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Report No:SZEMO09010025901
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FCC ID: W2UQINGSONGTOY

TEST REPORT

Application No. : SZEMO090100259

Applicant: Qingsong Toy Industrial Co., Ltd.

Fundamental Carrier 72.050MHz, 72.150MHz, 72.210MHz, *

Frequency :

* Please refer to section 2 of this report which indicates which Fundamental Carrier Frequency was actually tested.

Equipment Under Test (EUT):

Name: R/C HELICOPTER

Model: 478, 578, 678, 118, 128, 811, 810, 8016, 8018, 8019, 5884, 5886, 5887, 5888, 5889

Standards: FCC Part 95

Date of Receipt: 16 January 2009

Date of Test: 16 January 2009

Date of Issue: 16 January 2009

Test Result :	PASS *
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Robinson Lo
Manager

This report refers to the General Conditions for Inspection and Testing Services, printed overleaf. This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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2 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Field Strength of Fundamental	FCC Part 95	Section 95.639	PASS
Field Strength of Harmonics or other Frequency	FCC Part 95	Section 95.635	PASS
Emission Bandwidth	FCC Part 95	Section 95.633	PASS
Frequency Stability	FCC Part 95	Section 95.623	PASS
Crystal Access Restrictions	FCC Part 95	Section 95.645	PASS
Conducted Emissions	FCC PART 15	Section 15.207	PASS

Remark: The fundamental frequencies:

72.050MHz, 72.150MHz, 72.210MHz,

Since the same PCBs only use 3 types of crystals,

only 72.210MHz product was completely tested in the whole report.

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4 General Information

4.1 Client Information

Applicant Name: Qingsong Toy Industrial Co., Ltd.

Applicant Address: 39 Lian Road, Wai Pu Industrial District, Chenghai District, Shantou City

4.2 General Description of E.U.T.

Product Name: R/C HELICOPTER

Model: 478, 578, 678, 118, 128, 811, 810, 8016, 8018, 8019, 5884, 5886, 5887, 5888, 5889

Power Supply: 9.6V DC (8 x 'AA' Size Rechargeable Batteries).

Power Cord: N/A-

4.3 Description of Support Units

The EUT was tested as an independent unit: a 72MHz Remote Control.

4.4 Standards Applicable for Testing

The customer requested FCC tests for a 72MHz Remote Control.

The standard used was FCC PART 95.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory, No.198 Kezhu Road, Science Town Economic& Technology Development District Guangzhou, China 510663

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

No tests were sub-contracted.

4.6 Other Information Requested by the Customer

None.

5 Test Results

5.1 Test Instruments

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	16-06-2007	15-06-2009
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	12-12-2008	11-12-2009
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	18-06-2008	17-06-2009
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0014	12-08-2008	11-08-2009
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	18-06-2008	17-06-2009
7	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0005	12-08-2008	11-08-2009
8	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	12-08-2008	11-08-2009
9	Pre-amplifier (1-18GHz)	Rohde & Schwarz	AFS42-00101 800-25-S-42	SEL0081	18-06-2008	17-06-2009
10	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33- 18002650-30- 8P-44	SEL0080	18-06-2008	17-06-2009
11	Band filter	Amindeon	82346	SEL0094	18-06-2008	17-06-2009
12	Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	15-06-2008	14-06-2009

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	N/A	N/A
2	LISN	ETS-LINDGREN	3816/2	SEL0021	18-06-2008	17-06-2009
3	ISN	Rohde & Schwarz	ENY 22 1109	EMC0114	18-06-2008	17-06-2009
4	ISN	Rohde & Schwarz	ENY 41 1110	EMC0115	18-06-2008	17-06-2009
5	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	18-06-2008	17-06-2009
6	Coaxial Cable	SGS	N/A	SEL0024	18-06-2008	17-06-2009

5.2 E.U.T. Operation

Input voltage:	9.6V DC (8 x 'AA' Size Rechargeable Batteries(Fully charged)).
Operating Environment:	
Temperature:	24.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1012 mbar
EUT Operation:	Test in transmitting mode:

5.3 Test Procedure & Measurement Data

5.3.1 Filed Strength of Fundamental

Test Requirement:	FCC Part 95 Section 95.639
Test Method:	Based on TIA603:2004.
Test Date:	
Measurement Distance:	3m (Semi-Anechoic Chamber)
	Test instrumentation resolution bandwidth 120 kHz (30 MHz - 1000 MHz)
Detector	Peak
Operation:	Receive antenna scan height 1 - 4 m, polarization Vertical/ Horizontal

Requirements: The maximum transmitter power for an R/C transmitter, under any condition of modulation, should not exceed a carrier power or peak envelop TP of:

For 72-76 MHz operation: the limit is ERP 0.75 W.

