

## FCC TEST REPORT

**FCC ID** : WIR-8464208002T  
**Applicant** : Ultra-Lit Tree Co.  
**Address** : 1989 Johns Drive, Glenview, IL 60025, US

**Equipment Under Test (EUT) :**

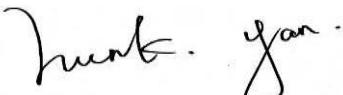
Product Name : Christmas Tree Fire alert system  
Model No. : 8464208002

**Standards** : FCC CFR47 Part 15 Section 15.231:2009

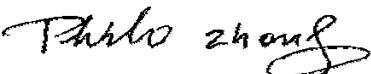
**Date of Test** : July 27, 2011 ~ July 29, 2011

**Date of Issue** : August 10, 2011

**Test Engineer** : Hunk yan



**Reviewed By** : Philo zhong



<b>Test Result</b>	<b>: PASS</b>
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**Prepared By:**

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❖ The sample detailed above has been tested to the requirements of Council Directives ANSI C63.4:2003. The test results have been reviewed against the Directives above and found to meet their essential requirements.

## 2 Test Summary

FCC Part 15 Subpart C Requirements			
Test Items	Test Requirement	Test Method	Result
Spurious Radiated Emissions (30MHz to 5GHz)	15.205(a) 15.209 15.231(b)	ANSI C63.4: 2003	PASS
Conducted Emissions (150kHz ~ 30MHz)	15.207	ANSI C63.4:2003	N/A
20dB Bandwidth	15.231(c)	ANSI C63.4: 2003	PASS
Activation time	15.231(a)(2)	ANSI C63.4: 2003	PASS

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## 4 General Information

### 4.1 Client Information

**Applicant** : Ultra-Lit Tree Co.

**Address of Applicant** : 1989 Johns Drive, Glenview, IL 60025, US

**Manufacturer** : DONGGUAN PROTTRONIC ELECTRONICS LTD.

**Address of Manufacturer** : Protronic Industrial Park, Xiangxi Village, Shipai Town, DongGuan, GuangDong

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

**Product Name** : Christmas Tree Fire alert system

**Model No.** : 8464208002

**Operation Frequency** : 433.92MHz

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

**Technical Data:** : DC 3.0V (2\*1.5V 'AA' Size Battery)

### 4.4 Description of Support Units

The EUT has been tested as an independent unit. All the test was performed in the condition of DC 3.0V input.

### 4.5 Standards Applicable for Testing

The customer requested FCC tests for a Christmas Tree Fire alert system. The standards used were FCC CFR47 Part 15 Section 15.231:2009.

#### 4.6 Test Facility

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

- **IC – Registration No.: IC7760A**

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, Aug.03, 2010.

- **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, May 26, 2011.

#### 4.7 Test Location

All the tests were performed at:

