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FEDERAL COMMUNICATIONS COMMISSION

Registration number: 282399

Report No.: GZEM100800146201

Page: 1 of 17

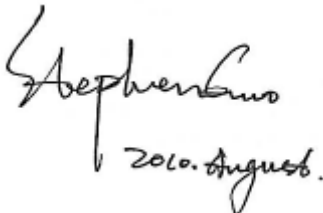
FCC ID: U2N-GC887853

TEST REPORT

Application No.:	GZEM1008001462RF
Applicant:	DOUBLE HORSE TOYS INDUSTRY CO., LTD
FCC ID:	U2N-GC887853
Equipment under Test (EUT)	
Name:	R/C helicopter
Model No.:	9099, 9050, 9097, 9100, 9101, 9102, 9103, 9104, 9105, 9106 ♣
♣	Please refer to section 3 of this report for further details.
Function:	Radio toys with 27.145MHz as a carrier.
Standards:	FCC PART 15, SUBPART C: 2009 (Section 15.227)
Date of Receipt:	2010-08-05
Date of Issue:	2010-08-24
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

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2010-08-24		Original

Authorized for issue by:			
Tested By	 (David Liu) / Project Engineer	2010-08-09 to 2010-08-12 Date	
Prepared By	 (Millie Li) / Clerk	2010-08-23 Date	
Checked By	 (Jeffrey Chen) / Reviewer	2010-08-24 Date	



3 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Radiated Emission	FCC PART 15 :2009	Section 15.227	PASS
Occupied Bandwidth	FCC PART 15 :2009	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.			
<p>♣ Item No.: 9099, 9050, 9097, 9100, 9101, 9102, 9103, 9104, 9105, 9106</p> <p>According to the declaration of the applicant, the electrical circuit design, layout, components used and internal wiring were identical for all models, with only difference being colors.</p> <p>Therefore only one model 9099 was tested in this report.</p>			



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5 General Information

5.1 Client Information

Applicant: DOUBLE HORSE TOYS INDUSTRY CO., LTD

Address of Applicant: Donghu industrial park, Chenghai, Shantou City, Guangdong P.R.C.China

5.2 General Description of E.U.T.

EUT Name: R/C helicopter

Model No.: 9099, 9050, 9097, 9100, 9101, 9102, 9103, 9104, 9105, 9106

5.3 Details of E.U.T.

EUT Power Supply: DC 9.0 V (6 x 1.5V size "AA" batteries)

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Standards Applicable for Testing

The customer requested FCC tests for the EUT.

The standard used was FCC PART 15, SUBPART C: 2009 (Section 15.227).

5.6 Test Location

All tests were performed at:

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

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

No tests were sub-contracted.

5.7 Deviation from Standards

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

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.



5.10 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	Cal.Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	N/A	N/A
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100283	2010-01-25	2011-01-25
EMC0056	EMI Test Receiver	Rohde & Schwarz	ESCI	10036	2010-06-02	2011-06-02
N/A	EMI Test Software	Audix	E3	N/A	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	2009-12-09	2010-12-09
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	2009-12-20	2010-12-20
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	2009-12-20	2010-12-20
EMC0517	Horn Antenna	Rohde & Schwarz	HF906	100095	2009-09-15	2010-09-15
EMC0040	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	2009-12-05	2010-12-05
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	2010-01-25	2011-01-25
EMC0049	Amplifier	Agilent	8447D	2944A10862	2010-04-21	2011-04-21
EMC0075	310N Amplifier	Sonama	310N	272683	2009-10-26	2010-10-26
EMC0523	Active Loop Antenna	EMCO	6502	42963	2009-11-17	2010-11-17
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	2010-05-17	2011-05-17

General used equipment						
No.	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal.Due date
					(YYYY-MM-DD)	(YYYY-MM-DD)
EMC0006	DMM	Fluke	73	70681569	2009-12-16	2010-12-16
EMC0007	DMM	Fluke	73	70671122	2009-12-16	2010-12-16



7 Test Results

7.1 E.U.T. test conditions

Power supply: DC 9.0 V (New battery)

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: 2010-08-09
Test Method: ANSI C63.4:2009
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 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 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:

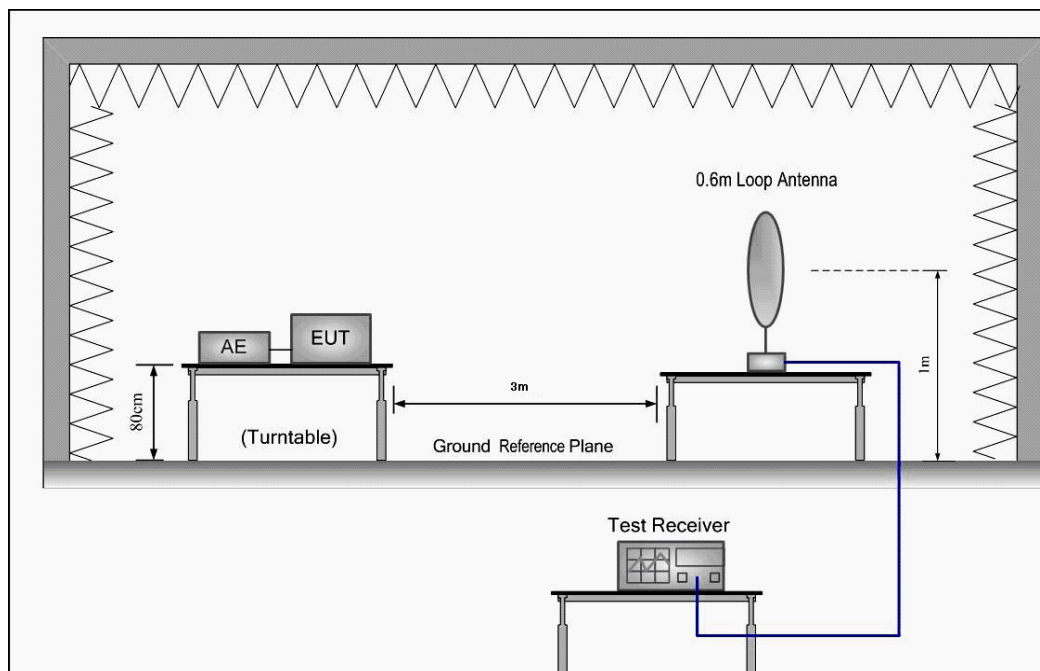
For testing performed with the bi-log type antenna, testing was performed in accordance to ANSI 63.4. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

3) 1GHz to 40GHz emissions:

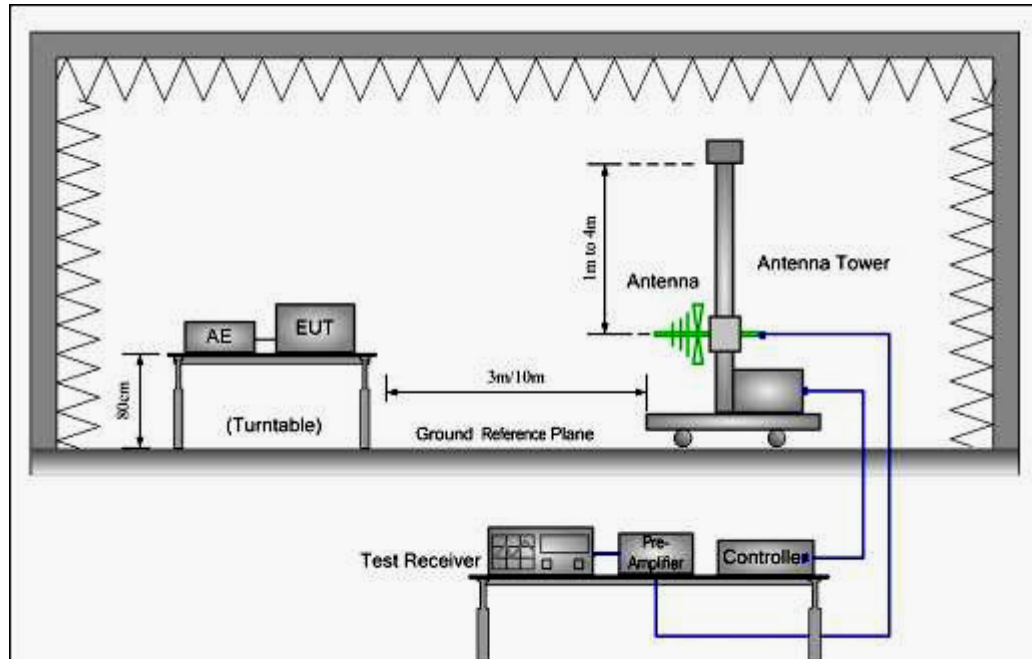
For testing performed with the horn antenna, testing was performed in accordance to ANSI 63.4. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

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:





7.2.1 Measurement Record:

1) Emissions below 30MHz:

Vertical:

Test Frequency (MHz)	Peak (dB μ V/m)			Limits (dB μ V/m)	Margin (dB)		
	X	Y	Z		X	Y	Z
27.145	66.62	66.61	66.10	100.0	33.38	33.39	33.90
Test Frequency (MHz)	Average (dB μ V/m)			Limits (dB μ V/m)	Margin (dB)		
	X	Y	Z		X	Y	Z
27.145	55.20	55.30	55.10	80.0	24.80	24.70	24.90

Horizontal:

Test Frequency (MHz)	Peak (dB μ V/m)			Limits (dB μ V/m)	Margin (dB)		
	X	Y	Z		X	Y	Z
27.145	58.26	58.10	57.90	100.0	41.74	41.90	42.10
Test Frequency (MHz)	Average (dB μ V/m)			Limits (dB μ V/m)	Margin (dB)		
	X	Y	Z		X	Y	Z
27.145	47.60	46.10	45.10	80.0	32.40	33.90	34.90

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 C63.4-2009, the portable 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.



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.



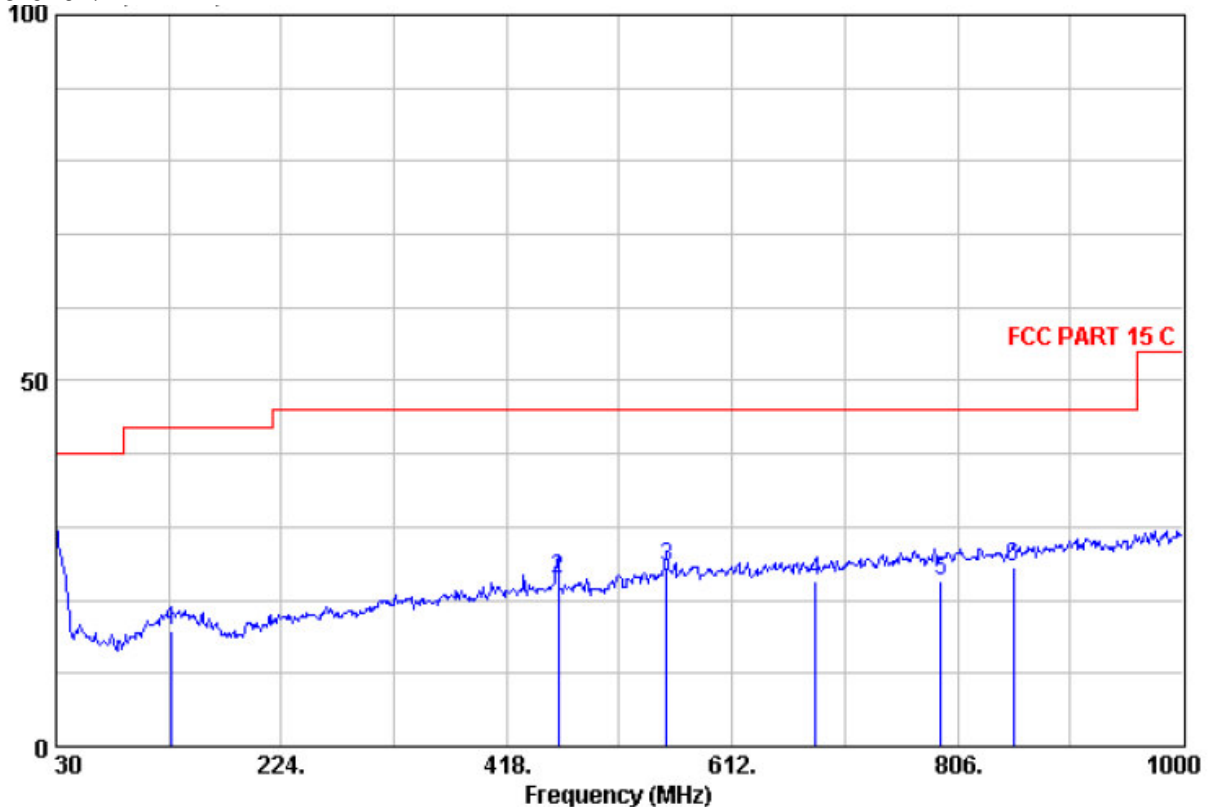
30MHz to 1GHz emissions

Tx Transmitting mode

Horizontal:

Peak scan:

Level: dBuV/m



Quasi-peak measurement

Freq	Read Level	Antenna Factor	Cable Loss	Preamplifier Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
129.910	30.23	12.00	1.00	27.51	15.72	43.50	-27.78	QP
462.620	33.86	15.18	1.90	27.95	22.99	46.00	-23.01	QP
555.740	33.15	17.45	2.10	28.24	24.46	46.00	-21.54	QP
683.780	30.13	18.05	2.40	27.96	22.62	46.00	-23.38	QP
791.450	28.85	18.92	2.50	27.65	22.62	46.00	-23.38	QP
854.500	30.10	19.06	2.60	27.12	24.63	46.00	-21.37	QP

Remark:

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



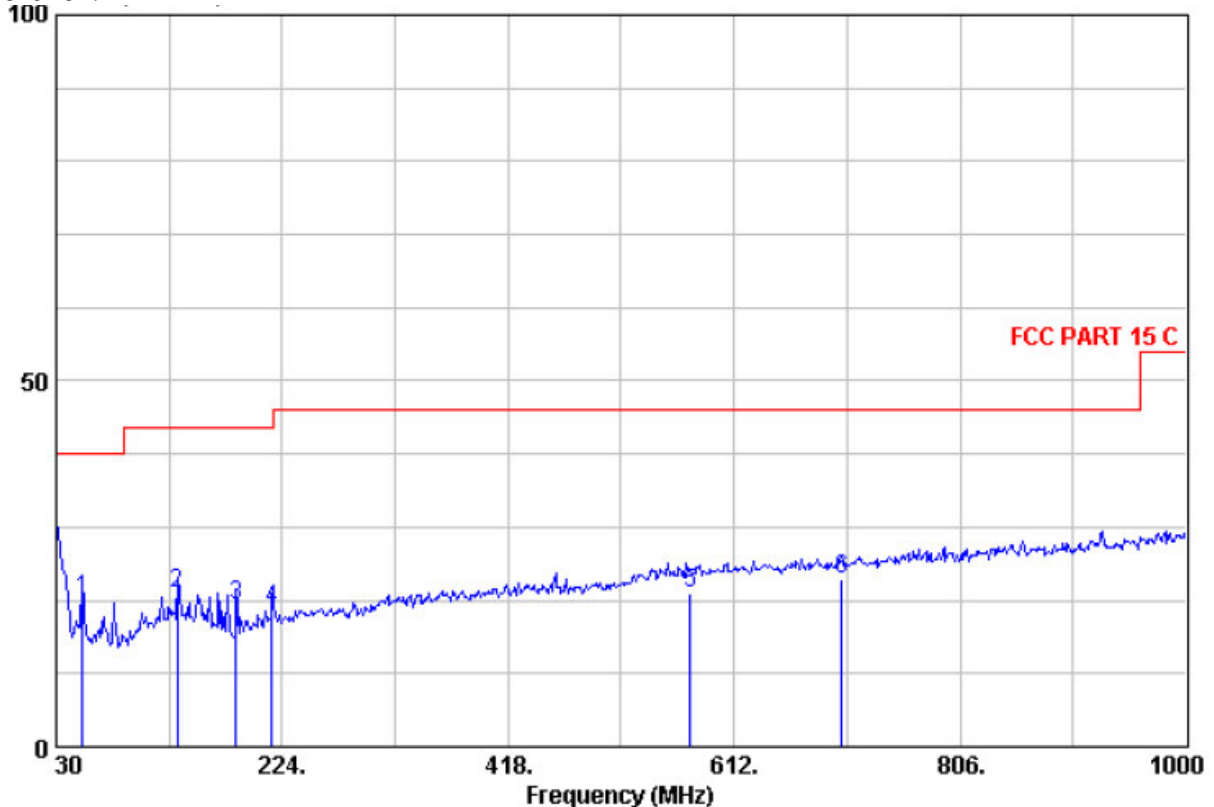
30MHz to 1GHz emissions

Tx Transmitting mode

Vertical:

Peak scan:

Level: dBuV/m



Quasi-peak measurement

Freq	Read 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	37.67	9.83	0.60	27.87	20.23	40.00	-19.77	QP
133.790	35.50	11.87	1.00	27.49	20.87	43.50	-22.63	QP
184.230	37.04	8.50	1.20	27.29	19.45	43.50	-24.05	QP
215.270	34.46	10.32	1.30	27.21	18.87	43.50	-24.63	QP
574.170	29.50	17.59	2.10	28.30	20.89	46.00	-25.11	QP
704.150	30.37	18.13	2.40	27.87	23.02	46.00	-22.98	QP

