

FCC TEST REPORT

FCC ID : SPNTX400-72FM

Applicant : Zhu Hai Xing Yu Model Products Co., Ltd.

Equipment Under Test (EUT) :

Product description : Radio Control System

Model No. : TX400-72FM, R6M-72F

Standards : FCC RULES PART 95-Personal Radio Service
Subpart C-Radio Control (R/C) Radio Service
Subpart E-Technical Regulations
FCC RULES PART 2- Frequency Allocations and Treaty Matters
General Rules and Regulations

Date of Test : September 5, 2006

Test Engineer : Tiger Su

Reviewed By :



PERPARED BY:

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3 Test Summary

TEST CASE	Requirement	Results
Output Power radiated	P95.210, 95.639	PASS
Unwanted Emission radiated	P95.635	PASS
Modulation limits	P95.631	N/A
Emission bandwidth	P95.633	PASS
Frequency stability	P95.623,P2.1055	PASS

4 General Information

4.1 Client Information

Applicant: **Zhu Hai Xing Yu Model Products Co., Ltd.**
Address of Applicant: Hong Qiao 3rd Road No.3 Bai Jiao Science & Industry Area,
Zhuhai P.R China

4.2 General Description of E.U.T.

Product description: Radio Control System
Model No.: TX400-72FM, R6M-72F

4.3 Details of E.U.T.

Power Supply: 9.6 V DC Battery.

4.4 Description of Support Units

The EUT has been tested as an independent unit.

4.5 Standards Applicable for Testing

The customer requested FCC tests for an Radio Control System, The standards used were FCC Part95.

4.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **FCC – Registration No.: 759357**

Solid Industrial (Shenzhen) 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 759357, November 04, 2003.

4.7 Test Location

All Emissions tests were performed at:-

Solid Industrial (Shenzhen) Co., Ltd. at 333 Bulong Highway Buji Longgang, Shenzhen, Guangdong, China.

5 Equipment Used during Test

Conducted Emission Test						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due date
1	Shielding Room	ETS	8 x 4 x 4 m ³	N0.2	N/A	N/A
2	LISN	Rohde & Schwarz	ESH2-Z5	100028	06-11-2005	05-11-2006
3	EMI Test Receiver	Rohde & Schwarz	ESCS30	100038	18-11-2005	17-11-2006
Radiated Emission Test						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due date
1	3m Semi- Anechoic Chamber	ETS	N/A	N/A	06-11-2005	05-11-2006
2	EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	06-11-2005	05-11-2006
3	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100038	06-11-2005	05-11-2006
4	EMI Test Software	ROHDE & SCHWARZ	ES-K1	N/A	N/A	N/A
5	Bilog Type Antenna	ETS	2075	2346	06-11-2005	05-11-2006
6	Horn Antenna	ROHDE & SCHWARZ	HF906	1000029	06-11-2005	05-11-2006
7	Ultra-Broadband Antenna	ROHDE & SCHWARZ	HL562	100015	06-11-2005	05-11-2006
Common Used Equipment						
Item	Test Equipment	Manufacturer	Model No.	Series No.	Cal. Date	Due date
1	Temperature, Humidity & Barometer	OREGON SCIENTIFIC	BA-888	20001 to20004	25-07-2006	24-07-2007
2	DMM	FLUKE	73	70681567 or 70671126	23-07-2006	22-07-2007

6 Conducted Emission Test

The EUT is a battery-operated unit; therefore, the conducted emissions test on AC mains was not performed.

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

7 Personal Radio Service in FCC Part95

7.1 Output Power Radiated

Product Name:	Radio Control System
Test Requirement:	FCC Part95.639&Part 2 Subpuart J(Section 2.1046)
Test Date:	September 5, 2006
Measurement Distance:	3m

7.1.1 Test Procedure

The test procedure are performed following the test standards ANSI STANDARD C63.4:2003 and ANSI/TIA/EIA-603.

