



## SGS-CSTC Standards Technical Services Co., Ltd.

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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 Frequency :** 72.050MHz, 72.150MHz, 72.210MHz, ♣

♣ 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

|                      |               |
|----------------------|---------------|
| <b>Test Result :</b> | <b>PASS *</b> |
|----------------------|---------------|

\* 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 | Stanadard Paragraph | Result |
|--|------------------|---------------------|--------|
| Flid Strength of Fundamental                   | FCC Part 95      | Section 95.639      | PASS   |
| Flid Strength of Harmornics 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.



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## 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<br>800-25-S-42      | SEL0081       | 18-06-2008          | 17-06-2009              |
| 10            | Pre-amplifier (18-26GHz)       | Rohde & Schwarz      | AFS33-<br>18002650-30-<br>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              |

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### 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 Flid 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)<br>Test instrumentation resolution bandwidth<br>120 kHz (30 MHz - 1000 MHz) |
| Detector              | Peak   |
| Operation:            | Receive antenna scan height 1 - 4 m, polarization Vertical/<br>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)

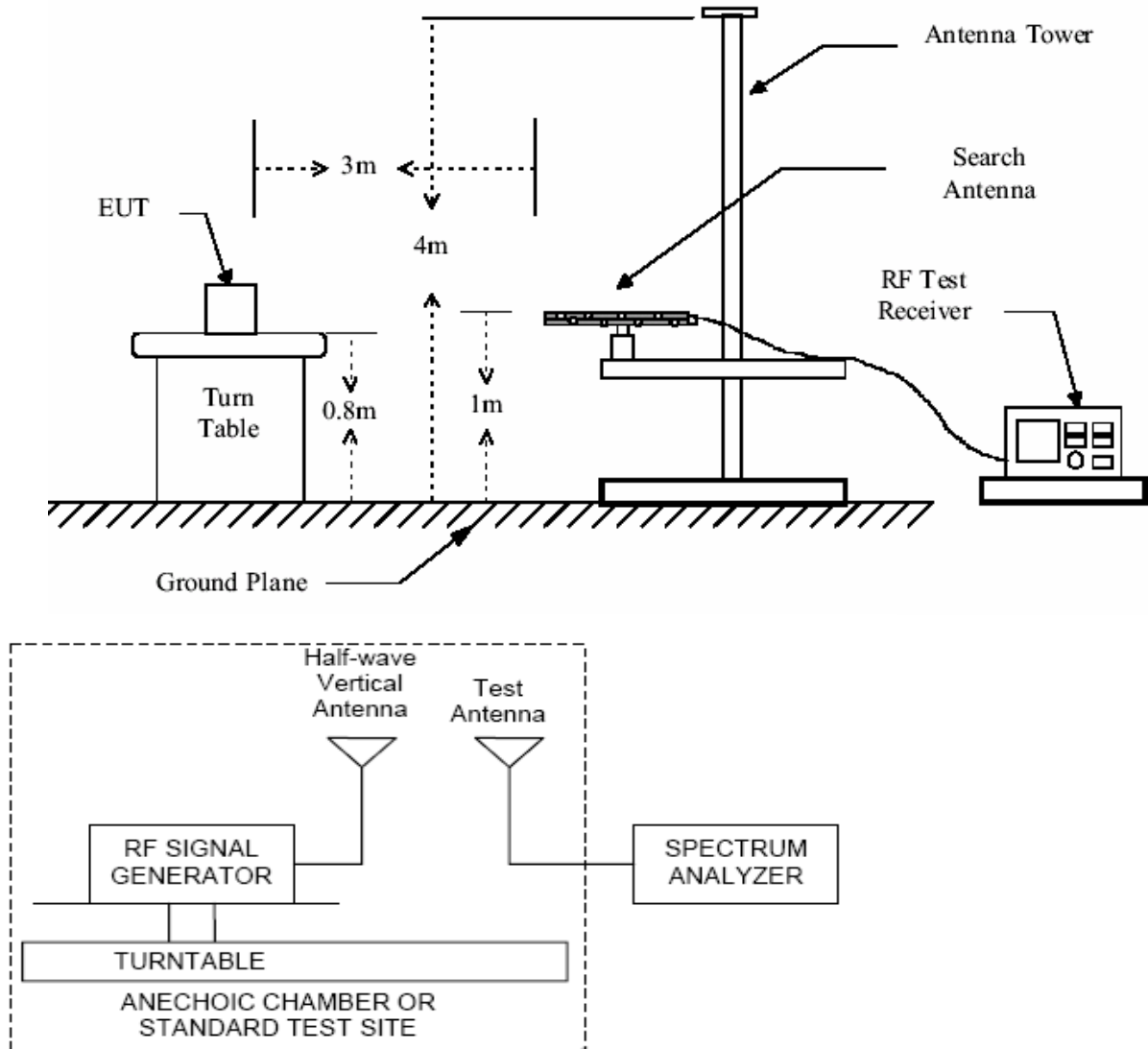
Effective radiated power was measured using the substitution method described in TIA/EIA-603:2004 . The unit was placed on an open area test site at a test distance of 3m. The ERP level is determined using signal substitution and is referenced to the gain of a half-wave dipole. The unit was tested in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

