

FCC TEST REPORT

FCC ID : WSDTANK-001

Applicant : HONG KONG YING HIN CHICK YUET DEVELOPMENT.,LIMITED

Address of Applicant: 8/F.,CNT COMMEERCIAL BUILDING,
302 QUEEN'S ROAD CENTRAL,HONG KONG

Equipment Under Test (EUT) :

Product description : Custom Remote Control Tank

Model No. : TANK-001

Standards : FCC 15 Subpart C Paragraph 15.227

Date of Test : Oct.11,2008

Test Engineer :Olic huang

Reviewed By : 

PERPARED BY:

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3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (25MHz to 1GHz)	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: HONG KONG YING HIN CHICK
YUET DEVELOPMENT.,LIMITED

Address of Applicant: 8/F.,CNT COMMEERCIAL BUILDING,302 QUEEN'S ROAD
CENTRAL,HONG KONG

Manufacturer: HONG KONG YING HIN CHICK
YUET DEVELOPMENT.,LIMITED

Address: 8/F.,CNT COMMEERCIAL BUILDING,302 QUEEN'S ROAD
CENTRAL,HONG KONG

4.2 General Description of E.U.T.

Product description: Custom Remote Control Tank
Model No.: TANK-001

4.3 Details of E.U.T.

Power Supply: TX: DC 3.0V , Battery

4.4 Description of Support Units

The EUT has been tested as an independent device unit.

4.5 Standards Applicable for Testing

The customer requested FCC tests for a Custom Remote Control Tank. The standards used were FCC 15 Paragraph 15.227, Paragraph 15.205, Paragraph 15.209, 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.

- **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
3m Semi-anechoic chamber						
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	SUNSPO	SP-14C	ISO9001	12	Aug-08	-
EMI Shielded Room						
Test Receiver	ROHDE&SCHWARZ	ESPI	ISO9001	12	Jul-08	101155
Two-Line V- Network	ROHDE&SCHWARZ	ENV216	ISO9001 EN/ISO/IEC 17025	12	Jul-08	100115
Absorbing Clamp	ROHDE&SCHWARZ	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

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

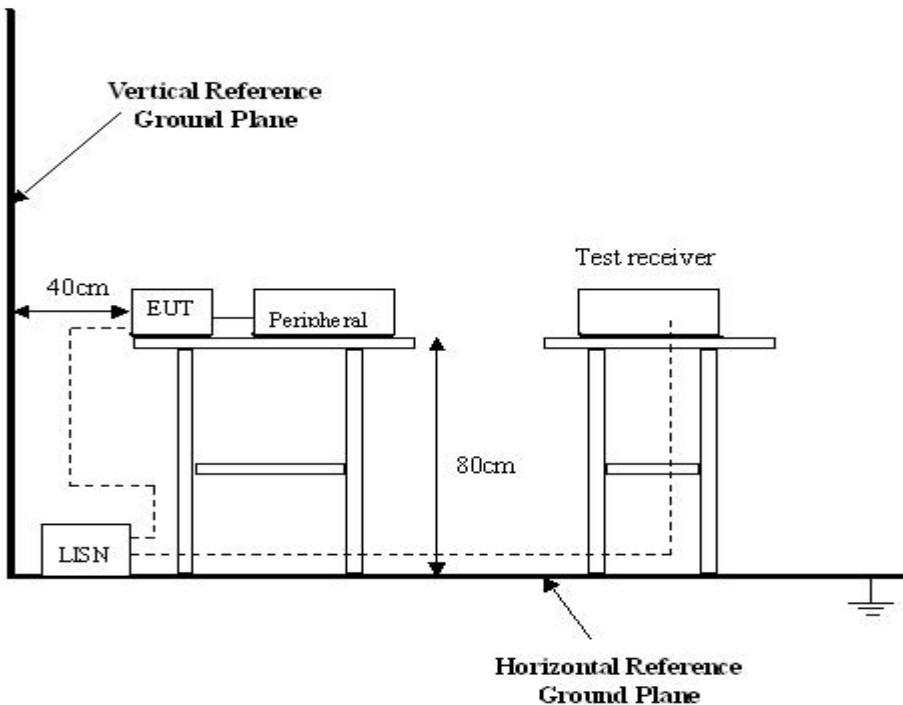
Please refer to Section 5 this report.

