

# EMC TEST REPORT

For

Stair Night Light

Model Number: SL-EI-0101-000-0CP

FCC ID: VK7SLEI01010000CP

Report Number : WT088001250

Test Laboratory : Shenzhen Academy of Metrology and  
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## TEST REPORT DECLARATION

Applicant : Mainstar Electrical Company Ltd.  
Address : Room 40,12/F,Block D, Wah Lok Ind'l Centre, Shan M, Hong Kong,  
Manufacturer : Mainstar Electrical Company Ltd.  
Address : Block A5& A6,Chang An Wu Sha International Industrial Park, Chang An, Dongguan, Guangdong Province, China  
EUT Description : Stair Night Light  
Model Number : SL-EI-0101-000-0CP  
FCC ID : VK7SLEI01010000CP

Test Standards:

### FCC Part 15 15.209, 15.231

The EUT described above is tested by Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory to determine the maximum emissions from the EUT. Shenzhen Academy of Metrology and Quality Inspection EMC Laboratory is assumed full responsibility for the accuracy of the test results. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with FCC Rules Part 15.207, 15.209, 15.249.

The test report is valid for above tested sample only and shall not be reproduced in part without written approval of the laboratory.

Tested by:



Date:

Jul.21,2008

(Ryan Chen)

Checked by:



Date:

Jul.21,2008

(Dewelly Yang)

Approved by:



Date:

Jul.21,2008

(Peter Lin)

## 1. TEST RESULTS SUMMARY

Table 1 Test Results Summary

Test Items	FCC Rules	Test Results
Conducted Disturbance	15.207	N/A
Radiated Disturbance	15.209, 15.231	Pass
Occupied Bandwidth	15.231	Pass
Deactivation time	15.231	Pass
Antenna Requirement	15.203	Pass
Frequency stability	15.231	N/A
Transmit and silent Time	15.231	N/A

N/A is not applicable

## 2. GENERAL INFORMATION

### 2.1. Report information

- 2.1.1. This report is not a certificate of quality; it only applies to the sample of the specific product/equipment given at the time of its testing. The results are not used to indicate or imply that they are application to the similar items. In addition, such results must not be used to indicate or imply that SMQ approves recommends or endorses the manufacture, supplier or use of such product/equipment, or that SMQ in any way guarantees the later performance of the product/equipment.
- 2.1.2. The sample/s mentioned in this report is/are supplied by Applicant, SMQ therefore assumes no responsibility for the accuracy of information on the brand name, model number, origin of manufacture or any information supplied.
- 2.1.3. Additional copies of the report are available to the Applicant at an additional fee. No third part can obtain a copy of this report through SMQ, unless the applicant has authorized SMQ in writing to do so.

### 2.2. Laboratory Accreditation and Relationship to Customer

The testing report were performed by the Shenzhen Academy of Metrology and quality Inspection EMC Laboratory (Guangdong EMC compliance testing center), in their facilities located at Bldg. of Metrology & Quality Inspection, Longzhu Road, Nanshan District, Shenzhen, Guangdong, China. At the time of testing, Laboratory is accredited by the following organizations:

China National Accreditation Committee for Laboratories (**CNAL**) accredits the Laboratory for conformance to FCC standards, EMC international standards and EN standards. The Registration Number is L0579.

The Laboratory is listed in the United States of American Federal Communications Commission (**FCC**), and the registration number are **97379**(open area test site) and **274801**(semi anechoic chamber).

The Laboratory is listed in Voluntary Control Council for Interference by Information Technology Equipment (**VCCI**), and the registration number are **R-1974**(open area test site) , **R-1966**(semi anechoic chamber),**C-2117**(mains ports conducted interference measurement) and **T-180**(telecommunication ports conducted interference measurement).

The Laboratory is registered to perform emission tests with Industry Canada (**IC**), and the registration number is **IC4174**.

**TUV Rhineland** accredits the Laboratory for conformance to IEC and EN standards, the registration number is **E2024086Z02**.

Measurement Uncertainty

### 2.3. Measurement Uncertainty

Radiated Disturbance: 30MHz~1000MHz 4.5dB  
1GHz~18GHz 4.6dB

### 3. PRODUCT DESCRIPTION

#### 3.1. EUT Description

Description : Stair Night Light  
Manufacturer : Mainstar Electrical Company Ltd.  
Model Number : SL-EI-0101-000-0CP  
Operate Frequency : 315MHz  
Modulation Type : ASK  
Power : 4.5V (3XAA battery)  
Bandwidth : 100kHz  
Antenna Designation : Integrated

#### 3.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: VK7SLEI01010000CP filing to comply with Section 15.209, 15.231 of the FCC Part 15, Subpart C Rules.

#### 3.3. Block Diagram of EUT Configuration



Figure 1 EUT setup 1

#### 3.4. Operating Condition of EUT

Mode 1: Transmitting at 315MHz

#### 3.5. Test voltage

Battery: DC4.5V (new battery)

#### 3.6. Special Accessories

Not available for this EUT intended for grant.

