

FCC TEST REPORT

Under
FCC 15 Subpart C, Paragraph 15.249: 2002

Prepared For :

SATOW ELECTRONIC CO., LTD

WEIXING BLDG, HUADA INDUSTRIAL PARK, WEST REN MIN RD.,
ZHUHAI CHINA

FCC ID: PTN00899

**EUT: 2.4GHz Wireless
TV& Monitor Sytem**

Model: 00899

April 6, 2004

Report Type: Original Report

Test Engineer: Peter Lin

Test Date: March 14, 2004


Review By: Apollo Liu / Manager

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1. General Information

1.1 Notes

The test results of this report relate exclusively to the test item specified in 1.5. The KMO Lab does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the KMO Lab.

1.2 Testing Laboratory

Ke Mei Ou Laboratory Co., Ltd.

7A, Jiaxiangge, Jiahuixincheng, No.3027, Shennan Rd., Futian, Shenzhen, Guangdong, P.R.China.

Tel: +86 755 83642690 Fax: +86 755 83297077

Email: kmo@kmolab.com

Internet: www.kmolab.com

Site on File with the Federal Communications Commission – United States

Registration Number: 125782

For 3 & 10 meter OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC4986

For 3 & 10 meter OATS

1.3 Details of Applicant

Name : Satow Electronic Co., Ltd.
Address : Weixing Bldg., Huada Industrial Park, West Ren Min Rd., Zhuhai China
Contact : Tang Li Wen / Vice General Manager
Tel : + 86 756 8510653
Fax : + 86 756 8639098

1.4 Application Details

Date of Receipt of Application : March 12, 2004
Date of Receipt of Test Item : March 12, 2004
Date of Test : March 14, 2004

1.5 Test Item

Manufacturer : See Applicant
Trade Name : Homeland, SATOW
Model No. : 00899 / 01899, LEE-552BTW/243BAL, LEE-552BTW/243BAL-II
Description : 2.4GHz Wireless TV & Monitor System

Additional Information

Frequency : 2414MHz~2468MHz
Maximum Range : N/A
Number of Channels : 3
Transmitter Antenna : N/A
Power Supply : DC 9V
Current Consumption : 300 mA

1. 6 Test Standards

FCC 15 Subpart C, Paragraph 15.249: 2002
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Note: All radiated measurements were made in all three orthogonal planes. The values reported are the maximum values.

2. Technical Test

2.1 Summary of Test Results

The EUT has been tested according to the following specifications:

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.207	Conducted Test	PASS	Minimum passing margin is -21.2/-28.1 dB at 0.410 MHz Neutral
FCC Part 15 Subpart C Paragraph 15.249(a) and 15.249(b) Limit	Field Strength of Fundamental	PASS	Minimum passing margin is -21.90 dB at 2414 MHz Horizontal
FCC Part 15, Paragraph 15.209	Radiated Test	PASS	Complies
FCC Part 15 Subpart C Paragraph 15.249(d) Limit	Measured Band Edges	PASS	Complies.

3. EUT Modifications

No modification by Ke Mei Ou Laboratory Co., Ltd.

