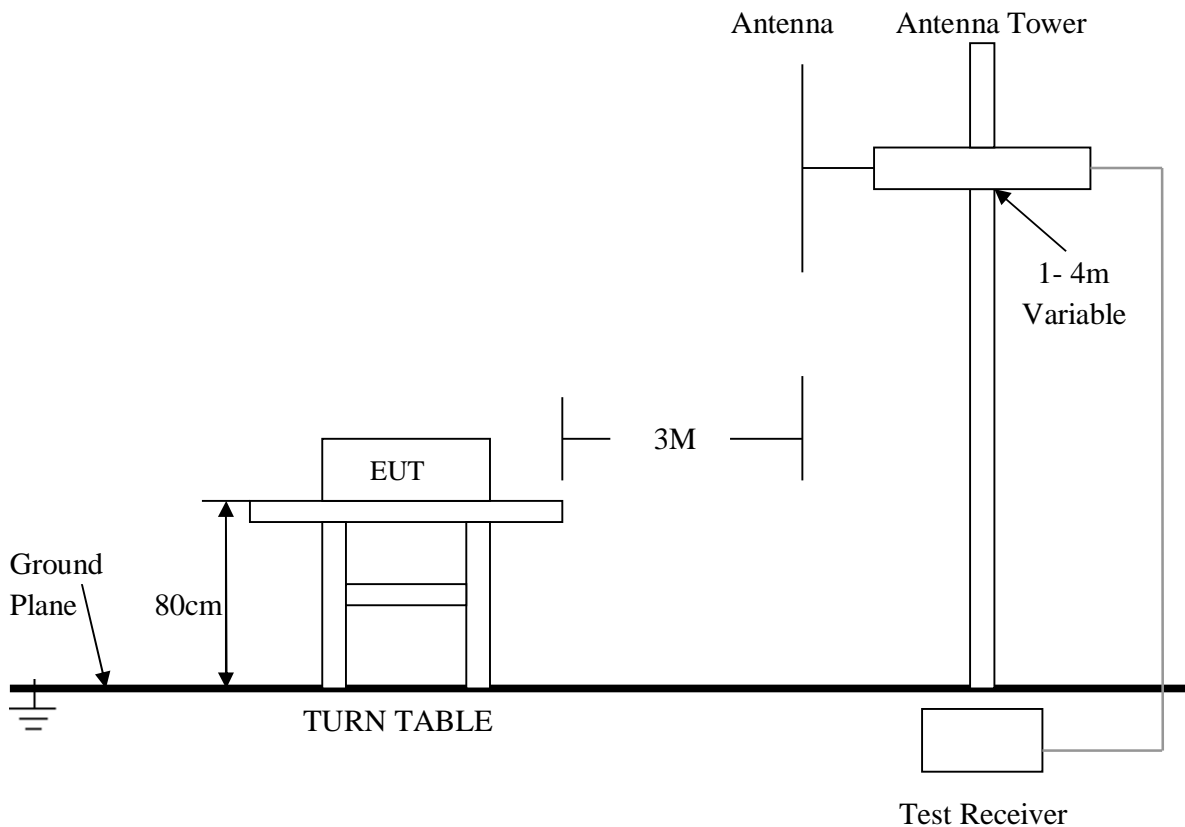
### 6.1 Test Equipment

Please refer to Section 9 this report.

### 6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2003.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.

### 6.3 Radiated Test Setup



For the actual test configuration , please refer to the related items – Photos of Testing