#### 3.7. Equipment Modifications

Not available for this EUT intended for grant.

### 3.8. Support Equipment List

Table 2 Support Equipment

Name	Model Number	S/N	Manufacture
--	--	--	--

### 3.9. Test Conditions

Date of test: Jul.07-10,2008

Date of EUT Receive: Jun.26,2008

Temperature: 22-23 °C

Relative Humidity: 65-67%

## 4. TEST EQUIPMENT USED

Table 3 Test Equipment

No.	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
SB3436	EMI Test Receiver	Rohde & Schwarz	ESI26	Jan.24, 2008	1 Year
SB3440	Bilog Antenna	Chase	CBL6112B	Jan.24, 2008	1 Year
SB3435	Horn Antenna	Rohde & Schwarz	HF906	Jan.24, 2008	1 Year
SB3435/01	Amplifier(1-18GHz)	Rohde & Schwarz	---	Jan.24, 2008	1 Year
SB3450/01	3m Semi-anechoic chamber	Albatross Projects	9X6X6	Jan.24, 2008	1 Year

## 5. CONDUCTED DISTURBANCE TEST

### 5.1. Test Standard and Limit

#### 5.1.1. Test Standard

FCC Part 15 15.207

#### 5.1.2. Test Limit

Table 4 Conducted Disturbance Test Limit (Class B)

Frequency	Maximum RF Line Voltage (dB $\mu$ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz	56	46
5MHz~30MHz	60	50

- Decreasing linearly with logarithm of the frequency
- The lower limit shall apply at the transition frequency.

### 5.2. Test Procedure

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI test receiver (R&S Test Receiver ESCS30) is used to test the emissions form both sides of AC line. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

### 5.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

### 5.4. Test Data

The device is powered by battery , the test don't need.

## 6. RADIATED DISTURBANCE TEST

### 6.1. Test Standard and Limit

#### 6.1.1. Test Standard

FCC Part 15 15.231, 15.209

#### 6.1.2. Test Limit

Table 5 Radiated Disturbance Test Limit (15.209)

FREQUENCY MHz	FIELD STRENGTHS LIMITS ( $\mu$ V/m)	FIELD STRENGTHS LIMITS dB ( $\mu$ V/m)
Fundamental	50000	94.0
Harmonics	500	54.0
30 ~ 88	100	40.0
88 ~ 216	150	43.5
216 ~ 960	200	46.0
960 ~	500	54.0

\* The lower limit shall apply at the transition frequency.

\* The test distance is 3m.

Table 6 Radiated Disturbance Test Limit (15.231)

Fundamental Frequency (MHz)	Field Strength of Fundamental ( $\mu$ V/m)	Field Strength of Spurious Emissions ( $\mu$ V/m)
40.66 ~ 40.70	2250	225
70 ~ 130	1250	125
130 ~ 174	1250 to 3750**	125 to 375**
174 ~ 260	3750	375
260 ~ 470	3750 to 12500**	375 to 1250**
Above 470	12500	1250

\*\* linear interpolations

## 6.2. Test Procedure

The EUT is placed on a turntable, which is 0.8 meter above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

Radiated test was performed on the frequency range from 30MHz to 25GHz. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz,  $VBW \geq RBW$ . All readings above 1 GHz are AV and PK values.  $RBW=1MHz$  and  $VBW=10Hz$  for AV value,  $RBW=1MHz$  and  $VBW \geq RBW$  for peak value.

Measurements were made at 3 meters

## 6.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

## 6.4. Test Data

Table 7 Radiated Disturbance Test Data

Model number: SL-EI-0101-000-0CP								
Mode:1								
Frequency (MHz)	Polarization	Reading Value (dB $\mu$ V)	Correction Factor (dB)	Antenna Factor (dB/m)	Emission Level (dB $\mu$ V/m)	Limits dB ( $\mu$ V/m)	Test voltage	Note
314.952	H	55.4	2.9	14.0	72.3	75.6	DC4.5V	QP
629.860	H	20.5	4.3	19.1	43.9	55.6	DC4.5V	QP
945.910	H	11.7	5.2	21.2	38.1	55.6	DC4.5V	QP
314.942	V	47.0	2.9	14.0	63.9	75.6	DC4.5V	QP
629.860	V	14.9	4.3	19.1	38.3	55.6	DC4.5V	QP

Note: 1. Emission level(dBuV/m)=Reading Value(dBuV) + Correction Factor(dB)+Antenna Factor (dB/m)

