

FCC TEST REPORT

FCC ID : U69GW-SCL-001

Applicant : Fiurete Enterprise Co., Ltd.
#102. 5F-3, CHENG HSIN ST. TSOYING DISTRICT, KAOHSIUNG,
TAIWAN

Equipment Under Test (EUT) :

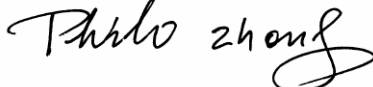
Product description : Wireless Third Brakelight

Model No. : GW-SCL-001

Standards : FCC 15 Subpart C Paragraph 15.231

Date of Test : April 19, 2007

Test Engineer : Tiger Su

Reviewed By : 

PREPARED BY:

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3 Test Summary

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

4 General Information

4.1 Client Information

Applicant:	Fiurete Enterprise Co., Ltd.
Address:	#102. 5F-3, CHENG HSIN ST. TSOYING DISTRICT, KAOHSIUNG, TAIWAN
Manufacturer:	Great Well Electronic Limited
Address:	Gangtou Chenwu Village Industrial Area, Guanlan Road, Guanlan Town, Baoan District, Shenzhen City

4.2 General Description of E.U.T.

Product description:	Wireless Third Brakelight
Model No.:	GW-SCL-001

4.3 Details of E.U.T.

Power Supply:	DC 12V
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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 Wireless Third Brakelight. The standards used were FCC 15 Paragraph 15.231, 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:

- **FCC – Registration No.: 101879**

Compliance Engineering Service (China) 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 101879, September 28, 2004.

4.7 Test Location

All Emissions tests were performed at:-

No. 6 Bldg. 35 Jin Ao Industry Technolog Yuan, Jukeng Rd., Da-Dhui-Keng Cun, Guan Lan Zhen, Bao An Qu, ShenZhen City, China 518110

5 Equipment Used during Test

DESCRIPTION	MFR	MODEL#	SERIAL #	LAST CAL.	CAL.DUE	Firmwar e	Software
AMPLIFIER	MITEQ	AW-1604-3000	1093584	2006/06/10	2007/06/09	N/A	N/A
ANTENNA	EMCO	3142B	9910-1436	2006/06/10	2007/06/09	N/A	N/A
BILOG ANTENNA	SCHAF FNER	CBL6143	5082	2006/06/10	2007/06/09	N/A	N/A
Horn Antenna	ASA	NA	NA	2006/06/10	2007/06/09	N/A	N/A
CABLE	TIME MICRO WAVE	LMR-400	N-TYPE04	2006/06/10	2007/06/09	N/A	N/A
Spectrum Analyzer	Agilent	E7402A	MY420001 39	2006/06/10	2007/06/09	N/A	N/A
EMI test Receiver	ROHD E&SCH WARZ	ESCI	1166.595K 03	2007/02/09	2008/02/08	N/A	N/A
Signal Generator	Agilent	8648C	3847M0111 4	2007/02/09	2008/02/08	N/A	N/A

DESCRIPTION	MFR	MODEL#	SERIAL#	LAST CAL.	CAL. DUE	Firmwar e	Software
Receiver	R&S	ESPI3		2007/02/09	2008/02/08	Ver 3.32 SP2	Labview 5.0
LISN (EUT)	R&S	ENV216		2007/02/09	2008/02/08	N/A	N/A
LISN	EMCO	3825/2	8901-1459	2007/02/09	2008/02/08	N/A	N/A

SPECTRUM ANALYZER	ADVANT ENT	R3132	N02563	2006/06/10	2007/06/0 9	Ver F04	N/A
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6 Conducted Emission Test

Product Name:	Wireless Third Brakelight
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

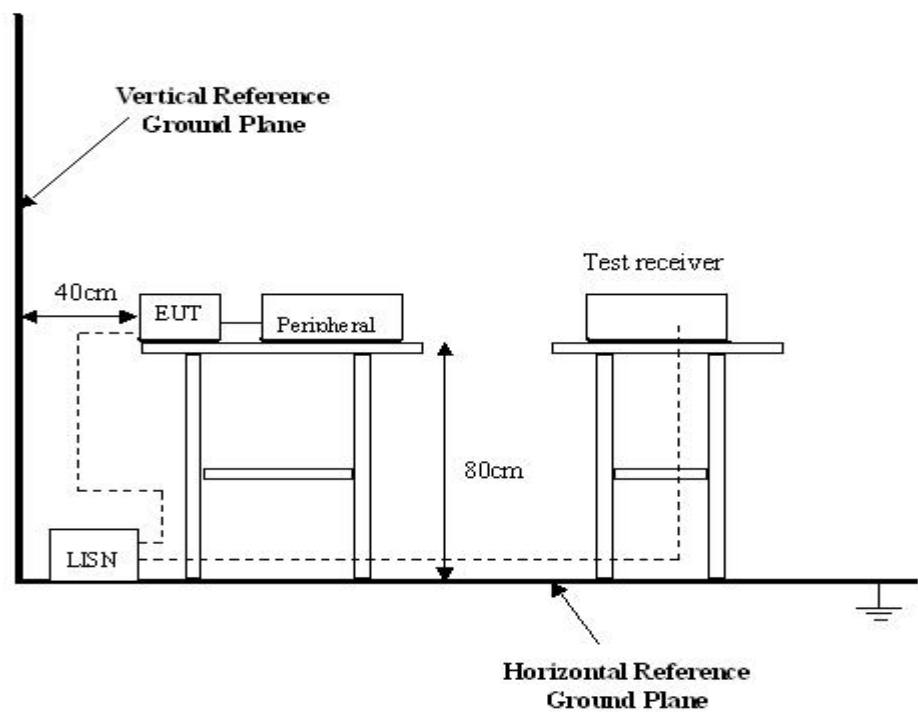
Please refer to Section 5 this report.

