

FCC TEST REPORT

Product : R/C Toys
Trade mark : MaxTech
Model/Type reference : MT24
Serial Number : N/A
Ratings : DC 9V
FCC ID : XLA48500TX27
Report Number : EESZE06140006
Date : July 04, 2012
Regulations : See below

Test Standards	Results
<input checked="" type="checkbox"/> 47 CFR FCC Part 15 Subpart C 15.227:2011	PASS

Prepared for:
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Date: July 04, 2012

Check No. 30000763

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N/A means not applicable.

1. GENERAL INFORMATION

Applicant: The Maya Group, Inc.
19823 Hamilton Ave, Torrance, California, 90502, USA

Manufacturer: The Maya Group, Inc.
19823 Hamilton Ave, Torrance, California, 90502, USA

Equipment Authorization: FCC Part 15 Certification

FCC ID: XLA48500TX27

Product: R/C Toys

Trade mark: MaxTech

Model/Type reference: MT24

Serial Number: Not Applicable

Report Number: EESZE06140006

Date of Test: June 14, 2012 to July 04, 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 C63.4:2003.

2. TEST SUMMARY

Clause	Test Item	Rule	Result
1	Radiated Emission	FCC 15.209	PASS
2	Out of Band Emission	FCC 15.227(b)	PASS
3	20 dB Bandwidth	FCC 15.215(c)	PASS
4	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	27.145MHz

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 9163	401	07/06/2012
Multi device Controller	ETS-LINGREN	2090	00057230	N/A
Loop Antenna	ETS-LINDGERN	6502	71730	07/06/2013

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

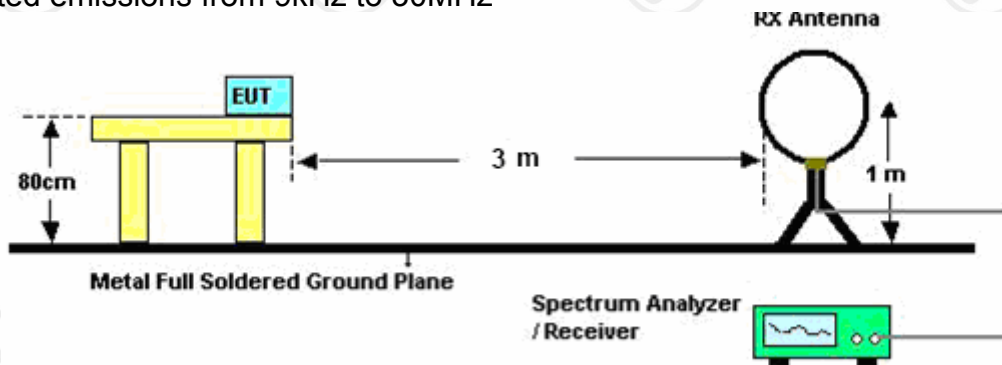
- (1) The field strength of any emission within this band shall not exceed 10,000 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.
- (2) The field strength of any emissions, which appear outside of operating frequency band specified in 15.227, shall not exceed the general radiated emission limits as below.

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

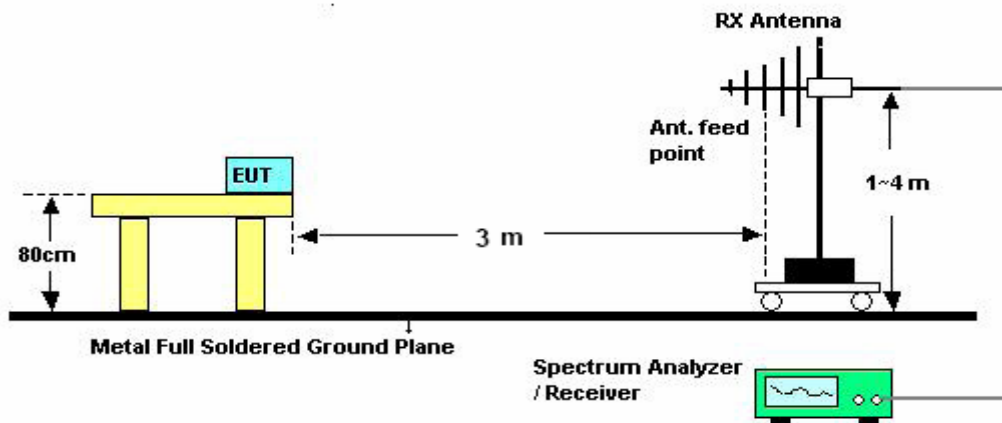
Note: the tighter limit applies at the band edges.

