



MISSION

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FEDERAL COMMUNICATIONS COMMISSION
Registration number: 556682

Report No.: SZEMO061202628RFF(I)
Page: 1 of 13
FCC ID: RTW8122

FCC TEST REPORT

Application No. : SZEMO061202628RF(SGS SZ NO.: SZTYR061203177/EL)
Applicant: SIRDAR METAL & PLASTIC WORKS
FCC ID: RTW8122
Fundamental Frequency: 72.19,72.21,72.23,72.25,72.27,72.29,72.31,72.33,72.35,72.37,72.39,72.41,
72.43,72.45,72.47,72.49,72.51,72.53,72.55,72.57,72.59,72.61,72.63,72.65,
72.67,72.69,72.71,72.73,72.75,72.77,72.79MHz♣
♣ Please refer to section 2 of this report which indicates which Fundamental Carrier Frequency was actually tested.

Equipment Under Test (EUT):

EUT Name: 72MHz FOUR CHANNEL TRANSMITTER AND RECEIVER
Model No.: T4DP-FM72
Labelled Age Grading: 14yrs & up
Country of Origin: CHINA
Country of Destination: USA
Standards: FCC Part 95: 2006
Date of Receipt: 29 December 2006
Date of Test: 04 January 2007
Date of Issue: 05 January 2007

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

Robinson Lo
Laboratory 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.
This report may only be reproduced and distributed in full. 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. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

2 Test Summary

Test	Test Requirement	Standard Paragraph	Result
Flied Strength of Fundamental	FCC Part 95: 2006	Section 95.639	PASS
Flied Strength of Harmornics or other Frequency	FCC Part 95: 2006	Section 95.635	PASS
Emission Bandwidth	FCC Part 95: 2006	Section 95.633	PASS
Frequency Stability	FCC Part 95: 2006	Section 95.623	PASS

♣ Remark:

The fundamental frequencies:

72.19,72.21,72.23,72.25,72.27,72.29,72.31,72.33,72.35,72.37,72.39,72.41,
72.43,72.45,72.47,72.49,72.51,72.53,72.55,72.57,72.59,72.61,72.63,72.65,
72.67,72.69,72.71,72.73,72.75,72.77,72.79MHz

Since the same PCBs only use different types of crystals,

only 72.39MHz product was completely tested in the whole report.



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4 General Information

4.1 Client Information

Applicant Name: SIRDAR METAL & PLASTIC WORKS
Applicant Address: Bai-Shi Industrial Zone, San Xiang Town, Zhong Shan City, Guang Dong, China

4.2 General Description of E.U.T.

EUT Name: 72MHz FOUR CHANNEL TRANSMITTER AND RECEIVER
Model No.: T4DP-FM72
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.

4.4 Standards Applicable for Testing

The customer requested FCC tests for 72MHz FOUR CHANNEL TRANSMITTER AND RECEIVER.
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 8215 5555 Fax: +86 20 8207 5059

No tests were sub-contracted.

4.6 Other Information Requested by the Customer

None.

5 Test Results

5.1 Test Instruments

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	28-04-2005	27-04-2007
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	22-09-2006	21-09-2007
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	20-05-2006	19-05-2007
5	Coaxial cable	SGS	N/A	SEL0027	20-05-2006	19-05-2007
6	BiConiLog Antenna	ETS-LINDGREN	3142C	00042673	03-03-2006	02-03-2007
7	EMI Test Receiver	Rohde & Schwarz	ESCI	100119	03-03-2006	02-03-2007
8	Loop Antenna	Emco	6502	00042963	30-05-2006	29-05-2007

5.2 E.U.T. Operation

Input voltage: 9.6V DC (8 x 'AA' Size Rechargeable Batteries).
 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 Field Strength of Fundamental

Test Requirement:	FCC Part 95 Section 95.639
Test Method:	Based on TIA 603
Test Date:	04 January 2007
Measurement Distance:	3m (Semi-Anechoic Chamber) Test instrumentation resolution bandwidth 120 kHz (30 MHz - 1000 MHz)
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 0.75 W.

