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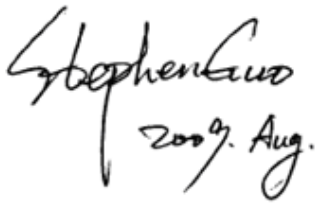
FEDERAL COMMUNICATIONS COMMISSION
Registration number: 282399

TEST REPORT

Application No.:	GLEMO090702245RF
Applicant:	SYMA TOYS FACTORY
Address of Applicant:	Laimei Industry Areas, Chenghai, Shantou City Guangdong, China
Equipment under Test (EUT)	
Name:	R/C Helicopter Series
Model No.:	006047
FCC ID:	VDY-GC887552-1
Function:	Radio toys with 27.145MHz as a carrier.
Standards:	FCC PART 15, SUBPART C: 2008 (Section 15.227)
Date of Receipt:	22 July 2009
Date of Issue:	01 August 2009
Test Result :	**PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 3 of this report for further details.

Authorized Signature:



Stephen Guo
Lab Manager

2 Version

Version No.	Date	Description
01	01 August 2009	Original

Prepared By: ***David Liu&Celia Xiang*** ***Date*** ***2009-08-01***

Project Engineer

Check By: ***Gavin Wu*** ***Date*** ***2009-09-01***

Reviewer

3 Test Summary

Test	Test Requirement	Stanadard Paragraph	Result
Radiated Emission	FCC PART 15 :2008	Section 15.227	PASS
Occupied Bandwidth	FCC PART 15 :2008	Section 15.215	PASS

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radiated Frequency.

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5 General Information

5.1 Details of E.U.T.

EUT Power Supply: DC 9V (Size "AA" 1.5V x 6)

5.2 Description of Support Units

The EUT has been tested as an independent unit.

5.3 Standards Applicable for Testing

The customer requested FCC tests for the EUT..

The standard used was FCC PART 15, SUBPART C: 2008 (Section 15.227).

5.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory,
198 Kezhu Road, Scientech Park, Guangzhou Economic & Technology Development District,
Guangzhou, Guangdong, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

5.5 Deviation from Standards

Biconical and log periodic antennas were used instead of dipole antennas.

5.6 Abnormalities from Standard Conditions

None.

5.7 Other Information Requested by the Customer

None.

5.8 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP – Lab Code: 200611-0**

  SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **FCC – Registration No.: 282399**

  SGS-CSTC Standards Technical Services Co., Ltd., 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 282399, May 31, 2002.

6 Equipments Used during Test

	RE in Chamber					
No:	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	N/A	N/A
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	28-01-2009	28-01-2010
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	10036	14-07-2009	14-07-2010
N/A	EMI Test Software	Audix	E3	N/A	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	04-12-2008	04-12-2009
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	08-10-2008	08-10-2009
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	08-10-2008	08-10-2009
EMC0517	Horn Antenna	Rohde & Schwarz	HF906	100095	12-08-2008	12-08-2009
EMC0040	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	05-12-2008	05-12-2009
EMC0520	0.1-1300 MHz Pre-Amplifier	HP	8447D OPT 010	2944A06252	11-03-2009	11-03-2010
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	11-03-2009	11-03-2010
EMC0075	310N Amplifier	Sonama	310N	272683	10-09-2008	10-09-2009
EMC0523	Active Loop Antenna	EMCO	6502	00042963	09-08-2008	09-08-2010
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	10-08-2008	10-08-2009

	General used equipment					
No:	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (dd-mm-yy)**	**Cal.Due date (dd-mm-yy)**
EMC0006	DMM	Fluke	73	70681569	23-12-2008	23-12-2009
EMC0007	DMM	Fluke	73	70671122	23-12-2008	23-12-2009

7 Test Results

7.1 E.U.T. test conditions

Power supply: 9V DC (New batteries)

Requirements: **15.31(e)** :For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

Type of antenna: Integral

Operating Environment:
Temperature: 22-25.0 °C
Humidity: 48-55% RH
Atmospheric Pressure: 1001-1010 mbar

Test frequencies: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and, if required, reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top, 1 near middle and 1 near bottom

Test nominal frequency: 27.145 MHz.