6. 4 Configuration of The EUT

Same as section 4 . 4 of this report

6. 5 EUT Operating Condition

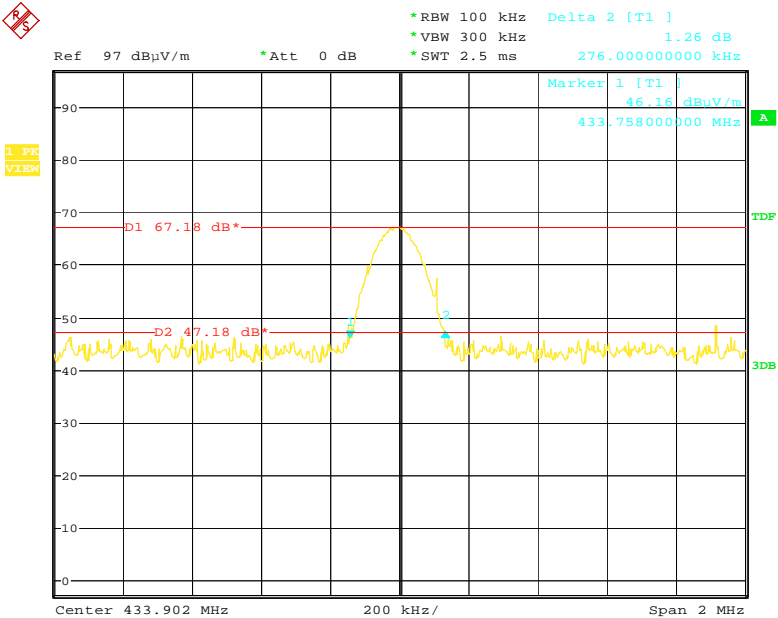
Same as section 4 . 5 of this report.

6. 6 Band Edge FCC 15.231 Limit

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. Bandwidth is determined at the points 20dB down from the modulated carrier.  
B.W(20dBc) Limit = 0.25% x f (MHz) = 0.25% x 433.902MHz = 1.0848MHz  
From the plot, the bandwidth is observed to be 0.276MHz, at 20dBc where the bandwidth limit is 1.0848MHz.

6. 7 Band Edge Test Result

Product	: LCD Remote Sensor	Test Mode	: Normal
Test Item	: Band Edge Data	Temperature	: 25 °C
Test Voltage	: DC 3V (Power by Battery)	Humidity	: 56%RH
Test Result	: <b>PASS</b>		



Date: 27.AUG.2008 15:58:24

- Note:**
- (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.
  - (2) The average measurement was not performed when the peak measured data under the limit of average detection.

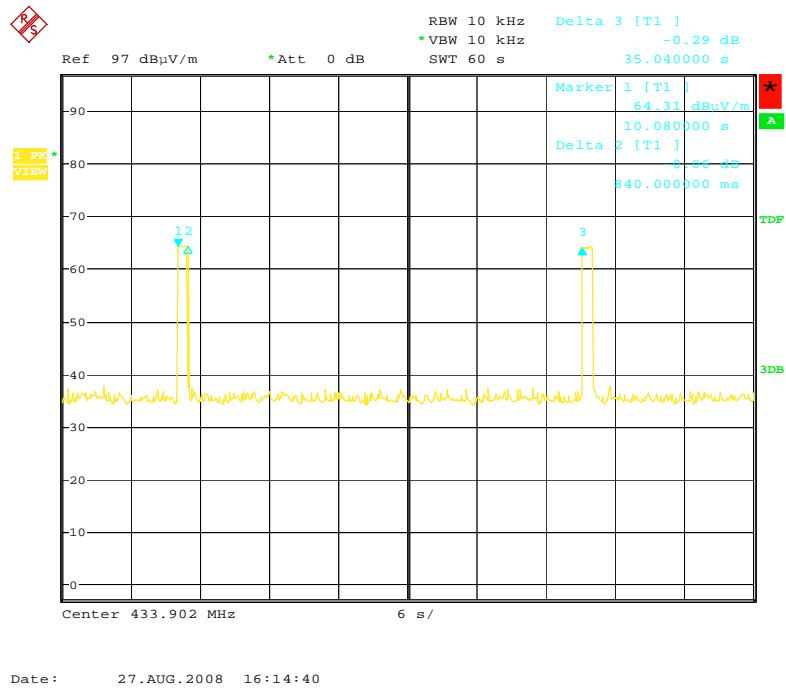
6. 8 Periodic Operation [FCC 47CFR 15.231e]

According to FCC 47CFR15.231e. The EUT 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 transmission shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

Results:

Since the EUT of each transmission is 840msec, so the silent period must not less than 25.2 seconds (840msec x 30).

The following figures showed the duration of each transmission and silent period.