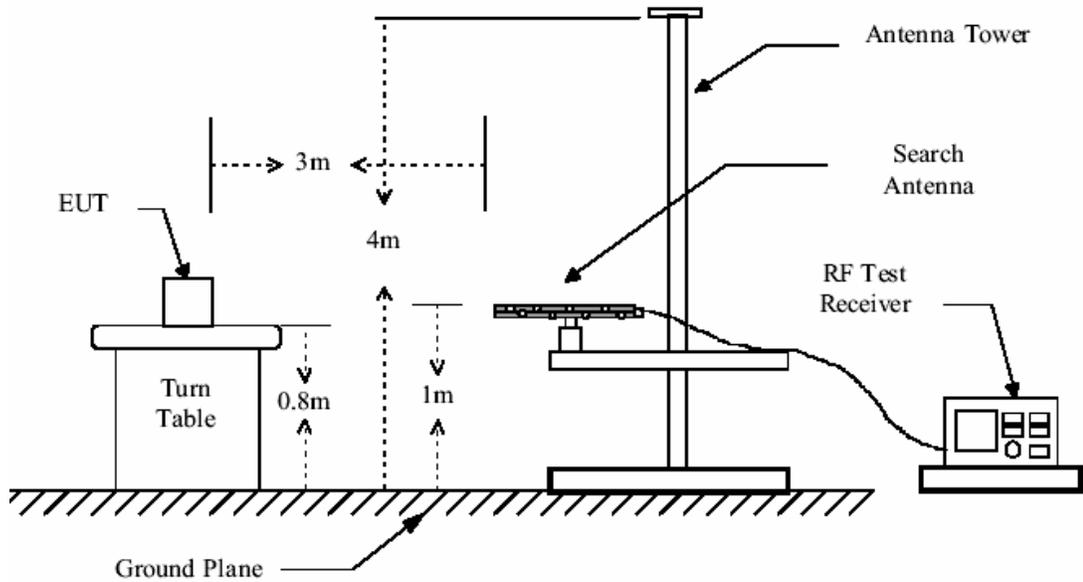
Test Procedure:

Test Method: The procedure used was TIA 603.

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 (72.390MHz) 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 (72.390MHz) 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 highest field strength measured at the fundamental frequency (72.390MHz) was 107.2dB μ V/m at a distance of 3 meters.

The transmitter output power found using the antenna substitution method was 6.9mW.

The unit does meet the FCC requirements.



5.3.2 Field Strength of Harmonics or other Frequency

Test Requirement:	FCC Part 95 Section 95.635
Test Method:	Based on TIA 603.
Test Date:	04 January 2007
Measurement Distance:	3m (Semi-Anechoic Chamber)
Frequency range	30 MHz – 1GHz for transmitting mode. Test instrumentation resolution bandwidth 120 kHz (30 MHz - 1000 MHz)
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 $56+10\text{Log}(TP)$ 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: 72.390 MHz

Measurement Distance: 3m

Calculation of FCC Limit: $FS - [56 + 10\text{Log}(TP)]$

Where, TP = measured transmitter power (W); FS = Fundamental field strength (dB μ V/m)

$107.2 \text{ dB}\mu\text{V/m} - [56 + 10\text{Log}(6.9\text{mW}/1000)] = 72.8\text{dB}\mu\text{V/m}$

The field strength of the spurious emissions should not exceed 72.8dB μ V/m

Test Procedure:

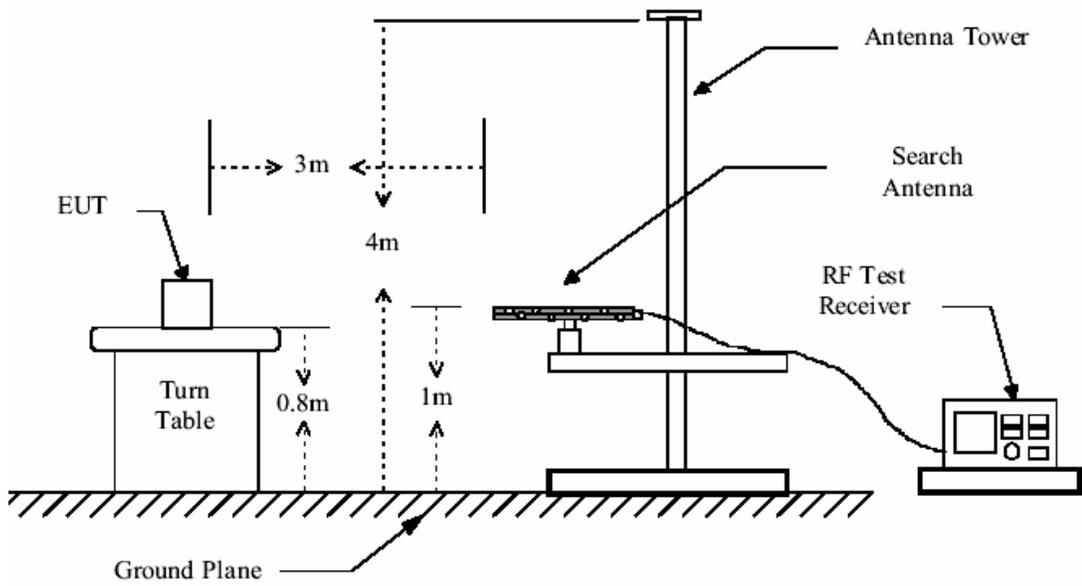
Below 30MHz

Test Procedure: For testing performed with the loop antenna, testing was performed in accordance to TIA 603. 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.