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

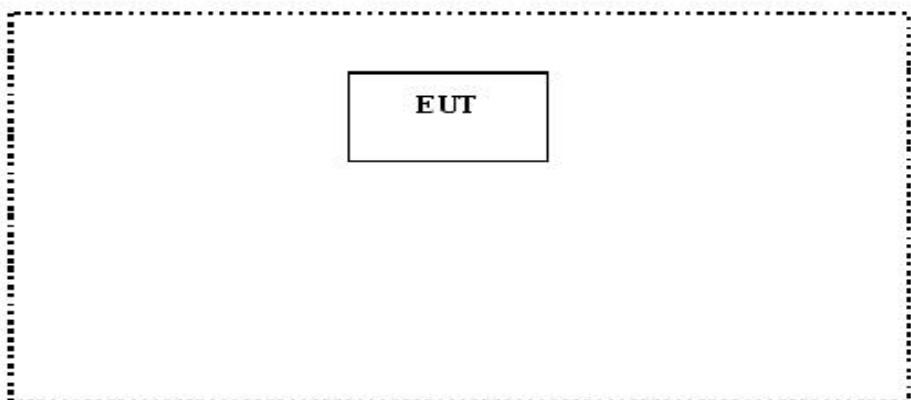
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



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 between 0.15MHz & 0.5MHz

56 dB μ V between 0.5MHz & 5MHz

60 dB μ V 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

Test Requirement:	FCC Part15 Paragraph 15.227
Test Method:	Based on FCC Part15 Paragraph 15.33
Test Date:	Oct .11 ,2008
Frequency Range:	25MHz to 1GHz
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.

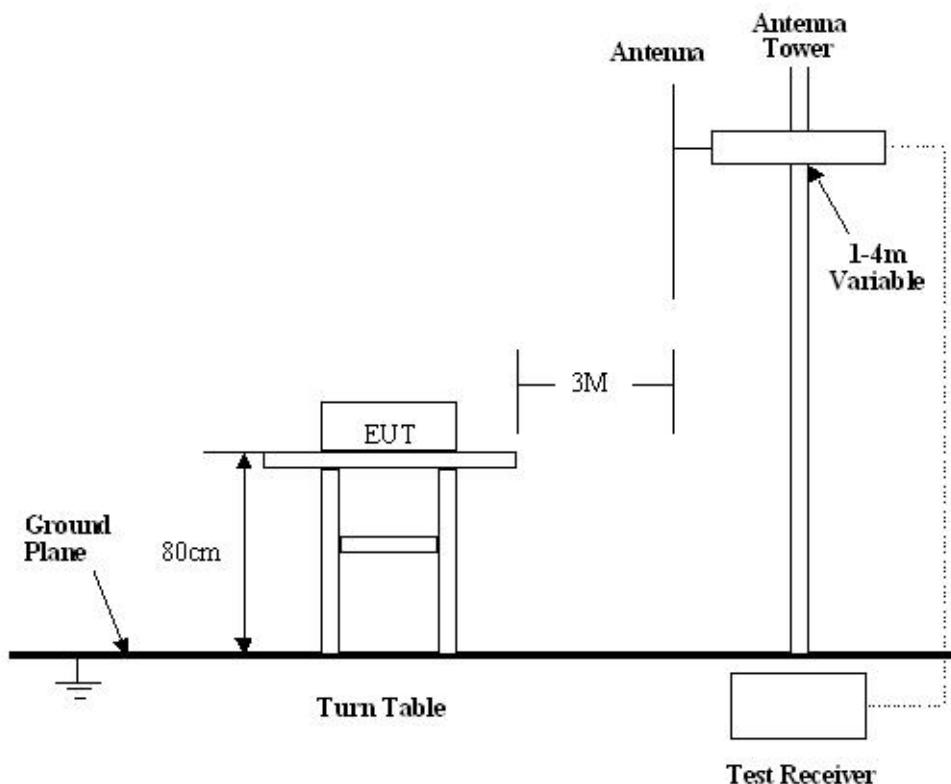
Based on ANSI C63.4:2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Waltek EMC Lab is ± 2.9 dB.

