

FCC TEST REPORT

Product Name : R/C Toys
Trade Name : XQ
Model Name : 1:10/12 R/C Toys
Serial Number : N/A
Technical Data : DC 9V
FCC ID : W2MXQ006TX49
Report Number : EESZE05250010-1
Date : May 31, 2012
Regulations : See below

Test Standards	Results
<input checked="" type="checkbox"/> 47 CFR FCC Part 15 Subpart C 15.235:2010	PASS

Prepared for:
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North of Xing Ye Road, Lai Mei Industrial District,
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May 31, 2012

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Check No.: 30006586

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N/A means not applicable.

1. GENERAL INFORMATION

Applicant: XQ ARTS TOYS CO., LTD
 North of Xing Ye Road, Lai Mei Industrial District, Shan Tou,
 Guang Dong, China

Manufacturer: XQ ARTS TOYS CO., LTD
 North of Xing Ye Road, Lai Mei Industrial District, Shan Tou,
 Guang Dong, China

Equipment Authorization: FCC Part 15 Certification

FCC ID: W2MXQ006TX49

Product Name: R/C Toys

Trade Name: XQ

Model Name: 1:10/12 R/C Toys

Serial Number: Not Applicable

Report Number: EESZE05250010-1

Date of Test: May 25, 2012 to May 29, 2012

The above equipment was tested by Centre Testing International for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart C and the measurement procedure according to ANSI C63.4:2009.

2. TEST SUMMARY

Clause	Test Item	Rule	Result
1	Radiated Emission	FCC 15.209	PASS
2	Out of Band Emission	FCC 15.235(b)	PASS
3	Antenna Requirements	FCC 15.203	PASS*

* Telescope-type antenna with unique antenna connector.

3. MEASUREMENT UNCERTAINTY

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Measurement items	Uncertainty
Radiated Emissions / Out of Band Emission	4.5 dB

4. PRODUCT INFORMATION

Items	Description
Rating	DC 9V
EUT type	Intentional Transmitter
Modulation	FSK
Operated Frequency	49.86MHz

5. FACILITIES AND ACCREDITATIONS

5.1 TEST FACILITY

All test facilities used to collect the test data are located at Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4, CISPR 16-1-1 and other equivalent standards.

5.2 TEST EQUIPMENT LIST

Instrumentation: The following list contains equipments used at CTI for testing.

The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

Equipment used during the tests:

3M Semi-anechoic Chamber - Radiated Emission Test				
Equipment	Manufacturer	Model	Serial No.	Due Date
3M Chamber & Accessory Equipment	ETS-LINDGREN	FACT-3	3510	07/09/2012
Spectrum Analyzer	Agilent	E4440A	MY46185649	03/07/2013
TRILOG Broadband Antenna	schwarzbeck	VULB 9136	401	07/06/2012
Multi device Controller	ETS-LINGREN	2090	00057230	N/A

6. SYSTEM TEST CONFIGURATION

6.1 JUSTIFICATION

For emission testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. It was powered by 9 V DC of battery. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 200Hz from 9kHz to 150kHz, 9kHz from 150kHz to 30MHz and 100kHz or greater for frequencies between 30MHz to 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

The unit was operated standalone and placed in the center of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as the customers would normally use it). The EUT was placed on a turn table, and the Antenna of EUT was fully extended, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

For simplicity of testing, the unit was wired to transmit continuously.

6.2 EUT EXERCISING SOFTWARE

No Software was used during testing.