Above 30MHz

The procedure used was TIA 603. The receive was scanned from 30MHz to 1GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. 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. The worst case emissions were reported.

Test Configuration:





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 Factor – Peramlifer Factor

The following test results were performed on the EUT:

Quasi-Peak Measurement

Vertical:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
105.450	1.10	8.25	40.33	49.68	72.8	-23.12
143.950	1.31	8.47	40.54	50.32	72.8	-22.48
215.125	1.49	11.01	47.82	60.32	72.8	-12.48
432.550	2.34	16.54	39.55	58.43	72.8	-14.50

Horizontal:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
105.450	1.10	8.25	31.35	40.70	72.8	-32.10
143.950	1.31	8.47	32.51	42.29	72.8	-30.51
215.125	1.49	11.01	42.80	55.34	72.8	-17.46
432.550	2.34	16.54	36.56	55.44	72.8	-17.36

1. Level = Read Level + Antenna Factor + Cable Loss.
2. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

The unit does meet the FCC requirements.



5.3.3 Emission Bandwidth

Test Requirement: FCC Part 95 Section 95.633

Test Method: Based on TIA 603.

Test Date: 04 January 2007

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:

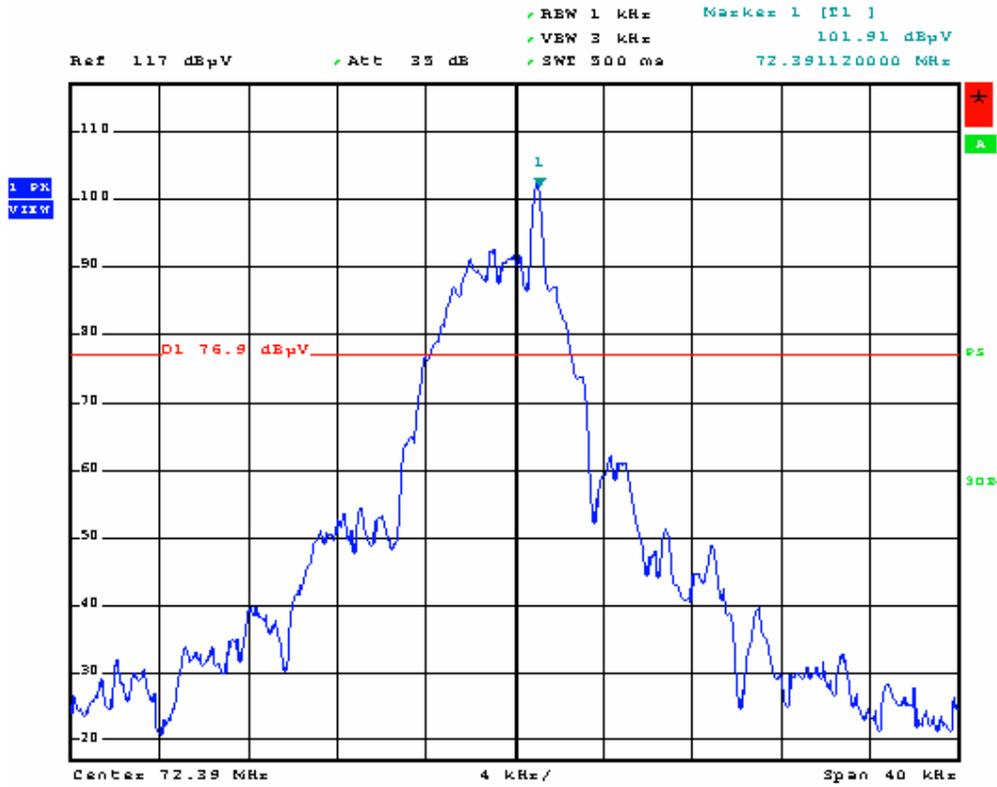
(1) At least 25 dB (decibels) on any frequency removed from the center of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.

(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.



N

Date: 4. JAN. 2007 08:49:41

The unit does meet the FCC requirements.



5.4 Frequency Stability

Test Requirement: FCC Part 95 Section 95.623
 Test Method: Based on TIA 603.
 Test Date: 04 January 2007
 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)
72.39	-30	72.39065	0.65	1.440
	-20	72.39062	0.62	1.440
	-10	72.39057	0.57	1.440
	0	72.39056	0.56	1.440
	+10	72.39052	0.52	1.440
	+20	72.39050	0.50	1.440
	+30	72.39047	0.47	1.440
	+40	72.39034	0.34	1.440
	+50	72.39006	0.06	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)
72.39	9.6	72.39050	0.50	1.440
	9.0	72.39054	0.54	1.440
	8.0	72.39077	0.77	1.440
	7.0	72.39078	0.78	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.