FCC TEST REPORT

FCC ID : RNIP705648

Applicant :**Esel International Co. Ltd**
Rm 15-17,5/F, Cardinal Ind,Bldg, No.17 On Lok Mun St., Fanling, N.T., HongKong

Manufacturer : **Eastern Sources Electronic Manufacturer**
DaJi Industrial Zone, HengShan District, ShiPai Town, DongGuan City

Equipment Under Test (EUT) :

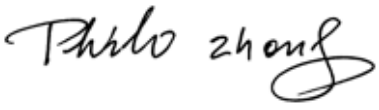
Product description : PS2 2.4G Wireless Controller

Model No. : LM648

Standards : FCC 15 Paragraph 15.205, Paragraph 15.209, Paragraph 15.31, Paragraph 15.33, Paragraph 15.35, Paragraph 15.249

Date of Test : August 12, 2005

Test Engineer : Tiger Su

Reviewed By : 

PERPARED BY:
Shenzhen Academy Of Metrology and Quality Inspection EMC Laboratory
Bldg,of Metrology and Quality Inspection ,Longzhu Road ,Nanshan District ,Shenzhen ,Guangdong ,China

FCC Registration Number: 97379

2 Contents

3 Test Summary

Test	Test Requirement	Test Method	Class / Severity	Result
Radiated Emission (30MHz to 25GHz)	FCC PART 15: 2003	ANSI C63.4: 2003	Class B	PASS
Conducted Emission (150KHz to 30MHz)	FCC PART 15: 2003	ANSI C63.4:2003	Class B	N/A

4 General Information

4.1 Client Information

Applicant:	**Esel International Co. Ltd**
Address of Applicant:	Rm 15-17,5/F, Cardinal Ind,Bldg, No.17 On Lok Mun St., Fanling, N.T., HongKong

4.2 General Description of E.U.T.

Product description:	PS2 2.4G Wireless Controller
Model No.:	LM648

4.3 Details of E.U.T.

Power Supply:	3.0V 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 a PS2 2.4G Wireless Controller. The standards used were FCC 15 Paragraph 15.205, Paragraph 15.209, Paragraph 15.31,Paragraph 15.33, Paragraph 15.35, Paragraph 15.249.

4.6 Test Location

Bldg,of Metrology and Quality Inspection ,Longzhu Road ,Nanshan District ,Shenzhen ,Guangdong ,China

4.7 Test Facility

Name of Facility : Shenzhen Academy Of Metrology and Quality Inspection EMC Laboratory

Site Description : Nov.30,1998 accredited by China National Accreditation Committee for Laboratories Registration Number:0157

Apr.17,2000 files on
Federal communications Commission
Registration Number: 97379

Aug.11,2000 certificated by
TUV Rheinland Shenzhen

Nov.15,2001 Accepted by
Industry Canada

Registration Number:IC4174

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	Schaffner Chase	MNZ050D11	1421	06-11-2004	05-11-2005
3	EMI Test Receiver	Rohde & Schwarz	ESCS30	100038	05-11.2004	04-11-2005
	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	05-11-2004	04-11-2005
2	EMI Test Receiver	ROHDE & SCHWARZ	ESI 26	100009	05-11.2004	04-11-2005
3	EMI Test Receiver	ROHDE & SCHWARZ	ESCS30	100038	05-11.2004	04-11-2005
4	EMI Test Software	ROHDE & SCHWARZ	ES-K1	N/A	N/A	N/A
5	Bilog Type Antenna	ETS	2075	2346	05-11.2004	04-11-2005
6	Horn Antenna	ROHDE & SCHWARZ	HF906	1000029	05-11.2004	04-11-2005
7	Ultra-Broadband Antenna	ROHDE & SCHWARZ	HL562	100015	05-11.2004	04-11-2005
	Common Used Equipment					
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Series No.**	**Cal. Date**	**Due date**
1	Temperature, Humidity & Barometer	OREGON SCIENTIFIC	BA-888	EMC0001 to EMC0004	05-11-2004	04-11-2005
2	DMM	FLUKE	73	70681569 or 70671122	05-11.2004	04-11-2005

6 Conducted Emission Test

Product:	PS2 2.4G Wireless Controller / LM648
Test Requirement:	FCC Part15 Paragraph 15.207
Test Method:	Based on FCC Part15 Paragraph 15.207
Test Date:	----------
Frequency Range:	150kHz to 30MHz
Class:	Class B
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1 Test Equipment

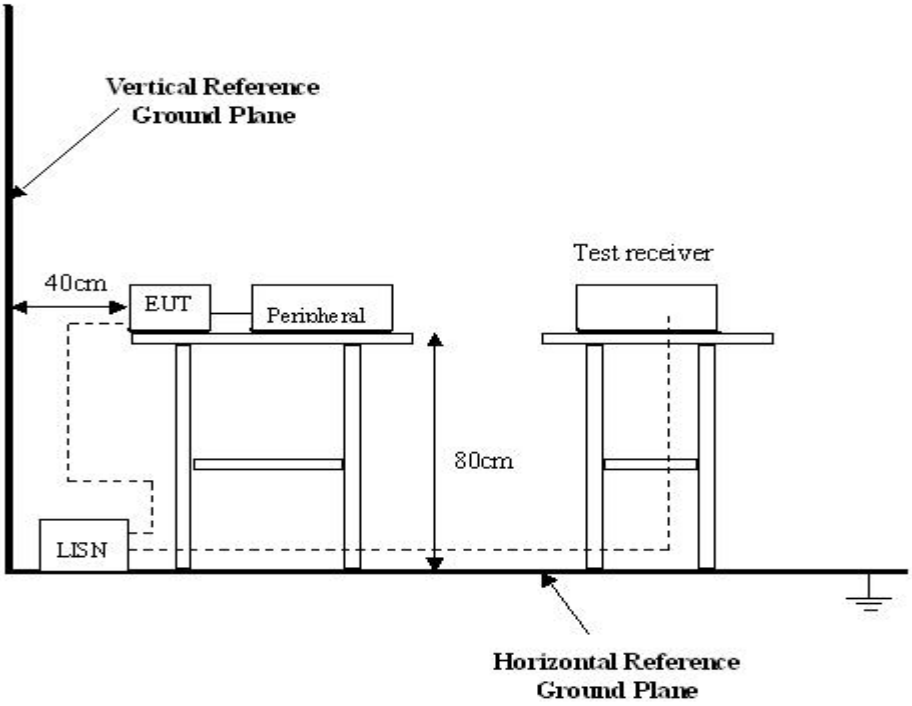
Please refer to Section 5 this report.