Remark:

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



7.3 Occupied Bandwidth

Test Date: 2010-08-12
Test Method: ANSI C63.4:2009
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

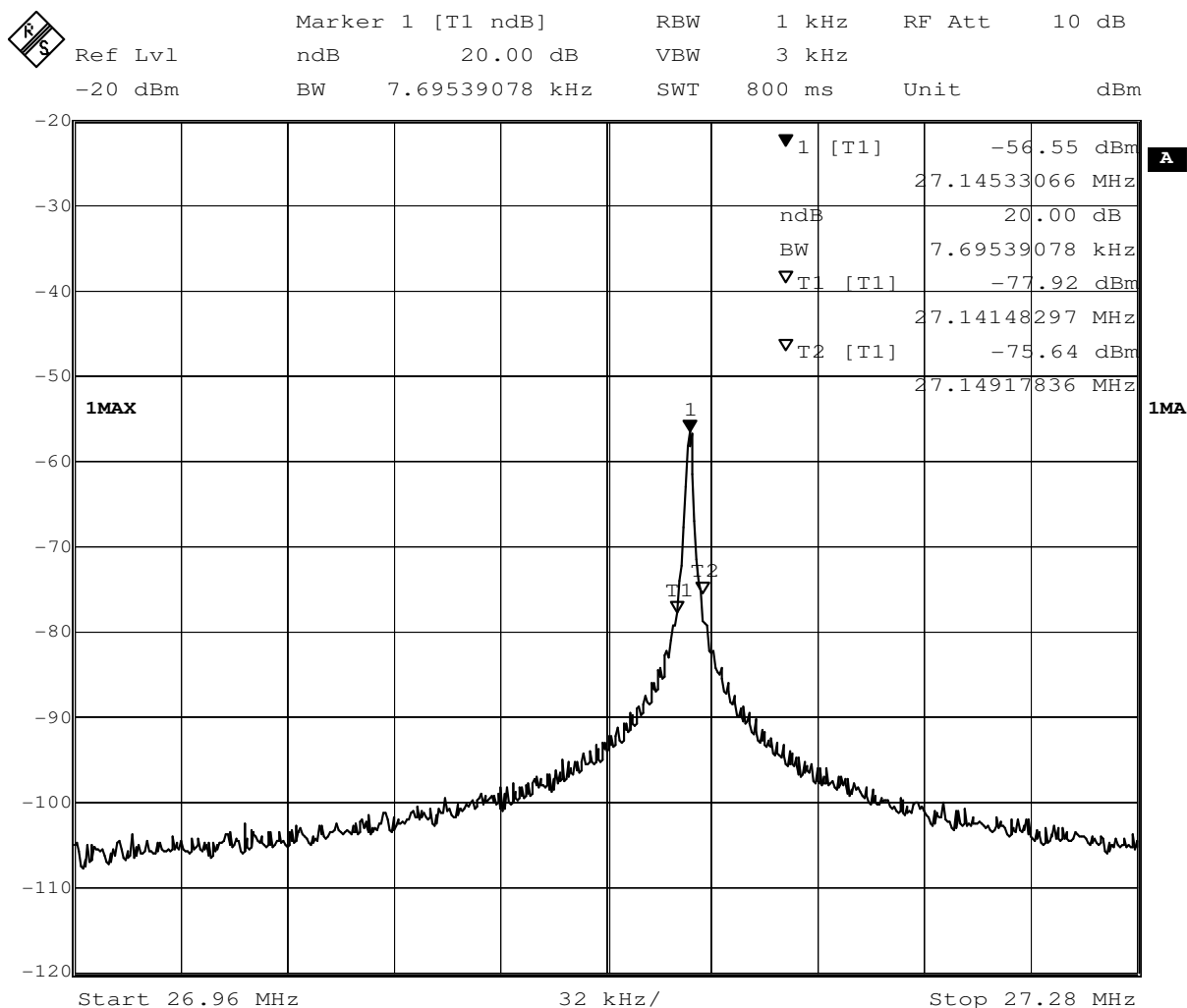
Set the spectrum analyzer: RBW = 1kHz, VBW = 3KHz

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

Mark the peak frequency and -20dB points bandwidth.



The graph as below:



Date: 16.AUG.2010 10:43:35

20dB bandwidth lower frequency : 27.14148297MHz

20dB bandwidth upper frequency : 27.14917836MHz

The results: The unit does meet the FCC requirements

--End of the Report--