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 and average detection mode.
5. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.
6. For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
7. The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement.

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 15.209, Paragraph 15.227 limits.



7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.227 Rules, the system was tested to 1000 MHz.

Start Frequency	25 MHz
Stop Frequency	1000 MHz
Sweep Speed	Auto
IF Bandwidth	100 kHz
Video Bandwidth	100KHz
Quasi-Peak Adapter Bandwidth	120 kHz
Quasi-Peak Adapter Mode	Normal
Resolution Bandwidth	100KHz

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 $-7\text{dB}\mu\text{V}$ means the emission is $7\text{dB}\mu\text{V}$ 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 7.11, the EUT complied with the FCC Part15 Paragraph 15.227 standards.

7.8 EUT Operating Condition

Same as section 6.4 of this report.

7.9 Radiated Emissions Limit

A. FCC Part 15 subpart C Paragraph 15.227 Limit

Fundamental Frequency(MHz)	Field Strength of Fundamental
	dBuV/m
27.00	80

Note:(1) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

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.

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 analyser (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 pressleter was accounted For in the spectrum analyser meter reading.

Example:

Freq(MHz) Meter Reading +ACF=FS

33 $20\text{dBuV} + 10.36\text{dB} = 30.36\text{dBuV/m}$ @3m

7.11 Radiated Emission Test Data

Test Item:	Radiated Emission Test Data						
Test Voltage:	9 VDC Battery						
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 (°)
27.000	AV	Vertical	61.35	80.0	-28.88	1.2	0
27.000	AV	Horizontal	58.69	80.0	-30.64	1.4	120
54.000	AV	Horizontal	29.38	40.0	-10.62	1.5	130
81. 000	AV	Horizontal	28.32	40.0	-11.68	1.8	127
108. 000	AV	Horizontal	30.36	43.5	-13.14	1.5	130
135. 000	AV	Horizontal	33.98	43.5	-9.52	1.2	120
162. 000	AV	Horizontal	41.84	43.5	-1.66	1.5	110
199. 000	AV	Horizontal	31.35	43.5	-12.15	1.8	100
216.000	AV	Horizontal	29.59	46.0	-16.41	1.5	110
243.000	AV	Horizontal	27.49	46.0	-18.51	1.5	120
270.000	AV	Horizontal	27.62	46.0	-18.38	1.5	125
54.000	AV	Vertical	29.89	43.5	-13.61	1.2	120
81. 000	AV	Vertical	29.47	43.5	-14.03	1.5	130
108. 000	AV	Vertical	29.92	43.5	-13.58	1.2	130
135. 000	AV	Vertical	28.39	43.5	-15.11	1.2	120
162. 000	AV	Vertical	28.96	46.0	-17.04	1.5	130
199. 000	AV	Vertical	28.01	46.0	-17.99	1.5	120
216.000	AV	Vertical	28.35	46.0	-17.65	1.5	120
243.000	AV	Vertical	28.11	46.0	-17.89	1.5	0
270.000	AV	Vertical	28.60	46.0	-17.40	1.3	120