Effective Radiated Power(ERP) (§2.1046)

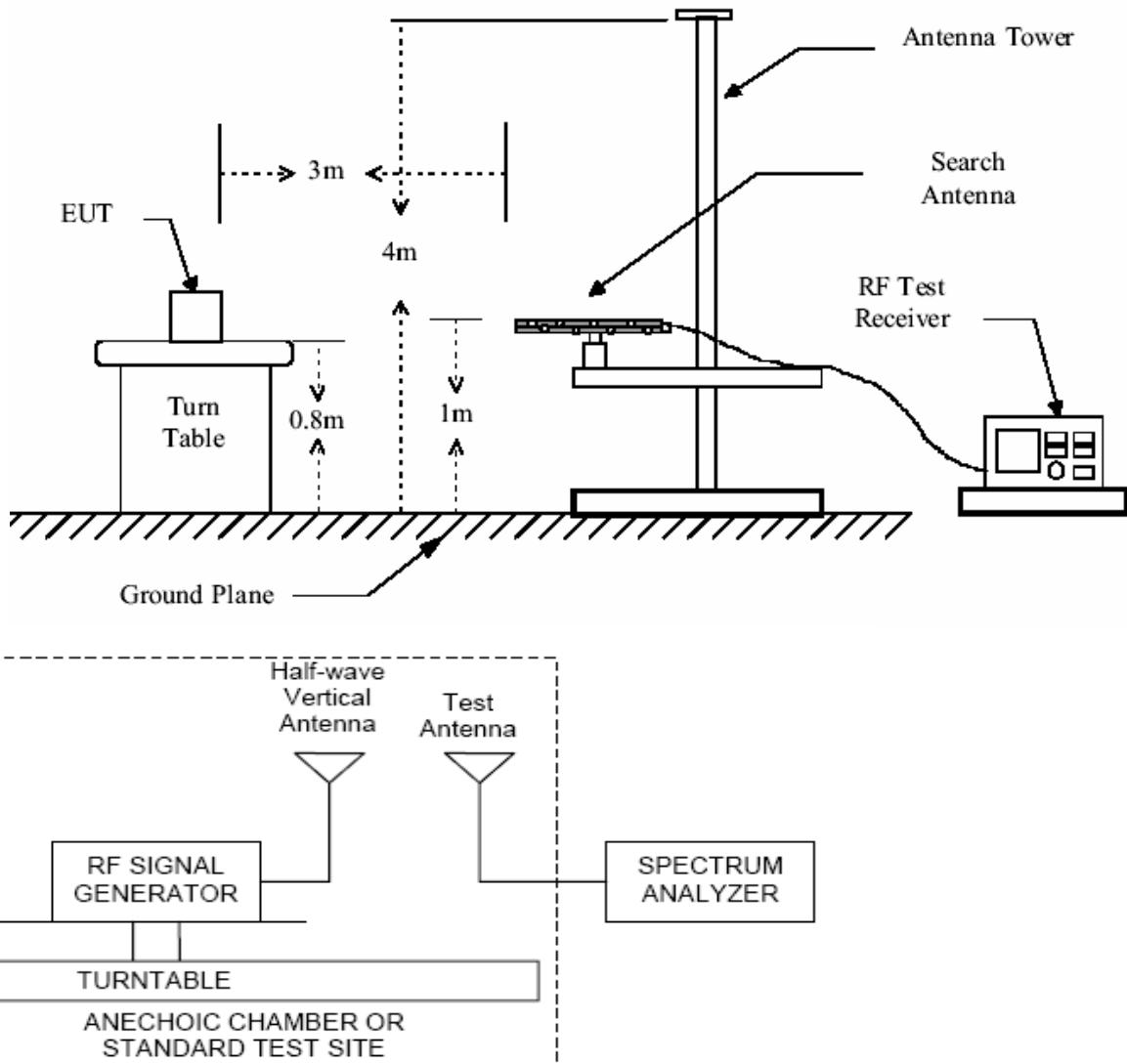
Effective radiated power was measured using the substitution method described in TIA/EIA-603:2004. The unit was placed on an open area test site at a test distance of 3m. The ERP level is determined using signal substitution and is referenced to the gain of a half-wave dipole. The unit was tested in three orthogonal planes to determine the highest power.