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

| 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.



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### 5.3.2 Field Strength of Harmonics 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)

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

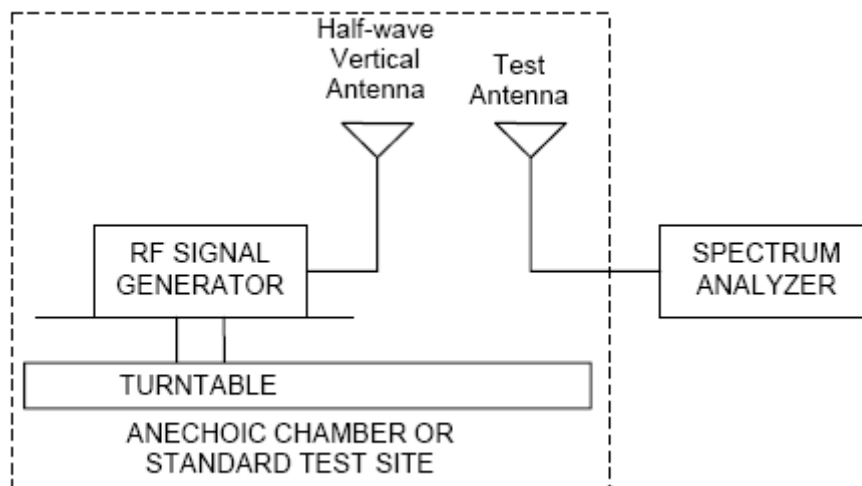
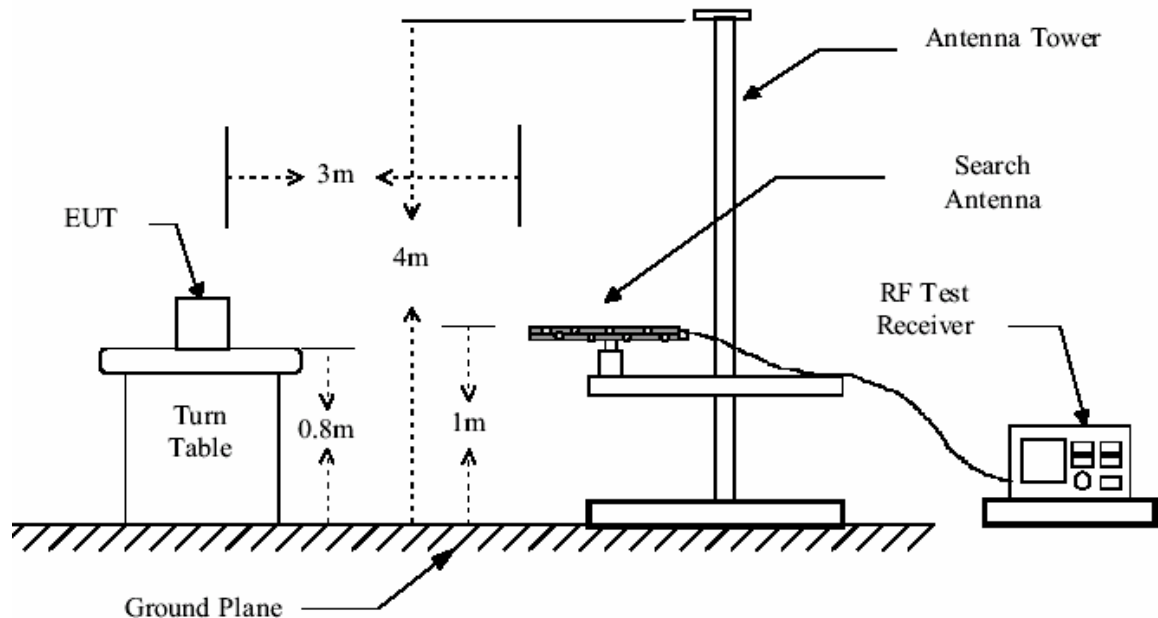
The spurious emissions should not exceed -26.02dBm

#### 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<br>(MHz) | Emission<br>Level(dBm) | Cable<br>Loss(dB) | Antenna<br>Gain(dBd) | SG<br>Level(dBm) | Antenna<br>Polarization<br>(H/V) | Limits<br>(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.