2. Correction Factor(dB) = Cable Factor (dB)+Amplifier Factor(dB)

3. The other emission levels were less than the limit 20dB

## Radiated Emission

EUT: SL-EL-0101-000-0CP

Operating Condition: tx

Test Site: SMQ EMC lab SAC

Test Specification: horizontal&vertical

Comment: DC 4.5V

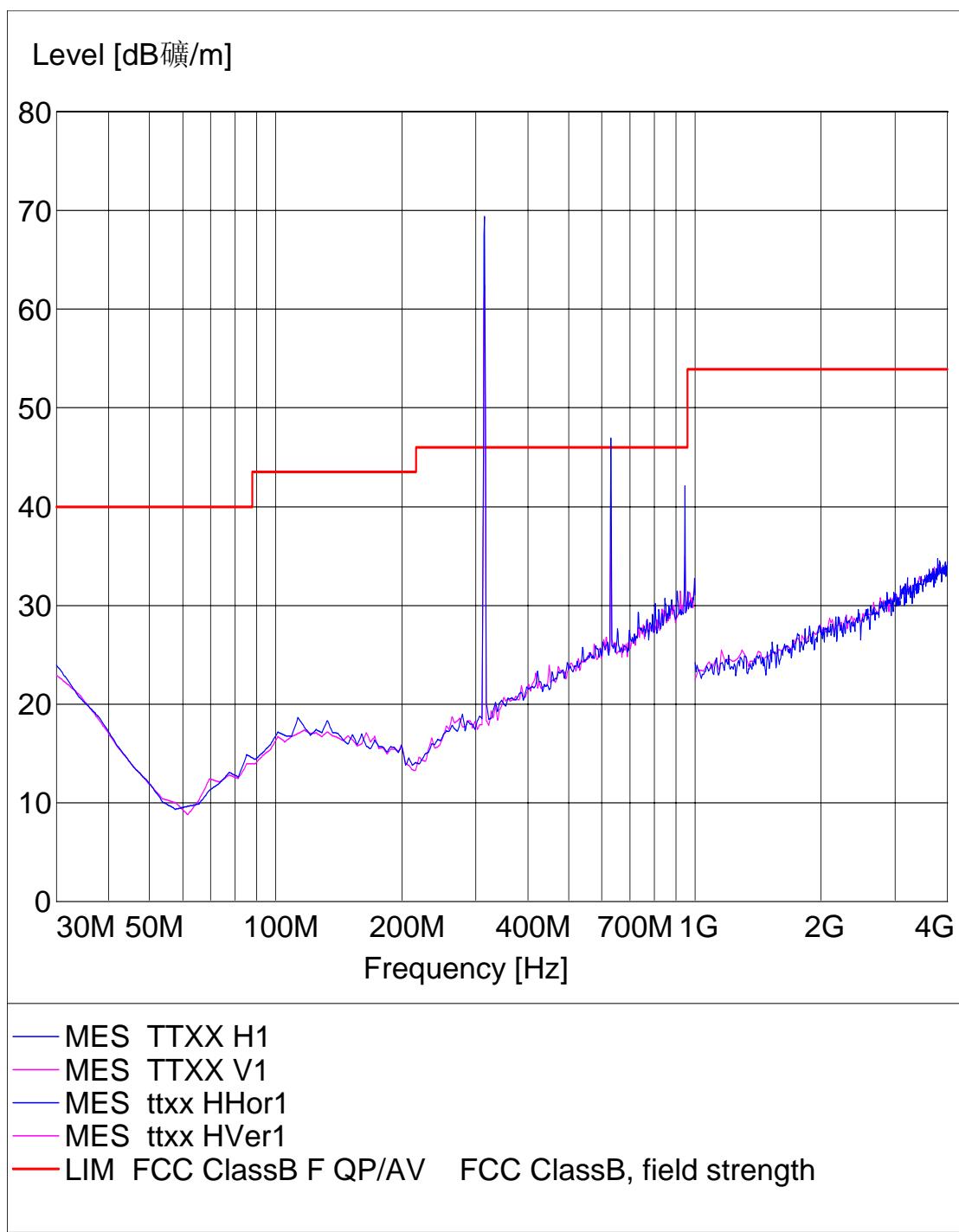


Table 8 Restricted Band Radiated Emission Data

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	
6.31175 - 6.31225	123 - 138	2200 - 2300	
8.291 - 8.294	149.9 - 150.05	2310 - 2390	
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	
12.29 - 12.293	167.72 - 173.2	3332 - 3339	
12.51975	-	3345.8 - 3358	
12.52025	240 - 285	3600 - 4400	
12.57675	-		
12.57725			
13.36 - 13.41			

All the emissions of the above band are 20dB less than the limit.