Test Procedure:

Test Method: The procedure used was Standard TIA603:2004.

The technique used to find the output power of the transmitter was the antenna substitution method. The following test procedure was followed:

1. The EUT was powered ON and placed on a table in the chamber. The antenna of the transmitter was extended to its maximum length.
2. The fundamental frequency (72.210MHz) of the transmitter was maximized on the test Receiver display by raising and lowering the receive antenna and by rotating the turntable. After the fundamental emission was maximized, a field strength measurement was made.
3. Steps 1 and 2 were performed with the EUT and the receive antenna in both vertical and horizontal polarization and performed a pre-test three orthogonal planes.
4. The transmitter was then removed and replaced with a substitution antenna.
5. A signal at the fundamental frequency (72.210MHz) was fed to the substitution antenna by means of a non-radiating cable. With both the substitution and the receive antennas horizontally and vertically polarized, the receive antenna was raised and lowered to obtain a maximum reading at the test Receiver. The level of the signal generator was adjusted until the measured field strength level in step 2 is obtained for this set of conditions.
6. The output power into the substitution antenna was then measured

Test Configuration:

Test result:

The transmitter output power found using the antenna substitution method was ERP 25mW.

$P_d(\text{dBm}) = P_g(\text{dBm}) - \text{Cable Loss}(\text{dB}) + \text{Antenna Gain}(\text{dB})$

Frequency (MHz)	ERP (dBm)	Cable Loss(dB)	Antenna Gain(dBd)	SG Level(dBm)	Antenna Polarization (H/V)	Limits (dBm)
72.21	13.98	0.9	1.08	13.8	V	28

The unit does meet the FCC requirements.

5.3.2 Flled Strength of Harmornics or other Frequency

Test Requirement:	FCC Part 95 Section 95.635
Test Method:	Based on TIA603:2004.
Test Date:	
Measurement Distance:	3m (Semi-Anechoic Chamber)
Frequency range	30 MHz – 1GHz for transmitting mode.
	Test instrumentation resolution bandwidth 120 kHz (30 MHz - 1000 MHz)
Detector	Quasi-peak
Operation:	Receive antenna scan height 1 - 4 m, polarization Vertical/ Horizontal

Requirements:

The power of each unwanted emission should be less than the transmitter power (TP) by at least $56+10\log(TP)$ on any frequency removed from the center of the authorized bandwidth by more than 250%.

The transmitter complied with the radiated spurious requirement and the following table contains the 10 highest spurious emissions.