## 7. Photos of Testing

### 7.1 EUT Test Photographs

Radiated emission test view



## 7.2 EUT Detailed Photographs

EUT top view

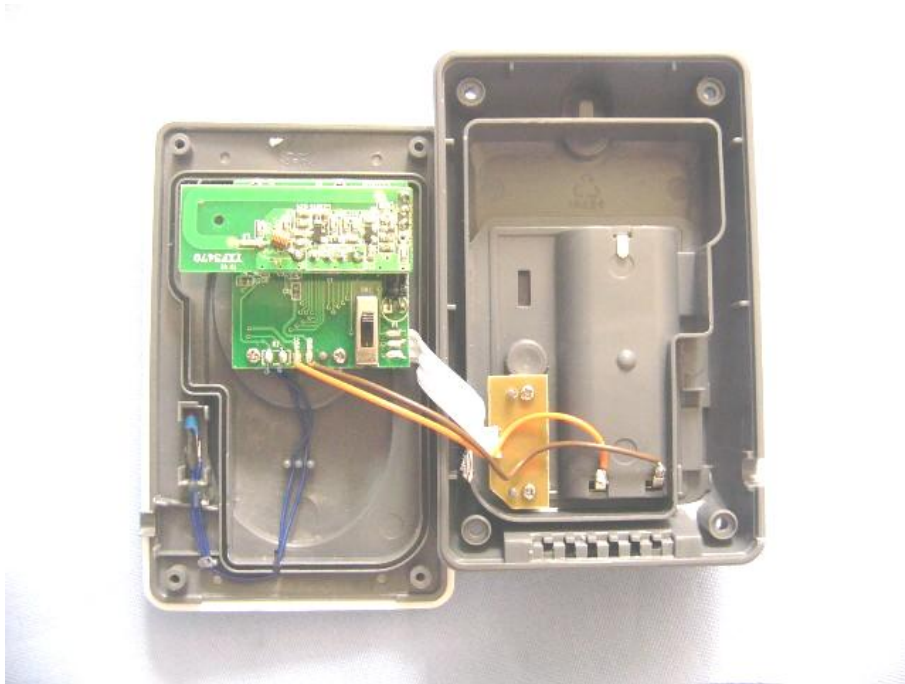