## 7. OCCUPIED BANDWIDTH

### 7.1. Test Standard and Limit

#### 7.1.1. Test Standard

FCC Part 15 15.231

#### 7.1.2. Test 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

### 7.2. Test Procedure

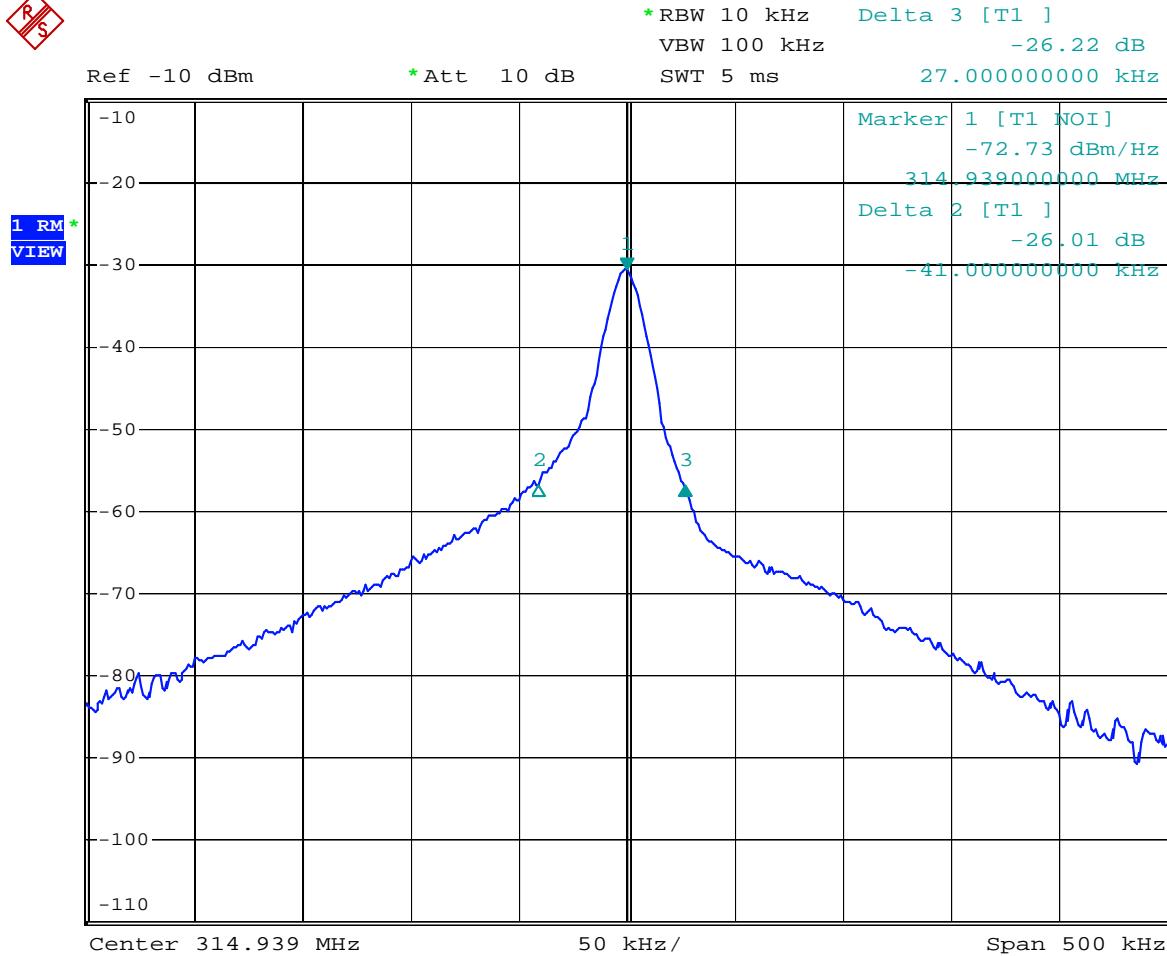
1. Set EUT as normal operation
2. Set EMI test receiver (ESIB26) Center Frequency = fundamental frequency,
3.  $RBW \geq 1\%$  bandwidth,  $VBW \geq RBW$ .
4. Set EMI test receiver (ESIB26) to maxhold mode, mark the points 20dB down from the modulated carrier

### 7.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

### 7.4. Test Data

20dB bandwidth is 68.0 kHz



Date: 8.JUL.2008 05:40:08

## 8. DEACTIVATION TIME

### 8.1. Test Standard and Limit

#### 8.1.1. Test Standard

FCC Part 15 15.231

#### 8.1.2. Test Limit

A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

A transmitter activated automatically shall cease transmission within 5 seconds after activation.

Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

### 8.2. Test Procedure

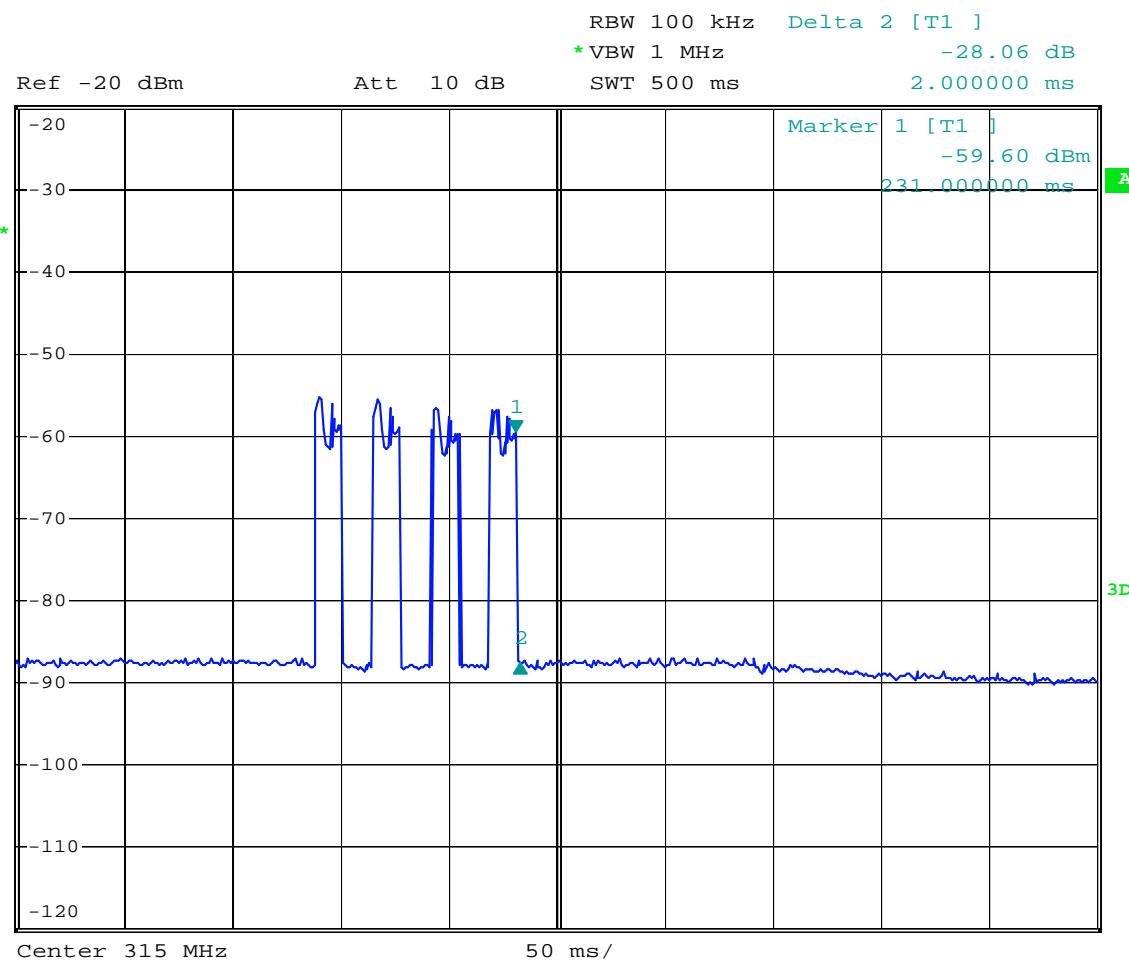
1. Set EUT as normal operation
2. Set EMI test receiver (ESIB26) Center Frequency to fundamental frequency, span to zero
3. Set EMI test receiver (ESIB26) sweep time =5second or less.
4. Set EMI test receiver (ESIB26) Max hold.
5. Record the time EUT start transmitting and stop transmitting.

### 8.3. Test Arrangement

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application. The detailed information refers to test picture.

### 8.4. Test Data

EUT is a manually operated transmitter, the deactivation time is 2ms.



Date: 9.JUL.2008 05:26:03

## **9. ANTENNA REQUIREMENT**

### **9.1. STANDARD APPLICABLE**

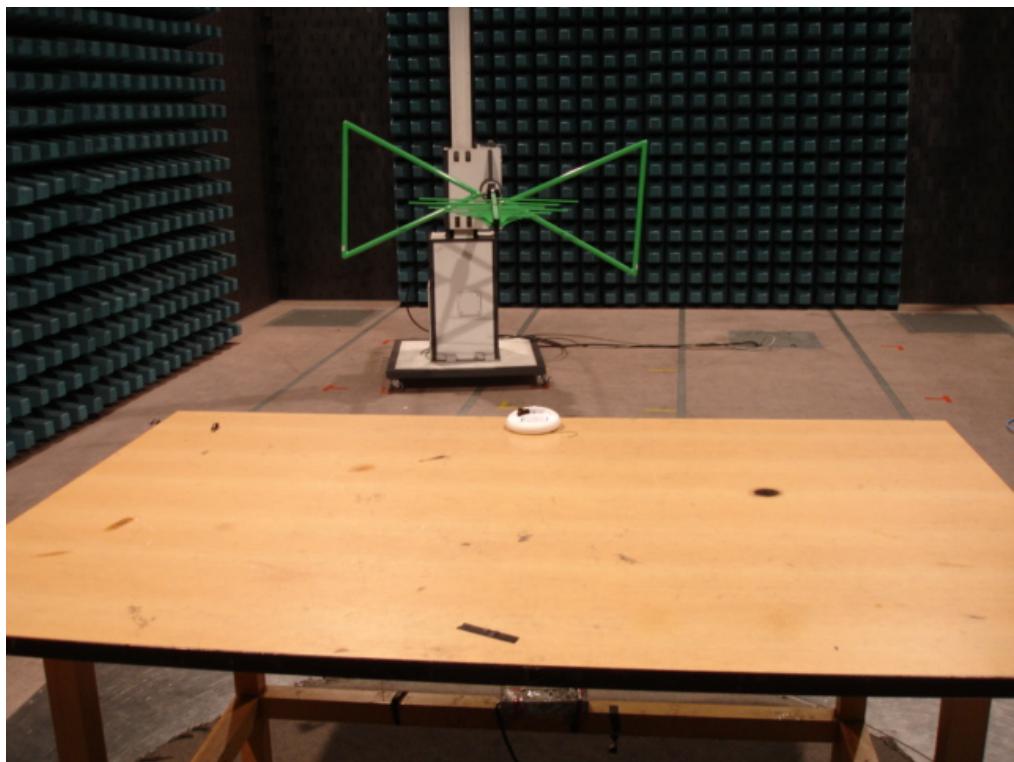
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **9.2. ANTENNA CONNECTED CONSTRUCTION**