Tuned Frequency: 72.210 MHz

Measurement Distance: 3m

Calculation of FCC Limit: $FS - [56 + 10\log(TP)]$

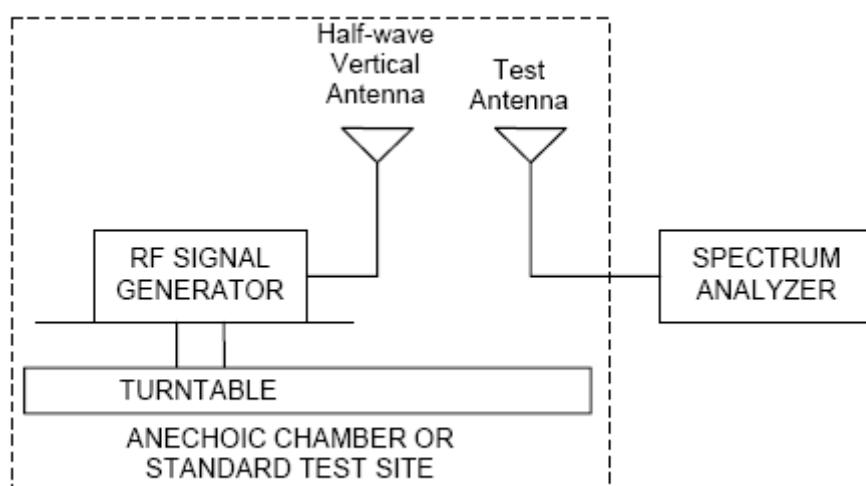
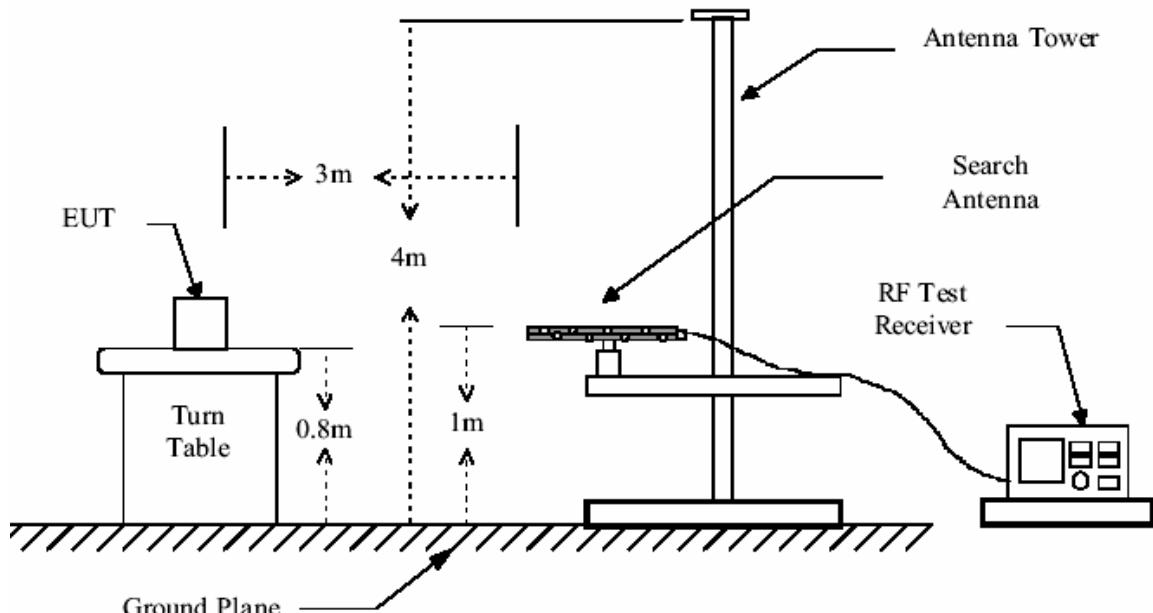
Where, TP = measured transmitter power (W); FS = Fundamental field strength (dBm)

$13.98\text{dBm} - [56 + 10\log(25\text{mW}/1000)] = -26.02\text{dBm}$

The spurious emissions should not exceed -26.02dBm

Test Procedure:

The EUT was placed on motorized turntable for radiated testing on a 3-meter open field test site. The emissions from the EUT were measured continuously at every azimuth by rotating the turntable. Receiving antennas were mounted on an antenna mast to determine the height of maximum emissions. The height of the antenna was varied between 1 and 4 meters. recording the measure result, and using signal substitution method transfer the dBuV to dBm.and the data is should in the curve.

Test Configuration:




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The following test results were performed on the EUT:

Frequency (MHz)	Emission Level(dBm)	Cable Loss(dB)	Antenna Gain(dBd)	SG Level(dBm)	Antenna Polarization (H/V)	Limits (dBm)
54.150	-35.7	0.4	-3.4	-31.9	V	-26.02
85.450	-31.4	1.0	0.1	-30.5	V	-26.02
432.550	-53.6	2.0	6.4	-58.0	V	-26.02
482.90	-68.3	2.2	6.1	-72.2	V	-26.02
505.05	-59.2	2.4	6.3	-63.1	V	-26.02
613.28	-41.8	2.7	5.7	-44.8	V	-26.02
54.150	-57.2	0.4	-3.4	-53.4	H	-26.02
85.450	-54.8	1.0	0.1	-53.9	H	-26.02
432.550	-55.1	2.0	6.4	-59.5	H	-26.02
505.05	-55.3	2.4	6.3	-59.2	H	-26.02
613.28	-60.9	2.7	5.7	-63.9	H	-26.02

The unit does meet the FCC requirements.

5.3.3 Emission Bandwidth

Test Requirement: FCC Part 95 Section 95.633

Test Method: Based on TIA603:2004.

Test Date:

Requirements: An R/C transmitter is allowed to transmit any appropriate non-voice emission, which meets the emission limitations for an R/C transmitter. The authorized bandwidth for any emission type transmitted by an R/C transmitter is 8kHz.