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 Occupied Bandwidth

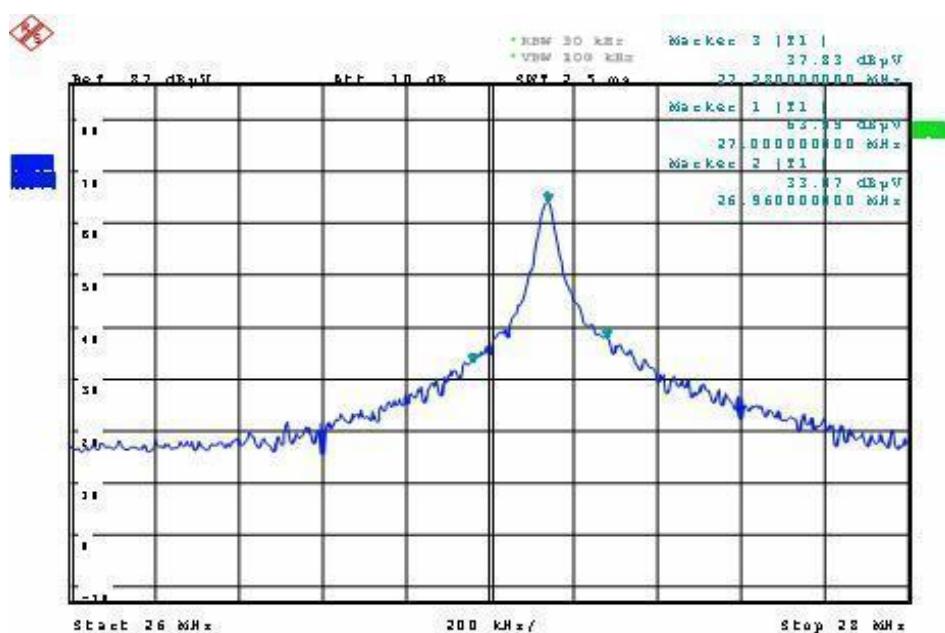
Rules of test : FCC Part15.227
Test Date: Oct 11,2008
Test mode: TX On
Temperature: 24 °C
Humidity: 52%RH

Test Procedure

1. The field strength of any emissions which appear outside of the band shall not exceed the general radiated emission limits in section 15.209.
2. The useful radiated emission form the EUT was detected by the spectrum analyser with peak detector.
3. The result has been complied with the 15.227 (b), see the following plot:

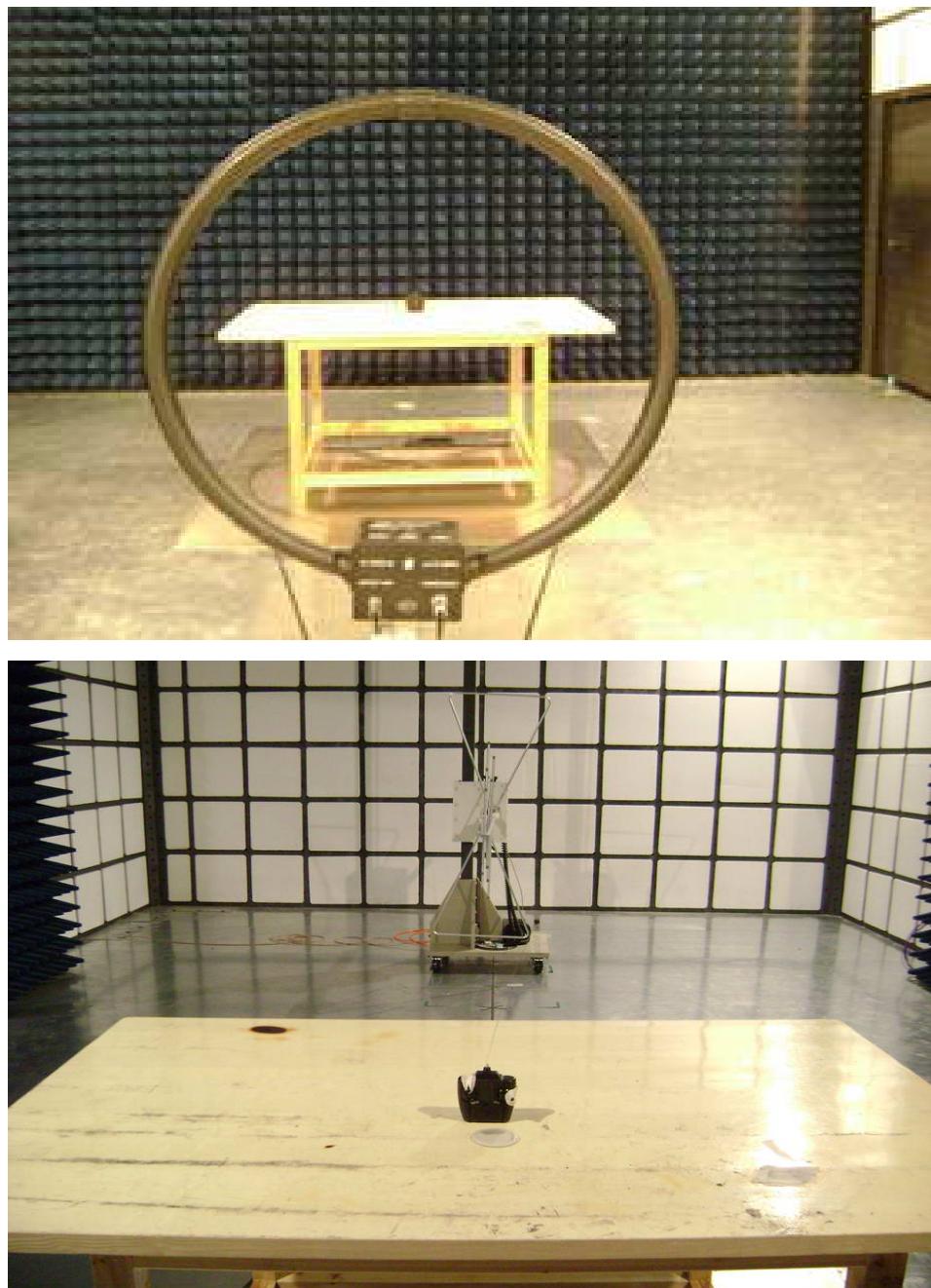
Frequency MHz	Emission dBuV/m	Limit dBuV/m
26.96	37.83	40
27.28	33.07	40