The EUT has a built in antenna which is integrated on the PCB, this is permanently attached antenna and meets the requirements of this section.

## **APPENDIX I TEST SETUP PHOTOS**

**Photo 1 Radiated Emission Test**

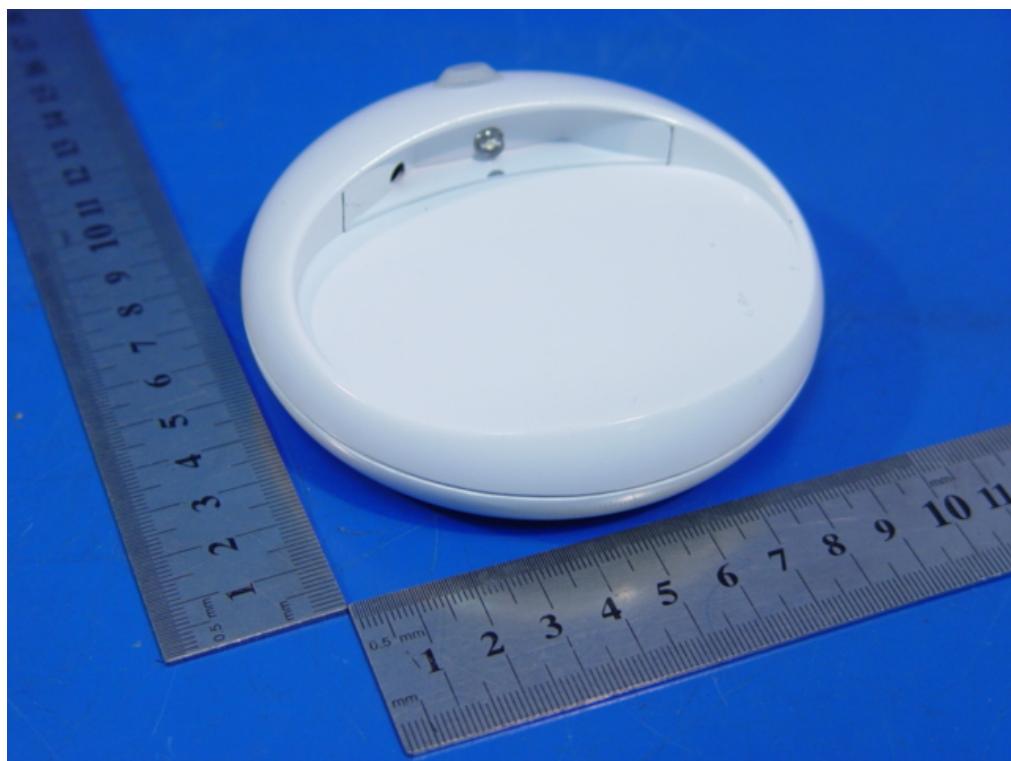