EUT bottom view

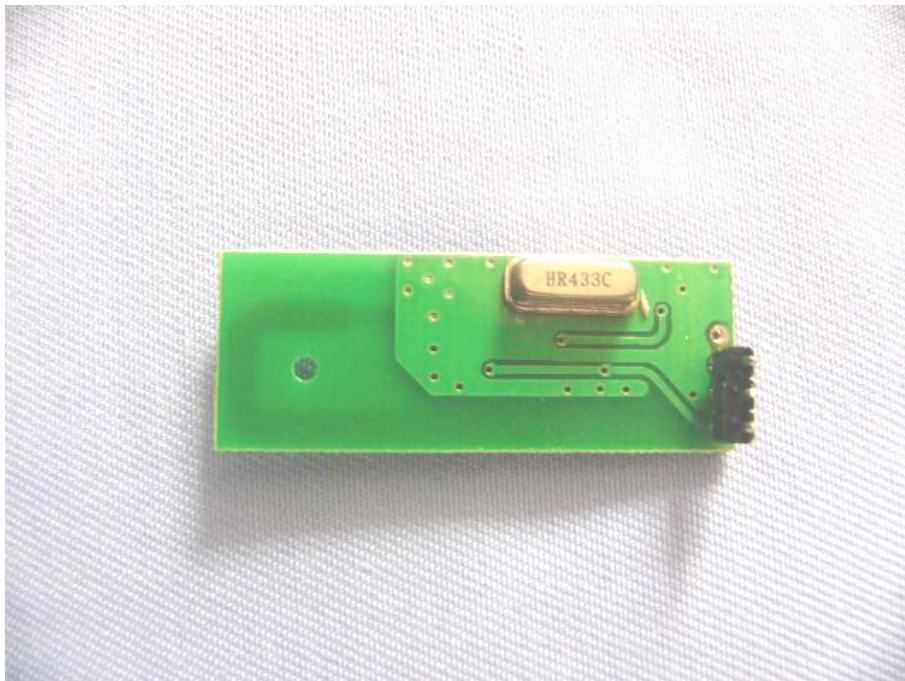




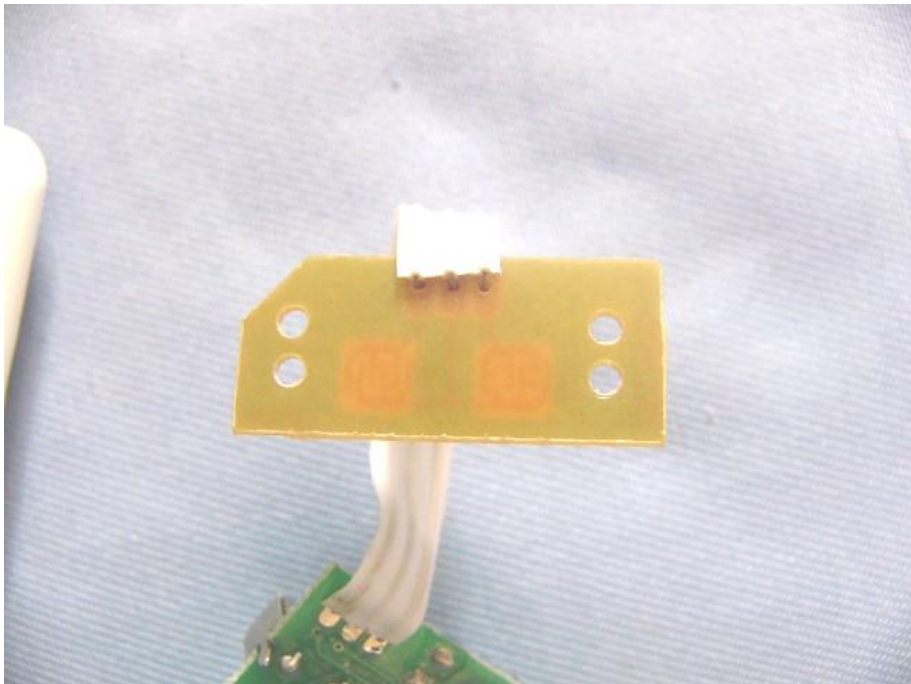
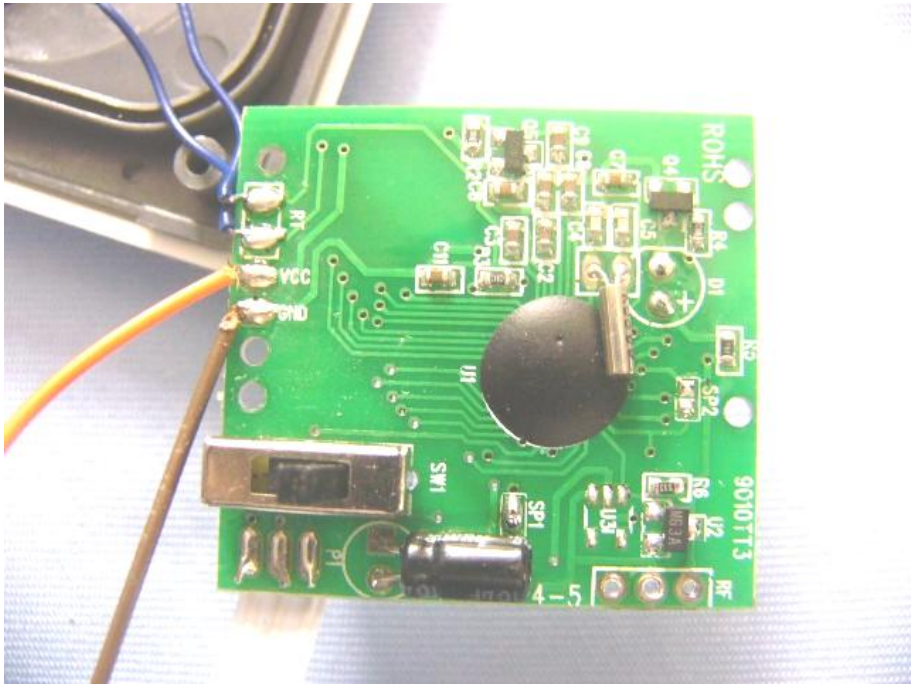
EUT inside whole view