The graph as below.



10 Photographs of Testing

Radiation Emission Test Setup View

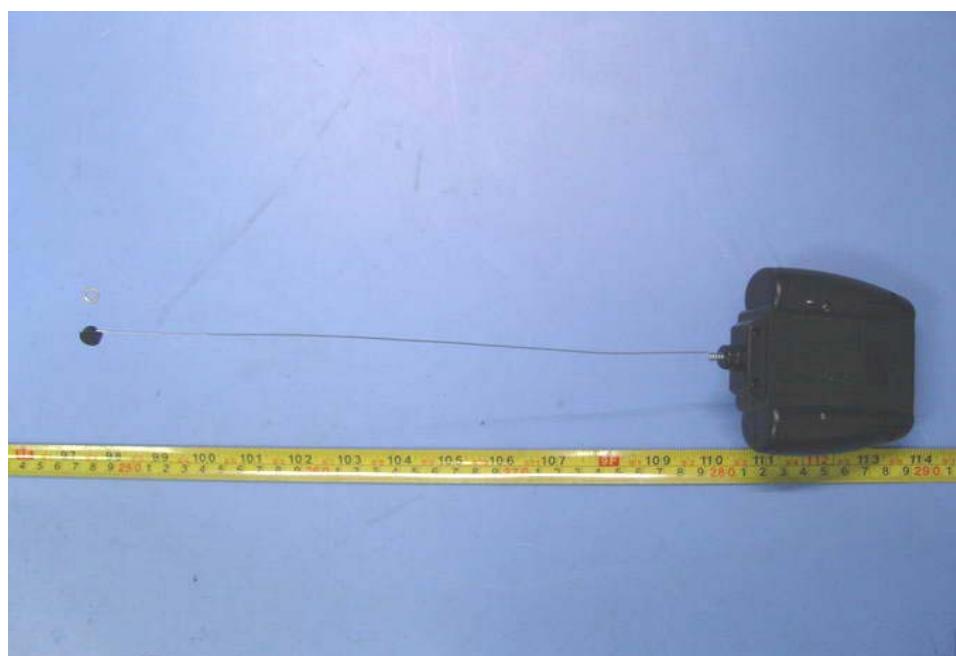


11 Photographs - Constructional Details

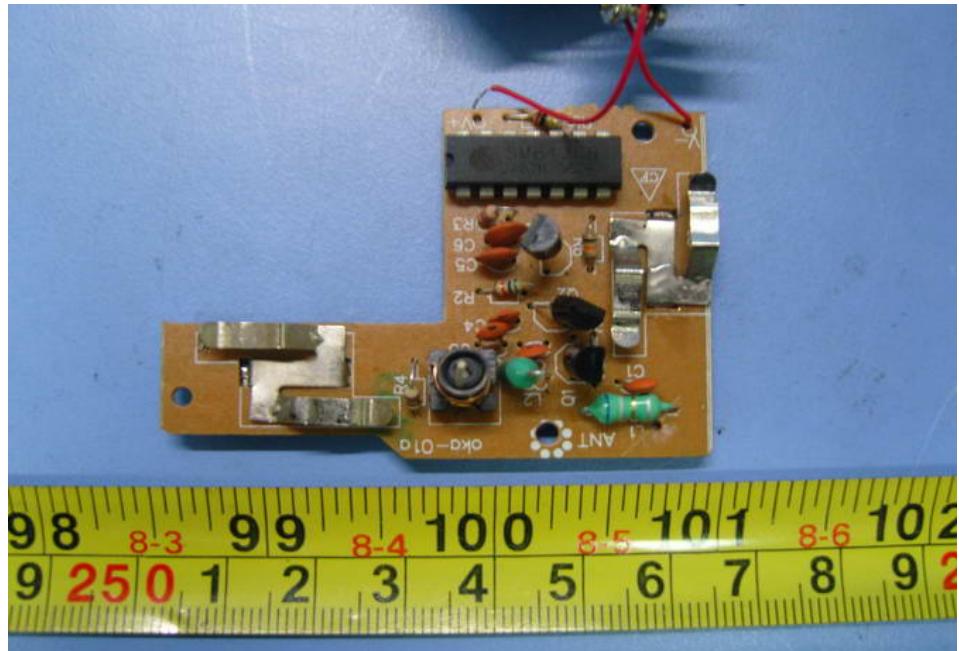