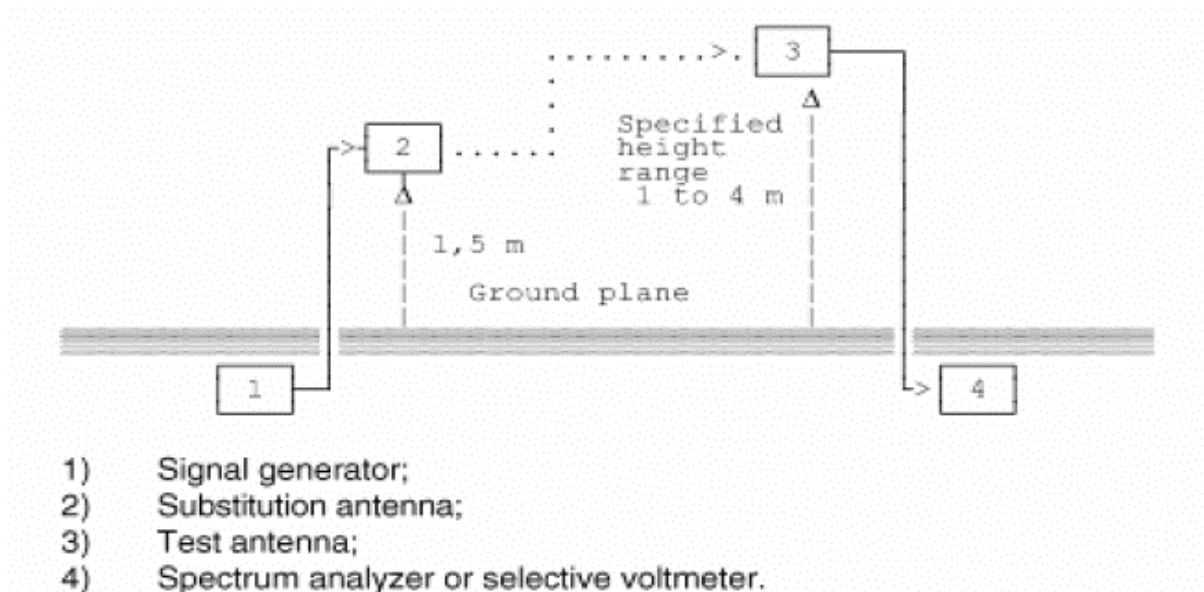
7.1.2 Test Setup

The radiated emission at the fundamental frequency is measured at 3m distance with a test antenna and spectrum analyzer.

ERP measurement in the determined frequency band is using the substitution method which will be applied to RF output power measurements as well as spurious emission power measurements. Substitution RF power measurements:

General:

The actual signal generated by the EUT can be determined by means of a substitution measurement in which a known signal source replaces the device to be measured.



The substitution antenna replaces the transmitter antenna at the same position and in vertical polarization. The frequency of the signal generator shall be adjusted to the measurement

frequency. The test antenna shall be raised or lowered, if necessary, to ensure that the maximum signal is still received. The input signal to the substitution antenna shall be adjusted in level until an equal or a known related level to that detected from the transmitter is obtained in the measurement receiver. If a fully anechoic chamber is used as test site in order to provide free space conditions there is no need to change the height of antenna.

The measurement will be repeated in horizontal position.

Calibration:

In order to make this kind of measurement more effective and to avoid subjective measurement faults HTW has installed automatic computer controlled measurement procedures.

With the above described substitution method a test site is calibrated over the full frequency range which is used in suitable frequency steps. For a certain power level on the substitution antenna the received power over the whole frequency range is documented. All necessary antenna gains, cable losses, filter losses and amplifications of preamplifiers are taken in consideration. The summary of this calibration measurement performs a transducer factor that is related to the considered test site and a certain measurement distance. Differences of the radiated power levels of different test samples are determined by internal attenuation of the measurement receiver. The proper function of such test site will be maintained by short term plausibility checks and periodical re-calibration.

Testing:

Now the test sample will be putted on the table at the defined position and radiated power will be received and documented by the measurement receiver.

On test sites with ground plane the measurement antenna will be lowered and raised to maximum values at significant frequencies.

For peak power measurements the sample is turned by the turntable over 360 degree in order to find the direction with the maximum radiation or to document the max reading with the MAXHOLD function during rotation.