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

## 5 Equipment Used during Test

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
EMC Analyzer	Agilent/ E7405A	MY451149 43	W2008001	9k-26.5GHz	Aug. 2, 2011	Aug. 1, 2012	Wws20 081596	±1dB
Trilog Broadband Antenne	SCHWARZB ECK MESS-ELEKTROM / VULB9163	336	W2008002	30-3000 MHz	Aug. 2, 2011	Aug. 1, 2012	-	±1dB
Broad-band Horn Antenna	SCHWARZB ECK MESS-ELEKTROM / BBHA 9120D(1201)	667	W2008003	1-18GHz	Aug. 2, 2011	Aug. 1, 2012	-	f<10 GHz: ±1dB 10GHz<f< 18 GHz: ±1.5dB
Broadband Preamplifier	SCHWARZB ECK MESS-ELEKTROM / BBV 9718	9718-148	W2008004	0.5-18GHz	Aug. 2, 2011	Aug. 1, 2012	-	±1.2dB
10m Coaxial Cable with N-male Connectors	SCHWARZB ECK MESS-ELEKTROM / AK 9515 H	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-	-
10m 50 Ohm Coaxial Cable	SCHWARZB ECK MESS-ELEKTROM / AK 9513	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-	-
Positioning Controller	C&C LAB/ CC-C-IF	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-	-
Color Monitor	SUNSPO/ SP-14C	-	-	-	Aug. 2, 2011	Aug. 1, 2012	-	-
Test Receiver	ROHDE&SC HWARZ/ ESPI	101155	W2005001	9k-3GHz	Aug. 2, 2011	Aug. 1, 2012	Wws20 080942	±1dB
EMI Receiver	Beijingkehuan	KH3931	-	9k-1GHz	Aug. 2, 2011	Aug. 1, 2012	-	-
Two-Line V-Network	ROHDE&SC HWARZ/ ENV216	100115	W2005002	50Ω/50μH	Aug. 2, 2011	Aug. 1, 2012	Wws20 080941	±10%
Digital Power Analyzer	Em Test AG/Switzerland/ DPA 500	V07451 03095	W2008012	Power: 2000VA Vol-range: 0-300V Freq_range : 10-80Hz	Aug. 2, 2011	Aug. 1, 2012	Wwd2 008118 5	Voltage distinguish:0 .025% Power_freq distinguish:0 .02Hz
Power Source	Em Test AG/Switzerland/ ACS 500	V07451 03096	W2008013	Vol-range: 0-300V Power_freq : 10-80Hz				

WALTEK SERVICES

Reference No.: WT11063370-D-E-F

Equipment Name	Manufacturer Model	Equipment No	Internal No	Specification	Cal. Date	Due Date	Cert. No	Uncertainty
RF Generator	TESEQ GmbH/ NSG4070	25781	W2008008	Fraq-range: 9K-1GHz RF voltage: -60 dBm- +10dBm	Aug. 2, 2011	Aug. 1, 2012	Wws20 081890	Power_freq distinguish0. 1Hz RFeletricity distinguish 0.1 B
CDN M-Type	TESEQ GmbH/ CDN M016	25112	W2008009	Voltage correct factor 9.5 dB	Aug. 2, 2011	Aug. 1, 2012	Wwc20 082396	150K- 80MHz: ±1dB 80- 230MHz:-2- +3dB
EM-Clamp	TESEQ GmbH/ KEMZ 801	25453	W2008010	Freq_range : 0.15-1000 MHz	Aug. 2, 2011	Aug. 1, 2012	Wwc20 082397	0.3-400 MHz: ±4dB Other freq: ±5dB
Attenuator 6dB	TESEQ GmbH/ ATN6050	25365	-	-	Aug. 2, 2011	Aug. 1, 2012	Wws20 081597	-
All Modules Generator	SCHAFFNE R/6150	34579	W2008006	voltage:200V -4.4KV Pulse current: 100A-2.2KA	Aug. 2, 2011	Aug. 1, 2012	Wwc20 082401	voltage: ±10% Pulse current: ±10%
Capacitive Coupling Clamp	SCHAFFNE R/ CDN 8014	25311	-	-	Aug. 2, 2011	Aug. 1, 2012	Wwc20 082398	-
Signal and Data Line Coupling Network	SCHAFFNE R/ CDN 117	25627	W2008011	1.2/50μS	Aug. 2, 2011	Aug. 1, 2012	Wwc20 082399	-
AC Power Supply	TONGYUN/ DTDGC-4	-	-	-	Aug. 2, 2011	Aug. 1, 2012	Wws20 080944	-

## 6 Conducted Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.107

Test Method: ANSI C63.4:2003

Test Result: N/A

Remark: Because the power of the EUT is supported by 2\*1.5V 'AA' Size Battery, this test is not applicable.