6.2 Test Procedure

1. The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.
2. The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.3 Conducted Test Setup

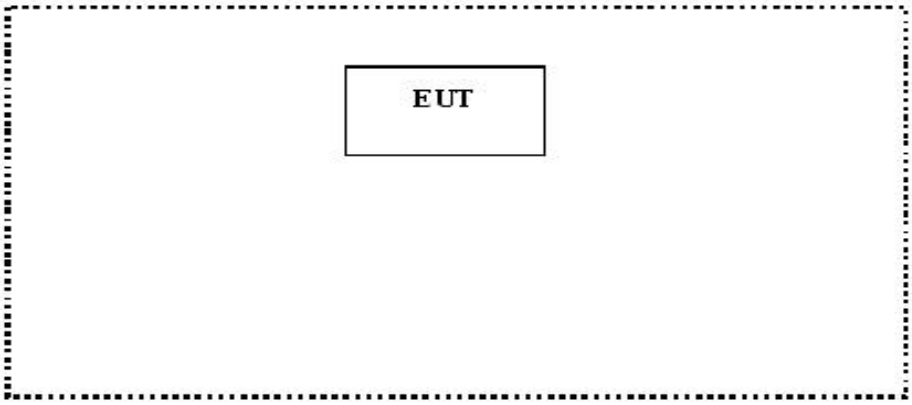
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.207 limits.



6.4 EUT Operating Condition

Operating condition is according to ANSI C63.4:2003.

A. Setup the EUT and simulators as shown on follow.
B. Enable RF signal and confirm EUT active.
C. Modulate output capacity of EUT up to specification.



6.5 Conducted Emission Limits

66-56 dBμV/m between 0.15MHz & 0.5MHz
56 dBμV/m between 0.5MHz & 5MHz
60 dBμV/m between 5MHz & 30MHz

Note: In the above limits, the tighter limit applies at the band edges.

6.6 Conducted Emission Test Result

Owing to the DC operation of EUT, this test is not performed.

7 Radiation Emission Test

Product:	PS2 2.4G Wireless Controller / LM648
Test Requirement:	FCC Part15 Paragraph 15.209 and Paragraph 15.249
Test Method:	Based on FCC Part15 Paragraph 15.33
Test Date:	August 12, 2005
Frequency Range:	30MHz to 25GHz
Measurement Distance:	3m
Detector:	Peak for pre-scan (120kHz resolution bandwidth)
	Quasi-Peak if maximised peak within 6dB of limit

7.1 Test Equipment

Please refer to Section 5 this report.

7.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

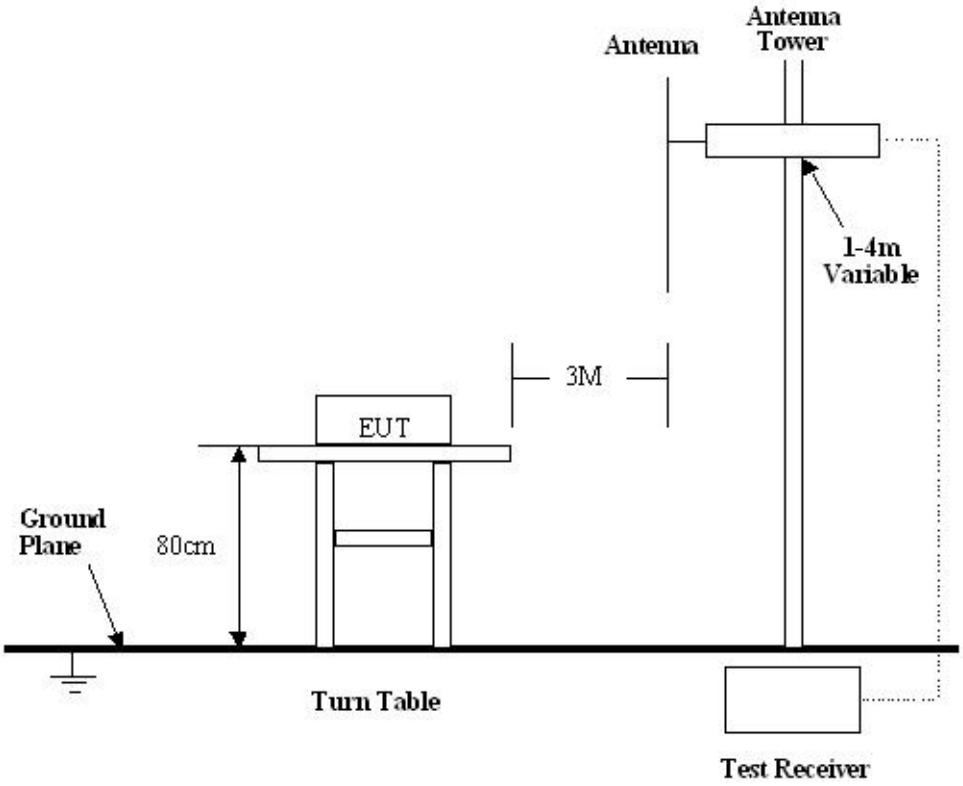
Based on ANSI C63.4:2003, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at SZHTW is +4.0 dB.