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### 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%.



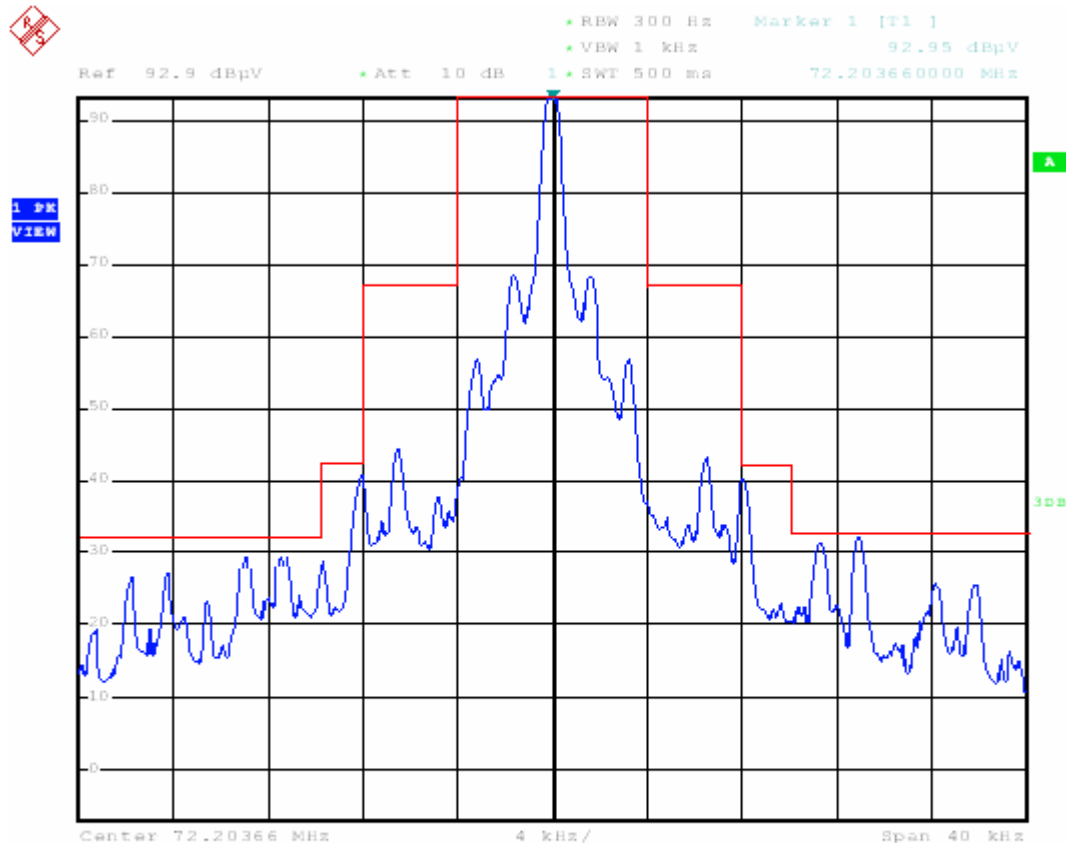
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The following plot shows the test results.



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

The unit does meet the FCC requirements.