7. Radiated Emissions Measurement

7.1 LIMITS

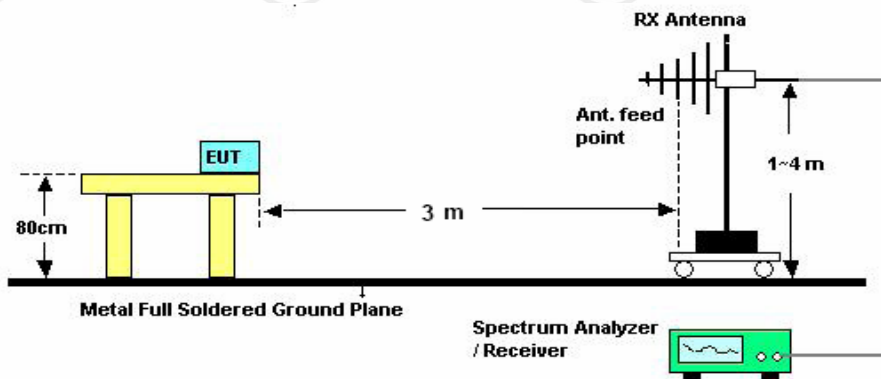
- (1) The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.
- (2) The field strength of any emissions, which appear outside of operating frequency band specified in 15.235, shall not exceed the general radiated emission limits as below.

Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note: the tighter limit applies at the band edges.

7.2 BLOCK DIAGRAM OF TEST SETUP

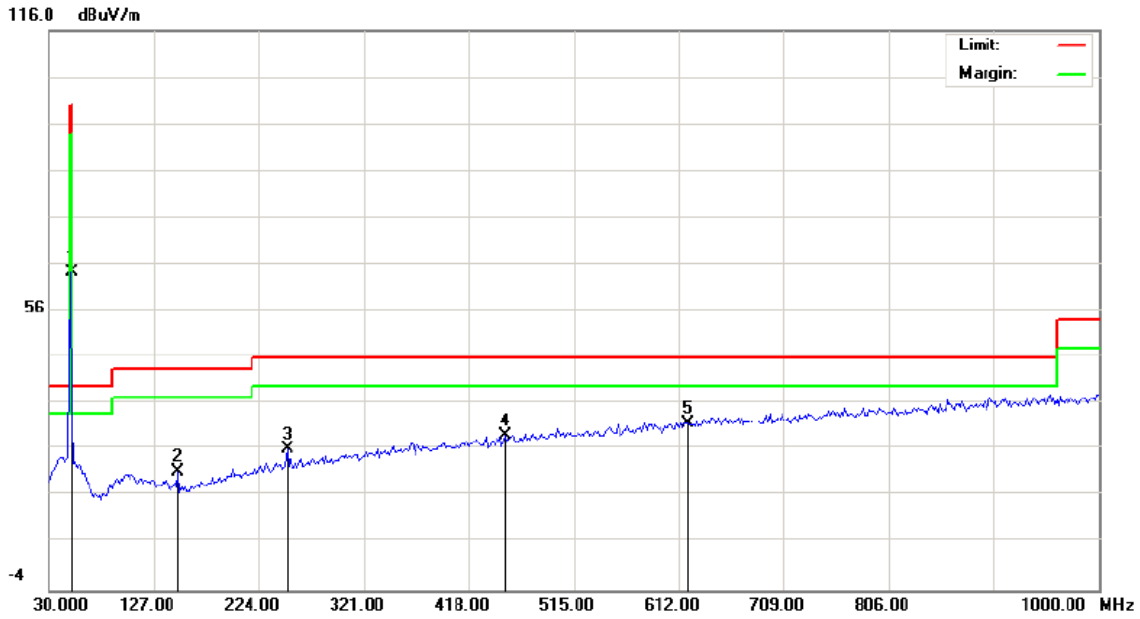
For radiated emissions from 30 - 1000MHz