7.2 BLOCK DIAGRAM OF TEST SETUP

For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30 - 1000MHz



7.3 TEST PROCEDURE

A. Above 30MHz

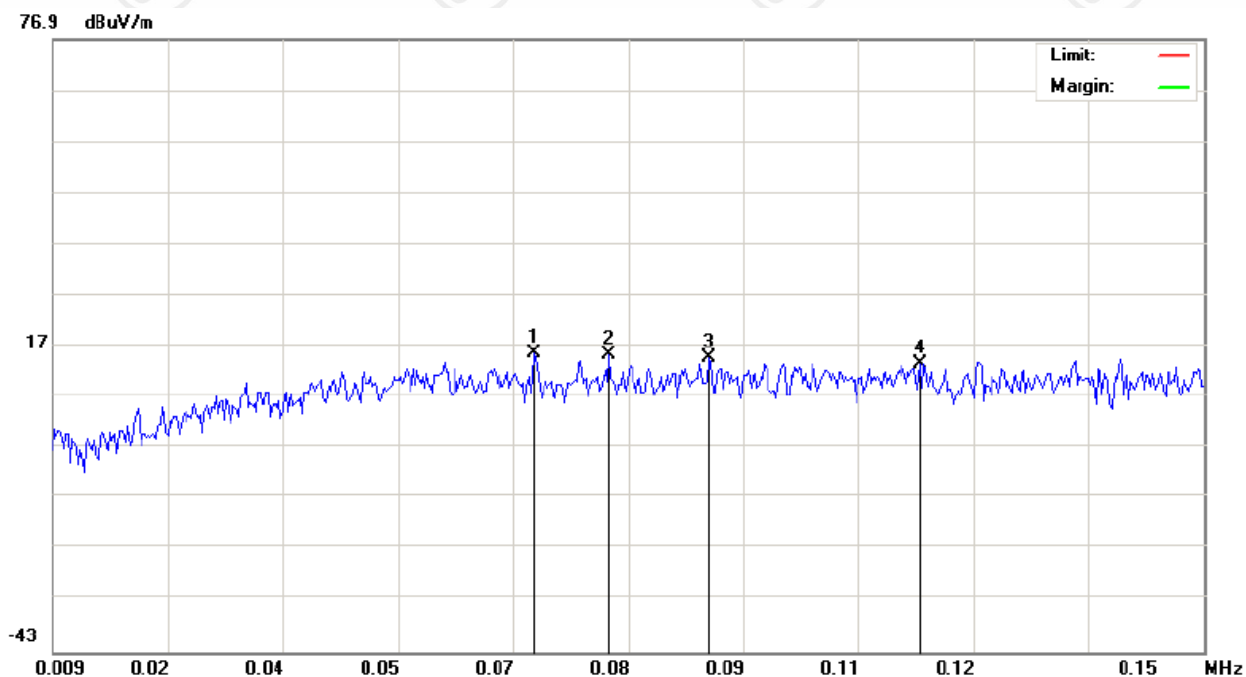
- a. The EUT was placed on the top of a turntable 0.8 meters above the ground in the chamber, 3 meters away from the antenna, which was mounted on the top of a variable-height antenna tower. The maximum values of the field strength are recorded by adjusting the polarizations of the test antenna and rotating 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.

B. Below 30MHz

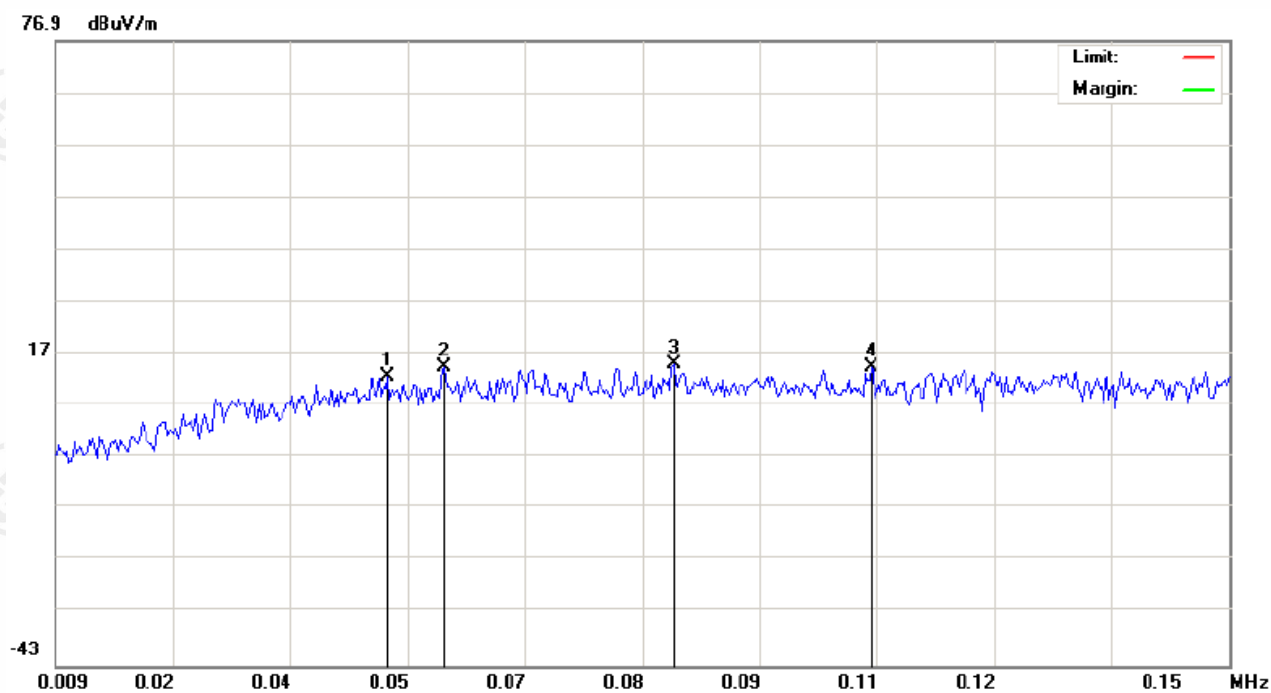
- a. The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.
- b. For each suspected emission, the EUT was arranged to its worst case and then 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