7.3 Test Procedure

1. For the radiated emissions test, since the EUT does not have a power source, there was no connection to AC outlets.
2. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT is compliant with all installation combinations.
3. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dBμV of specification limits), and are distinguished with a "Qp" in the data table.
4. The EUT was under normal mode during the final qualification test and the configuration was used to represent the worst case results.

7.4 Radiated Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4:2003, The specification used in this report was the FCC Part15 Paragraph 15.209 and Paragraph 15.249 limits.



7.5 Spectrum Analyzer Setup

According to FCC Part15 Paragraph 15.209 and Paragraph 15.249 Rules, the system was tested to 25000 MHz.

Start Frequency.....30 MHz
Stop Frequency .....25000 MHz
Sweep Speed Auto
IF Bandwidth .....100 kHz
Video Bandwidth .....1 MHz
Quasi-Peak Adapter Bandwidth .....120 kHz
Quasi-Peak Adapter Mode.....Normal
Resolution Bandwidth 1MHz

7.6 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Class B Limit

7.7 Summary of Test Results

According to the data in section 7.10, the EUT complied with the FCC Part15 Paragraph 15.209 and Paragraph 15.249 standards.

7.8 EUT Operating Condition

Same as section 6.4 of this report.

7.9 Radiated Emissions Limit

A. FCC Part 15 subpart C Paragraph 15.249 Limit

Fundamental Frequency	Field Strength of Fundamental		Field Strength of Harmonics	
	mV/m	dBuV/m	uV/m	dBuV/m
902-928MHz	50	94	500	54
2400-2483.5 MHz	50	94	500	54
5725-5875 MHz	50	94	500	54
24.0-24.25GHz	250	108	2500	68

Note: (1) RF Voltage(dBuV)=20 log RF Voltage(uV)

(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

(3)The emission limit in this paragraph is based on measurement instrumentaion employing an average detector.Measurement using instrumentation with a peak detector function,corresponding to 20dB above the maximum permitted average limit.

(4) Above 1GHz,do a Peak and average measurements for all emissions,Limit for peak is 74dBuvV/m,According to Part15.35(b) and average is 54BuvV/m.

B. Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency(MHZ)	Distance(m)	Field strength(dBuV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: (1) RF Voltage(dBuV)=20 log RF Voltage(uV)

(2) In the Above Table,the tighter limit applies at the band edges.

(3) Distance refers to the distance in meters between the measuring instrument antenna.

7.10 Radiated Emissions Test Result

Formula of conversion factors:the field strength at 3m was egtablished by adding
The meter reading of the spectrum analyer (which is set to read in units of dBuV)
To the antenna correction factor supplied by the antenna manufacturer. The antenna
Correction factors are stared in terms of dB.The gain of the pressletor was accounted
For in the spectrum analyser meter reading.

Example:

Freq(MHz)	Meter Reading +ACF=FS
33	20dBuV+10.36dB=30.36dBuV/m @3m

A. Fundamental Radiated Emission Data

Test Item:	Fundamental Radiated Emission Data
Test Voltage:	3V DC Battery
Test Mode:	TX On(TX Low/ TX Middle/ TX High)
Temperature:	24 °C
Humidity:	52%RH
Test Result:	PASS

1GHZ-25GHZ Radiated Emission Data

Frequency (MHz)	Antenna Polarization	Emission Level (dBuV/m)	FCC 15 Subpart C Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Turntable Angle (°)
Low frequency						
2421. 340681	Vertical	77.30	94.0	16.7	1.5	90
4842.195344	Vertical	46.20	54.0	7.8	1.5	45
7243.995145	Vertical	44.30	54.0	9.7	1.5	90
12086.356722	Vertical	41.40	54.0	12.6	1.5	45
2421. 340681	Horizontal	76.50	94.0	17.5	1.5	90
4842. 127441	Horizontal	42.50	54.0	11.5	1.5	180
7242.587022	Horizontal	41.80	54.0	12.2	1.5	45
12090.156831	Horizontal	40.50	54.0	13.5	1.5	90
Middle frequency						
2442.345754	Vertical	71.40	94.0	22.6	1.5	60
4884. 567134	Vertical	40.90	54.0	13.1	1.5	45
7322.428858	Vertical	39.40	54.0	14.6	1.5	90
12211.356762	Vertical	42.40	54.0	11.6	1.5	270
2442.345754	Horizontal	72.50	94.0	21.5	1.5	90
4884.567134	Horizontal	41.20	54.0	12.8	1.5	180
7325.735326	Horizontal	40.10	54.0	13.9	1.5	45
12209.509355	Horizontal	42.50	54.0	11.5	1.5	60
High frequency						
2474. 761723	Vertical	73.50	94.0	20.5	1.5	270
4948.882621	Vertical	40.40	54.0	13.6	1.5	60
7422.165398	Vertical	41.60	54.0	12.4	1.5	180
12369.457956	Vertical	43.90	54.0	10.1	1.5	90
2474. 761723	Horizontal	74.30	94.0	19.7	1.5	125
4948.543993	Horizontal	42.10	54.0	11.9	1.5	90
7423.737182	Horizontal	41.60	54.0	12.4	1.5	45
12368.095724	Horizontal	40.80	54.0	13.2	1.5	80

Note: (1) Above 1GHz,do a Peak and average measurements for all emissions,Limit for peak is 74dBuvV/m,According to Part15.35(b) and average is 54BuvV/m.