7.3 TEST PROCEDURE

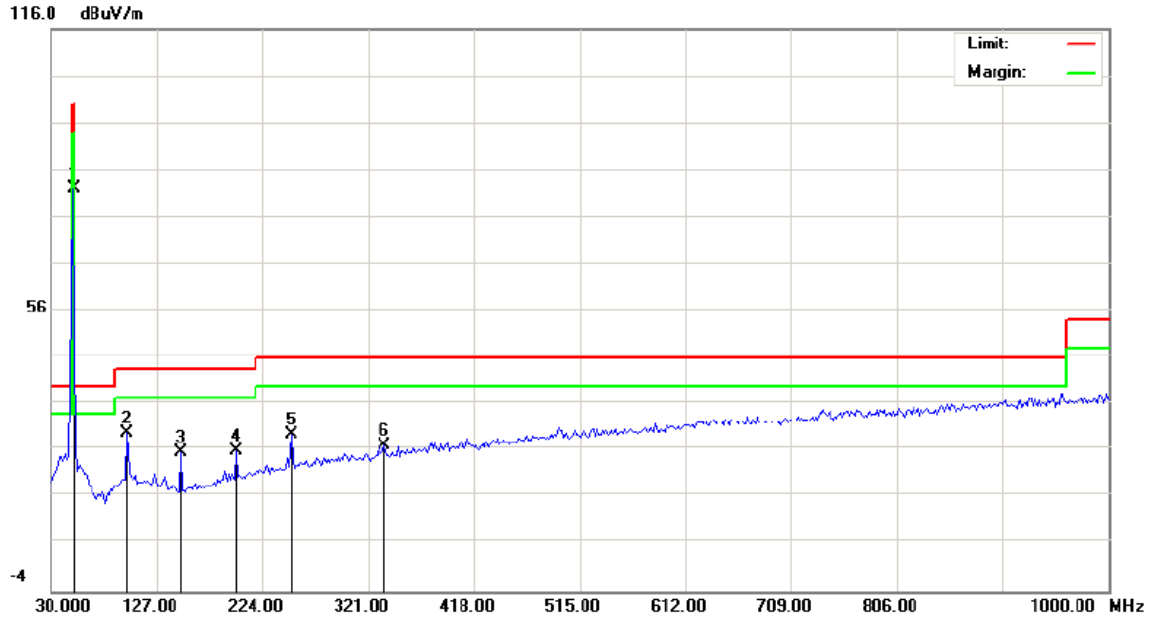
- a. The EUT was placed on the top of a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna (wideband antenna), which was mounted on the top of a variable-height antenna tower. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating the turntable.
- b. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
- c. The test frequency analyzer system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

7.4 TEST RESULT AND GRAPHS



Site site #1 Polarization: **Horizontal** Temperature: 23
 Limit: FCC 15.235 30M-1G Power: DC 9V Humidity: 58 %
 EUT: R/C Toys
 M/N: 1:10/12 R/C Toys
 Mode: TX
 Note:

No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	49.8600	47.79			16.36	64.15			100.0		-35.85		P	
2	149.6333	11.39			10.03	21.42			43.50		-22.08		P	
3	249.8667	11.08			14.97	26.05			46.00		-19.95		P	
4	451.9500	9.18			19.88	29.06			46.00		-16.94		P	
5	620.0833	8.54			23.39	31.93			46.00		-14.07		P	



Site site #1 Polarization: **Vertical** Temperature: 23
 Limit: FCC 15.235 30M-1G Power: DC 9V Humidity: 58 %
 EUT: R/C Toys
 M/N: 1:10/12 R/C Toys
 Mode: TX
 Note:

No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor dB	Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		P/F	Comment
		Peak	QP	AVG		peak	QP	AVG	QP	AVG	QP	AVG		
1	49.8600	65.53			16.36	81.89			100.0			-18.11		P
2	99.5167	16.79			12.88	29.67			43.50			-13.83		P
3	149.6333	15.59			10.03	25.62			43.50			-17.88		P
4	199.7500	13.15			12.73	25.88			43.50			-17.62		P
5	249.8667	14.47			14.97	29.44			46.00			-16.56		P
6	335.5500	9.72			17.31	27.03			46.00			-18.97		P

Note 1: The total factor = cable loss+ antenna factor.
 Final Emission_PK = Reading Level_PK+ total factor.
 For example: The cable loss of 49.86MHz is 1.1dB and the antenna factor is 15.26dB. So, the Total factor=1.1+15.26=16.36dB

Note 2: The duty cycle is simply the on-time divided by the period:

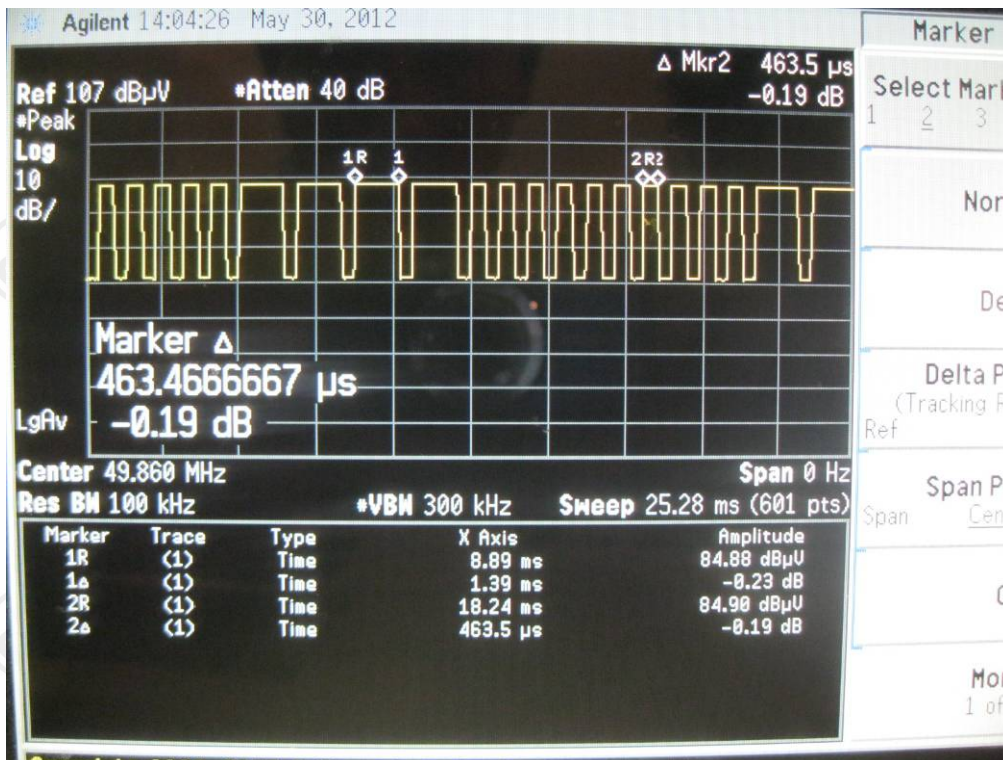
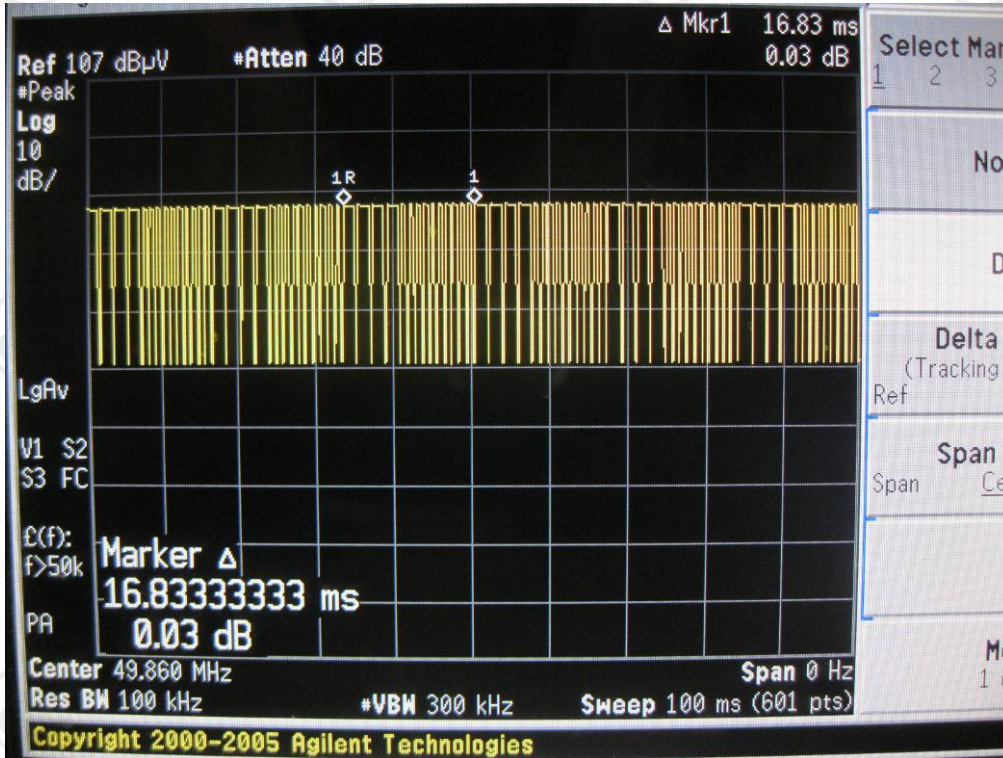
The duration of one cycle = 16.83ms
 Effective period of the cycle = 10*0.464ms+4*1.39ms
 = 10.20ms