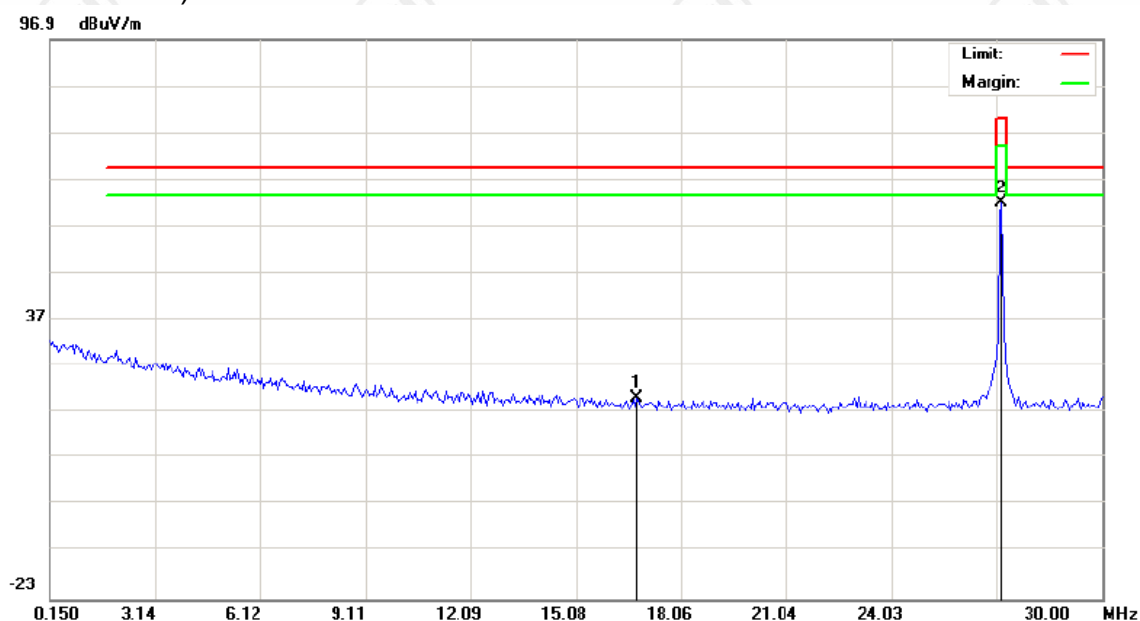
(9kHz to 150kHz) Horizontal



(9kHz to 150kHz) Vertical



(150kHz to 30MHz) Horizontal

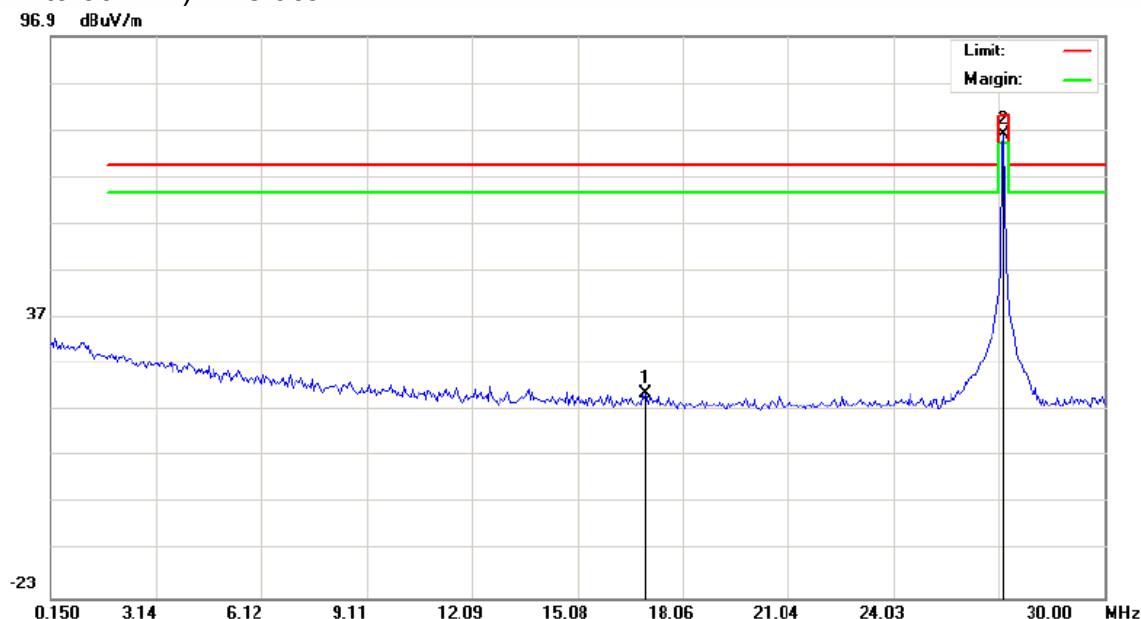


Site site #1
Limit: FCC 1.705-30M
EUT: R/C Toys
M/N: MT24
Mode: TX
Note:

Polarization: **Horizontal**
Power: DC 9V
Temperature: 25
Humidity: 58 %

No.	Freq. MHz	Reading_Level (dBuV)			Correct Factor			Measurement (dBuV/m)			Limit (dBuV/m)		Margin (dB)		P/F	Comment
		Peak	QP	AVG	dB	peak	QP	AVG	QP	AVG	QP	AVG	QP	AVG		
1	16.8161	9.58			10.79	20.37			69.50				-49.13		P	
2	27.1453	52.09			9.82	61.91			80.00				-18.09		P	

(150kHz to 30MHz) Vertical



Site site #1

Polarization: **Vertical**

Temperature: 25

Limit: FCC 1.705-30M

Power: DC 9V

Humidity: 58 %

EUT: R/C Toys

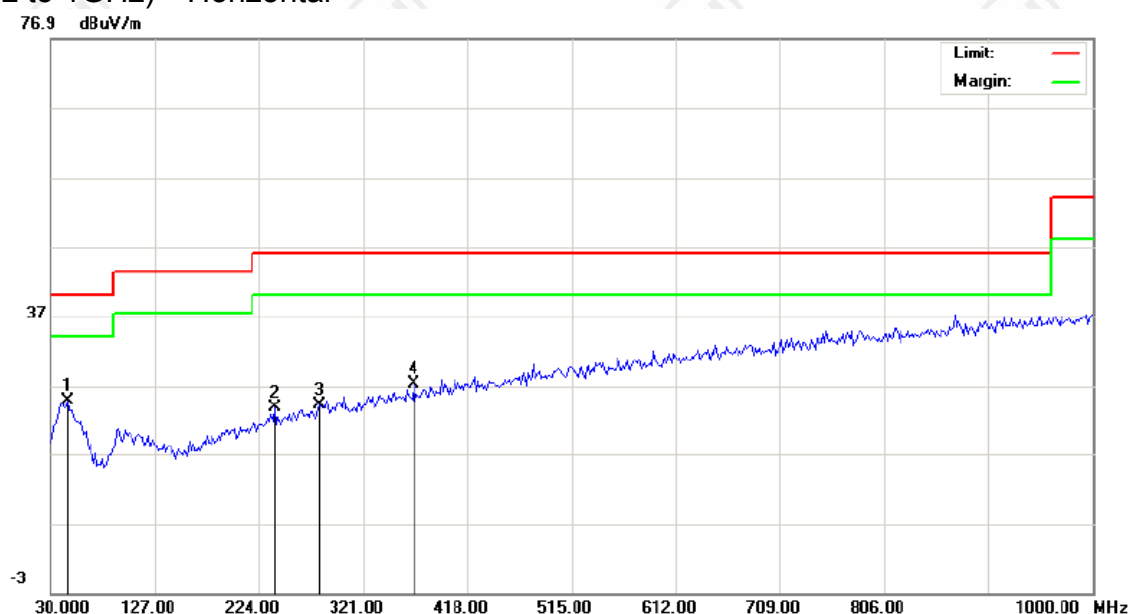
M/N: MT24

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	17.0152	9.99			10.79	20.78			69.50		-48.72		P	
2	27.1453	66.11			9.82	75.93			80.00		-4.07		P	