7.1.3 Measurement Record:

Carrier Frequency (MHz)	Power Meter Reading		Correction Factor(*) (dB)	ERP (dBm)	RF Output Power (mW)	Limit(m W)
	Horizontal	Vertical				
72.19	-11.2	-9.2	15.33	6.03	4.017	750

7.2 Unwanted emissions radiated Test

Product Name:	Radio Control System
Test Requirement:	FCC Part95.635
Test Date:	September 5, 2006
Frequency Range:	30MHz to 1GHz
Measurement Distance:	3m

7.2.1 Test Procedure

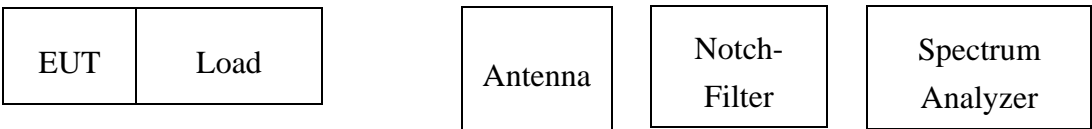
The test procedure are performed following the test standards ANSI STANDARD C63.4:2003 and ANSI/TIA/EIA-603.

7.2.2 Test Setup

Radiated unwanted emissions are emissions from the EUT on frequencies outside the operating band.

ERP measurement of unwanted emission using the general substitution method as described at 7.2.

In order to suppress inter modulation products in the spectrum analyzer a notch filter is used, if applicable.



Field strength spurious emission measurements are done at a the 3m Semi- Anechoic Chamber test site, The EUT is placed on a wooden table of 80cm high with dimensions of 1m by 1.5m. The EUT is measured in horizontal and vertical position with searching of max. Radiation by rotation of turn table and changing of the antenna high 1m too 4m over a frequency range from the lowest EUT generated frequency until the 10th harmonic of it.

7.2.3 Measurement Record:

Frequency (MHz)	Antenna Polarization	Correction Factor(*) (dB)	ERP (dBm)	Separation From Carrier(dBc)	Limit of ERP (dBc)	Margin for Limit (dBc)
144.38	Vertical	-9.89	-30.41	-36.61	-32.04	6.20
216.57	Vertical	-9.20	-33.69	-38.20	-32.04	4.51
360.95	Vertical	-10.10	-35.51	-39.90	-32.04	4.39
360.95	Horizontal	-9.60	-36.80	-38.50	-32.04	1.70
505.33	Horizontal	-10.50	-38.23	-42.10	-32.04	3.87
577.52	Horizontal	-10.40	-39.11	-43.20	-32.04	4.09

Note:

1. During the test, The EUT worst test result was recorded and presented.
2. Calculation of FCC Limit was: $-56 - 10 \log(\text{power}) = -56 - 10 \log(0.004018) = -32.04 \text{ dB}$

7.3 Modulations Characteristics/Emission types Test

An R/C transmitter may transmit any appropriate non-voice emission which meets the emission limitations of part 95.633

No further modulation test is required for R/C transmitters.

7.4 Occupied Bandwidth

Product Name:	Radio Control System
Test Requirement:	FCC 95.633
Test Date:	September 5, 2006
Measurement Distance:	3m

7.4.1 Test Procedure

The test procedure are performed following the test standards ANSI STANDARD C63.4:2003.