## 7 Spurious Radiated Emissions

Test Requirement:	FCC CFR47 Part 15 Section 15.209 & Section 15.231
Test Method:	ANSI C63.4:2003
Test Result:	PASS
Frequency Range:	30MHz to 5GHz
Measurement Distance:	3m
Class:	Class B
Limit:	40.0 dB $\mu$ V/m between 30MHz & 88MHz 43.5 dB $\mu$ V/m between 88MHz & 216MHz 46.0 dB $\mu$ V/m between 216MHz & 960MHz 54.0 dB $\mu$ V/m above 960MHz Above limits are for Quasi-Peak if maximised peak within 6dB of limit 74.0 dB $\mu$ V/m for peak above 1GHz 54.0 dB $\mu$ V/m for AVG above 1GHz The tighter limit applies at the band edges.
Detector:	Peak for pre-scan (120kHz resolution bandwidth)

### EUT Operation :

#### Operating Environment:

Temperature:	25.5 °C
Humidity:	51 % RH
Atmospheric Pressure:	1012 mbar

#### EUT Operation:

The EUT was tested in continuously transmit mode.

### 7.1 Measurement Uncertainty

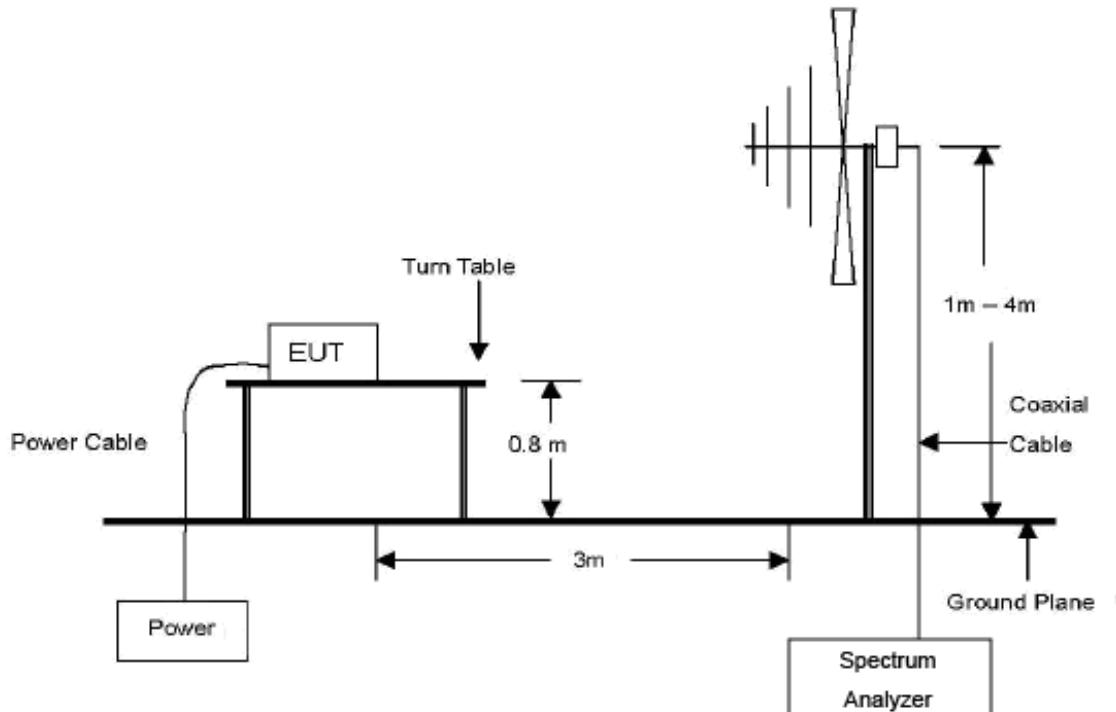
All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor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

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Waltek EMC Lab is  $\pm 5.03$ dB.