7.2 Radiated Emissions

Test Date:	24 July 2009
Test Method:	ANSI C63.4
EUT Operation:	operating
Status:	Kept Tx operating with modulation and standby mode.
Equipment Used:	Refer to section 6 for details.
Frequency Range:	FCC Part15 C Section 15.33

(a) Unless otherwise noted in the specific rule section under which the equipment operates for an intentional radiator the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:

(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

(4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation.

Test Requirement: FCC Part15 C Section 15.227

15.227(a) :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. The provisions in Section 15.35 for limiting peak emissions apply.

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.

Out of band emissions shall not exceed:

40.0 dBμV/m between 30MHz & 88MHz

43.5 dBμV/m between 88MHz & 216MHz

46.0 dBμV/m between 216MHz & 960MHz

54.0 dBμV/m above 960MHz

Test Procedure:

1)9K to 30MHz emissions:

For testing performed with the loop antenna, testing was performed in accordance to ANSI C63.4 section 8.2.1. The center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specied distance from the EUT.During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2)30MHz to 1GHz emissions:

For testing perfomed with the bi-log type antenna, testing was perfomed in accordance to ANSI 63.4. The measurement is performed with the EUT rotated 360º, the antenna height scaned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

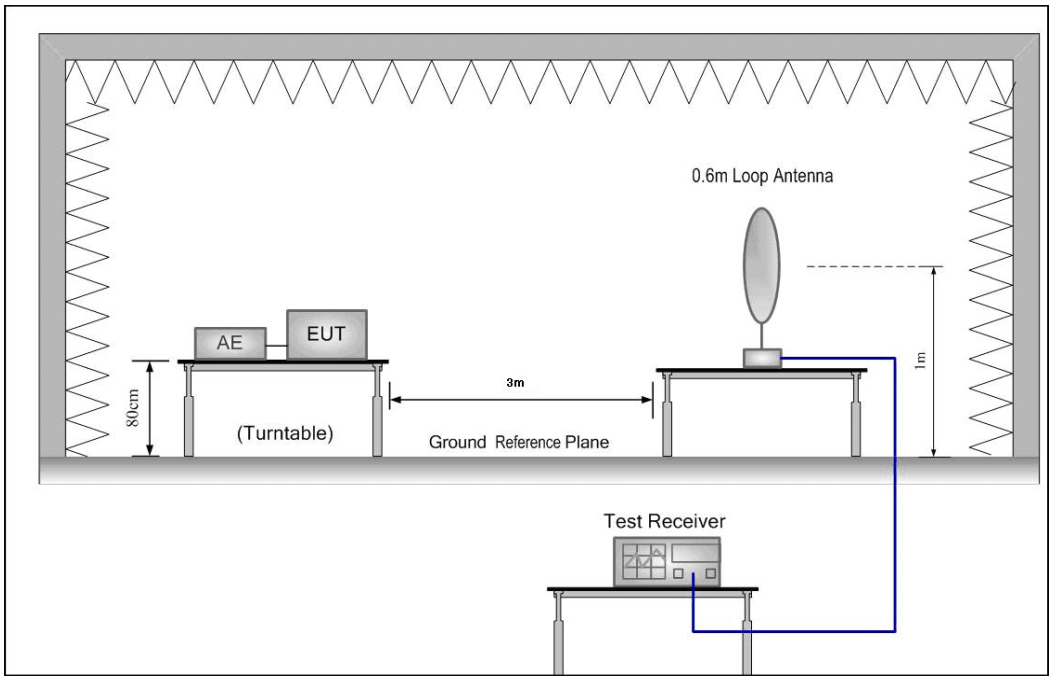
3)1GHz to 40GHz emissions:

For testing perfomed with the horn antenna, testing was perfomed in accordance to ANSI 63.4. The measurement is performed with the EUT rotated 360º, the antenna height scaned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