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

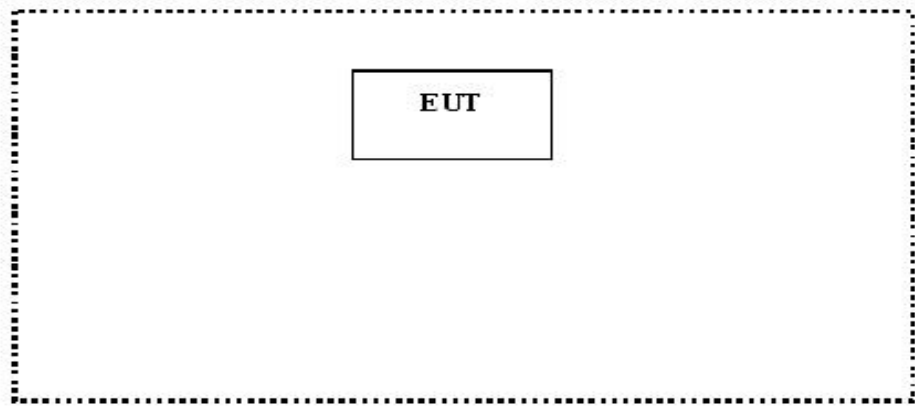
The conducted emission tests were performed using the setup accordance with the ANSI C63.4: 2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



6.4 EUT Operating Condition

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

- 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.



6.5 Conducted Emission Limits

66-56 dB μ V/m between 0.15MHz & 0.5MHz

56 dB μ V/m between 0.5MHz & 5MHz

60 dB μ V/m between 5MHz & 30MHz

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

6.6 Conducted Emission Test Result

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

7 Radiation Emission Test

Product Name:	Wireless Third Brakelight
Test Requirement:	FCC Part15 Paragraph 15.231
Test Method:	Based on FCC Part15 Paragraph 15.33
Test Date:	April 19, 2007
Frequency Range:	30MHz to 5GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth) Quasi-Peak if maximised peak within 6dB of limit

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.

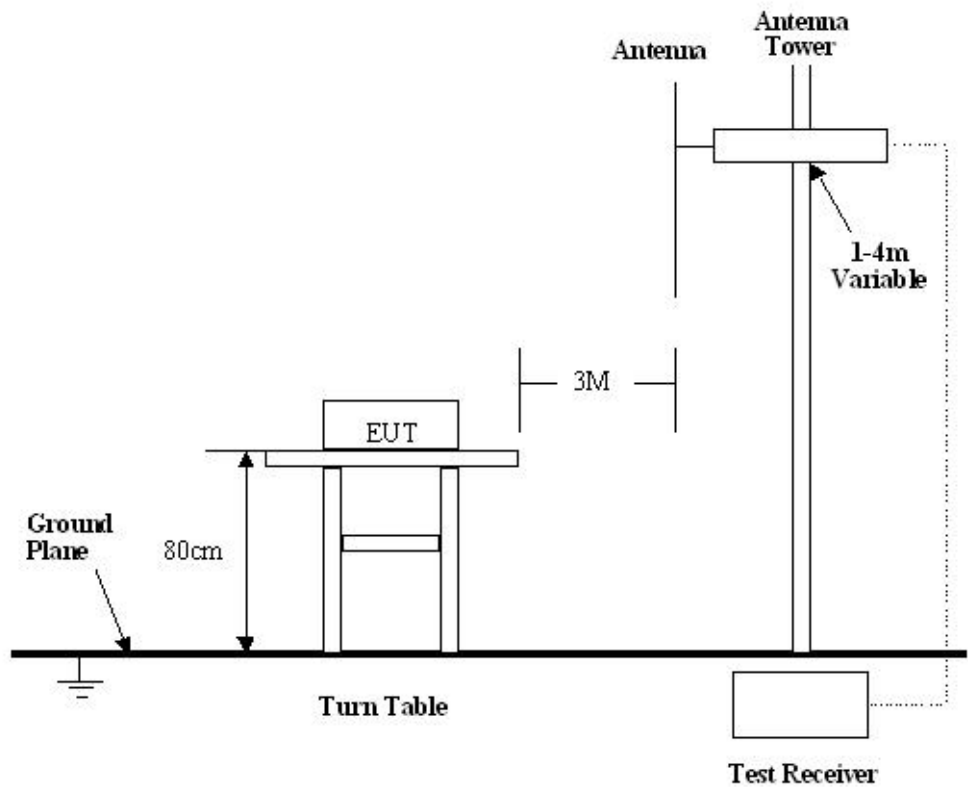
Based on ANSI C63.4: 2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at CCS EMC Lab is +4.0 dB.