(30MHz to 1GHz) Horizontal



Site site #1

Polarization: **Horizontal**

Temperature: 25

Limit: FCC PART15 B

Power: DC 9V

Humidity: 58 %

EUT: R/C Toys

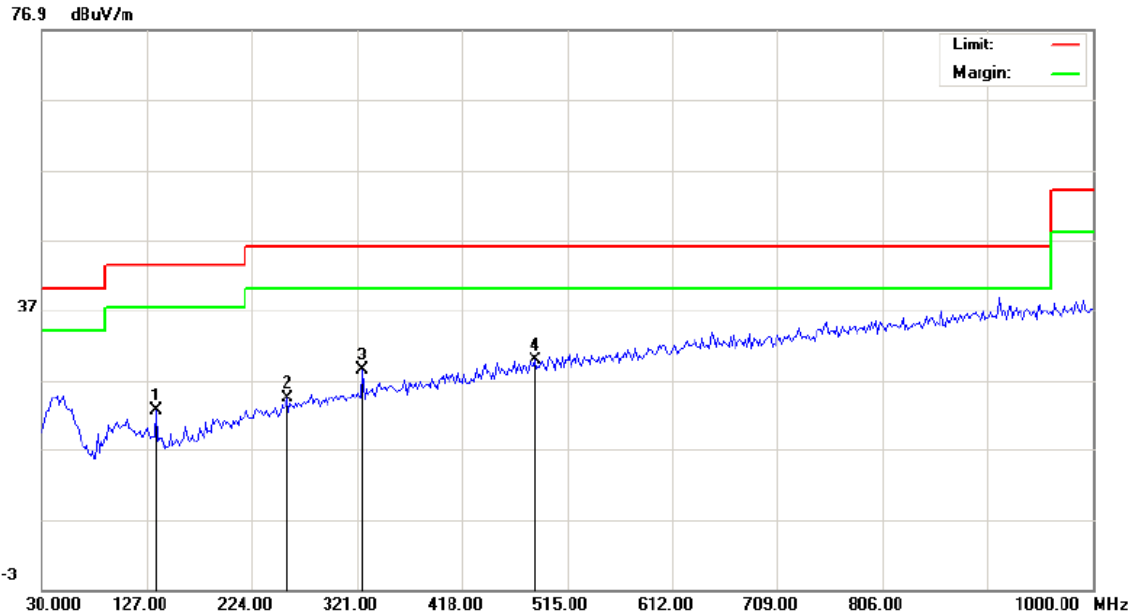
M/N: MT24

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	46.1667	8.02			16.71	24.73			40.00		-15.27		P	
2	238.5500	9.37			14.47	23.84			46.00		-22.16		P	
3	280.5833	8.42			15.74	24.16			46.00		-21.84		P	
4	367.8833	9.16			18.12	27.28			46.00		-18.72		P	

(30MHz to 1GHz) Vertical



Site site #1 Polarization: **Vertical** Temperature: 25
Limit: FCC PART15 B Power: DC 9V Humidity: 58 %
EUT: R/C Toys
M/N: MT24
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	135.0833	11.80			10.89	22.69			43.50		-20.81		P	
2	256.3333	9.27			15.14	24.41			46.00		-21.59		P	
3	325.8500	11.34			17.01	28.35			46.00		-17.65		P	
4	485.9000	9.07			20.74	29.81			46.00		-16.19		P	

Note 1: The peak data of the fundamental frequency is below the average limit (please refer to the test graph as above), so the average data is deemed to fulfill the average limits and not reported.

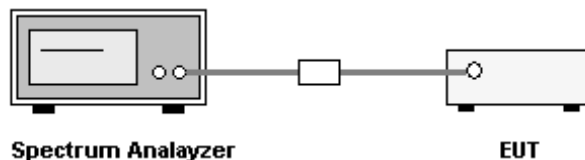
Note 2: The total factor = cable loss+ antenna factor.
Final Emission _PK = Reading_Level_ PK+ total factor.
For example: The cable loss of 27.145MHz is 0.6dB and the antenna factor is 9.22dB. So, the Total factor=0.6+9.22=9.82dB.

8. OUT OF BAND EMISSION Measurement

8.1 LIMITS

Please refer to the rules 15.227(b): The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