The power of each unwanted emission shall be less than the transmitter power (TP) by:

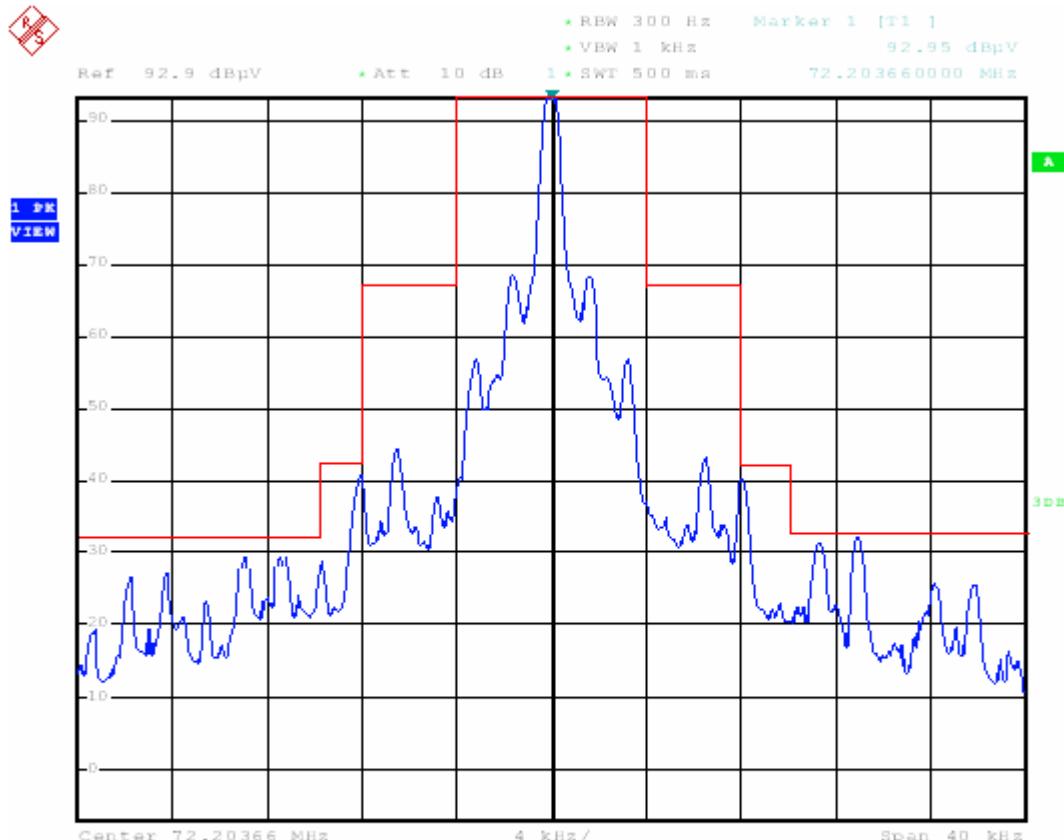
(1) At least 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

(2) At least 45 dB on any frequency removed from the center of the authorized bandwidth by more than 100% up to and including 125% of the authorized bandwidth.

(3) At least 55 dB on any frequency removed from the center of the authorized bandwidth by more than 125% up to and including 250% of the authorized bandwidth.

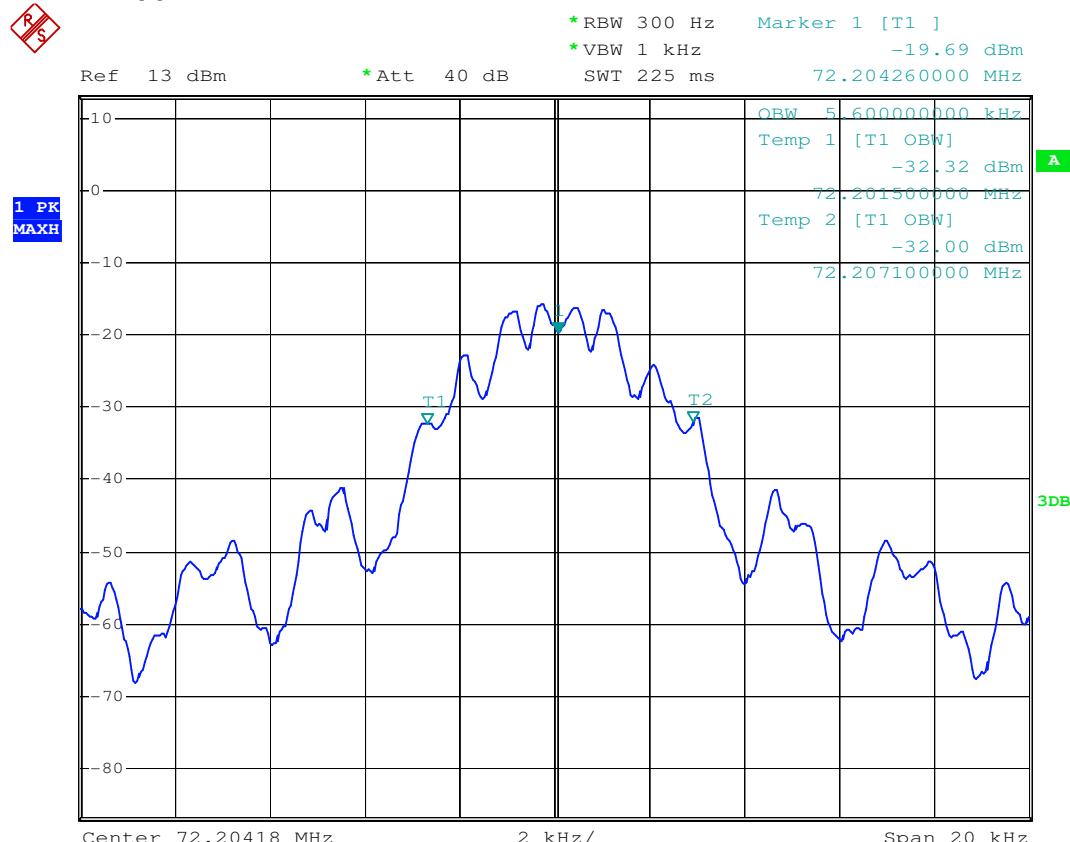
(4) At least $56 + 10 \log_{10} (T)$ dB on any frequency removed from the center of the authorized bandwidth by more than 250%.