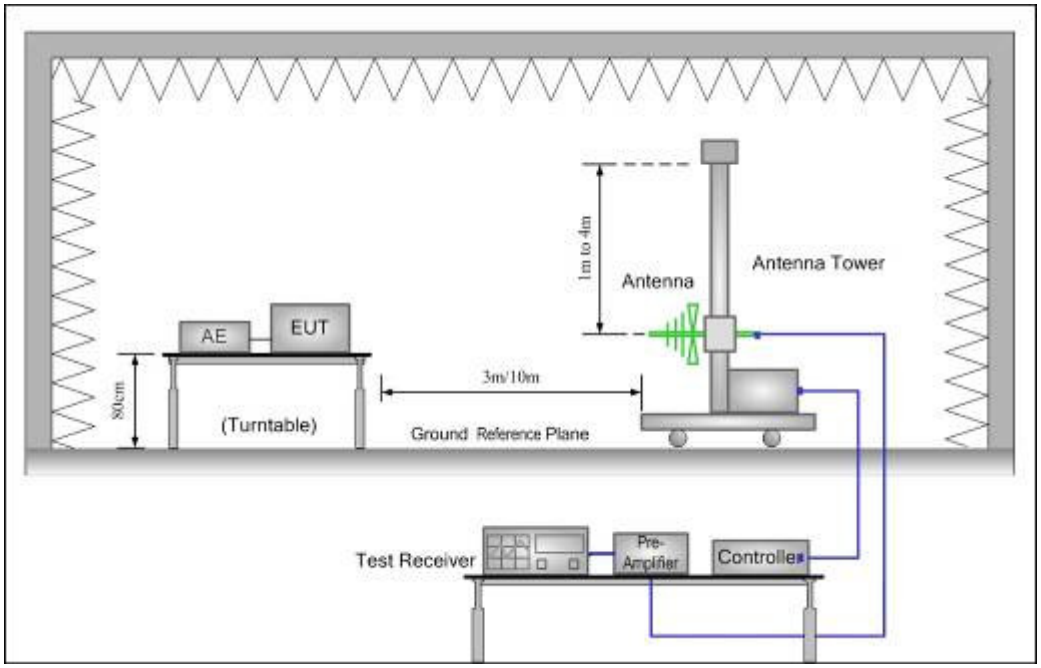
Detector: Peak Scan (9kHz resolution bandwidth for 9kHz to 30MHz; 120kHz resolution bandwidth for 30MHz to 1000MHz)

Test Configuration:

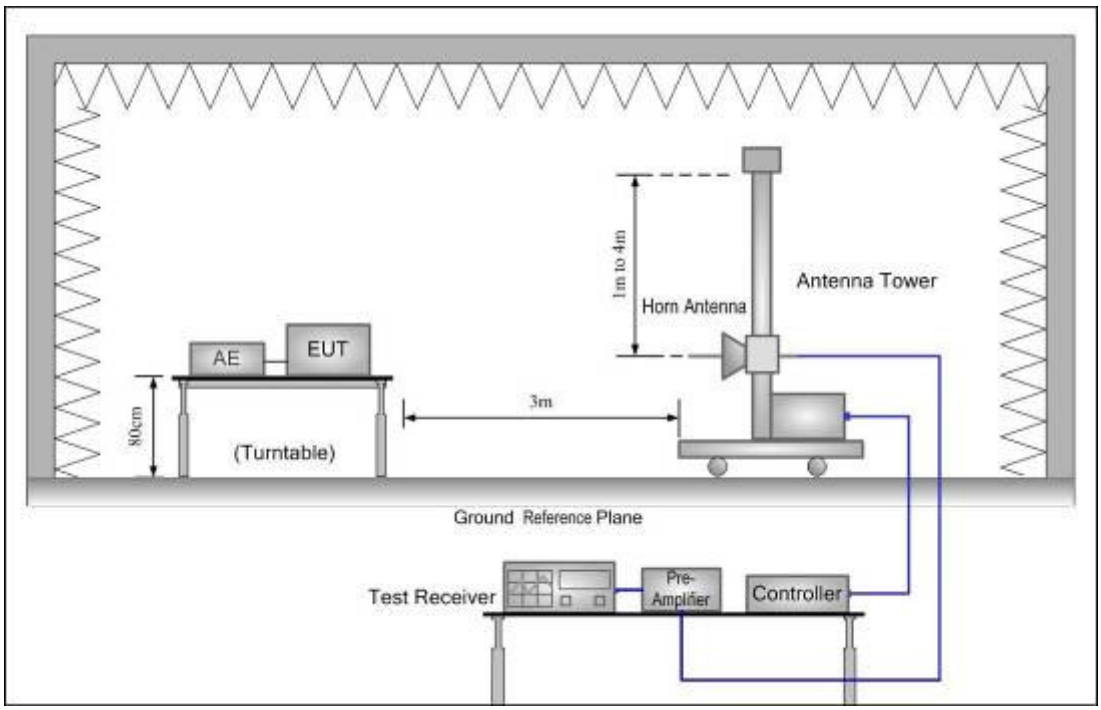
1) 9K to 30MHz emissions:



2) 30MHz to 1GHz emissions:



3) 1GHz to 40GHz emissions:



7.2.1.1 Measurement Record:

1) Emissions below 30MHz:

Vertical:

Test Frequency	Peak (dBμV/m)			Limits	Margin (dB)		
(MHz)	X	Y	Z	(dBμV/m)	X	Y	Z
27.145	52.4	51.6	50.8	100.0	47.6	48.4	49.2
Test Frequency	**Average (dBμV/m)**			**Limits**	**Margin (dB)**		
(MHz)	X	Y	Z	**(dBμV/m)**	X	Y	Z
27.145	50.0	50.1	50.2	80.0	30.0	29.9	29.8

Remark:

Y: EUT as Radiated Emission test setup photograph in section 8 of this report.

X: rotate EUT by 90° clockwise.

Z: rotate EUT by 90° vertically.

According to ANSI Standard C63.4-2003, the protable equipment shall be tested with X, Y, Z axis of the EUT to find the maximum emissions. Other equipment shall be put in normal use status to find the maximum emissions.

Pre-test the EUT in X, Y, Z axis with antenna in vertical and horizontal, found the worest case is in vertical and report it.

2) other emissions

Remark:

When an emission was found, the table was rotated to produce the maximum signal strength. was performed in the 3m chamber using the spectrum analyser in peak detection mode.The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. The worst case emissions were reported.

According to 15.35 (b) When average radiated emission measurements are specified in the regulations, including emission measurements below 1000 MHz, there is also a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit for the frequency being investigated unless a different peak emission limit is otherwise specified in the rules, e.g., see Section 15.255.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Peramplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Loss –Peramplifier Factor.