8.2 BLOCK DIAGRAM OF TEST SETUP



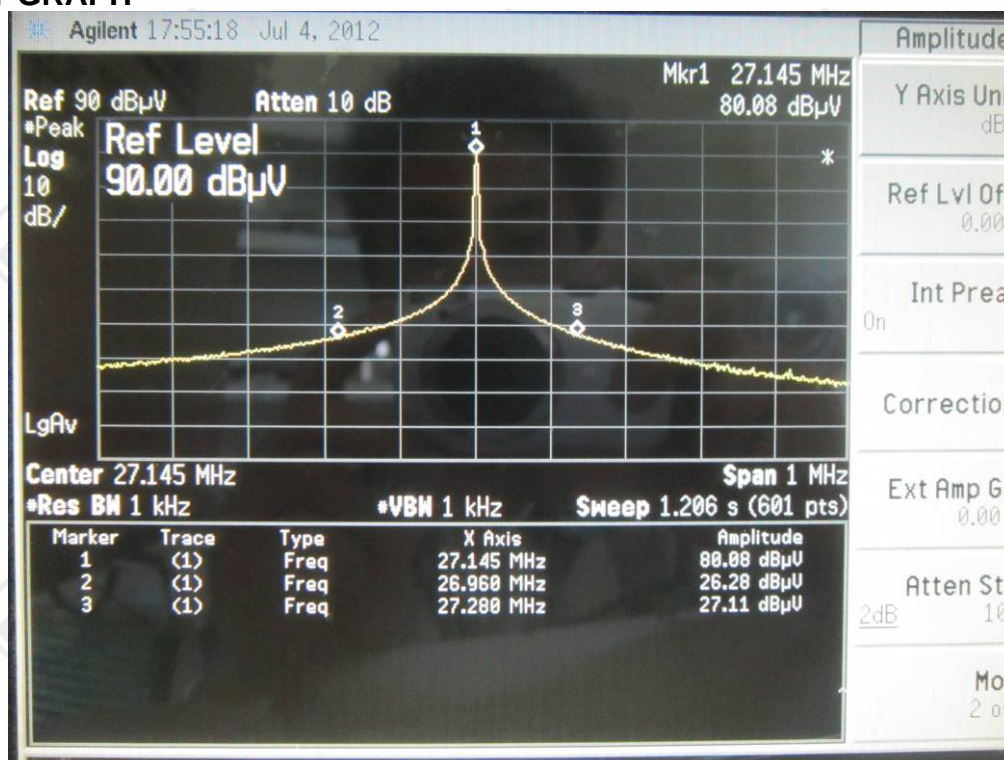
8.3 TEST PROCEDURE

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 26.96MHz and 27.28MHz respectively.
4. Use the marker method to determine the frequency 26.96MHz and 27.28MHz compliance as required.

8.4 TEST RESULT

Freq. (MHz)	Fundamental Emission (dBμV/m)	Delta (dB)	Final Emission (dBμV/m)	Limit (dBμV/m)	Result
26.96	75.93	53.80	22.13	69.54	Pass
27.28	75.93	52.97	22.96	69.54	Pass

8.5 TEST GRAPH

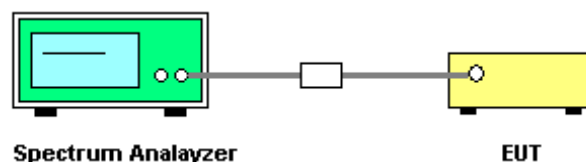


9. 20DB BANDWIDTH MEASUREMENT

9.1. LIMITS

None

9.2. BLOCK DIAGRAM OF TEST SETUP



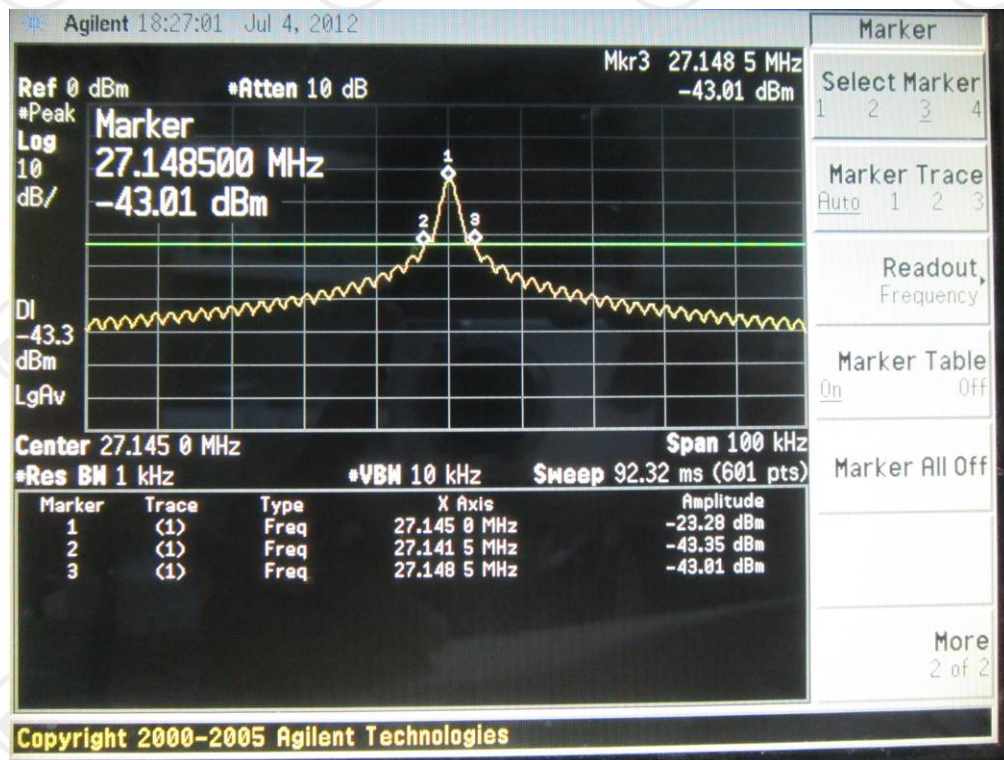
9.3. TEST PROCEDURE

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. A PEAK output reading was taken, a DISPLAY line was drawn 20 dB lower than PEAK level.
4. The 20dB bandwidth was determined from where the channel output spectrum intersected the display line.