DC = 10.20ms / 16.83ms =0.606

Therefore, the averaging factor is found by 20 log0.606 = -4.35 dB

Average = peak + averaging factor= 81.89 – 4.35 = 77.54dB

The plots of duty cycle:

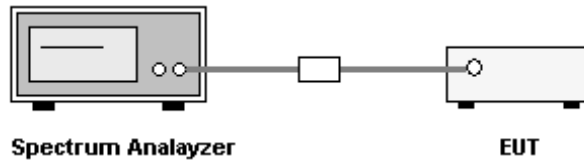


8. OUT OF BAND EMISSION Measurement

8.1 LIMITS

The field strength of any emissions appearing between the band edges and up to 10 kHz above and below the band edges shall be attenuated at least 26 dB below the level of the un-modulated carrier or to the general limits in §15.209, whichever permits the higher emission levels. The field strength of any emissions removed by more than 10 kHz from the band edges shall not exceed the general radiated emission limits in §15.209.

8.2 BLOCK DIAGRAM OF TEST SETUP



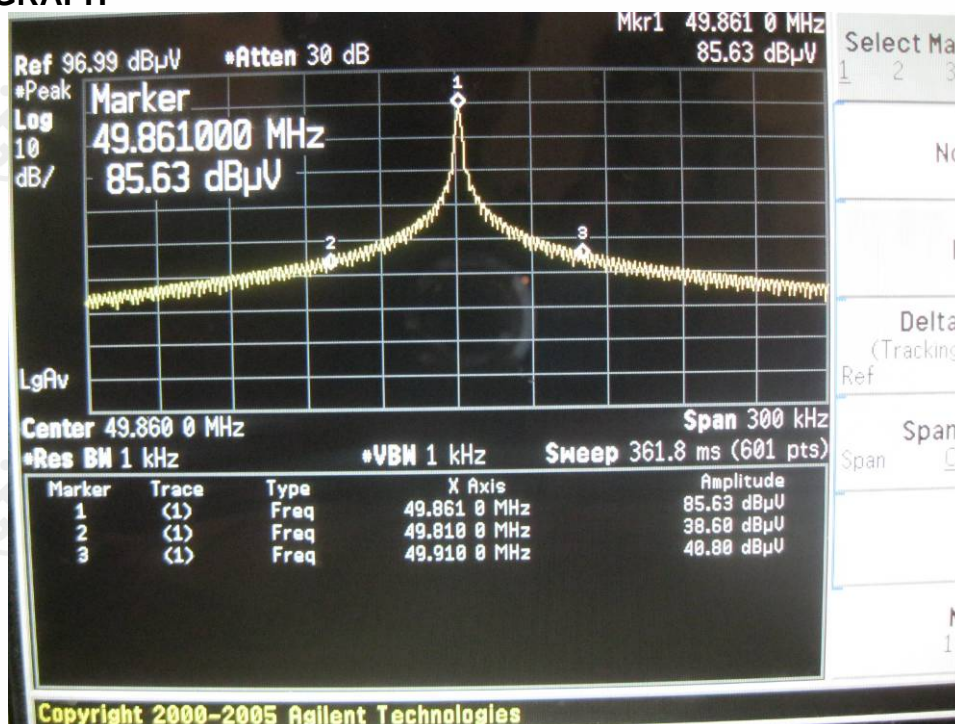
8.3 TEST PROCEDURE

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. Set spectrum analyzer's RBW and VBW to applicable value with Peak in Max Hold.
3. Record the emission drops at the frequency 49.81MHz and 49.91MHz respectively.
4. Use the marker method to determine the frequency 49.81MHz and 49.91MHz compliance as required.

