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FEDERAL COMMUNICATIONS COMMISSION

Registration number: 282399

Report No.: GLEMO09070224401

Page: 1 of 15

FCC ID :VDY-GC887553

TEST REPORT

Application No.:	GLEMO090702244RF
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-GC887553
Function:	Radio toys with 49.860MHz as a carrier.
Standards:	FCC PART 15, SUBPART C: 2008 (Section 15.235)
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

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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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** *2009-08-01*

Reviewer

3 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Radiated Emission	FCC PART 15 :2008	Section 15.235	PASS①
Occupied Bandwidth	FCC PART 15 :2008	Section 15.235	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.

Remark:

①: The EUT passed radiated emission after modification.

Modification detail:

1. Replace the capacitor C1 with new one which capacitance is 82pF.

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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 15.235).

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

The EUT passed radiated emission after modification.

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: 49.860MHz.

7.2 Radiated Emissions

Test Date: 31 July 2009

Test Method: ANSI C63.4

EUT Operation:

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 15.235

15.235(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.

15.235(b) : 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 unmodulated carrier or to the general limits in Section 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 Section 15.209. All signals exceeding 20 microvolts/meter at 3 meters shall be reported in the application for certification

Out of band emissions shall not exceed:

40.0 dB μ V/m between 30MHz & 88MHz

43.5 dB μ V/m between 88MHz & 216MHz

46.0 dB μ V/m between 216MHz & 960MHz

54.0 dB μ V/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 specified 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 performed with the bi-log type antenna, testing was performed in accordance to ANSI 63.4. The measurement is performed with the EUT rotated 360°, the antenna height scanned 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:

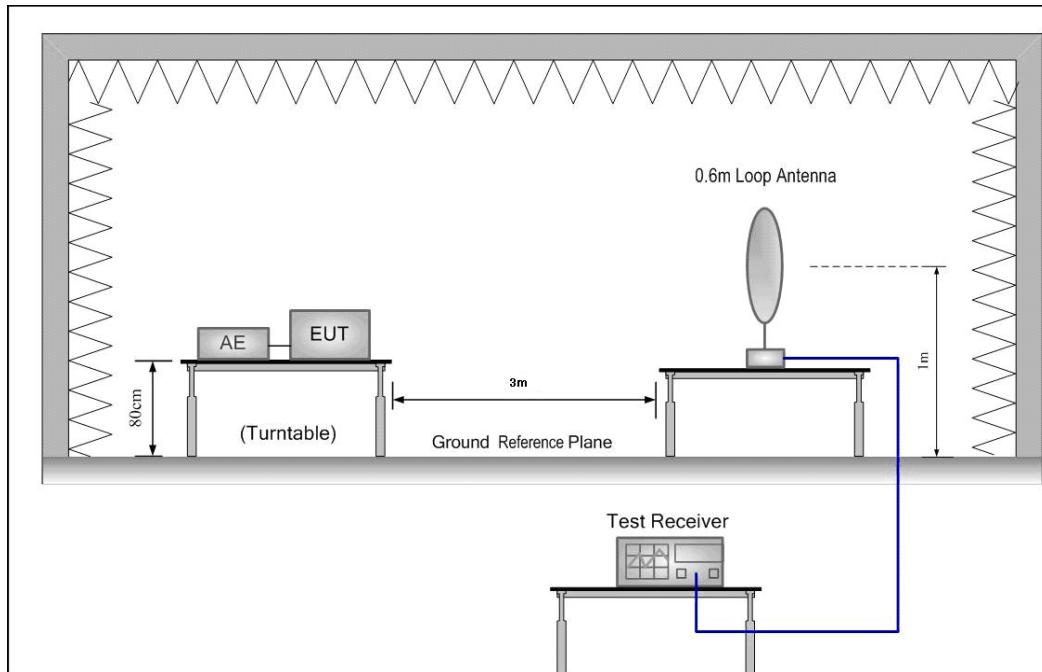
For testing performed with the horn antenna, testing was performed in accordance to ANSI 63.4. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

Detector:

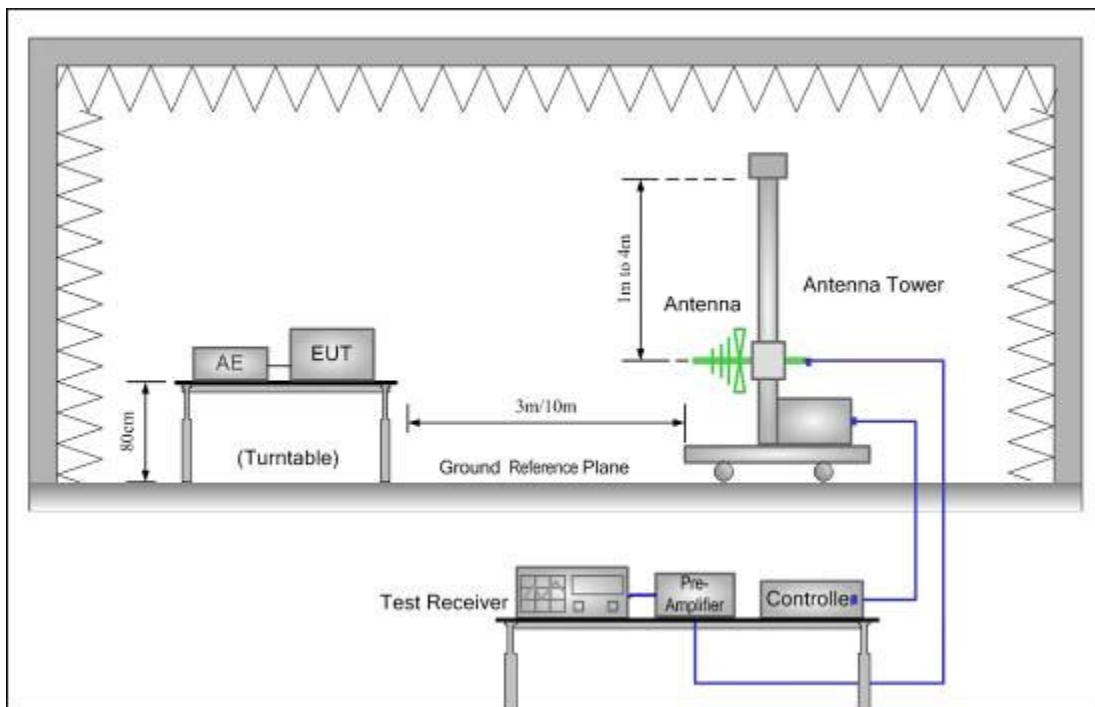
Peak Scan (9kHz resolution bandwidth for 9kHz to 30MHz;
120kHz resolution bandwidth for 30MHz to 1000MHz)

Test Configuration:

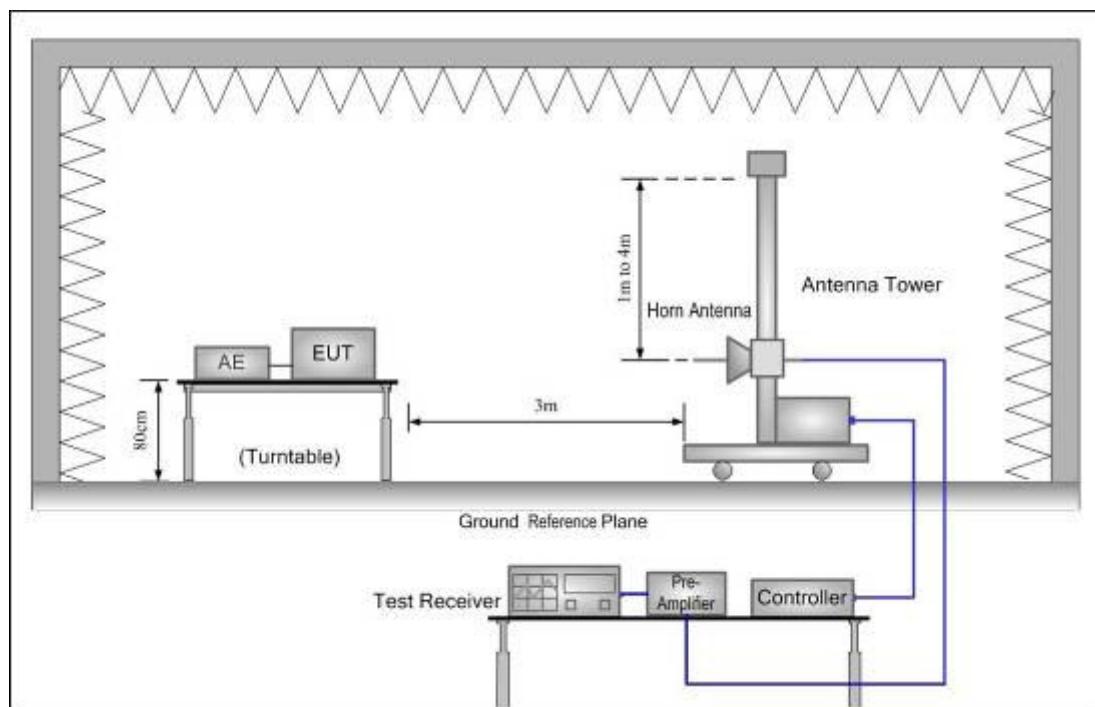
1) 9K to 30MHz emissions:



2) 30MHz to 1GHz emissions:



3) 1GHz to 40GHz emissions:



7.2.1.1 Measurement Record:**1) Fundamental Frequency emissions****Vertical:**

Frequency (MHz)	Reading Level (dBuV)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limit (dB μ V/m)	Antenna polarization
49.860	100.96	13.35	0.6	24.5	90.41	100.00	Peak
49.860	88.93	13.35	0.6	24.5	78.38	80.00	Average

Horizontal:

Frequency (MHz)	Reading Level (dBuV)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor (dB)	Emission Level (dBuV/m)	Limit (dB μ V/m)	Antenna polarization
49.860	83.73	13.35	0.6	24.5	73.18	100.00	Peak
49.860	77.89	13.35	0.6	24.5	67.34	80.00	Average

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 portable equipment shall be tested with X, Y, Z axis of the EUT to find the maximum emissions. The maximum emissions was found in the Y axis and report the data.

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:

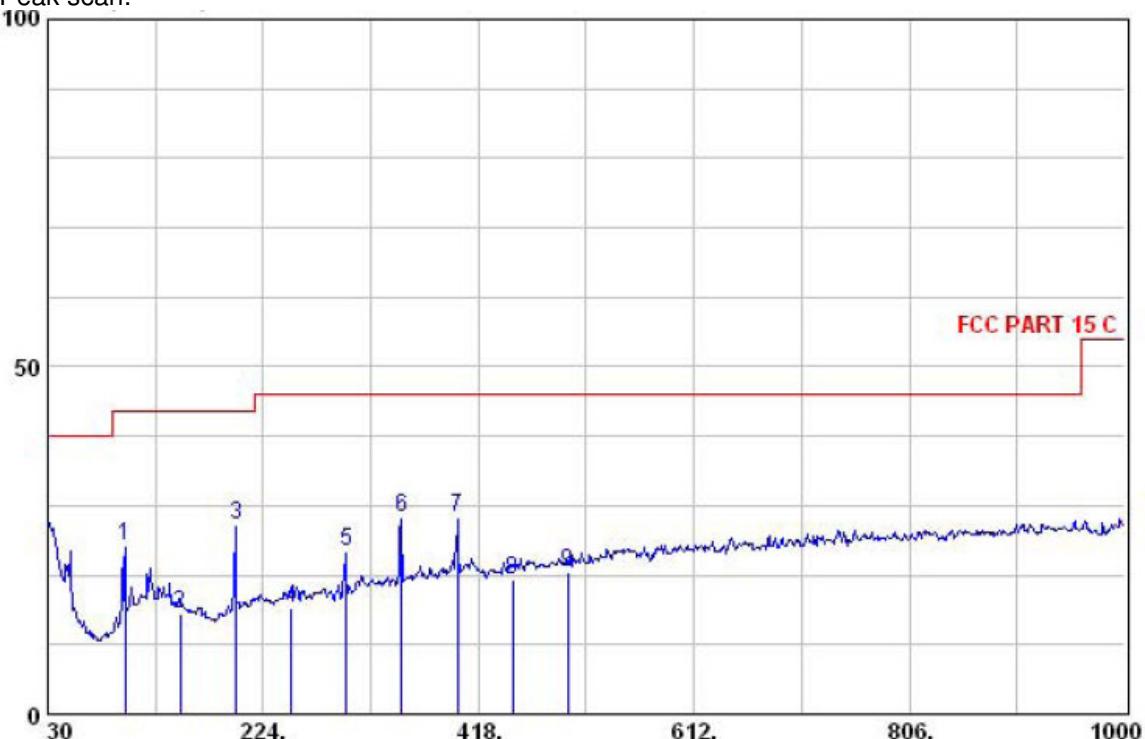
Final Test Level = Receiver Reading + Antenna Factor + Cable Loss - Peramplifier Factor.