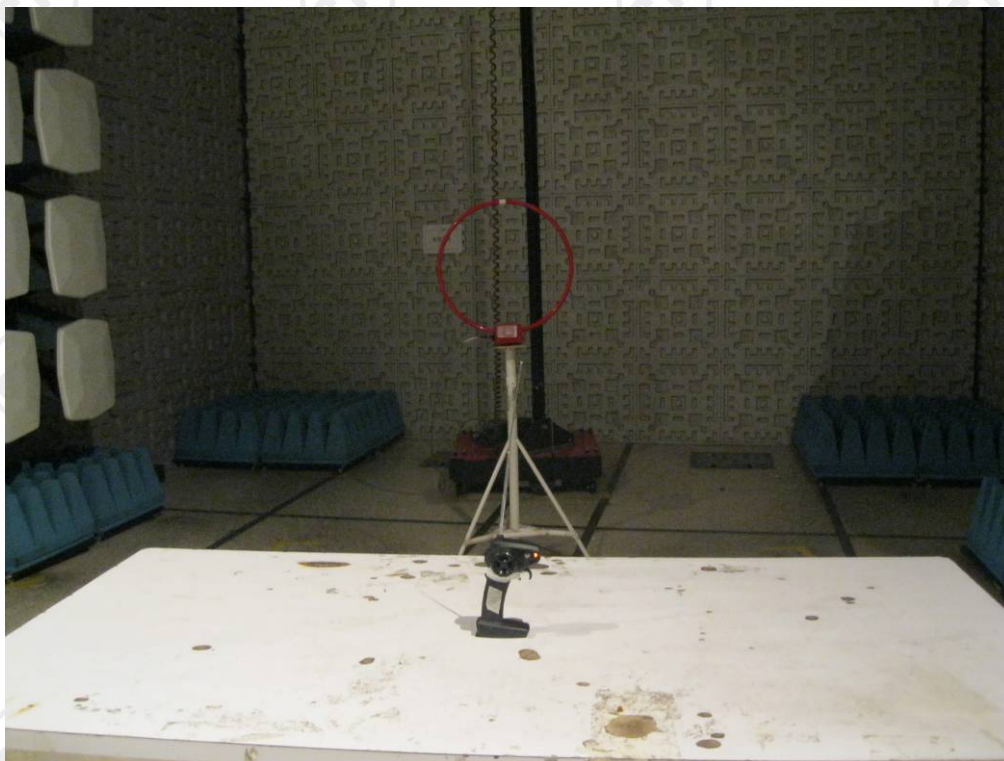
9.4. TEST RESULT

Measured Freq. (MHz)	Limit (MHz)	Result
Lowest: 27.1415	within 26.96-27.28MHz	Pass
Highest: 27.1485	within 26.96-27.28MHz	Pass

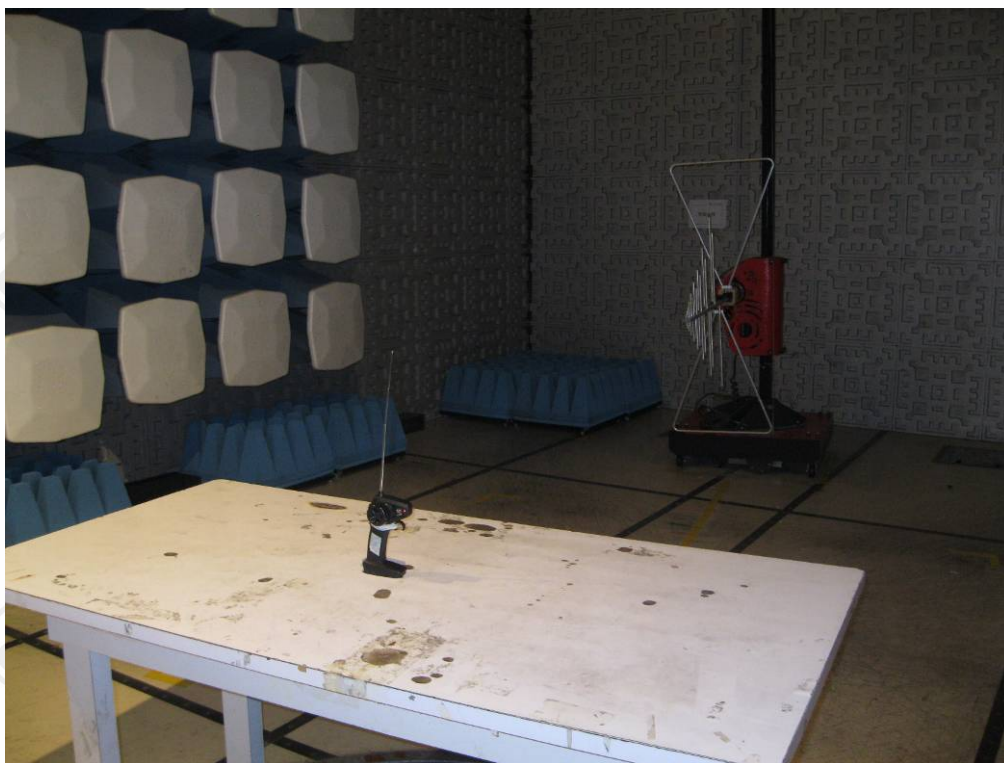
9.5. TEST GRAPH



APPENDIX 1 PHOTOGRAPHS OF TEST SETUP



TEST SETUP OF RADIATED EMISSION (9kHz-30MHz)