7.4.2 Test Setup

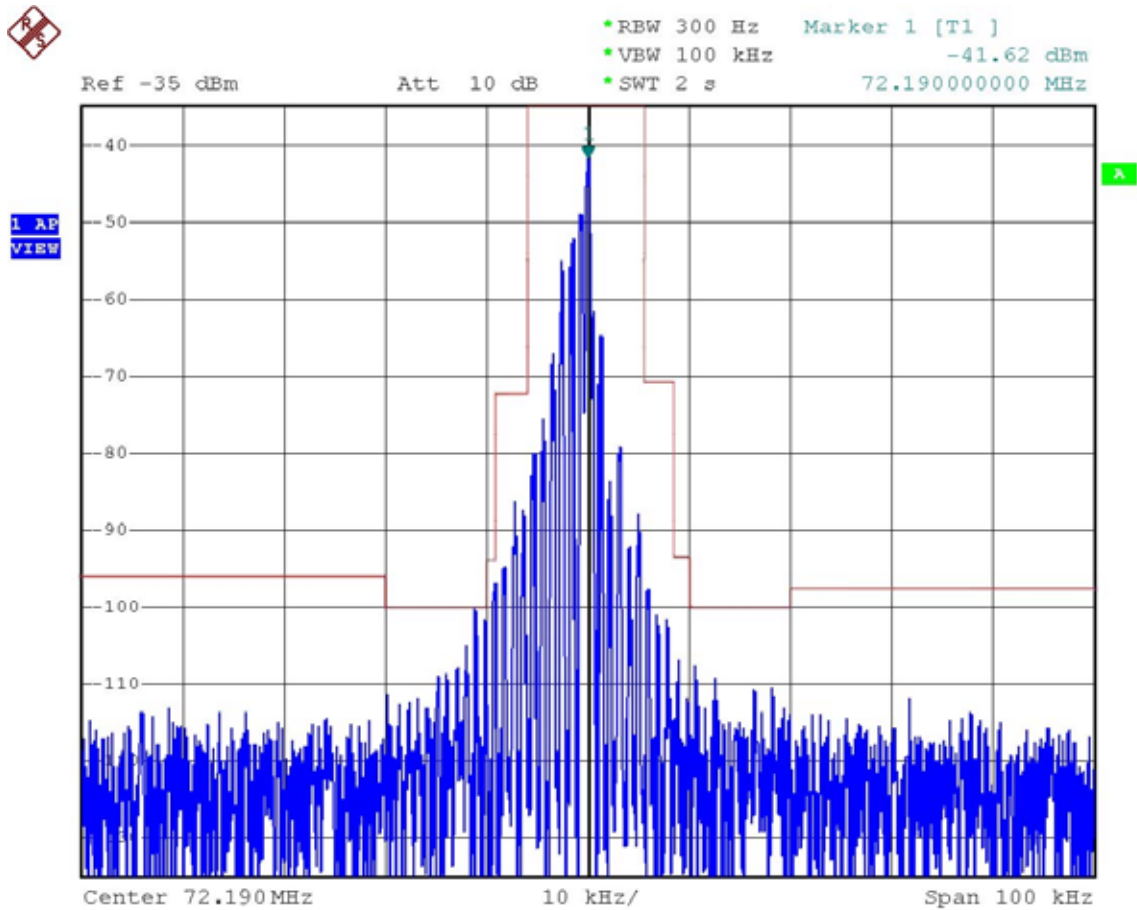
An R/C transmitter is allowed to transmit any appropriate non-voice emission which meets the emission limitations for an R/C transmitter. The authorized bandwidth for any emission type transmitted by an R/C transmitter is 8kHz.

With this test the occupied bandwidth required according to part 2.1049 is covered.

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

- 1) At least 25 dB on any frequency removed from the centre of the authorized bandwidth by more than 50% up to and including 100% of the authorized bandwidth.
- 2) At least 35dB on any frequency removed from the centre of the authorized bandwidth by more than 100% up to and including 250% of the authorized bandwidth.

7.4.3 Measurement Record:



1

Date: 4.Sep.2006 15:49:31

7.4.4 Test result:

The EUT complied with emission bandwidth requirement. During testing, all control switches and buttons were investigated for the worst-case modulated signal.

If the EUT complies with the emission bandwidth requirement, it complies with the occupied bandwidth requirement according to part 2.1049 too.

7.5 Frequency stability

Product Name:	Radio Control System
Test Requirement:	FCC 95.623; 2.1055
Test Date:	September 5, 2006
Measurement Distance:	3m

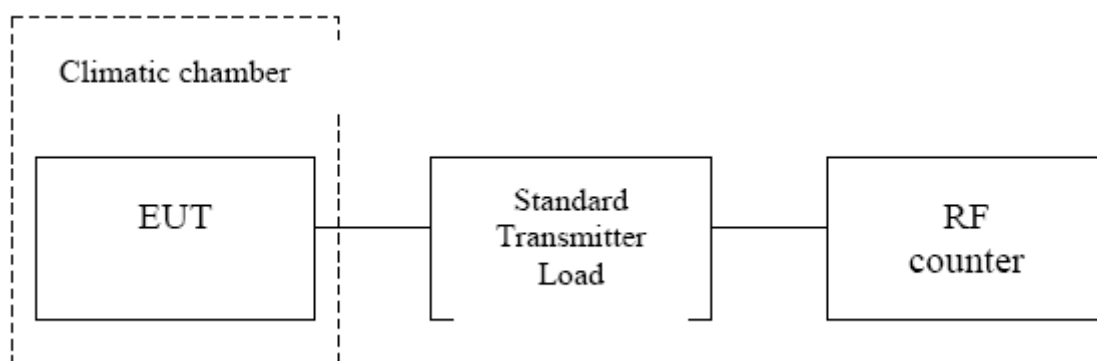
7.5.1 Test Procedure

The test procedure are performed following the test standards ANSI STANDARD C63.4:2003.