7.3 Test Procedure

1. For the radiated emissions test, since the EUT does not have a power source, there was no connection to AC outlets.
2. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
3. 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 μ V of specification limits), and are distinguished with a "Qp" in the data table.
4. The EUT was under normal 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, Paragraph 15.209 limits.



7.5 Spectrum Analyzer Setup

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

Start Frequency30 MHz
Stop Frequency5000 MHz
Sweep Speed Auto
IF Bandwidth100 kHz
Video Bandwidth1 MHz
Quasi-Peak Adapter Bandwidth120 kHz
Quasi-Peak Adapter Mode.....Normal
Resolution Bandwidth1MHz

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 -7dB μ V means the emission is 7dB μ V 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 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 emission (microvolts/meter)
40. 66-40. 70.....	1, 000.....	100
70-130.....	500.....	50
130-174.....	500 to 1, 500 \1\..	50 to 150 \1\
174-260.....	1, 500.....	150
260-470.....	1, 500 to 5, 000 \1\	150 to 500 \1\
Above 470.....	5, 000.....	500

7.10 Radiated Emissions Test Result

Formula of conversion factors:the field strength at 3m was egtablished by adding
The meter reading of the spectrum analyer (which is set to read in units of dBuV)
To the antenna correction factor supplied by the antenna manufacturer. The antenna
Correction factors are stared 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 Data

Test Item:	Radiated Emission Data
Test Voltage:	DC 12V
Test Mode:	TX On
Temperature:	24 °C
Humidity:	52%RH
Test Result:	PASS

Frequency (MHz)	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
433.92	Vertical	60.11	72.86	12.75	1.2	90
433.92	Horizontal	63.66	72.86	9.20	1.5	120
867.84	Vertical	36.68	52.86	16.18	1.5	45
1301.76	Vertical	39.84	54.00	14.16	1.5	120
1735.68	Vertical	38.55	54.00	15.45	2.0	90
2169.6	Vertical	40.46	54.00	13.54	1.8	90
867.84	Horizontal	38.72	52.86	14.14	1.8	45
1301.76	Horizontal	39.21	54.00	14.79	2.0	120
1735.68	Horizontal	39.97	54.00	14.03	2.0	60
2169.6	Horizontal	41.37	54.00	12.63	2.0	120

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, $\mu\text{V/m}$ at 3 meters $= 22.72727(F) - 2454.545$;
- (2). For the band 260-470MHz, $\mu\text{V/m}$ at 3 meters $= 16.6667(F) - 2833.3333$.