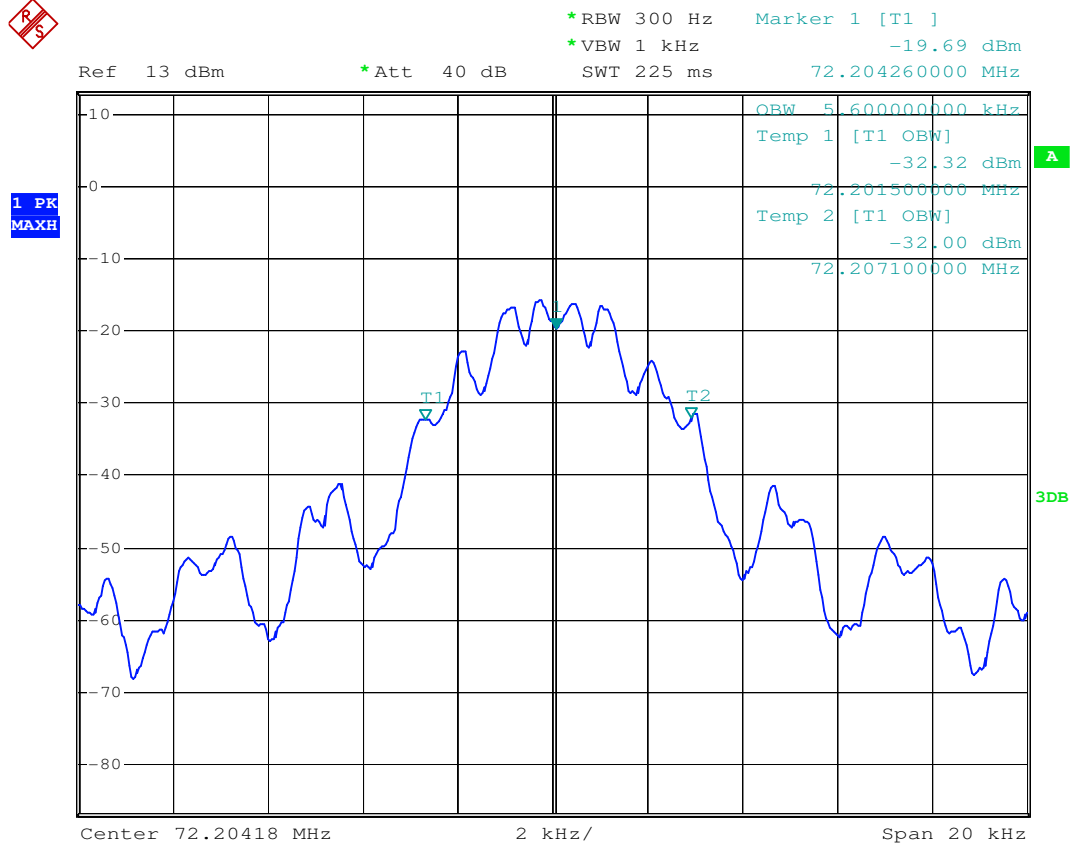
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### 99% Occupied Bandwidth



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



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### 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 ±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.<br>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

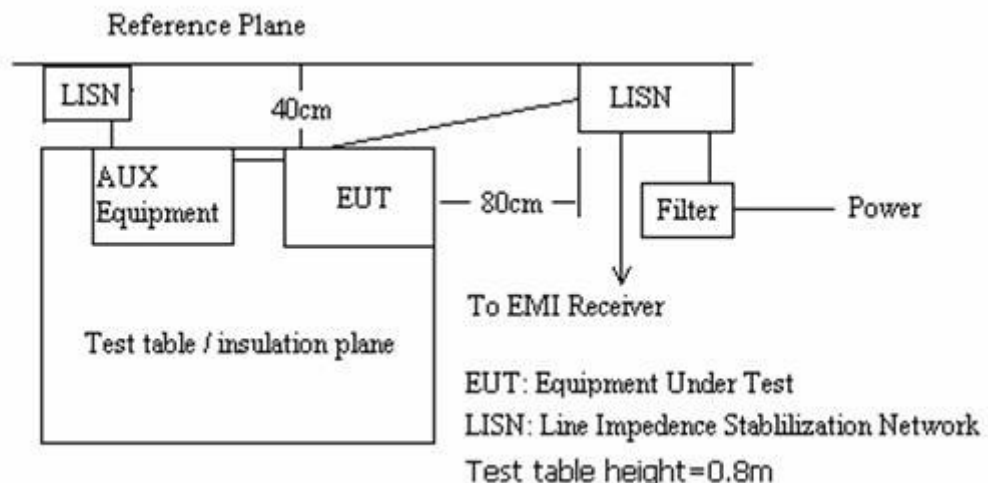
Operating Environment:

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





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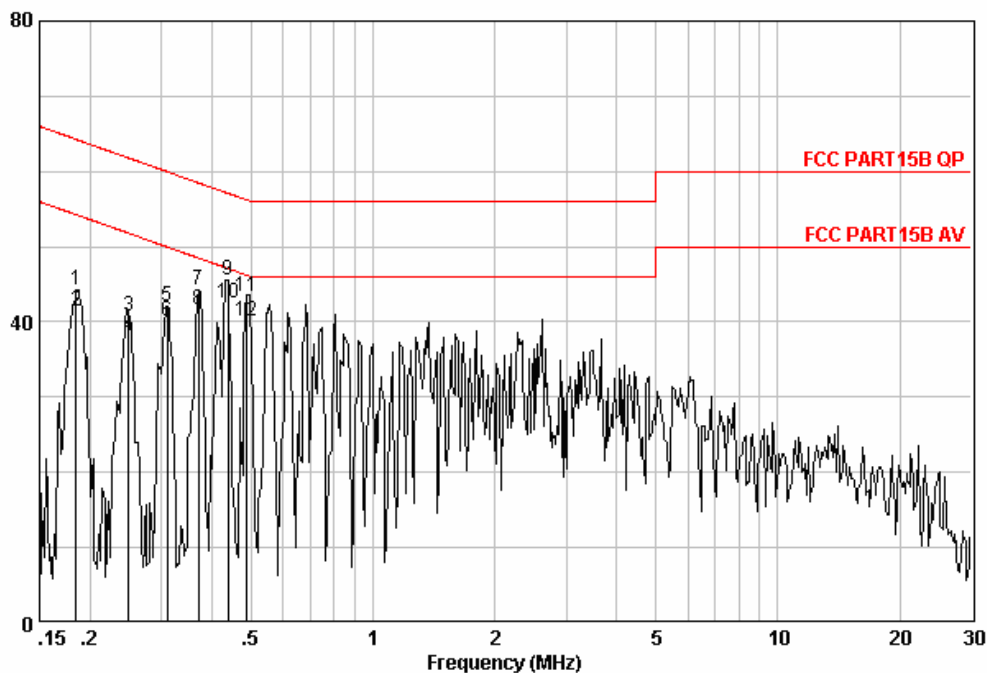
### 5.6.1.1 Measurement Data

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

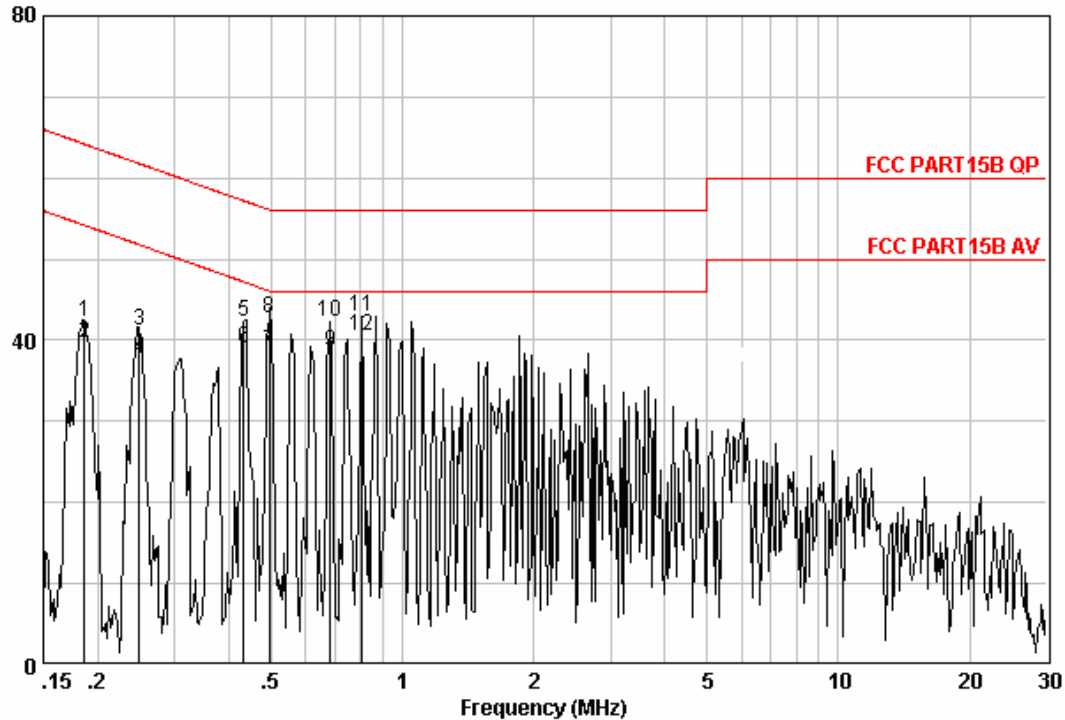


Site : Shielding Room  
Condition : FCC PART15B QP CE LINE

|      | Freq    | Cable Loss | LISN Factor | Read Level | Level | Limit Line | Over Limit | Remark  |
|------|---------|------------|-------------|------------|-------|------------|------------|---------|
|      | 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 Level | Level | Limit Line | Over Limit | Remark  |
|------|---------|------------|-------------|------------|-------|------------|------------|---------|
|      | 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.