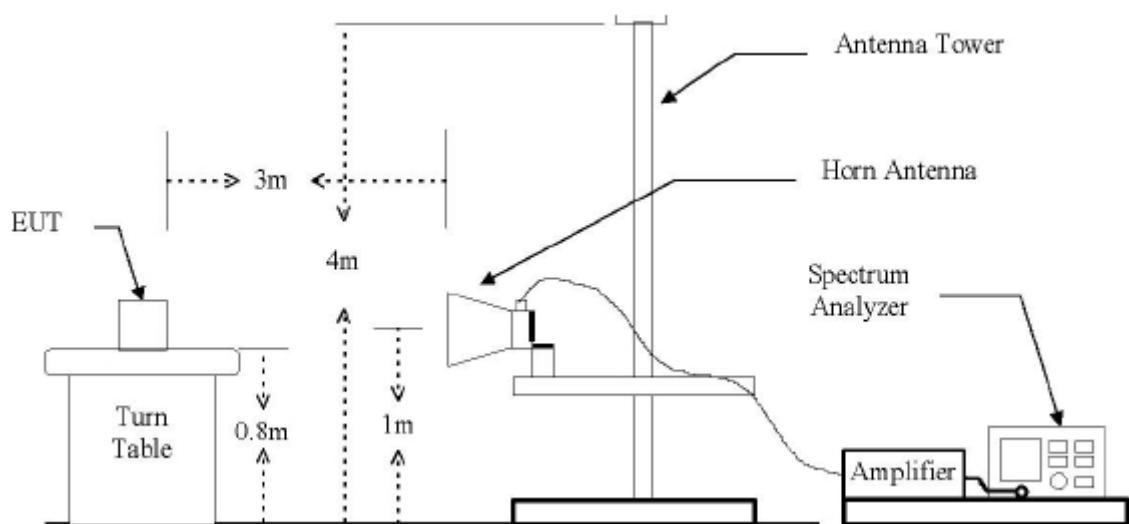
## 7.2 EUT Setup

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 diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz Emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to 5 GHz Emissions.



### 7.2.2 Spectrum Analyzer Setup

According to FCC Part15 Rules, the system was tested 30 to 5000MHz.

Below 1GHz

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

Above 1GHz

Start Frequency .....	1000MHz
Stop Frequency .....	5000MHz
Sweep Speed .....	Auto
IF Bandwidth.....	120 KHz
Video Bandwidth.....	100KHz
Quasi-Peak Adapter Bandwidth .....	120 KHz
Quasi-Peak Adapter Mode .....	Normal
Resolution Bandwidth .....	1MHz

### 7.3 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 performed in X(normal uses) axis positioning. And all the modes was tested in the report.Only the worst case is shown in the report.

## 7.4 Summary of Test Results

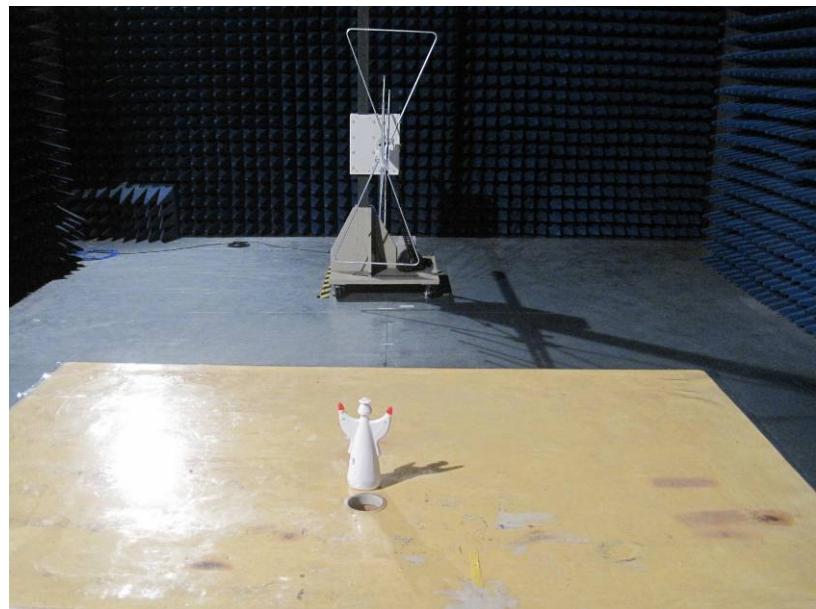
According to the data in this section, the EUT complied with the FCC Part15 C standards.