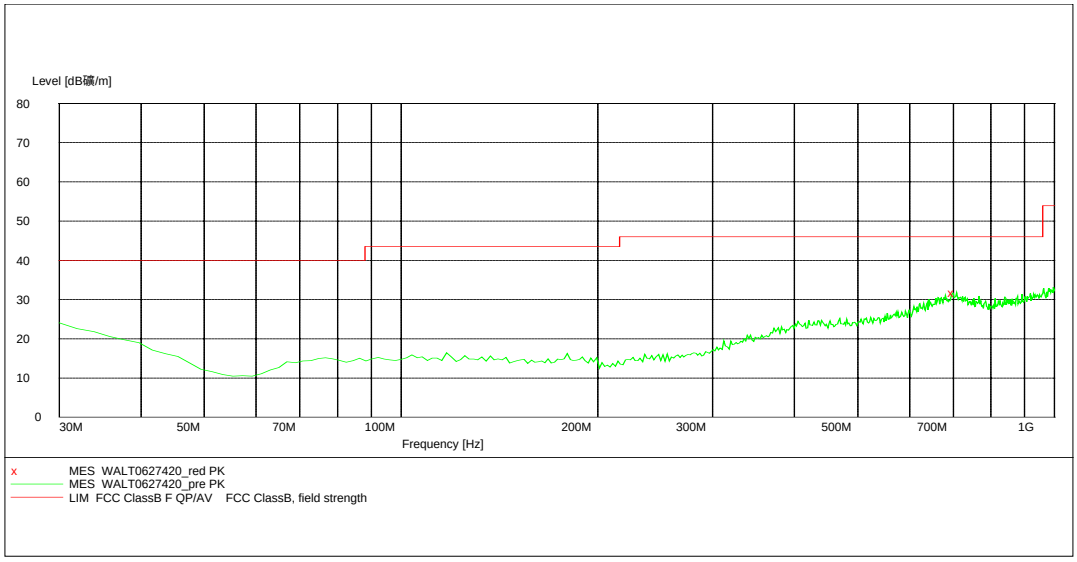
(2) Emission Level = Reading Level + Probe Factor + Cable Loss.

B. General Radiated Emission Data For 30MHZ-1GHZ

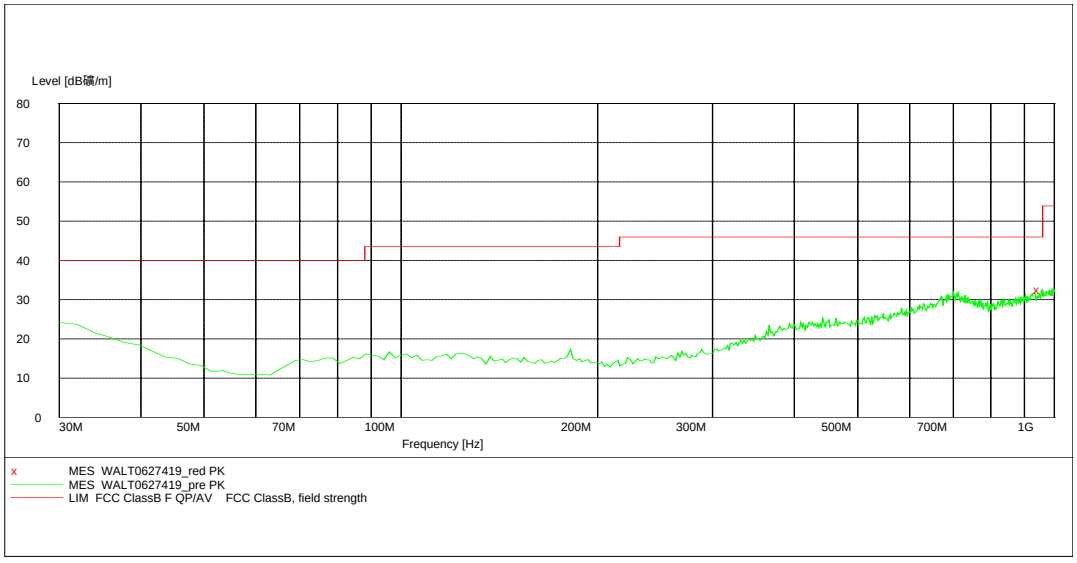
Test Item:	General Radiated Emission Data
Test Voltage:	3V DC Battery
Test Mode:	Tx On
Temperature:	24 °C
Humidity:	52%RH
Test Result:	PASS

Remarks:No significant emissions above the equipment noise floor were detected.

Horizontal:



Vertical:



8 Band Edge

8.1 Test Equipment

Please refer to Section 5 this report.

8.2 Test Procedure

1. The EUT, peripherals were put on the turntable which table size is 1mX1.5m, table high 0.8m. All set up is according to ANSI C63.4:2003.
2. With the EUT's antenna attached,The EUT's radiated emission power was received by the test antenna which was connected to the spectrum analyser with the START and STOP frequencies set to the EUT's operation band. Measurements were made at 3 meters.
3. The antenna high were varied from 1m to 4m high to find the maximum emission for each frequency.
4. Maximizing procedure was performed on the highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak reading was performed only when an emission was found to be marginal (within -4 dBμV of specification limits), and are distinguished with a "QP" in the data table.
5. The antenna polarization: Vertical polarization and horizontal polarization.

8.3 EUT Operation

Same as section 6.4 of this report.