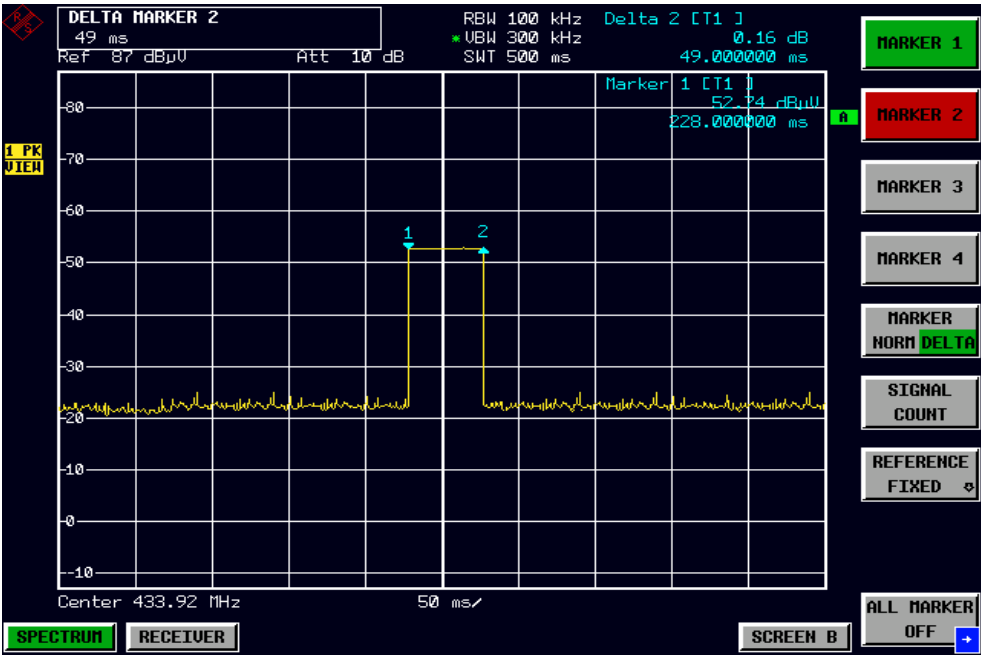
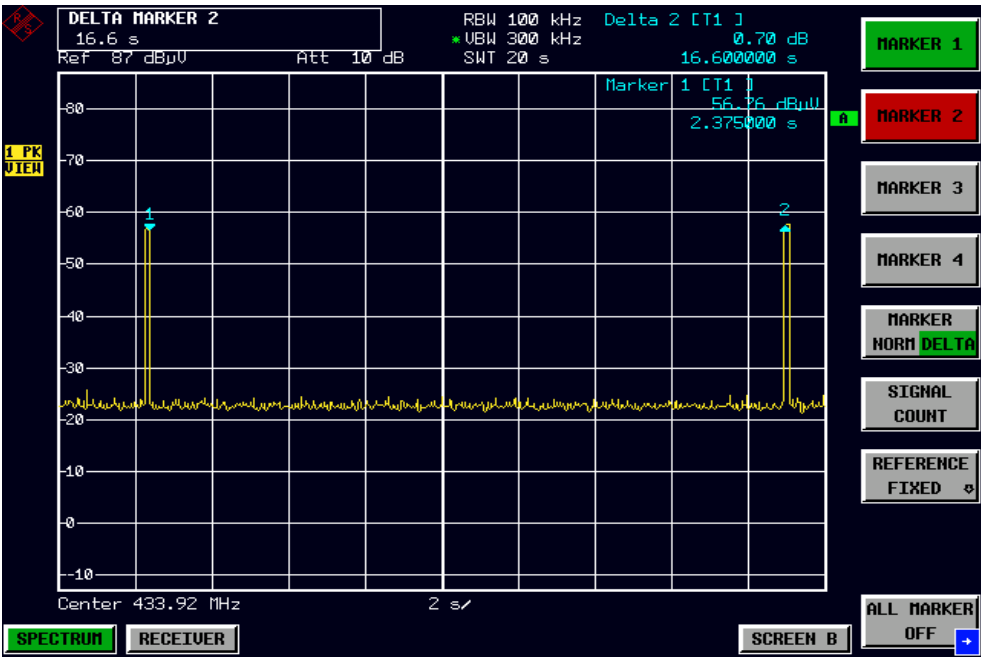
Sample calculation of limit @ 433.92MHz

$$16.6667 (433.92) - 2833.3333 = 4398.6811 \mu\text{V/m}$$

$$20\log(4398.34783) = 72.86 \text{ dBuV/m limit @ 433.92MHz}$$

8 Periodic Operation

Refer to the plot (as below),We find each the duration transmission for the device is about 49 ms.and silent period between transmissions is about 16.6 seconds,This device does meet the FCC requirement.



9 Band Edge

Test Requirement:	FCC Part15 C
Test Method:	Based on FCC Part15 Paragraph 15.231
Test Date:	April 19, 2007
Test mode:	TX On
Temperature:	24 °C
Humidity:	52%RH

9.1 Test Procedure

1. The EUT, peripherals were put on the turntable which table size is 1mX1.5m, table high 0.8m. All set up is according to ANSI C63.4: 2003.
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.