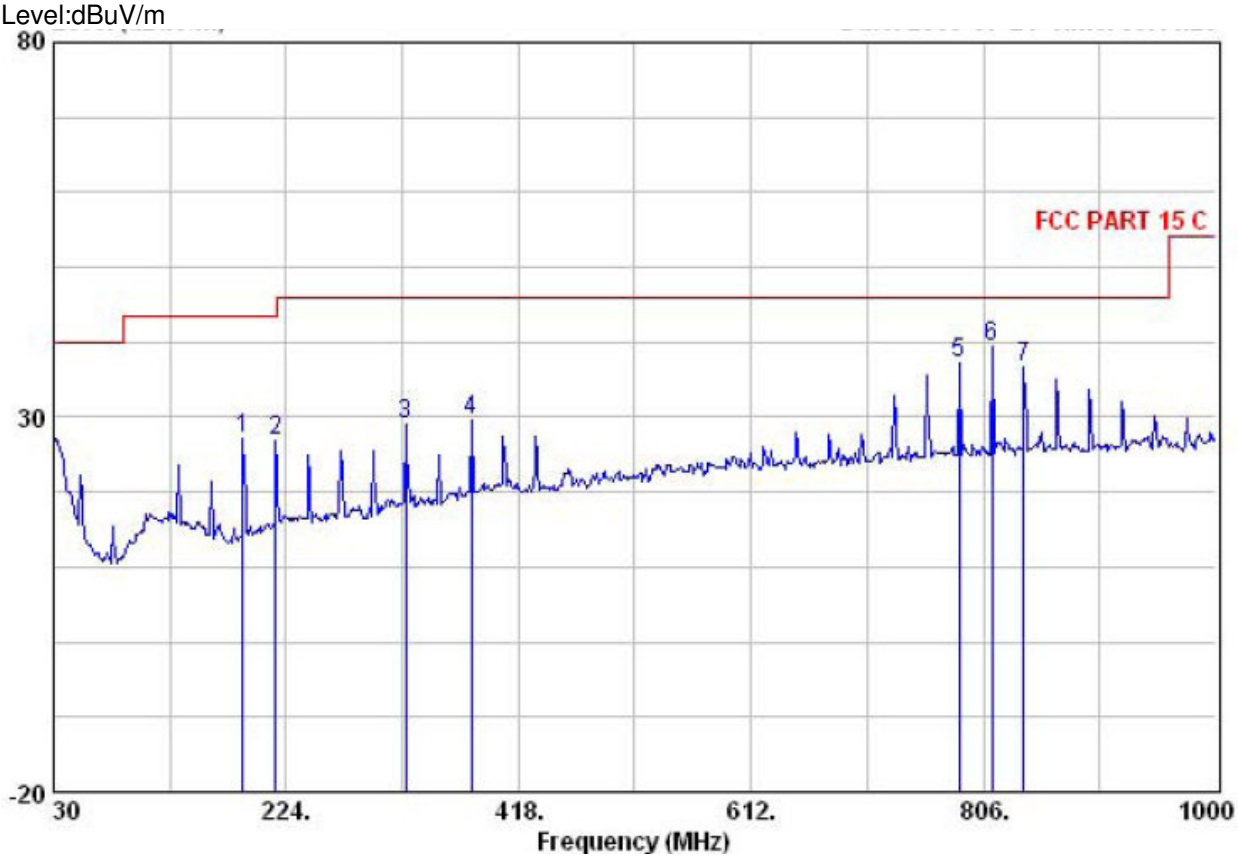
The following test results were performed on the EUT.

30MHz to 1GHz emissions **Tx Transmitting mode**

Horizontal:

Peak scan:

Level:dBuV/m



Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
188.110	40.46	9.88	1.20	24.30	27.24	43.50	-16.26	QP
215.270	38.19	11.50	1.30	24.10	26.89	43.50	-16.61	QP
323.910	37.69	14.00	1.60	24.30	28.99	46.00	-17.01	QP
378.230	37.71	15.08	1.70	24.78	29.71	46.00	-16.29	QP
785.630	40.18	19.75	2.50	25.30	37.14	46.00	-8.86	QP
812.790	42.19	20.02	2.50	25.30	39.41	46.00	-6.59	QP
839.950	38.97	20.30	2.50	25.20	36.57	46.00	-9.43	QP