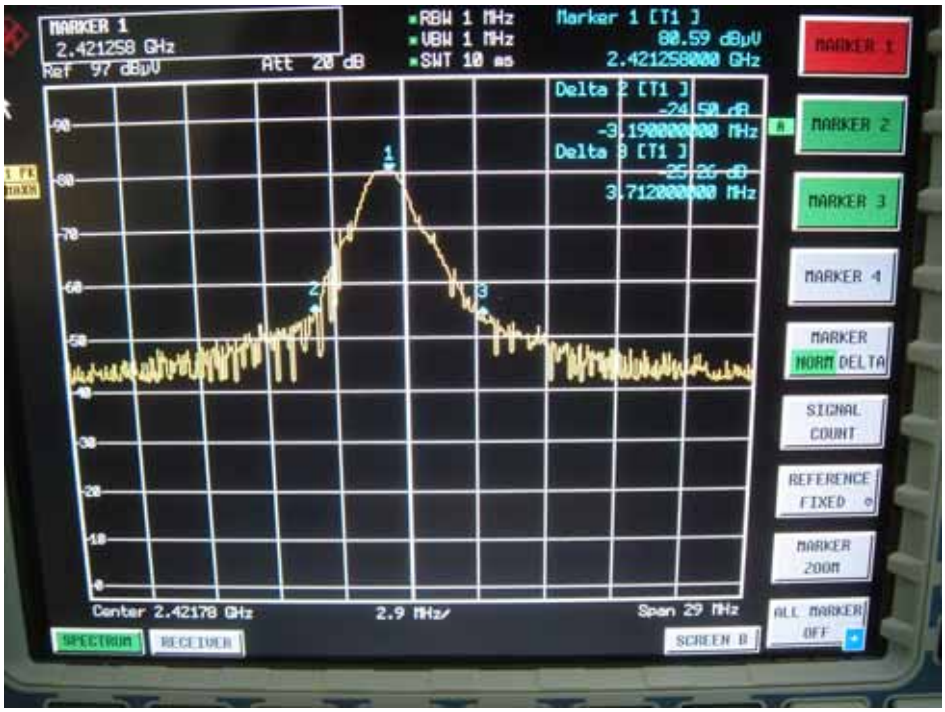
8.4 Band Edge

Requirements:FCC 15.249(c),The emission power at the START and STOP frequencies shall be at least 50dB below the level of the fundamental or to the general radiated emission limits in FCC 15.209.

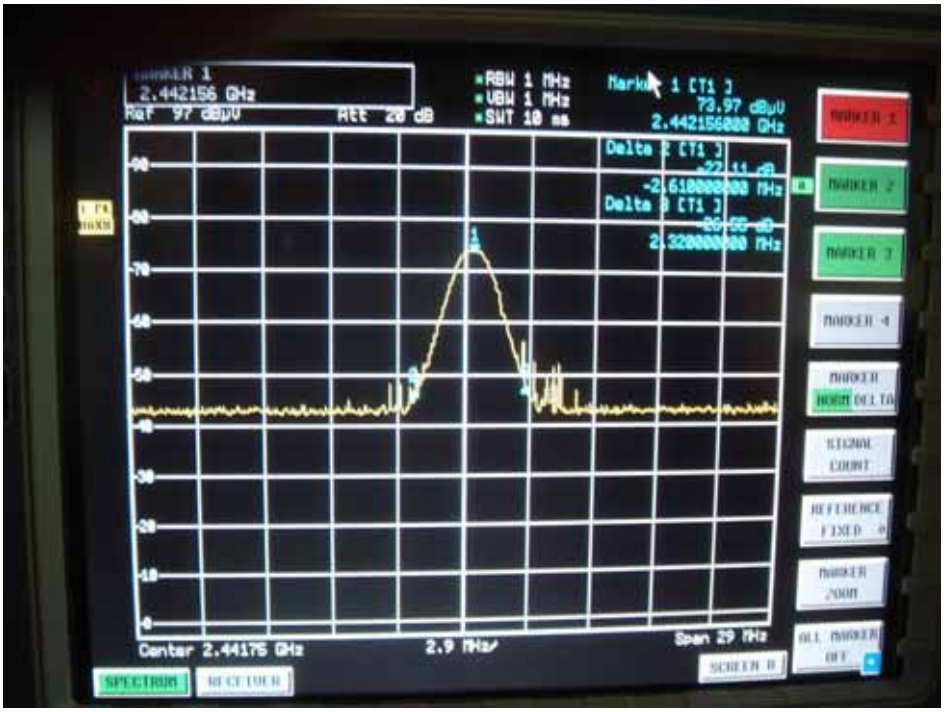
8.5 Band Edge Test Result

Product:	PS2 2.4G Wireless Controller / LM648
Test Item:	Band Edge Test
Test Voltage:	3VDC Battery
Test Mode:	TX On(TX Low/ TX Middle/ TX High)
Temperature:	24 °C
Humidity:	52%RH