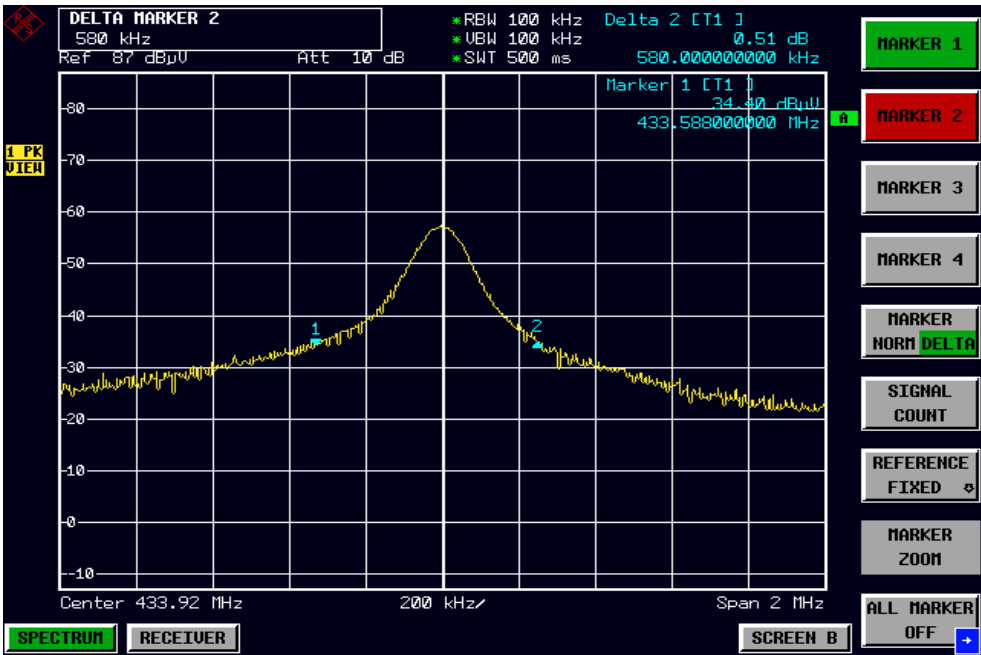
9.2 Band Edge

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	580	1084.8	Pass

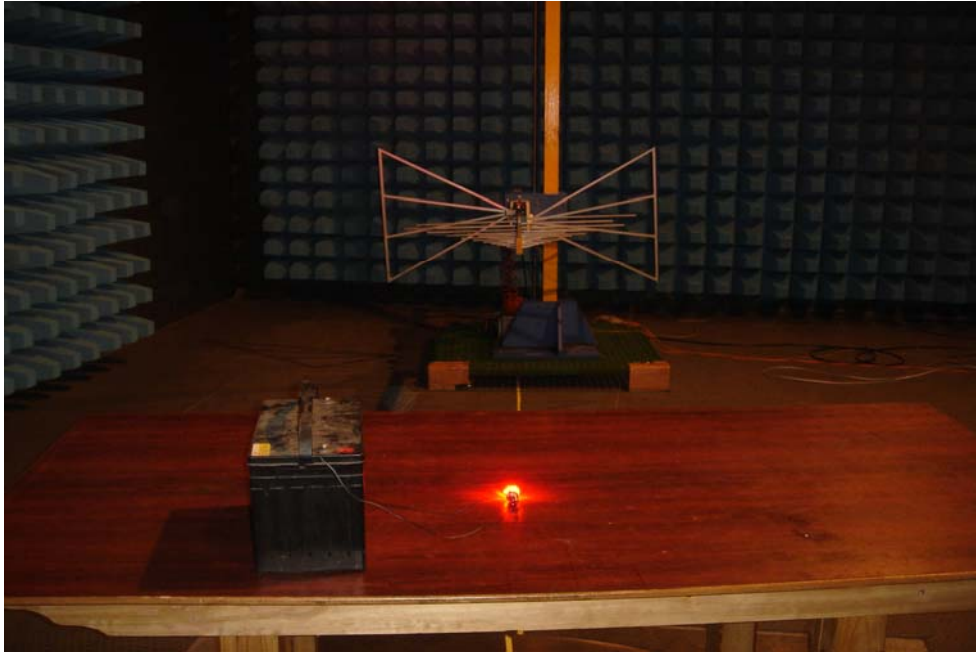
9.3 Band Edge Test Result

433.92 MHz TX



10 Photographs of Testing