### Test Data:

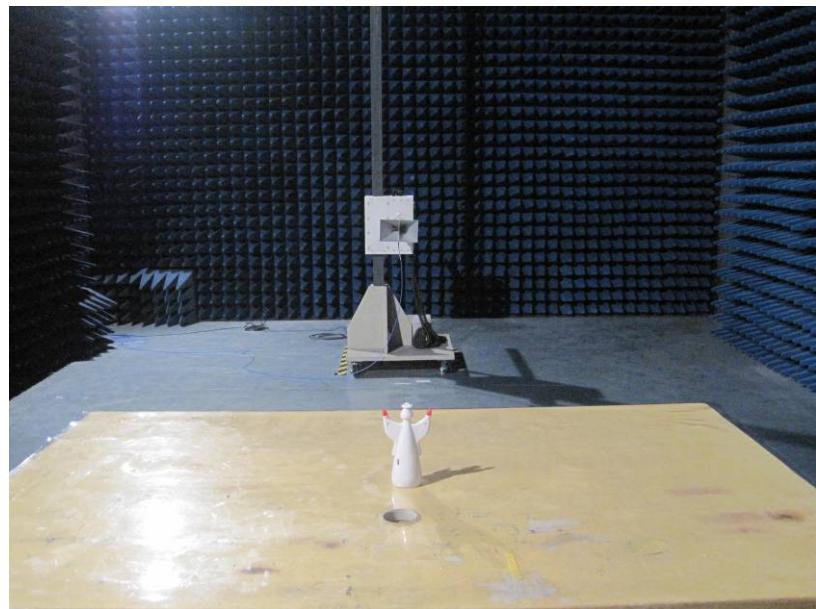
Frequency (MHz)	Detector	Ant. Pol	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
433.92	peak	V	97.25	100.83	-3.58	1.1	170
867.84	peak	V	74.26	80.83	-6.57	1.5	220
1301.76	peak	V	68.59	80.83	-12.24	1.0	160
1735.68	peak	V	75.18	80.83	-5.65	1.0	300
2603.52	peak	V	72.61	80.83	-8.22	1.3	310
3037.44	peak	V	62.25	80.83	-18.58	2.0	120
4339.20	peak	V	64.19	80.83	-16.64	1.8	90
433.92	peak	H	88.74	100.83	-12.09	2.2	20
867.84	peak	H	67.42	80.83	-13.41	1.9	130
1301.76	peak	H	58.84	80.83	-21.99	2.0	160
1735.68	peak	H	68.16	80.83	-12.67	1.6	60
2603.52	peak	H	64.33	80.83	-16.50	1.8	80
3037.44	peak	H	56.29	80.83	-24.54	2.1	150
4339.20	peak	H	58.74	80.83	-22.09	1.4	160
433.92	AVG	V	42.24	80.83	-38.59	1.1	170
867.84	AVG	V	19.25	60.83	-41.58	1.5	220
1301.76	AVG	V	13.58	60.83	-47.25	1.0	160
1735.68	AVG	V	20.17	60.83	-40.66	1.0	300
2603.52	AVG	V	17.6	60.83	-43.23	1.3	310
3037.44	AVG	V	7.24	60.83	-53.59	2.0	120
4339.20	AVG	V	9.18	60.83	-51.65	1.8	90
433.92	AVG	H	33.73	80.83	-47.10	2.2	20
867.84	AVG	H	12.41	60.83	-48.42	1.9	130
1301.76	AVG	H	3.83	60.83	-57.00	2.0	160
1735.68	AVG	H	13.15	60.83	-47.68	1.6	60
2603.52	AVG	H	9.32	60.83	-51.51	1.8	80
3037.44	AVG	H	1.28	60.83	-59.55	2.1	150
4339.20	AVG	H	3.73	60.83	-57.10	1.4	160