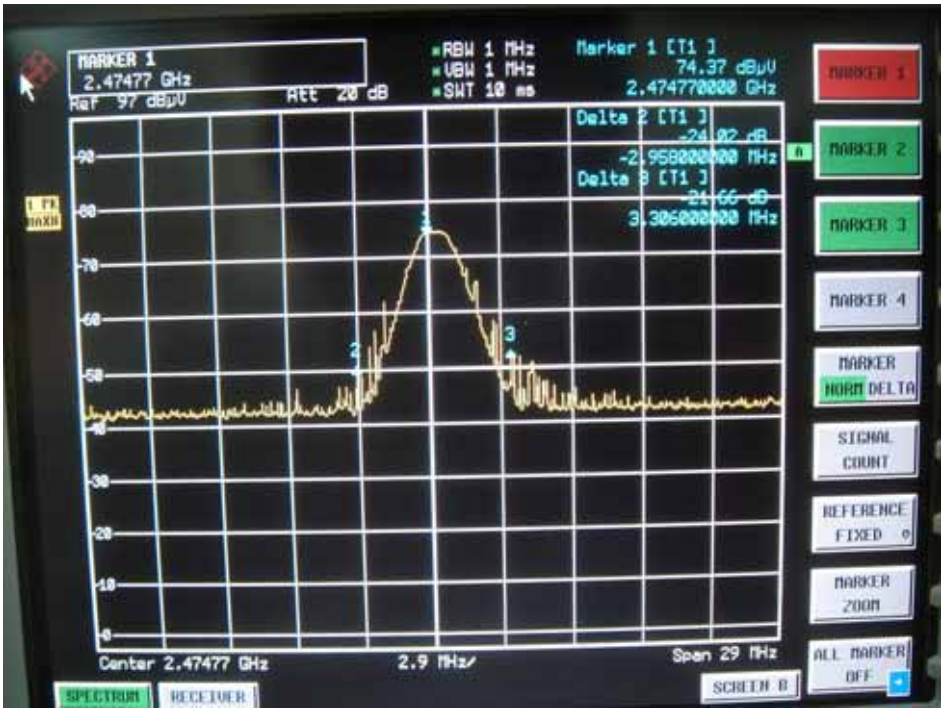
TX Low



TX Middle



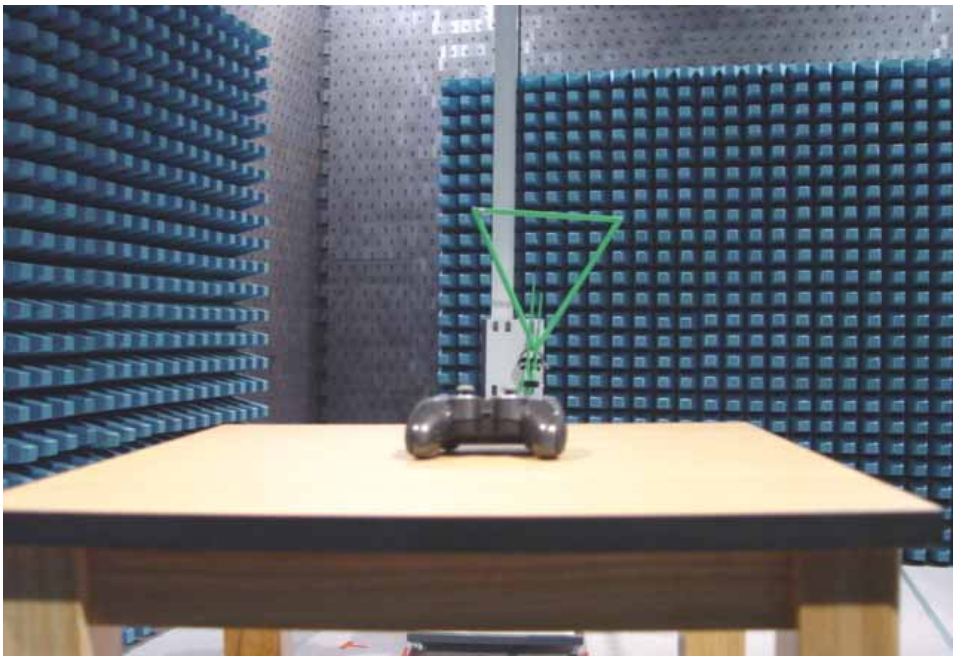
TX High

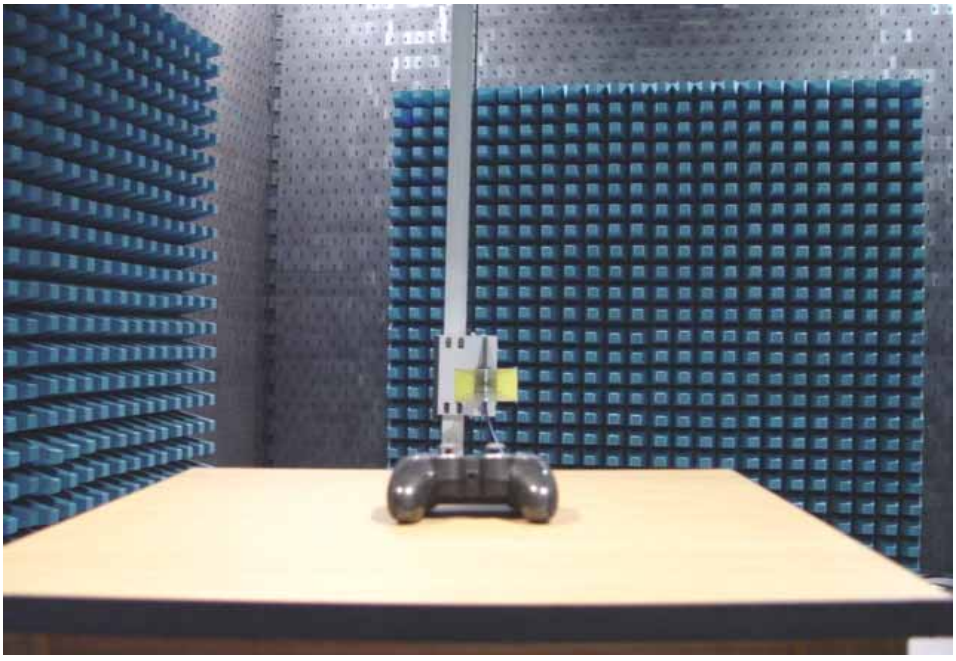


Note: (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.249.