The following plot shows the test results.



Date: 15.JAN.2009 15:01:24

The unit does meet the FCC requirements.

99% Occupied Bandwidth


Date: 4.FEB.2009 09:14:25

5.4 Frequency Stability

Test Requirement: FCC Part 95 Section 95.623

Test Method: Based on TIA603:2004.

Test Date:

Requirements: All other R/C transmitters that transmit in the 72-76 MHz frequency band must be maintained within a frequency tolerance of 0.002% (20ppm).

Test Method:

Frequency measurements were made as follows:

(a) at 10 degree intervals of temperatures between -30°C and +50°C at the manufacturer's rated supply voltage, and

(b) at +20°C temperature and $\pm 15\%$ supply voltage variations.

Note, for handheld equipment that is only capable of operating from internal batteries, reduce the primary supply voltage to the battery operating end point. The manufacturer should specify the battery operating endpoint voltage of the equipment.

Test Results:

Frequency Stability vs. Temperature

Assigned Frequency(MHz)	Temperature (°C)	Measured Frequency(MHz)	Frequency Deviation (KHz)	Limit (KHz)
72.21	-30	72.21076	0.760	1.440
	-20	72.21063	0.630	1.440
	-10	72.21051	0.510	1.440
	0	72.21097	0.970	1.440
	+10	72.21090	0.900	1.440
	+20	72.21075	0.750	1.440
	+30	72.21053	0.530	1.440
	+40	72.21032	0.320	1.440
	+50	72.21006	0.060	1.440

Frequency Stability vs. Supply Voltage

Nominal Voltage: 9.6VDC

Temperature: 20 °C

Assigned Frequency(MHz)	Voltage (V)	Measured Frequency(MHz)	Frequency Deviation (KHz)	Limit (KHz)
72.21	9.6	72.21091	0.901	1.440
	9.0	72.21085	0.850	1.440
	8.0	72.21081	0.810	1.440
	7.0	72.21075	0.750	1.440
Remark: The applicant declared the endpoint voltage 7.0Vdc. It will give the operation guidance to the customer in user manual.				
The unit does meet the FCC requirements.				