7.5.2 Test Setup

The carrier frequency stability is the ability of the transmitter to maintain an assigned carrier frequency.

Each R/C transmitter that transmits in the 72-76MHz frequency band with a mean TP of 2.5 Watts or less and that is used solely by the operator to turn on and/or off a device at a remote location. Other than a device used solely to attract attention, must be maintained within a frequency tolerance of 0.002%.



7.5.3 Measurement Record:

Frequency measurements were made as follows:

- (a) at 10 degree intervals of temperatures between -30 and +50 at the manufacturer's rated supply voltage, and
- (b) at +20 temperature and $\pm 15\%$ supply voltage variations.
- (c) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.

Frequency stability vs. temperature

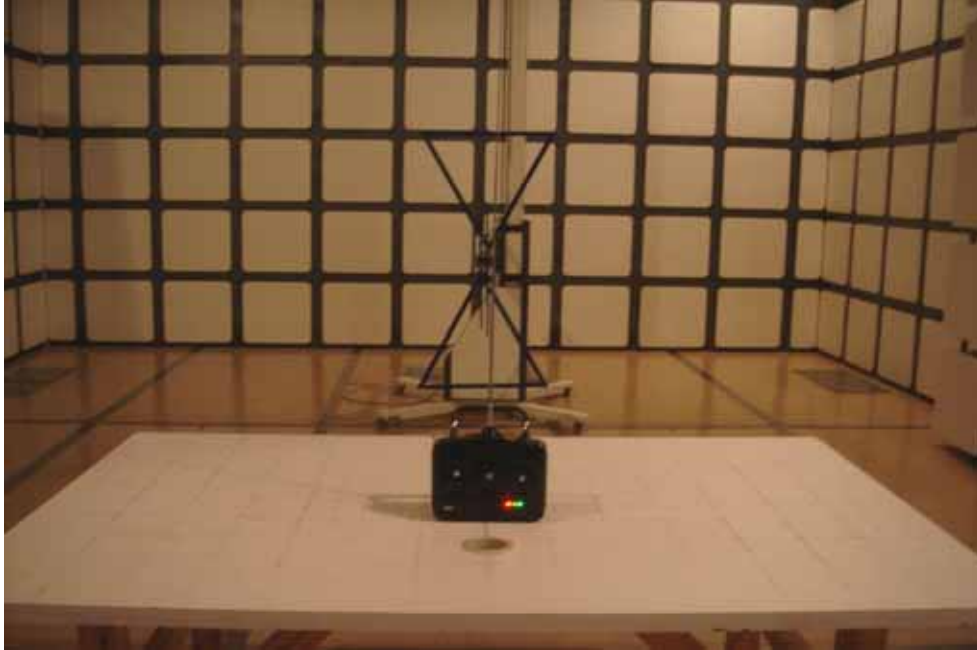
Operating temperature()	Measured Frequency(MHz)	Frequency Deviation(Mhz)	Frequency Deviation(%)
-30	72.191160	0.001160	0.00161
-20	72.191080	0.001080	0.0015
-10	72.190911	0.000911	0.00126
0	72.190690	0.000690	0.000956
+10	72.190410	0.000410	0.000568
+20	72.190000	0	0
+30	72.189880	-0.00012	-0.000166
+40	72.189650	-0.00035	-0.000445
+50	72.189645	-0.000355	-0.000492

Frequency stability vs. Supply Voltage

Input Voltage (V)	Measured Frequency(MHz)	Frequency Deviation(MHz)	Frequency Deviation(%)
11.04	72.190305	0.000305	0.000422
10.56	72.190267	0.000267	0.00037
9.6	72.190211	0.000211	0.000292
9.12	72.190190	0.000190	0.000263
8.64	72.190170	0.000170	0.000235
8.16	72.190151	0.000151	0.000210