### 7.5 Photograph – Radiation Emission Test Setup

Below 1GHz



Above 1GHz



## 8 20 dB Bandwidth

Test Requirement:	FCC Part 15.231
Test Method:	Based on ANSI C63.4:2003
Limit:	The bandwidth of the emission shall be no wider than 0.25% of the center frequency at the points 20 dB down from the modulated carrier. The bandwidth of the emission shall be no wider than 1.085 MHz
Test Status:	Normal working mode.

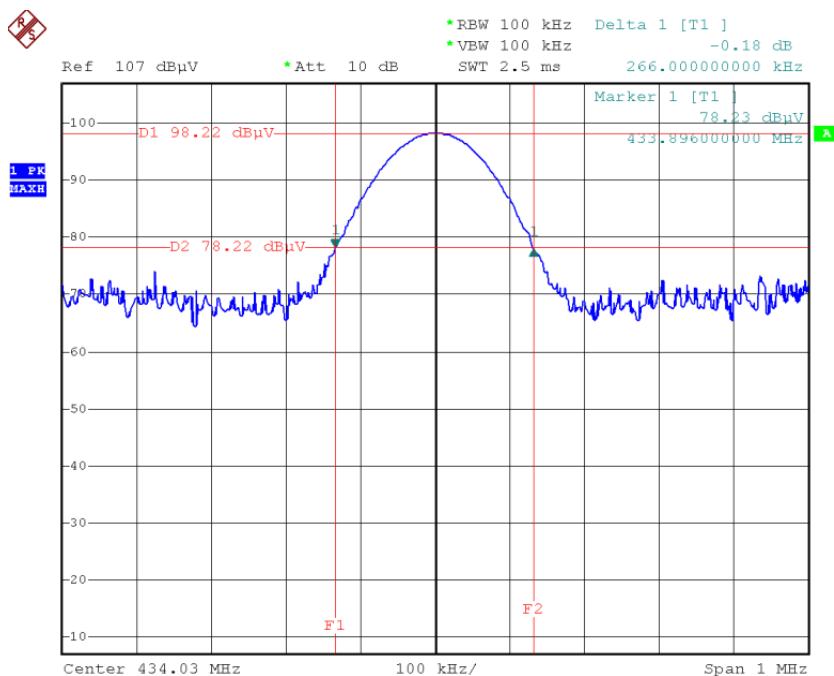
### Test Procedure:

1. The EUT was placed on a turntable which is 0.8m above ground plane
2. Set EUT as normal operation mode
3. Set SPA center frequency = fundamental frequency, RBW, VBW = 100kHz, Span = 1MHz.

### Test Result:

The 20 dB bandwidth of the EUT is 266.00kHz. Comply with the requirements of FCC Part 15.231.

Test result plot as follows:



## 9 Activation time

Test Requirement:	FCC Part 15.231
Test Method:	Based on ANSI C63.4:2003
Limit:	A transmitter activated automatically shall cease transmission within 5 seconds after activation.
Test Status:	Normal working mode.