11.1 EUT – Front View



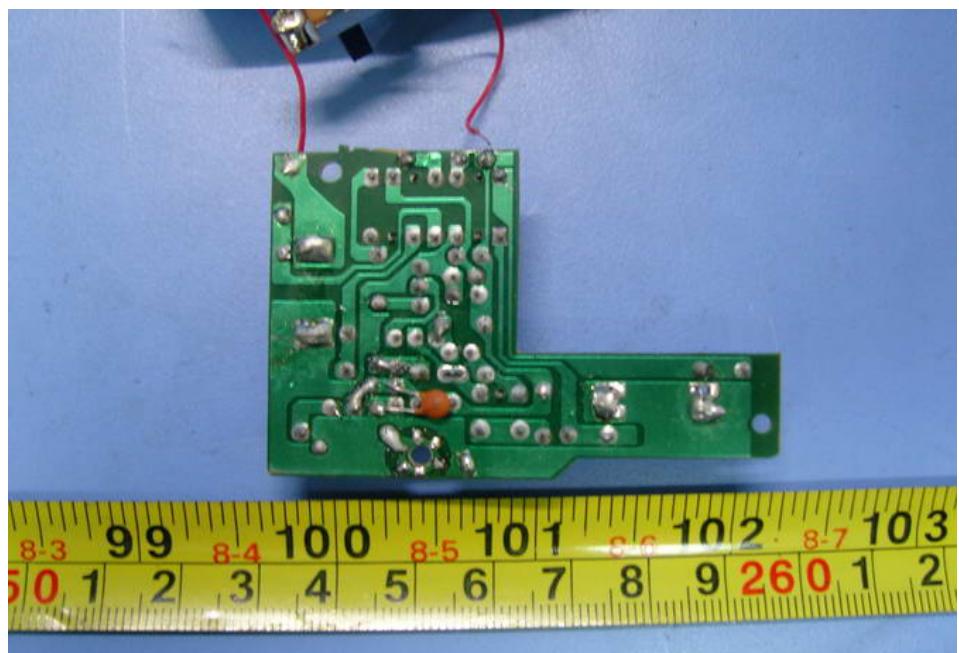
11.2 EUT – Back View



11.3 PCB – Front View



11.4 PCB – 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 Label Location