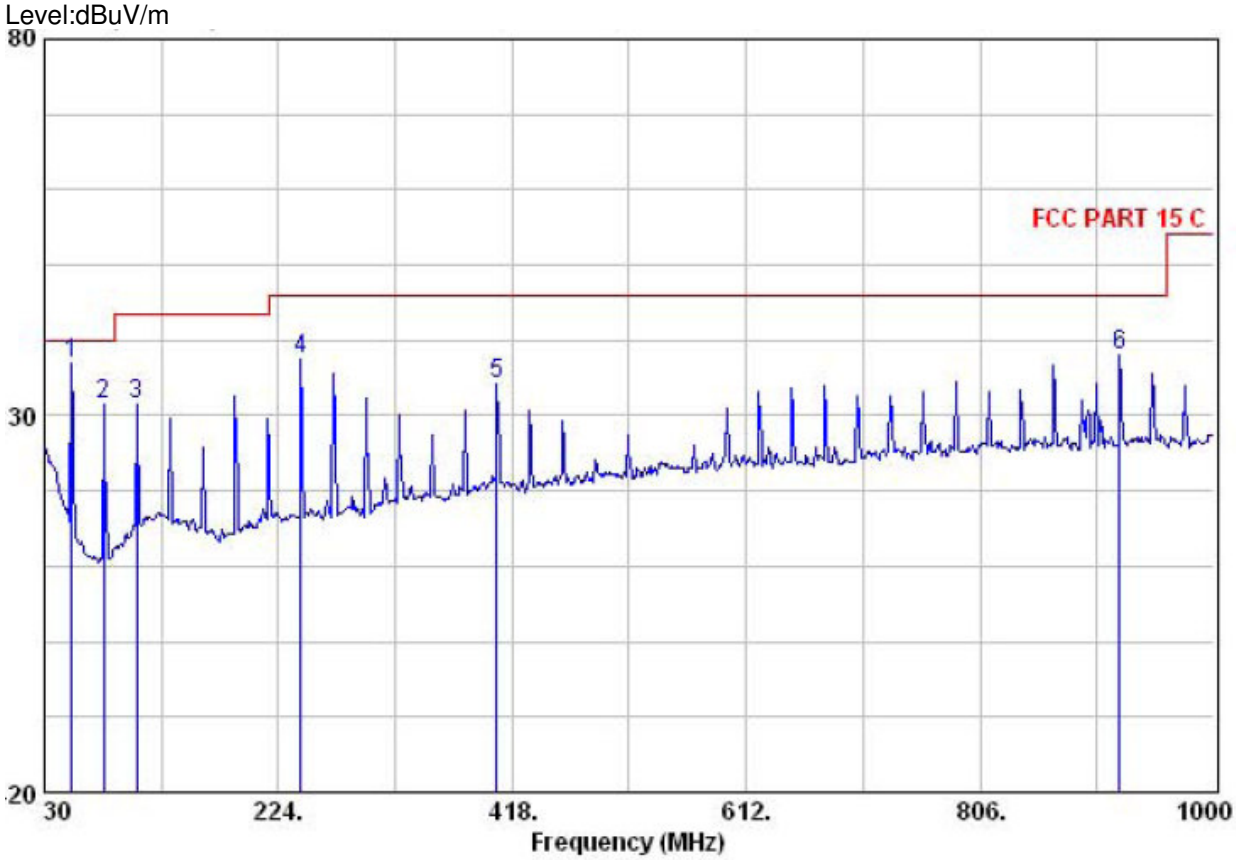
Remark:
Level = Read level + Antenna Factor + Cable Loss – Preamp Factor

30MHz to 1GHz emissions **Tx Transmitting mode**

Vertical:

Peak scan:

Level:dBuV/m



Quasi-peak measurement

Freq	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
52.310	49.04	11.70	0.60	24.50	36.84	40.00	-3.16	QP
79.470	48.51	6.77	0.80	24.58	31.49	40.00	-8.51	QP
106.630	43.53	11.62	0.90	24.50	31.55	43.50	-11.95	QP
242.430	48.05	12.05	1.40	24.10	37.40	46.00	-8.60	QP
405.390	41.01	16.36	1.80	25.05	34.12	46.00	-11.88	QP
921.430	39.75	20.51	2.70	24.99	37.97	46.00	-8.03	QP

s

Remark:
Level = Read level + Antenna Factor + Cable Loss – Preamp Factor

7.3 Occupied Bandwidth

Test Date:	23 July 2009
Test Method:	ANSI C63.4
EUT Operation:	transmitter
Status:	Kept Tx operating with modulation and standby mode.
Equipment Used:	Refer to section 6 for details.
Test Requirement:	FCC Part 15 C Section 15.215 (C) and Section 15.227.

15.215(c), Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Limit: **Operation within the band 26.960 – 27.280 MHz**

Test Procedure:

The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector. The vertical Scale is set to 10dB per division. Record the 20 dB bandwidth of the carrier.