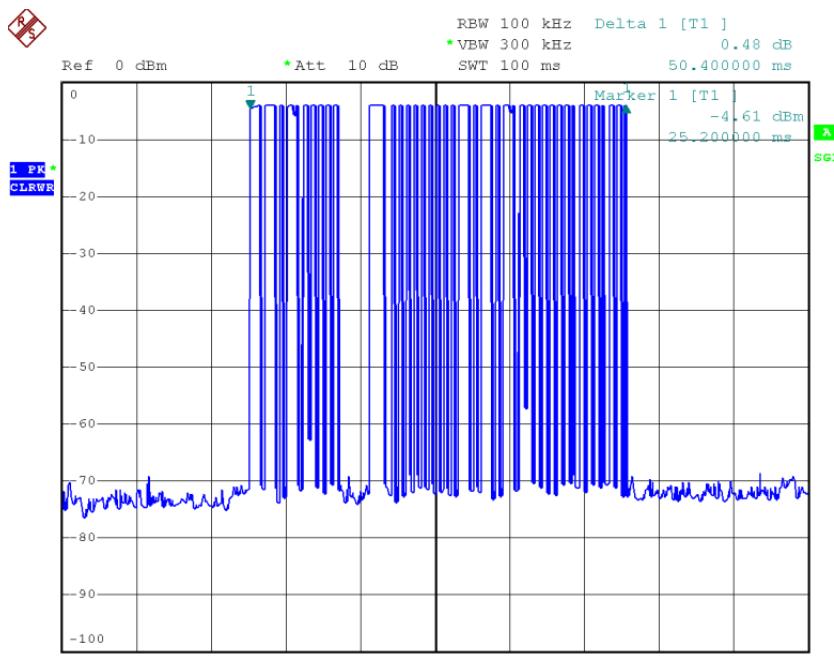
### Test Procedure:

1. The EUT was placed on a turntable which is 0.8m above ground plane
2. Set EUT as normal operation mode
3. Set SPA center frequency = fundamental frequency, RBW = 100kHz, VBW = 300kHz, Span = 0 Hz, Adjacent sweep time.

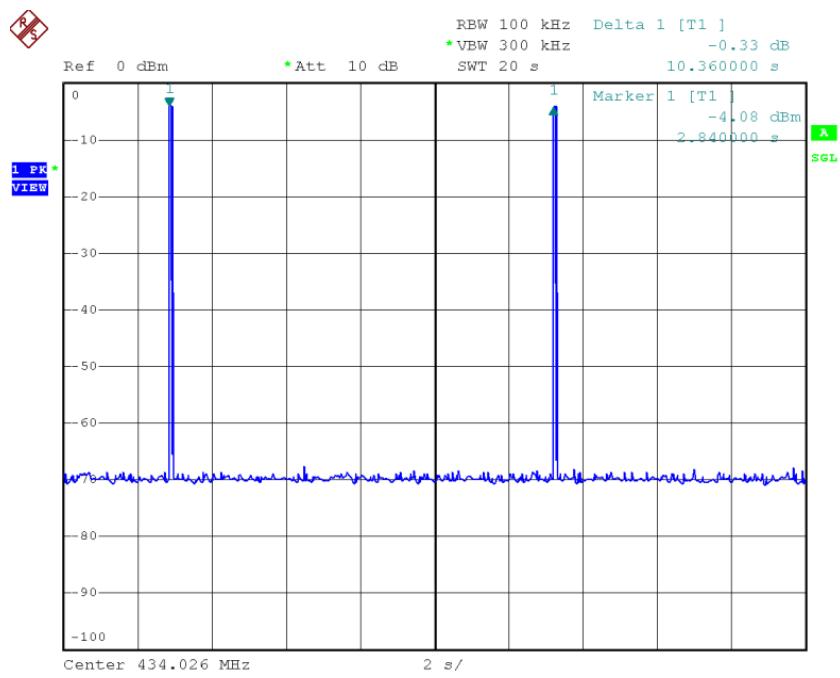
### Test Result:

The activation time of the EUT is 50.4ms, comply with the requirements of FCC CFR47 Part 15 Section 15.231.

Test result plot as follows:



(a)



(b)

## 10 RF Exposure Test

Test Requirement: FCC CFR47 Part 2 Section 2.1091

Test Method: Based on FCC CFR47 Part 1 Section 1.1307

EUT Operation: The EUT work in test mode(Tx) and test it

### Requirements:

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

### The procedures / limit

#### (A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

#### (B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; \*Plane-wave equivalent power density

**MPE Calculation Method**

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d}$$

**E** = Electric field (V/m)

**P** = Peak RF output power (W)

**G** = EUT Antenna numeric gain (numeric)

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (S) (mW/cm <sup>2</sup> )	Limit of Power Density (S) (mW/cm <sup>2</sup> )	Test Result
0	1	-9.54	0.11	0.00002	0.28928	Complies

**11 Antenna Requirement**

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 or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The EUT has a permanently attached antenna, it is full fill with the requirement.