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

APPENDIX 2 EXTERNAL PHOTOGRAPHS OF EUT



The View of EUT-1



The View of EUT-2

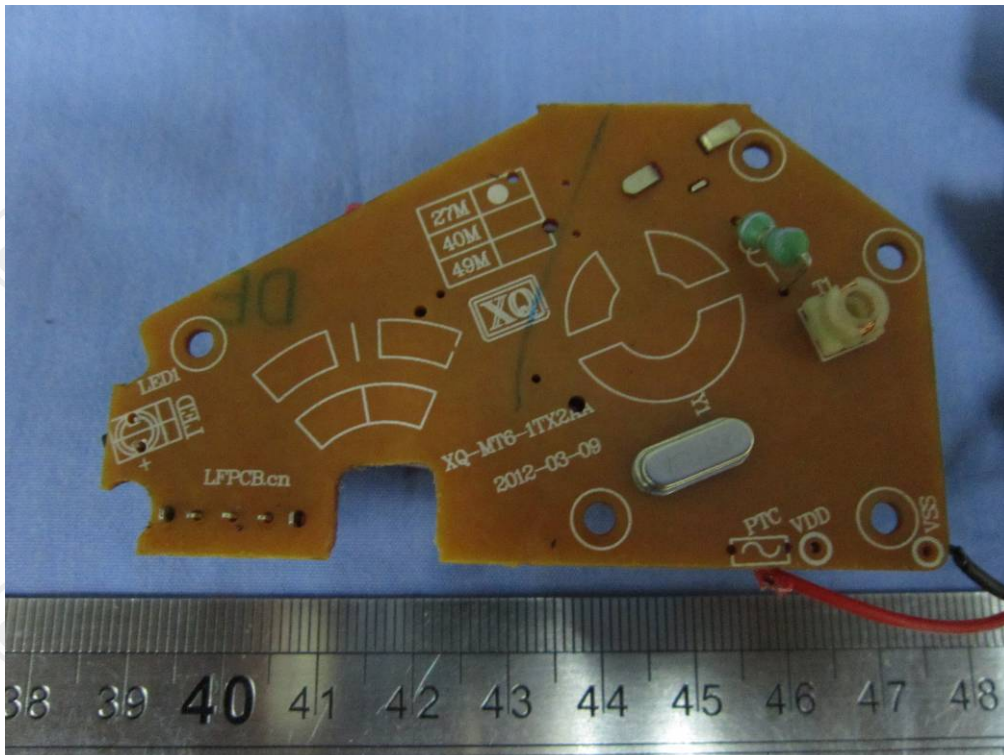


The View of EUT-3

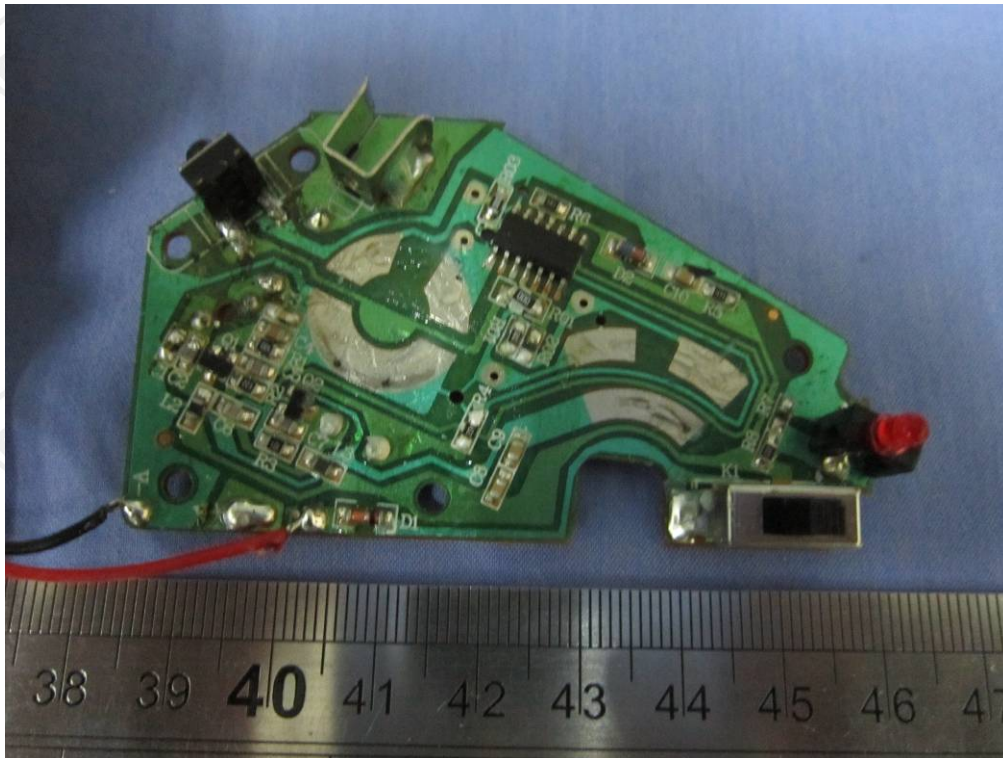
APPENDIX 3 INTERNAL PHOTOGRAPHS OF EUT



Internal View of EUT



Front View of PCB



Rear View of PCB

*** End of report ***

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