The following test results were performed on the EUT.

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

Horizontal:

Peak scan:

**Quasi-peak measurement**

Freq	Read		Antenna		Cable		Preamp		Limit	Line	Over	Remark
	Level	Factor	Loss	Factor	Level	dB	dBuV/m	dBuV/m				
MHz	dBuV	dB/m			dB	dB	dBuV/m	dBuV/m				
99.720	37.74	10.20	0.90	24.50	24.34	43.50	-19.16	QP				
149.580	26.40	11.24	1.10	24.40	14.34	43.50	-29.16	QP				
199.440	39.74	10.60	1.20	24.20	27.34	43.50	-16.16	QP				
249.300	25.92	12.12	1.40	24.10	15.34	46.00	-30.66	QP				
299.160	33.29	12.54	1.60	24.09	23.34	46.00	-22.66	QP				
349.020	36.93	14.20	1.70	24.49	28.34	46.00	-17.66	QP				
398.880	35.40	16.13	1.80	24.99	28.34	46.00	-17.66	QP				
448.740	26.84	15.99	1.80	25.29	19.34	46.00	-26.66	QP				
498.600	26.82	16.92	2.00	25.40	20.34	46.00	-25.66	QP				

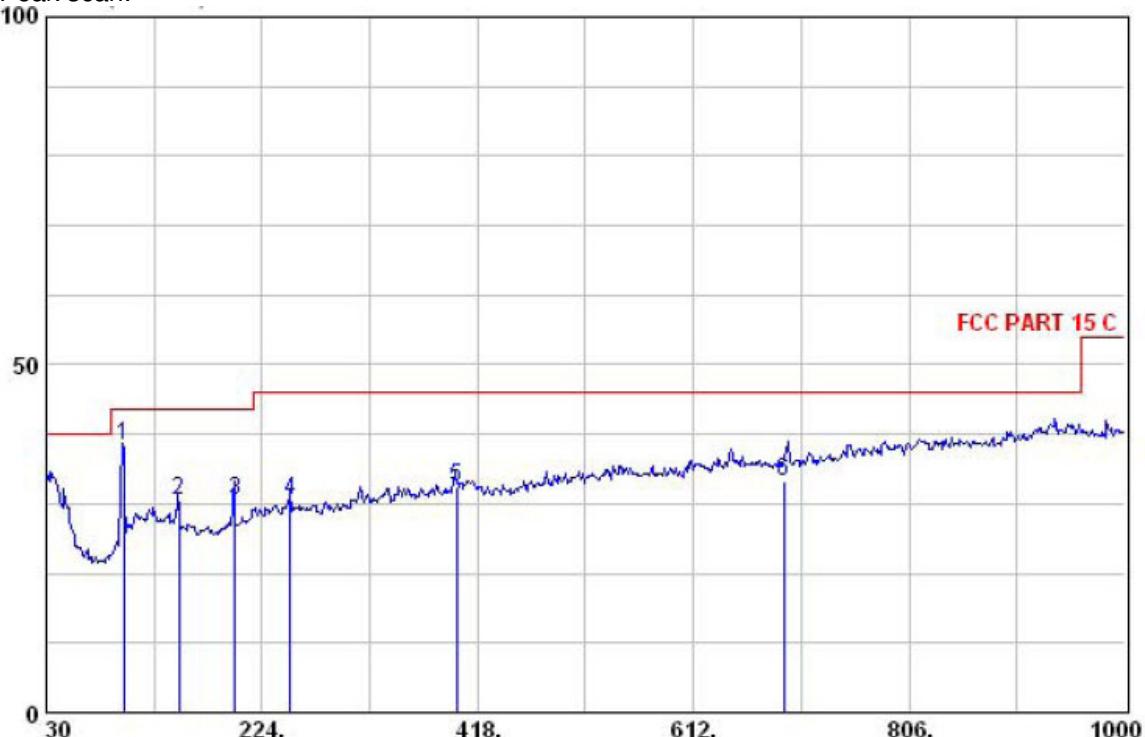
Remark:

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

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

Vertical:

Peak scan:

**Quasi-peak measurement**

Freq	Read	Antenna	Cable	Preamp	Limit	Over	Over	Remark
	Level	Factor	Loss	Factor				
99.720	51.81	10.20	0.90	24.50	38.41	43.50	-5.09	QP
149.580	42.47	11.24	1.10	24.40	30.41	43.50	-13.09	QP
199.440	42.81	10.60	1.20	24.20	30.41	43.50	-13.09	QP
249.300	40.99	12.12	1.40	24.10	30.41	46.00	-15.59	QP
398.880	39.47	16.13	1.80	24.99	32.41	46.00	-13.59	QP
693.480	37.49	18.91	2.40	25.43	33.38	46.00	-12.62	QP

Remark:

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

7.3 Occupied Bandwidth

Test Date: 24 July 2009

Test Method: ANSI C63.4

EUT Operation:

Status: Kept Tx in transmitting.

Equipment Used: Refer to section 6 for details.

Test Requirement: FCC Part 15 C Section 15.235 (b).

15.235(b):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 unmodulated carrier.

Limit:

Operation within the band 49.82 – 49.90 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. The horizontal scale is set to 20KHz per division. Read the down 26dB bandwidth of the carrier.

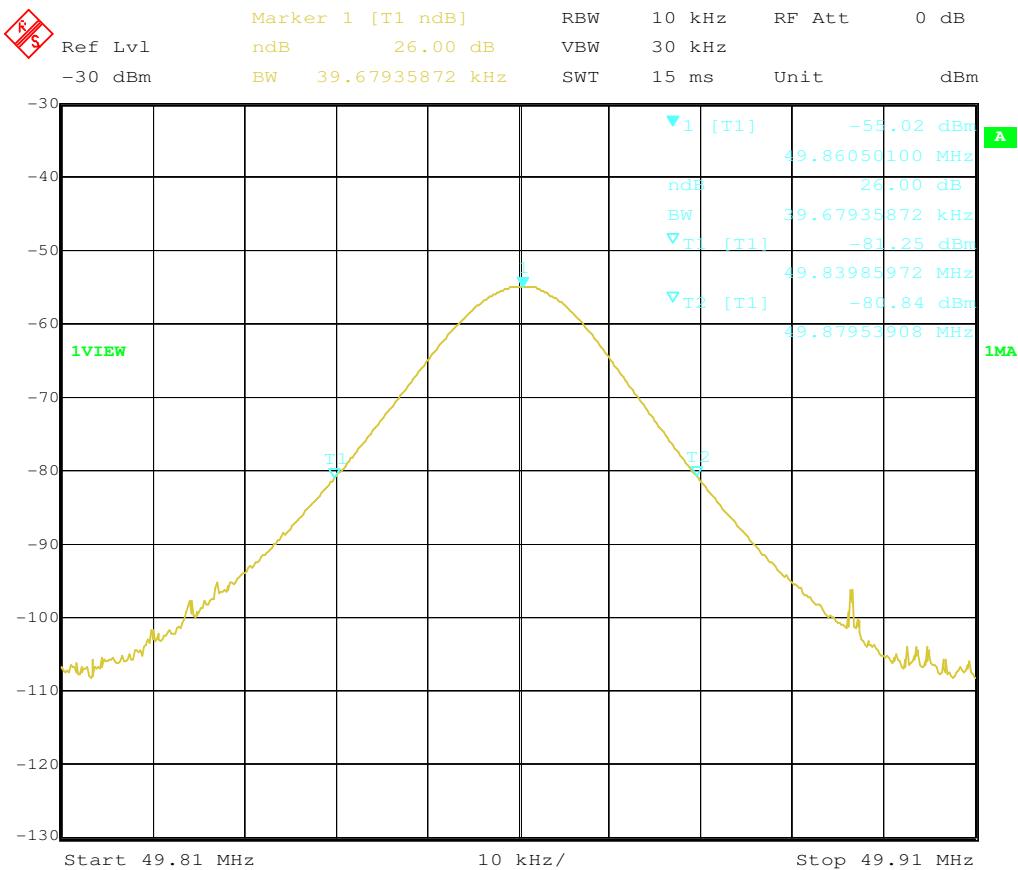
Set the spectrum analyzer: start at 49.81MHz and stop at 49.91MHz

Set the spectrum analyzer: RBW = 10kHz, VBW = 30KHz

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

Mark the peak frequency and -26dB points bandwidth.

The graph as below:



26dB bandwidth lower frequency :49.83985972MHz

26dB bandwidth upper frequency :49.87953908MHz

The results: The unit does meet the FCC requirements