## 12 Photographs - Constructional Details

### 12.1 EUT – Appearance View1



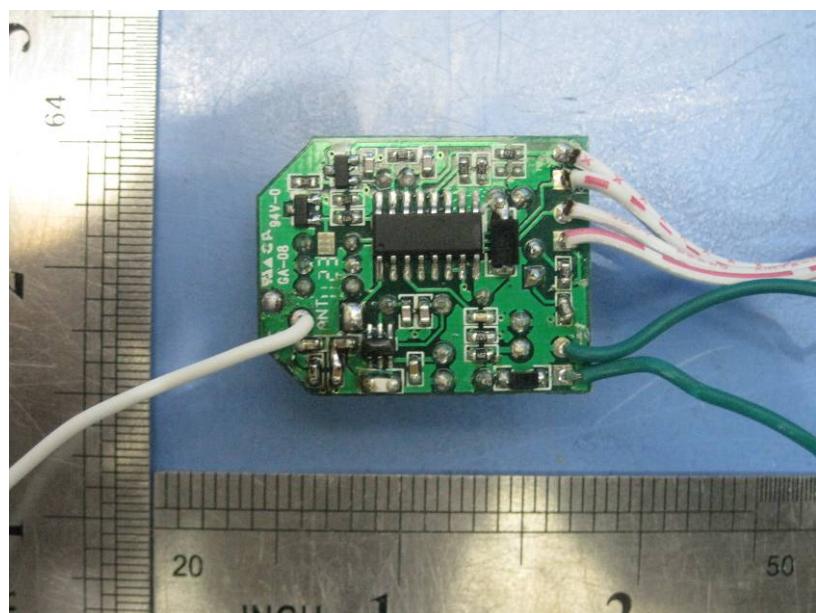
### 12.2 EUT – Appearance View2



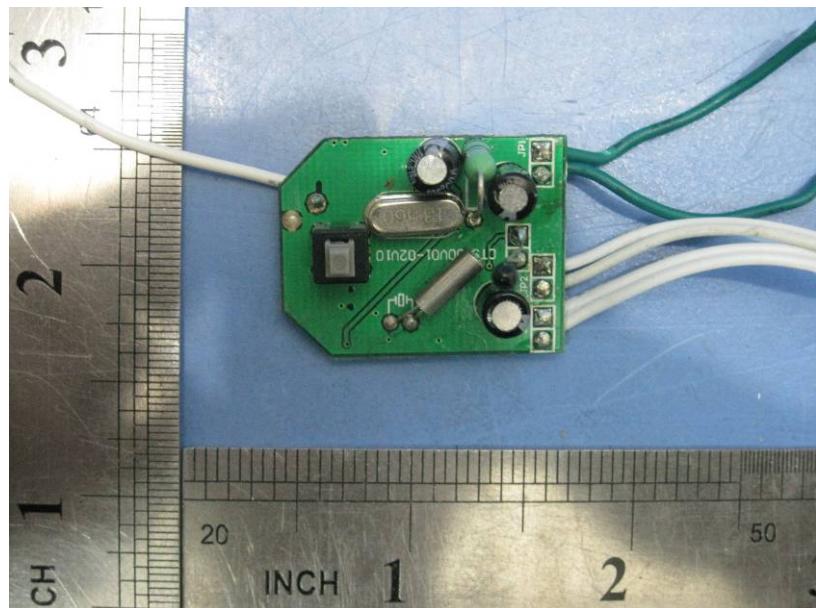
**12.3 EUT – Open View**



**12.4 PCB – Front View**



**12.5 PCB – Back View**



## 13 FCC 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.