10.1 Radiation Emission Test View For 30MHz-1000MHz

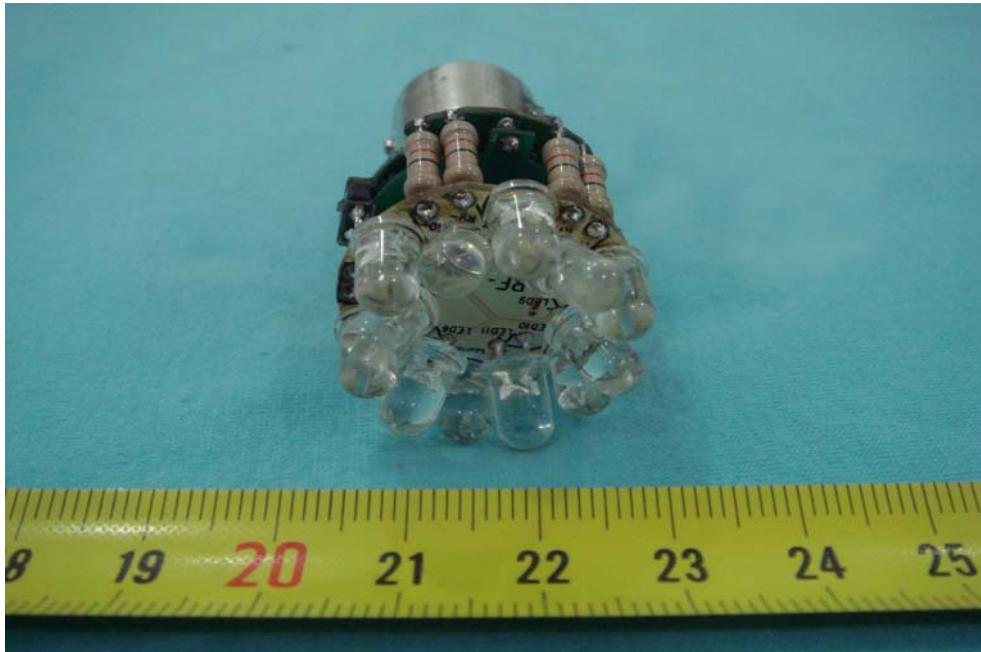


10.2 Radiation Emission Test View For 1GHz-5GHz

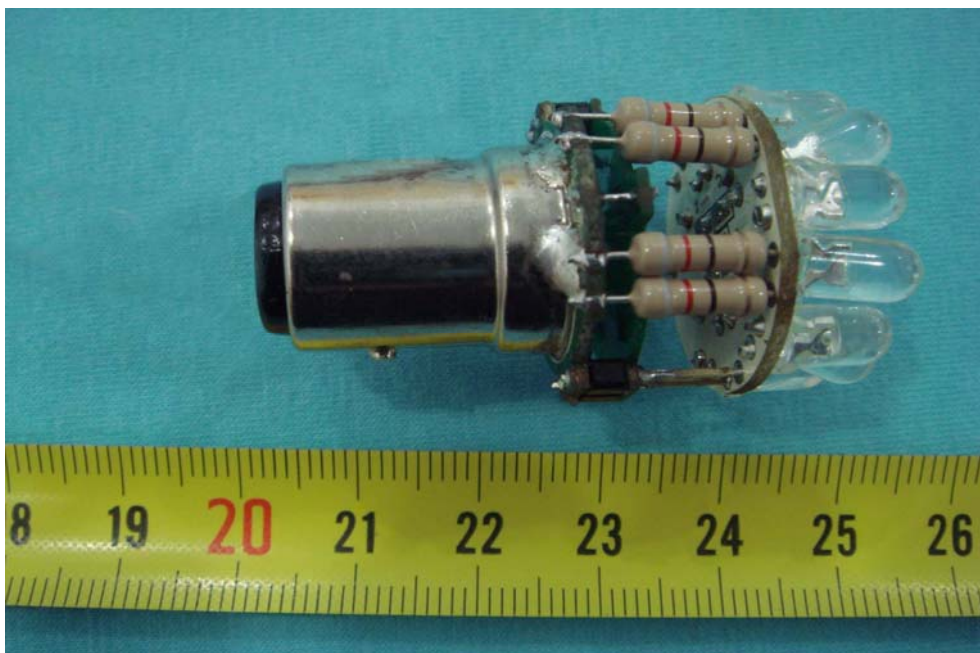


11 Photographs - Constructional Details