**APPENDIX II EUT PHOTOS**

**Photo 1 Appearance of EUT**



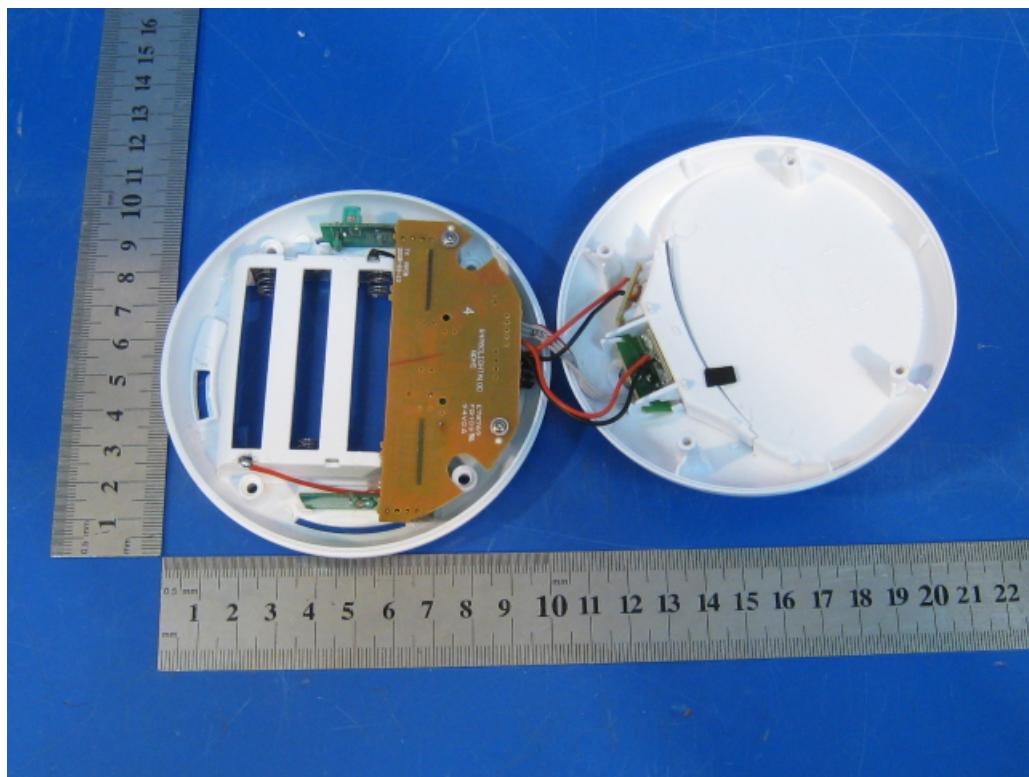
**Photo 2 Appearance of EUT**



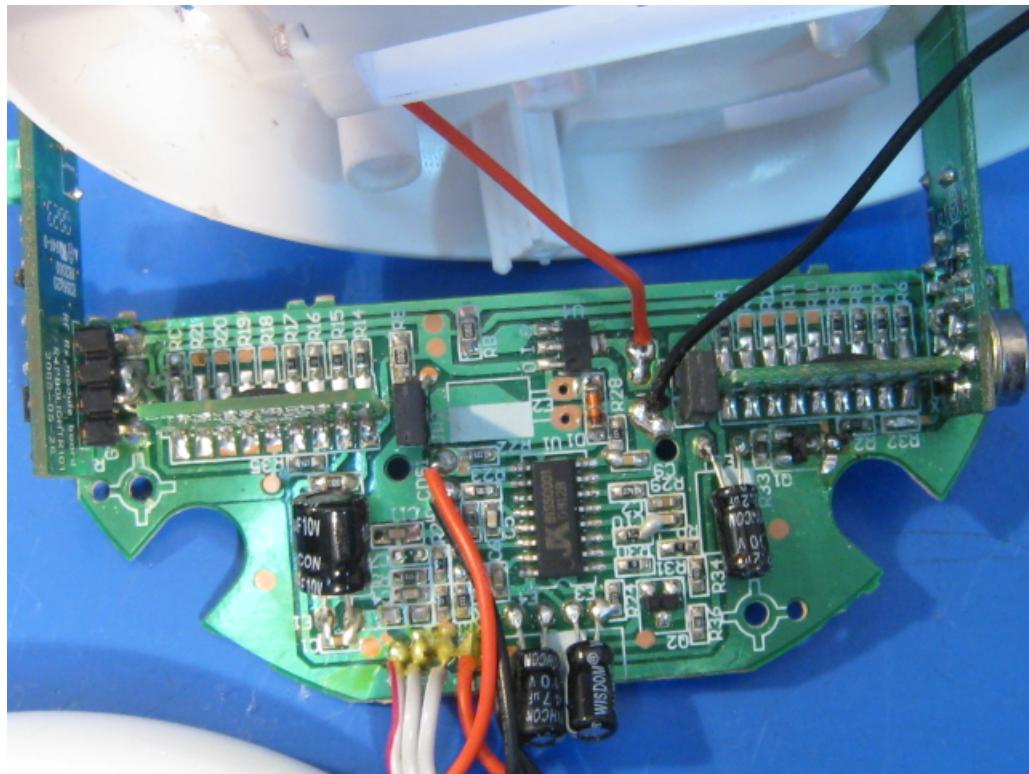