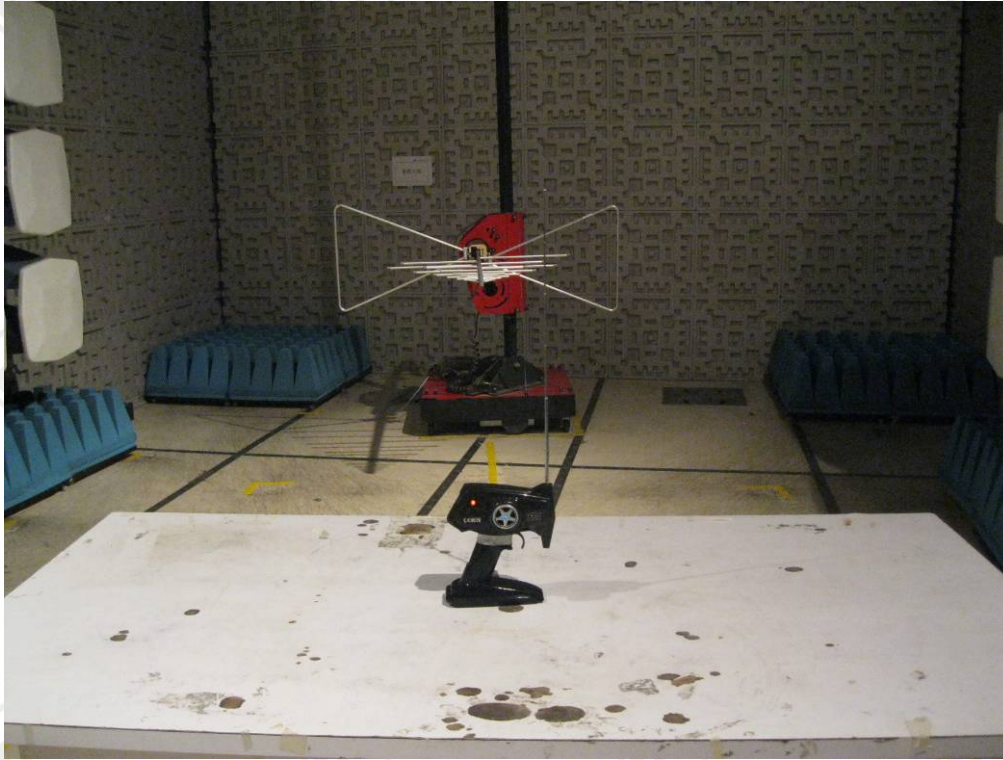
8.4 TEST RESULT

Freq. (MHz)	Fundamental Emission (dB μ V/m)	Delta (dB)	Final Emission (dB μ V/m)	Limit (dB μ V/m)	Result
49.81	81.89	47.03	34.86	40.0	Pass
49.91	81.89	44.83	37.06	40.0	Pass

8.5 TEST GRAPH



APPENDIX 1 PHOTOGRAPHS OF TEST SETUP



TEST SETUP OF RADIATED EMISSION (30MHz-1GHz)