9 Photographs of Testing

9.1 Radiation Emission Test View



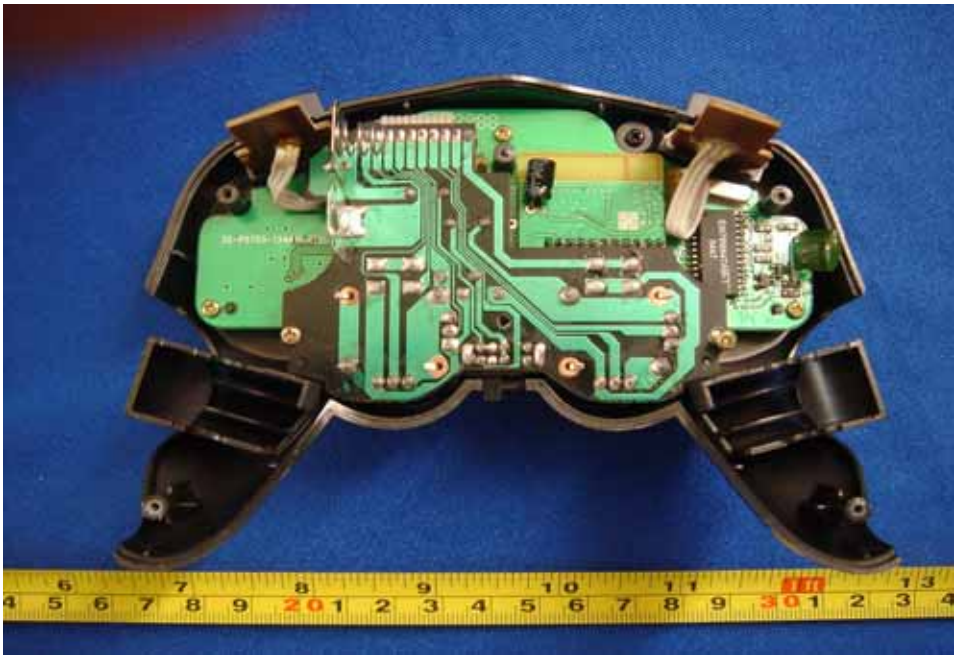


10 Photographs - Constructional Details

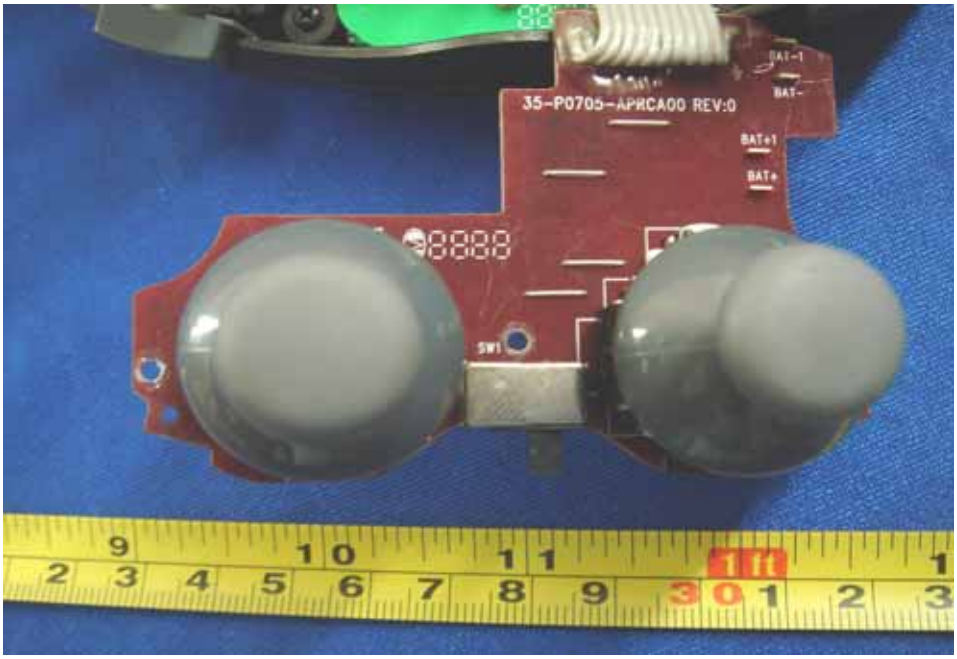
10.1 EUT - Front View

10.2 EUT - Back View

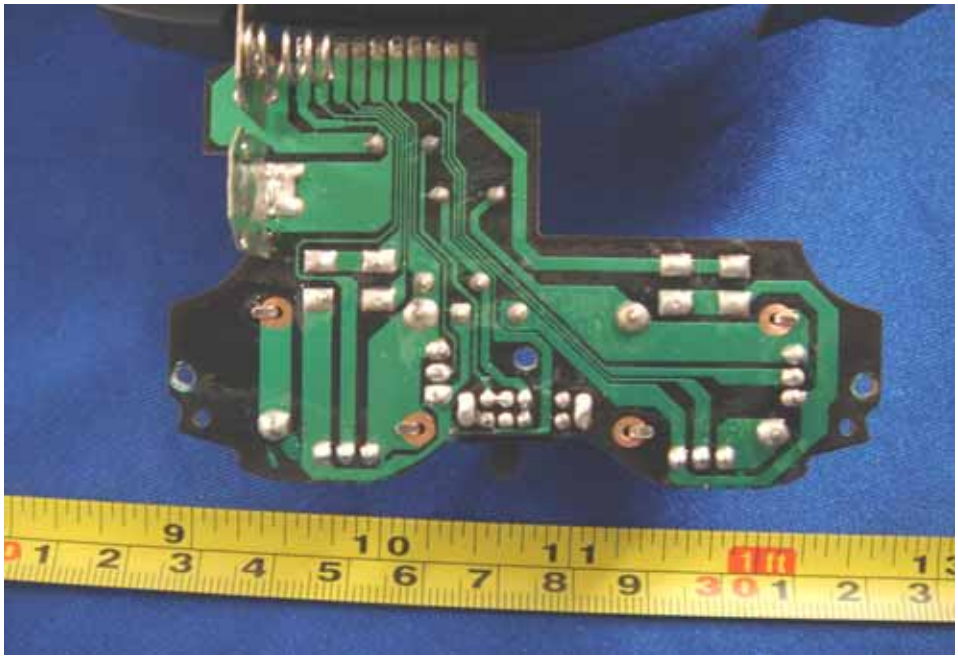
10.3 Tx PCB - Component View



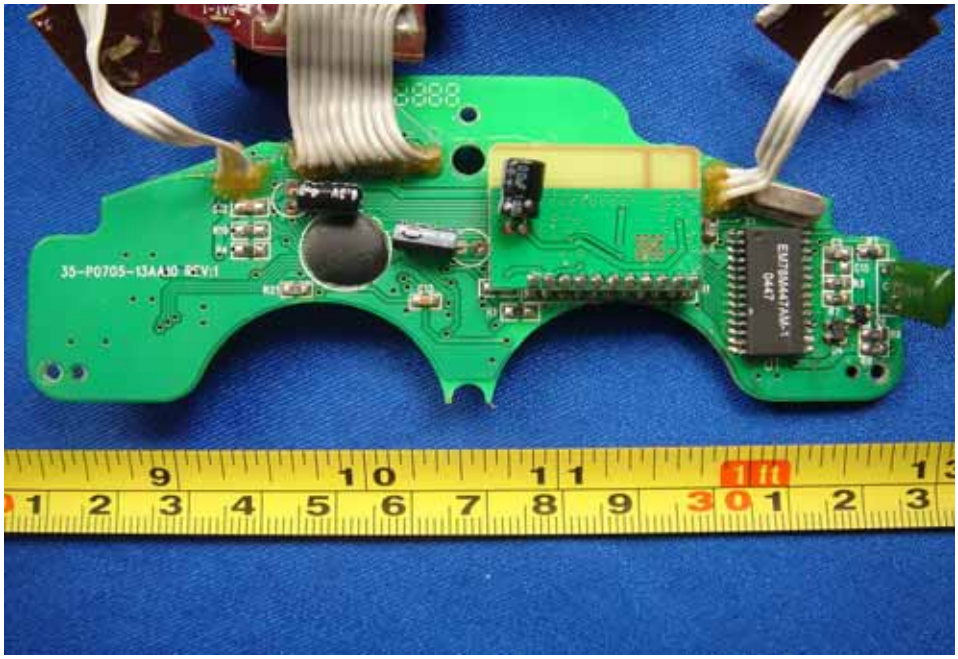
10.4 Tx PCB 1- Front View