11.1 EUT - Front View



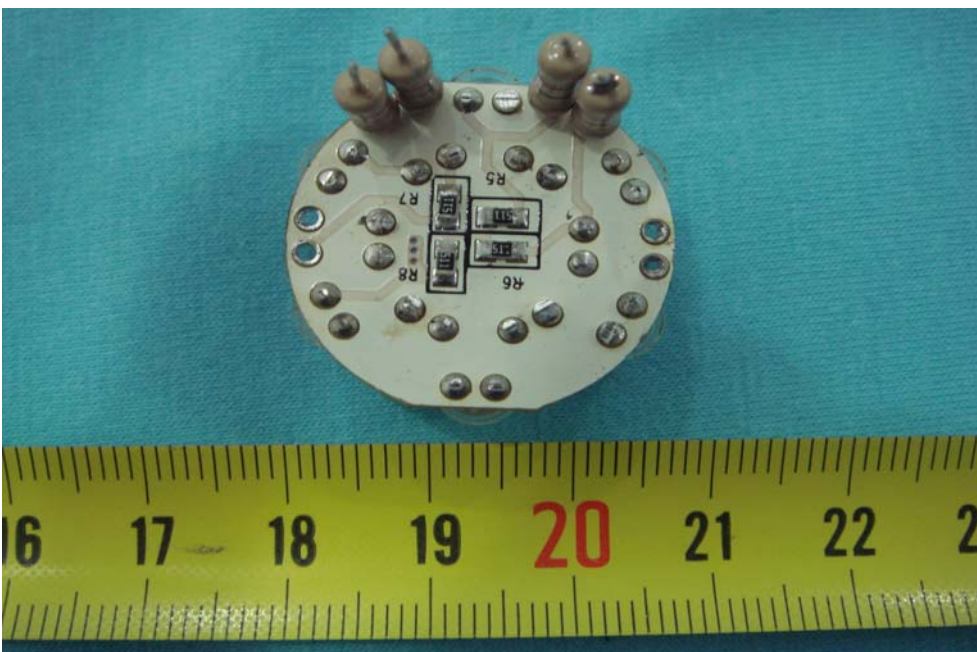
11.2 EUT - Back View



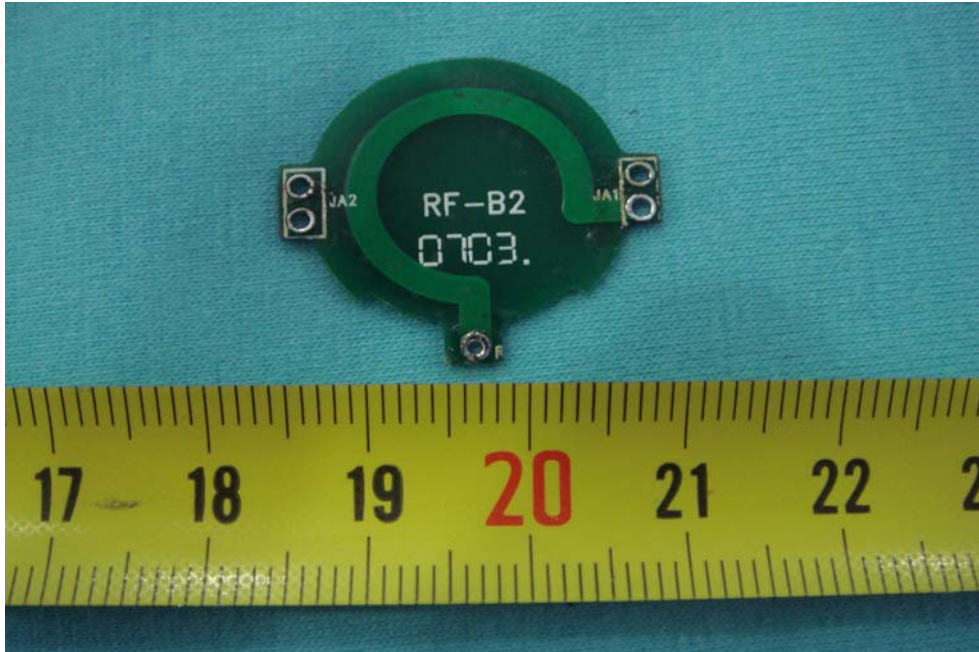
11.3 PCB1-Front View



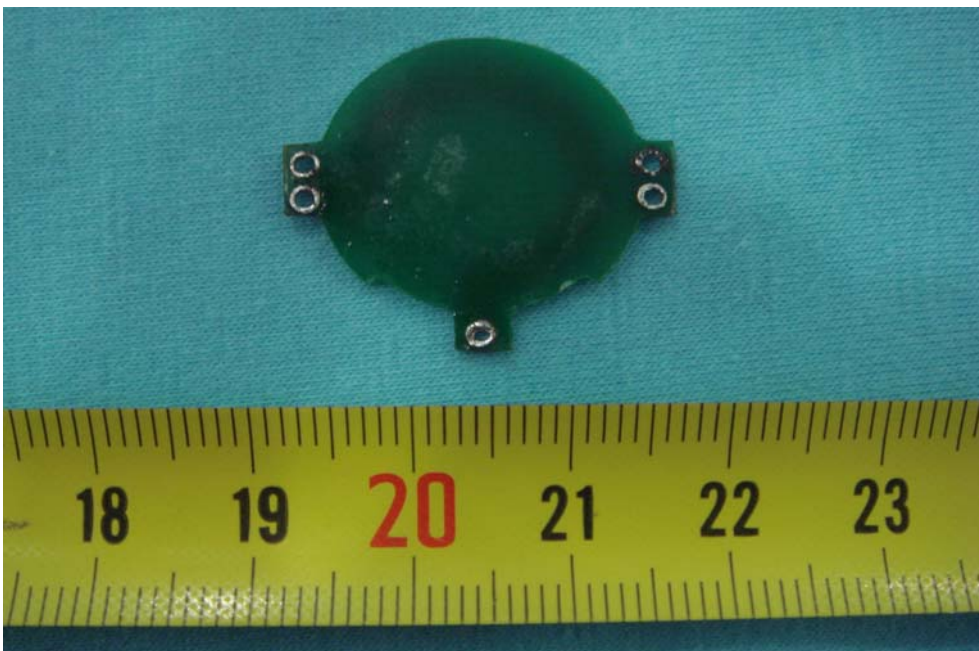
11.4 PCB1-Back View