**Photo 3 Appearance of EUT**



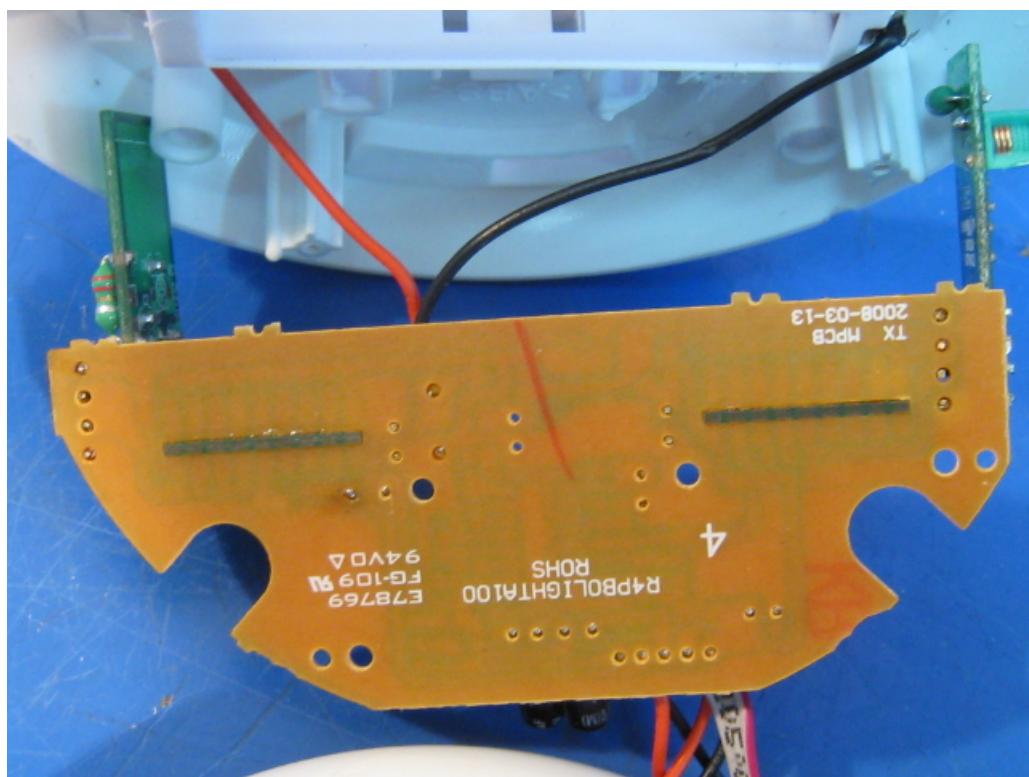
**Photo 4 Inside of EUT**



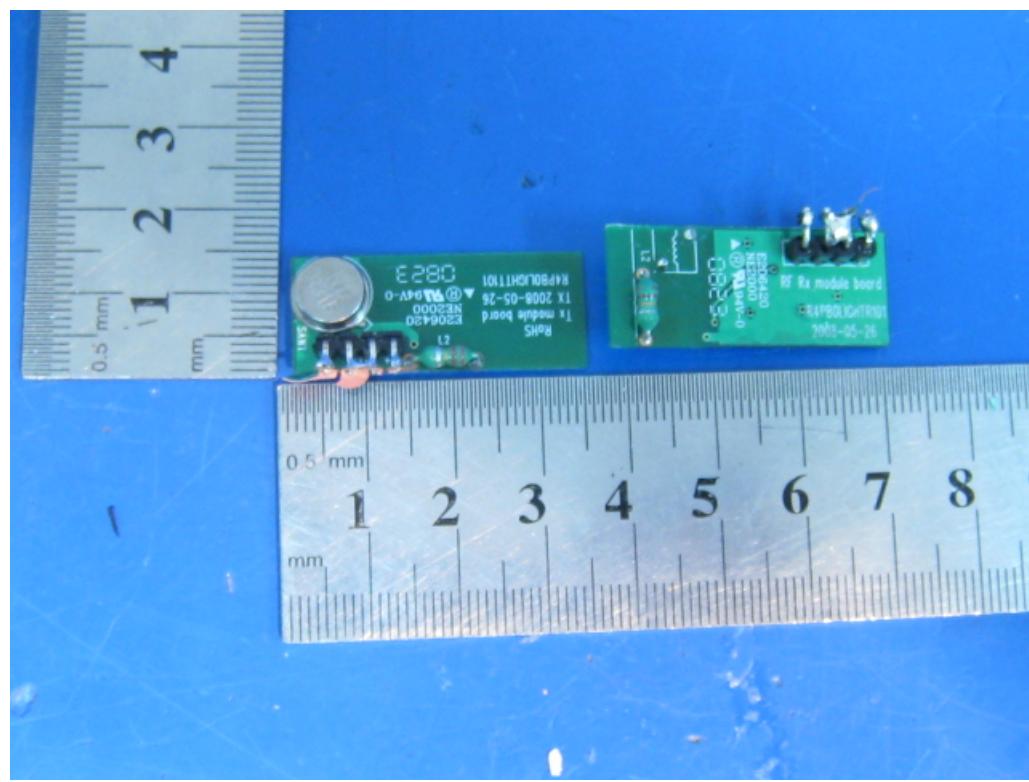
**Photo 5 Inside of EUT**



**Photo 6 Inside of EUT**



**Photo 7 Inside of EUT**



**Photo 8 Inside of EUT**