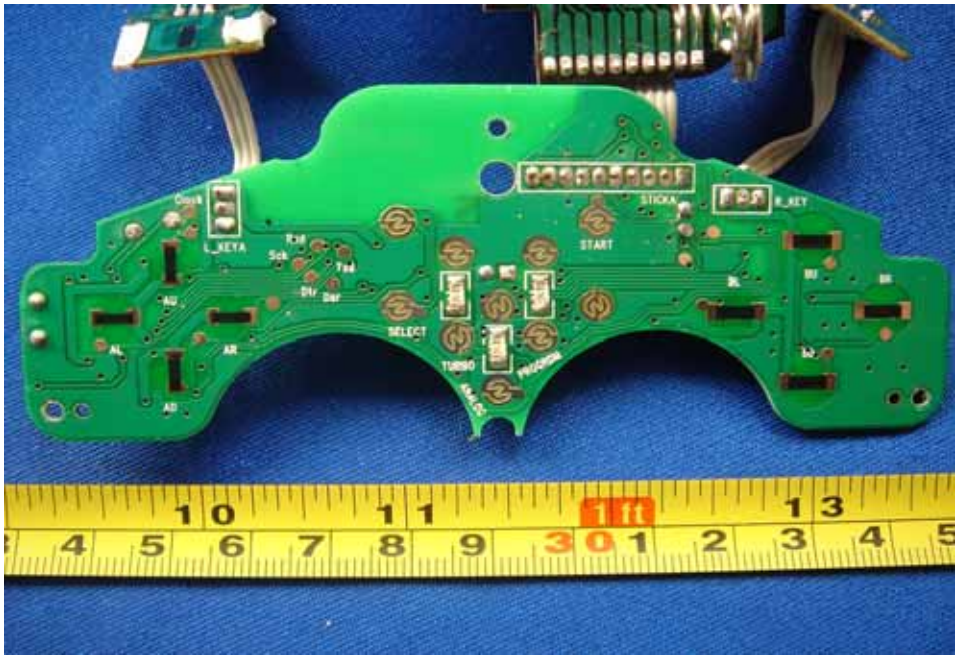
10.5 Tx PCB 1- Back View



10.6 Tx PCB 2- Front View



10.7 Tx PCB 2- Back View



11 FCC ID Label

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference,and (2) this device must accept any interference received, including interference that may cause undesired operation

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 Bottom View/proposed FCC Mark Location