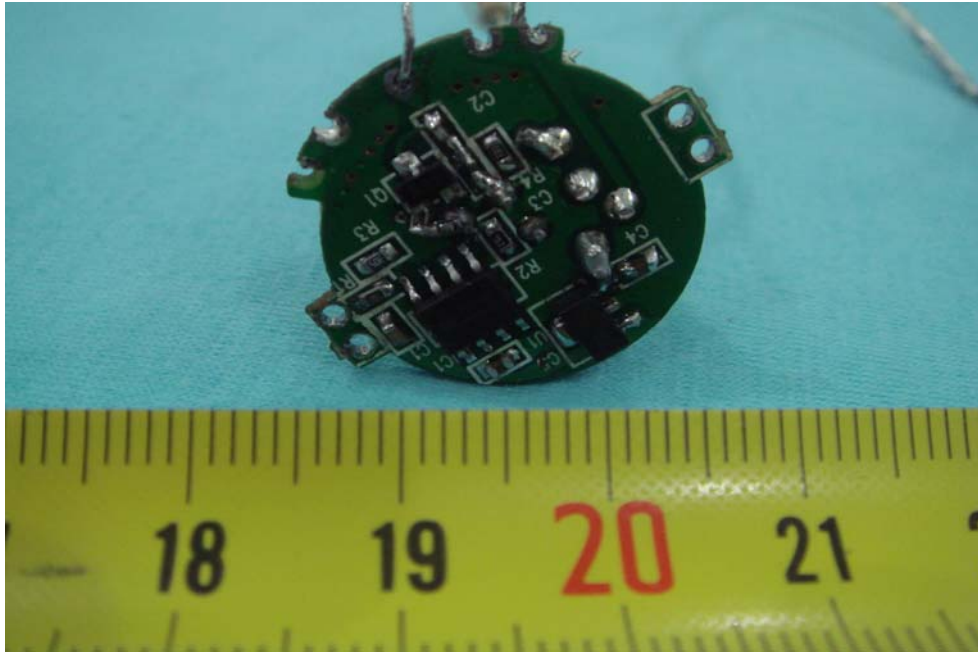
11.5 PCB2-Front View



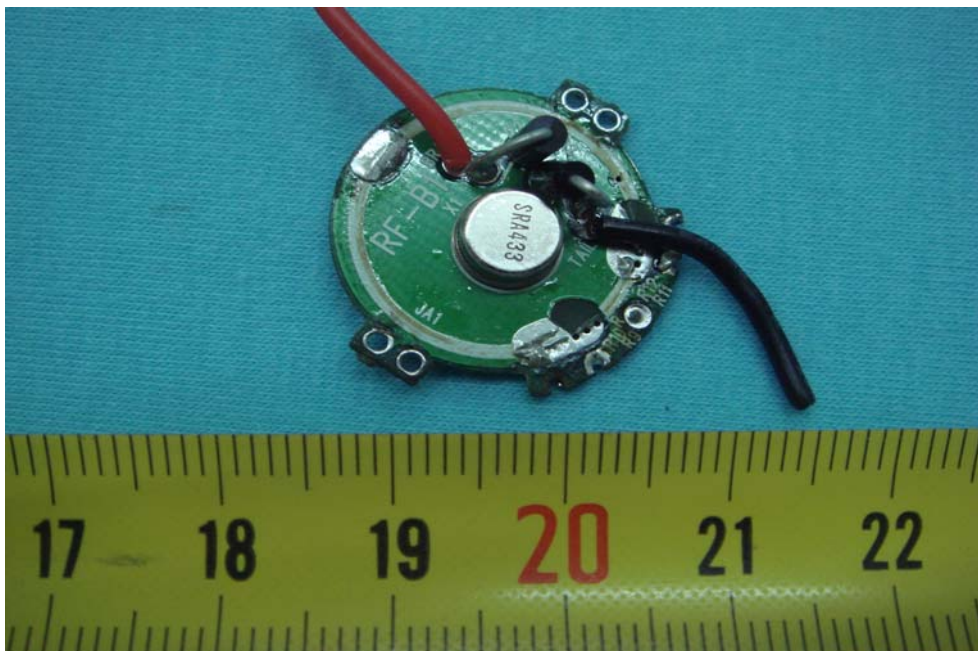
11.6 PCB2-Back View



11.7 PCB3-Front View



11.8 PCB3-Back View



12 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 Mark Location