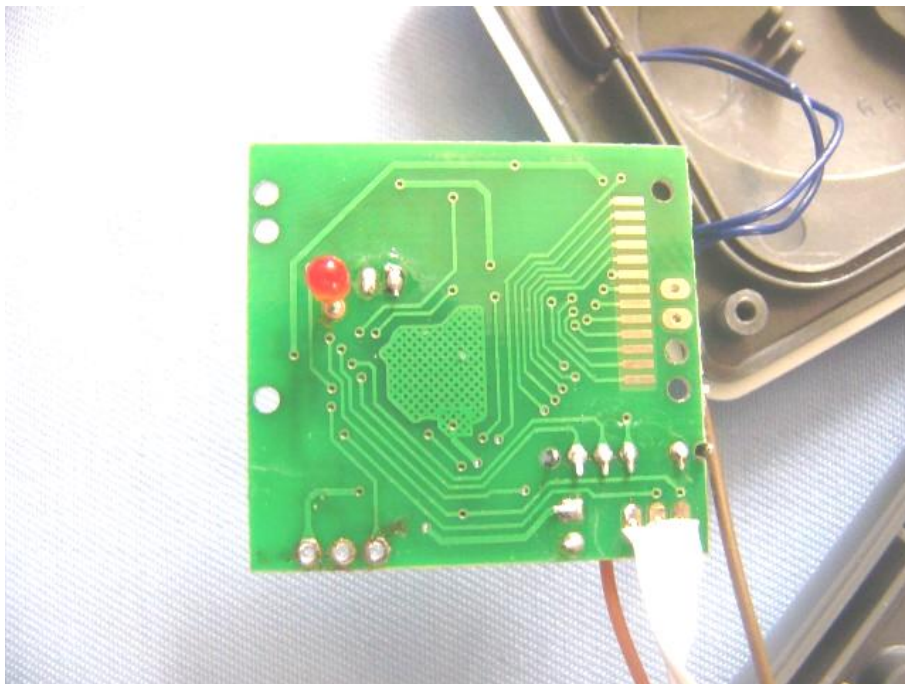
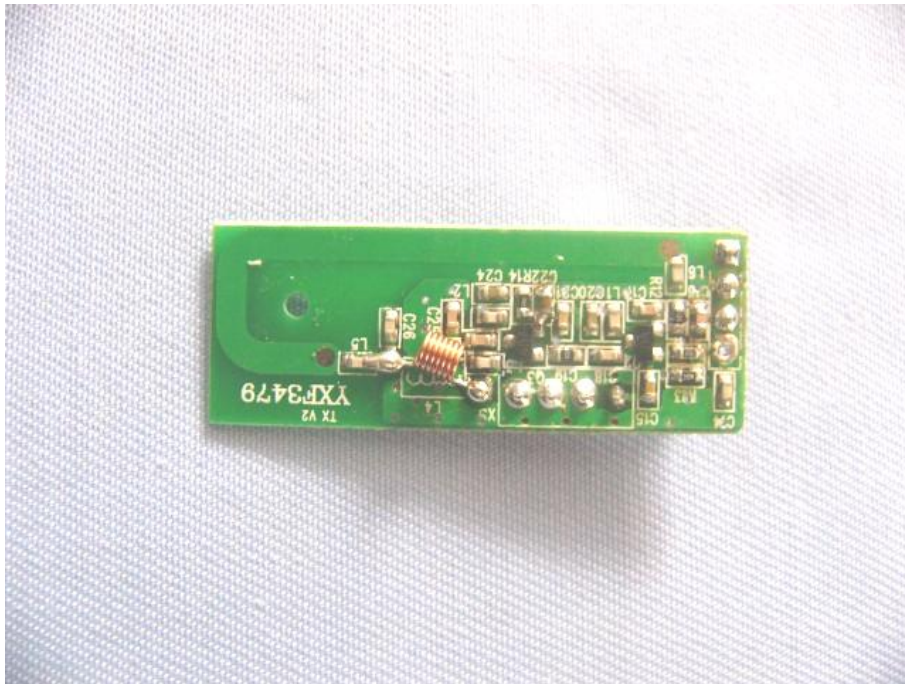
Main board component side