8 Photographs — EUT Test Setup

8.1 Photographs –Radiation Emission Test Setup



9 Photographs - Constructional Details

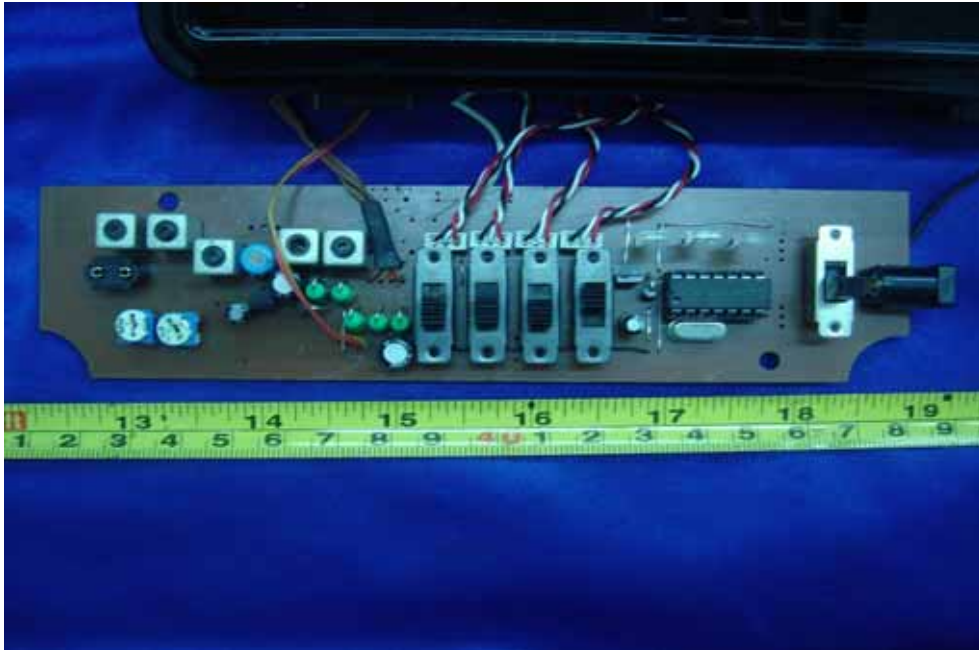
9.1 EUT-Front View



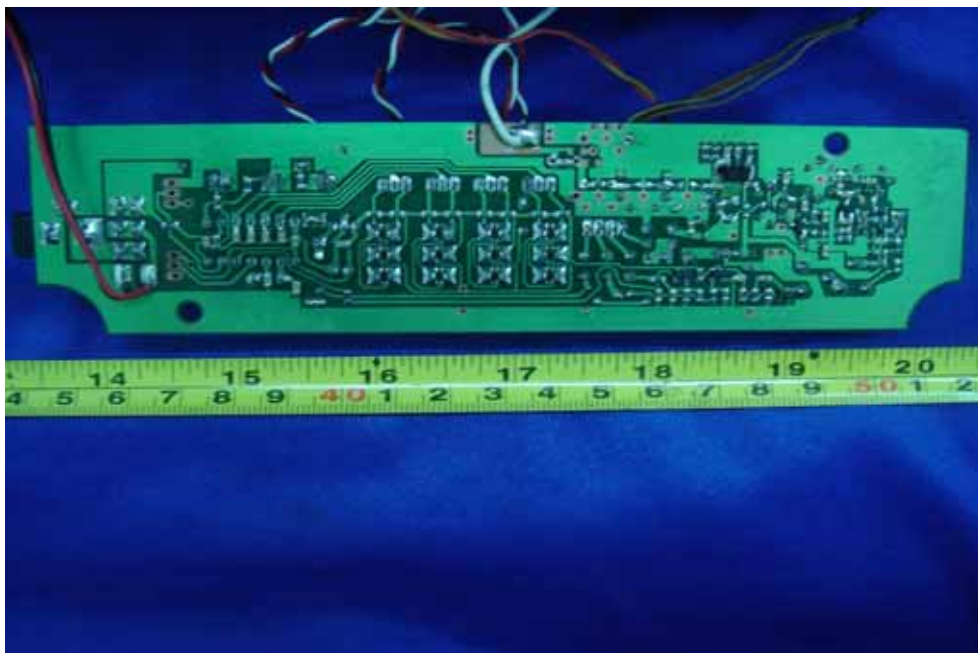
9.2 EUT-Back View



9.3 PCB– Front View



9.4 PCB –Back View



10 FCC ID Label

This device complies with Part 95 of the FCC Rules.

The Label must not be a stick-on paper. The Label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Proposed Label Location on EUT
EUT Top View/ proposed FCC Mark Location