The useful radiated emission from the EUT was detected by the spectrum analyser with peak detector. The vertical Scale is set to 10dB per division. The horizontal scale is set to 20KHz per division. Read the down 26dB bandwidth of the carrier.

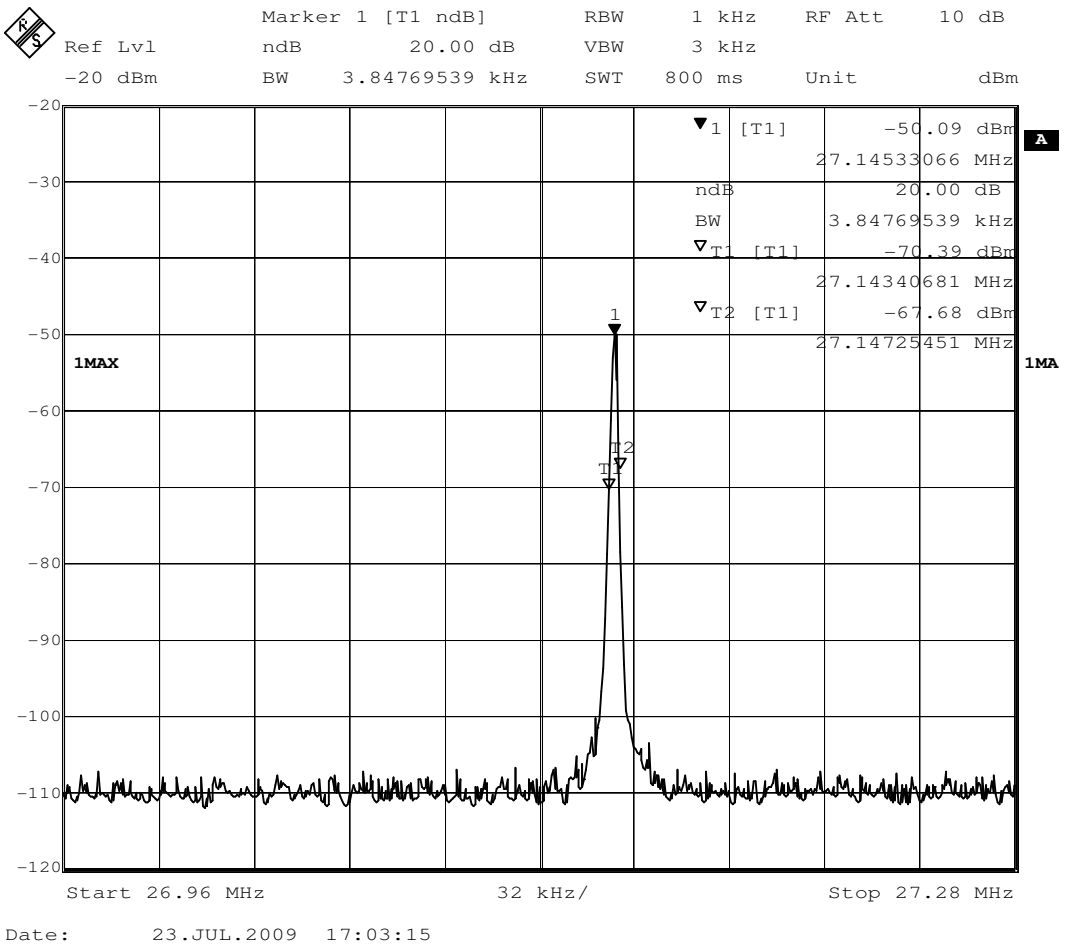
Set the spectrum analyzer: start at 26.96MHz and stop at 27.28MHz

Set the spectrum analyzer: RBW = 1kHz, VBW = 3KHz

Sweep = auto; Detector Function = Peak. Trace = Max Hold.

Mark the peak frequency and -20dB points bandwidth.

The graph as below:



20dB bandwidth lower frequency : 27.14340681MHz

20dB bandwidth upper frequency : 27.14723431MHz

The results: The unit does meet the FCC requirements