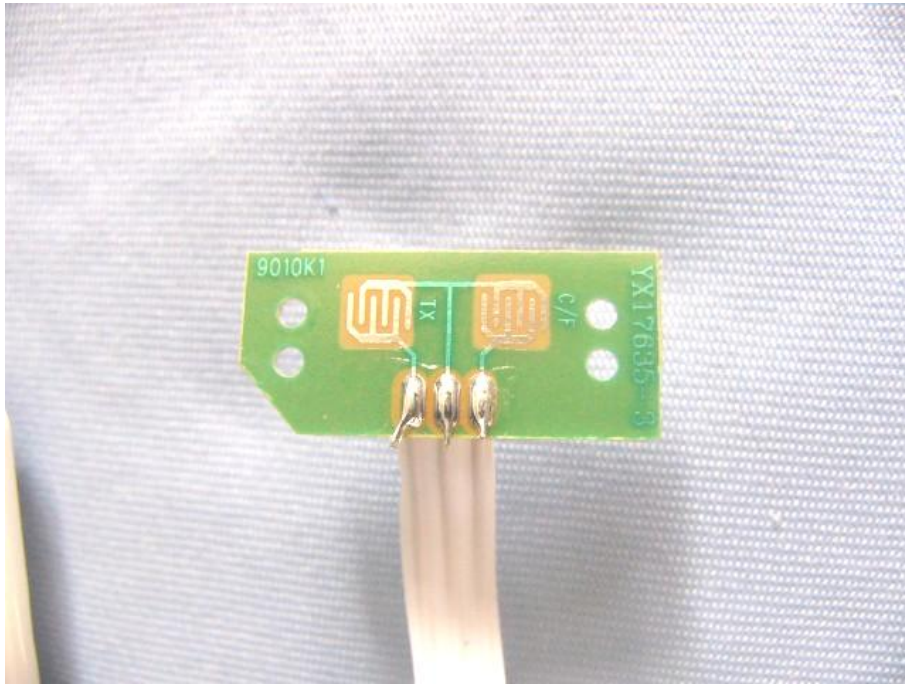






Main board solder side





## 8. FCC ID Label

**FCC ID: Q9E-KW9010**

**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 label. 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 ID Label Location



## 9. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Date of Cal.	Due Date
Turntable	SinTek	N/A	N/A	NCR	NCR
Antenna Tower	SinTek	N/A	N/A	NCR	NCR
OATS	SinTek	N/A	N/A	Oct. 9, 2007	Oct. 9, 2010
EMI Test Receiver	Rohde & Schwarz	ESPI7	100013	July 9, 2008	July 9, 2009
Spectrum Analyzer	Rohde & Schwarz	FSP40	100273	Sep.18, 2007	Sep.18, 2008
Signal Generator	FLUKE	PM5418+Y/C	LO747012	Feb.10, 2008	Feb.10, 2009
Signal Generator	FLUKE	PM5418TX	LO738007	Feb.10, 2008	Feb.10, 2009
Loop Antenna	SCHWARZBECK	FMZB1516	113	Jan. 30, 2008	Jan. 30, 2009
Loop Antenna	Rohde & Schwarz	HFH2-Z2	872096/16	Jan. 30, 2008	Jan. 30, 2009
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4079	Sep.18, 2007	Sep.18, 2008
Trilog-Super Broadband Antenna	SCHWARZBECK	VULB9161	9161-4080	Sep.18, 2007	Sep.18, 2008
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-564	Sep.18, 2007	Sep.18, 2008
Broad-Band Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-565	Sep.18, 2007	Sep.18, 2008
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct. 23, 2007	Oct. 23, 2008
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct. 23, 2007	Oct. 23, 2008
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS-21	N/A	Oct. 29, 2007	Oct. 29, 2008
KMO Shielded Room	KMO	KMO-001	N/A	N/A	N/A
Coaxial Cable with N-Connectors	SCHWARZBECK	AK9515H	95549	Sep.18, 2007	Sep.18, 2008
Power Meter	Rohde & Schwarz	NRVD	100041	Feb.10, 2008	Feb.10, 2009
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb.10, 2008	Feb.10, 2009
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb.10, 2008	Feb.10, 2009
Communication Analyzer	Wavetek Stabilock	4032	N/A	Feb. 01, 2008	Feb.01, 2009
Storage Oscilloscope	Tektronix	TDS3052	N/A	Feb. 01, 2008	Feb.01, 2009
Attenuator	Schwarzbeck	20dB	N/A	Feb. 01, 2008	Feb.01, 2009
Attenuator	Rohde & Schwarz	10dB	N/A	Feb. 01, 2008	Feb.01, 2009
SOHO Telephone Switching System	IKE	2000-108C	N/A	Feb.10, 2008	Feb.10, 2009
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb.10, 2008	Feb.10, 2009