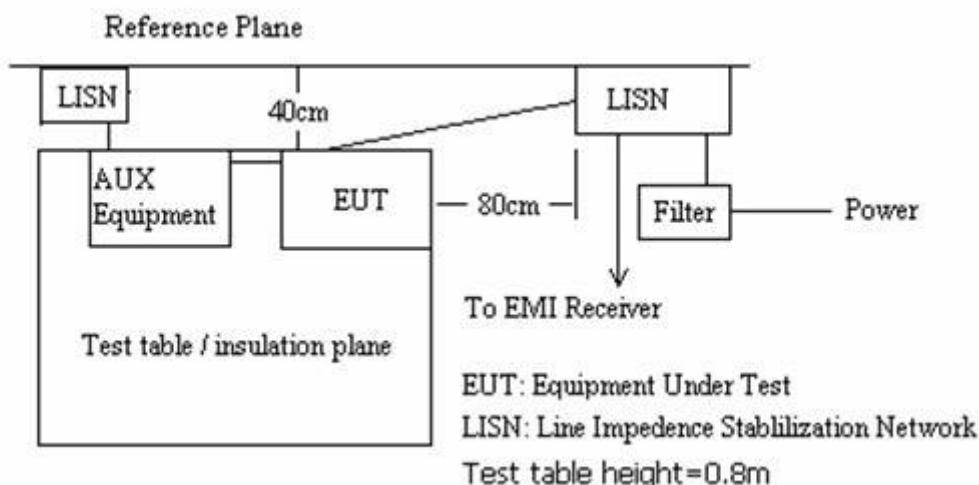
5.5 Crystal Access Restrictions

The EUT has no control knobs, switches, or other type of adjustments either on the operating front panel or on the exterior of the transmitter enclosure, which when manipulated can result in violation of the rules. The plug in crystal is not accessible to the user.

5.6 Conducted Emissions

Test Requirement: FCC Part15 C Section 15.207
Test Method: ANSI C63.4:2003
Frequency Range: 150KHz to 30MHz
Class / Severity: Class B
Detector: RBW=9KHz VBW=30KHz
Operating Environment:
Temperature: 24.0 °C Humidity: 52% RH Atmospheric Pressure: 1015 Mbar
EUT Operation: Test in normal mode. 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.
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Plan View of Test Setup



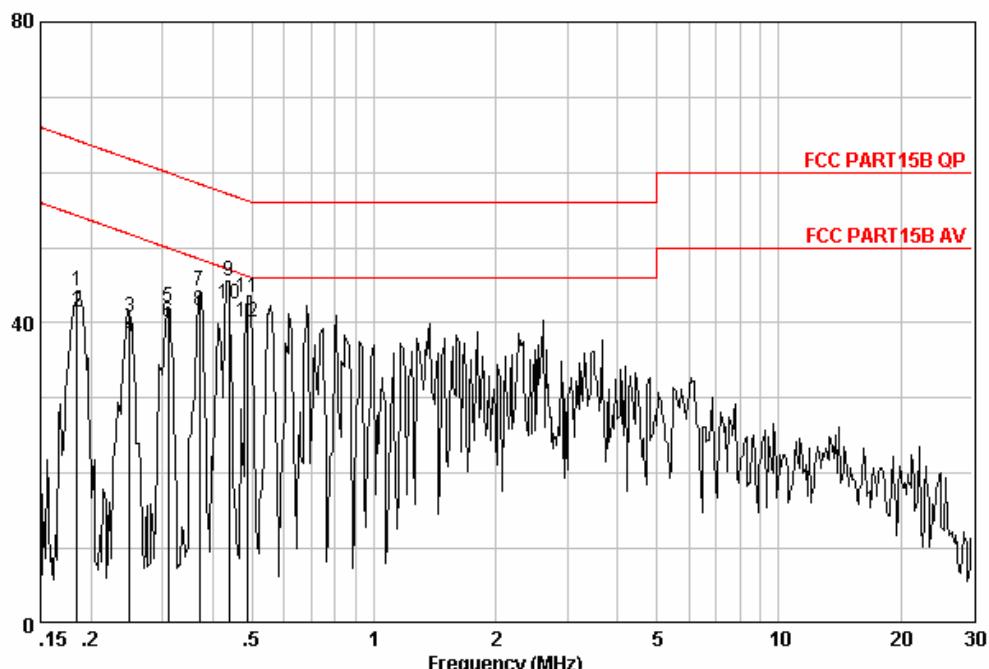
5.6.1.1 Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected. For EUT communicating with worst case mode.

The following Quasi-Peak and Average measurements were performed on the EUT:

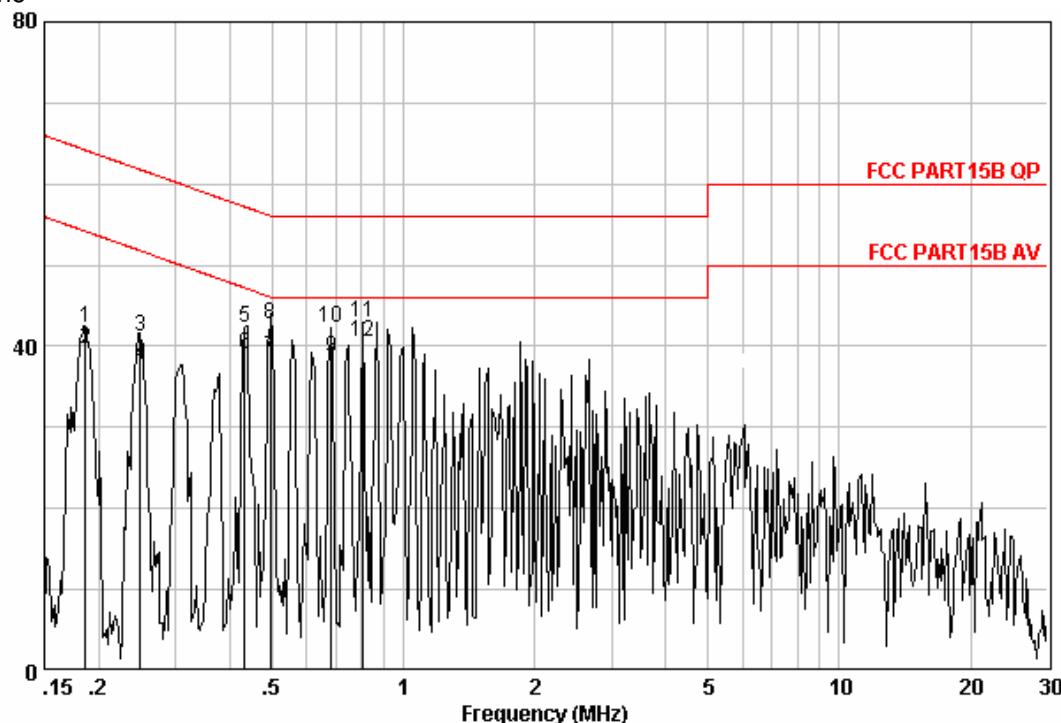
Live Line



Site : Shielding Room
 Condition : FCC PART15B QP CE LINE

Freq	Cable Loss	LISN Factor	Read	Limit	Over	Remark	
			Level	Level	Line		
MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.18443	-0.07	-0.05	44.38	44.26	64.28	-20.03 QP
2	0.18443	-0.07	-0.05	41.46	41.34	54.28	-12.94 Average
3	0.24945	-0.05	-0.04	40.86	40.77	61.78	-21.00 QP
4	0.24945	-0.05	-0.04	38.13	38.04	51.78	-13.74 Average
5	0.30998	0.00	-0.04	42.20	42.16	59.97	-17.82 QP
6	0.30998	0.00	-0.04	40.16	40.12	49.97	-9.85 Average
7	0.37117	0.00	-0.04	44.38	44.34	58.47	-14.14 QP
8	0.37117	0.00	-0.04	41.64	41.60	48.47	-6.88 Average
9	0.43742	0.00	-0.04	45.70	45.66	57.11	-11.45 QP
10 @	0.43742	0.00	-0.04	42.60	42.56	47.11	-4.55 Average
11	0.48890	0.00	-0.04	43.52	43.47	56.19	-12.71 QP
12	0.48890	0.00	-0.04	40.19	40.15	46.19	-6.04 Average

Neutral Line



Site : Shielding Room
Condition : FCC PART15B QP CE NEUTRAL

Freq	Cable Loss	LISN Factor	Read	Limit Line	Over Limit	Remark
			Level			
MHz	dB	dB	dBuV	dBuV	dBuV	dB
1	0.18639	-0.08	-0.04	42.49	42.38	64.20 -21.82 QP
2	0.18639	-0.08	-0.04	39.79	39.67	54.20 -14.52 Average
3	0.24945	-0.05	-0.04	41.21	41.13	61.78 -20.65 QP
4	0.24945	-0.05	-0.04	37.86	37.77	51.78 -14.00 Average
5	0.43281	0.00	-0.04	42.43	42.39	57.20 -14.81 QP
6	0.43281	0.00	-0.04	38.99	38.95	47.20 -8.25 Average
7	0.49411	0.00	-0.04	38.73	38.69	46.10 -7.41 Average
8	0.49411	0.00	-0.04	42.86	42.82	56.10 -13.28 QP
9	0.68263	0.00	-0.04	38.71	38.67	46.00 -7.33 Average
10	0.68263	0.00	-0.04	42.43	42.39	56.00 -13.61 QP
11	0.80876	0.04	-0.04	43.04	43.04	56.00 -12.96 QP
12 @	0.80876	0.04	-0.04	40.59	40.59	46.00 -5.41 Average

TEST RESULTS: The unit does meet the FCC requirements.