APPENDIX 2 EXTERNAL PHOTOGRAPHS OF EUT



The View of EUT-1



The View of EUT-2

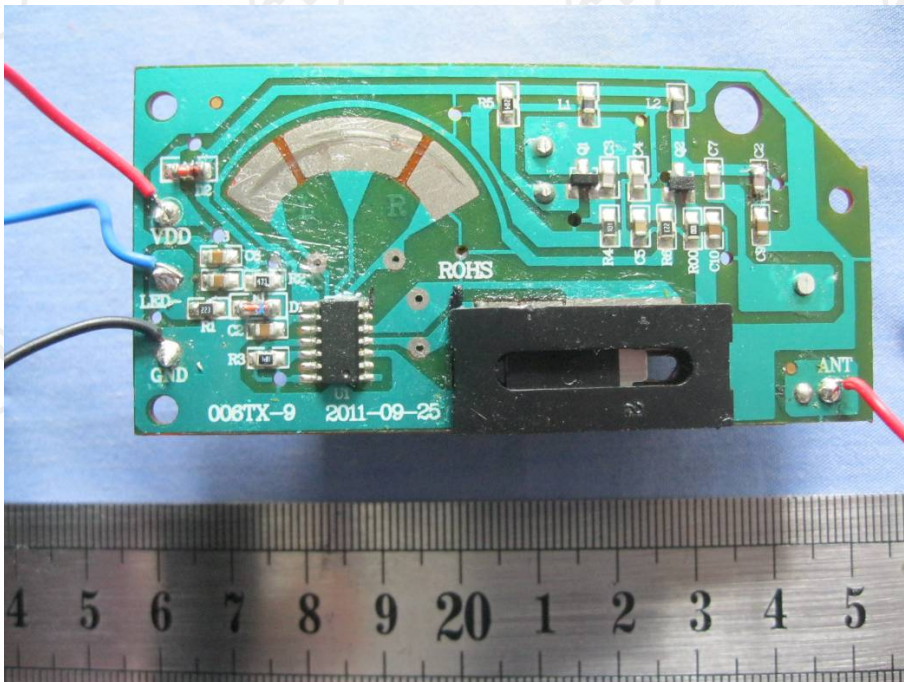


The View of EUT-3

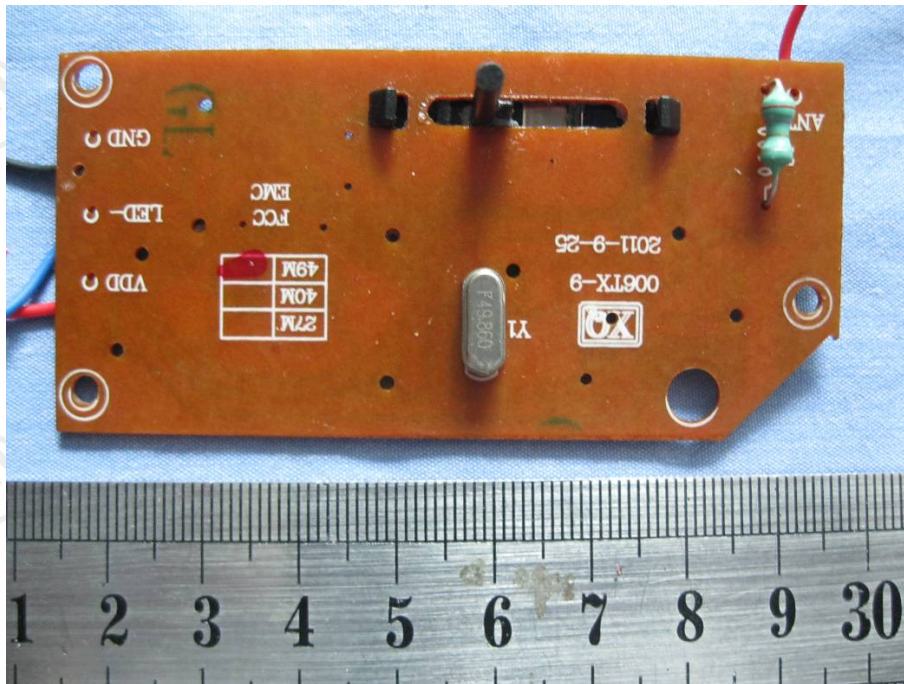
APPENDIX 3 INTERNAL PHOTOGRAPHS OF EUT



Internal View of EUT



Front View of PCB



Rear View of PCB

*** End of report ***

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