4. Conducted Power Line Test

4.1 Test Equipment

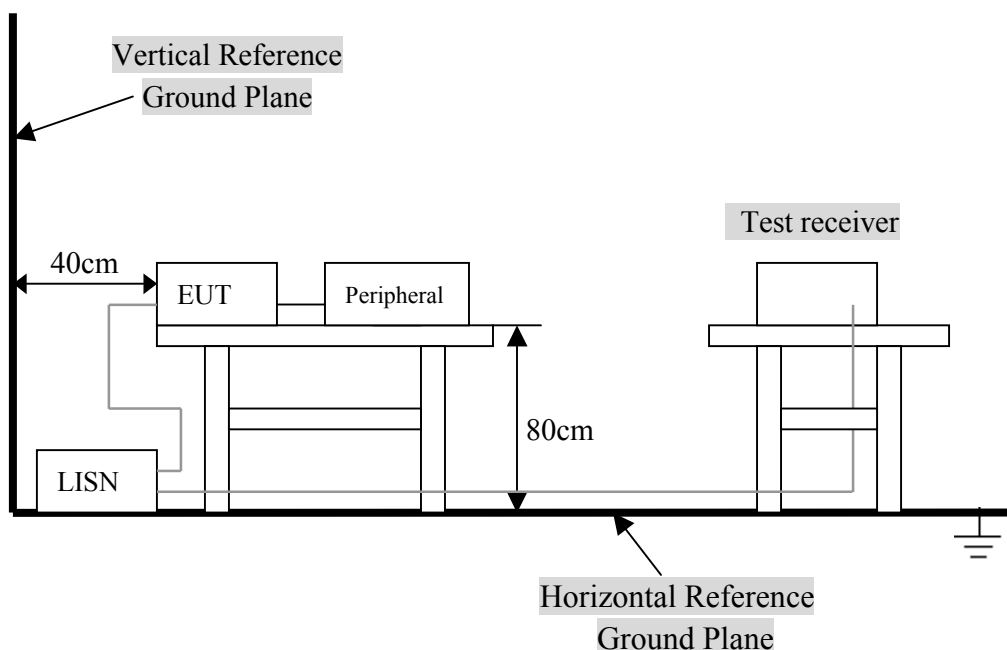
Please refer to Section 10 this report.

4.2 Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission., the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:2001 on conducted measurement. Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

4.3 Test Setup



For the actual test configuration, Please refer to the related items – Photos of Testing.

4.4 Configuration of the EUT

The EUT was configured according to ANSI C63.4-2001. EUT was used DC 9V (Power by Class 2 Adaptor). The operation frequency is from 2400MHz~2483.5MHz. Enable the signal transmitted from the external antenna from EUT to receiver. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

Note:

- 1) Below 1GHz, the channel 1, 2 and 3 were pre-tested, The channel 1, worst case one, was chosen for conducted and radiated emission test.
- 2) Above 1GHz, the channel 1, 2 and 3 were tested individually.

A. EUT

Device	Manufacturer	Model #	FCC ID
2.4GHz Wireless TV & Monitor System	Satow Electronic Co., Ltd.	00899	PTN00899

B. Internal Devices

Device	Manufacturer	Model #	FCC ID
N/A			

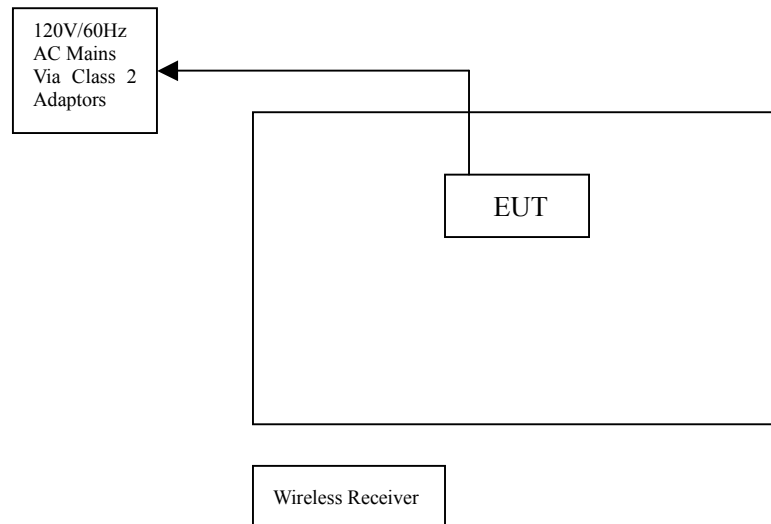
C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
Wireless Receiver	Satow Electronic Co., Ltd.	LEE-552BTW	N/A	N/A

4. 5 EUT Operating Condition

Operating condition is according to ANSI C63.4 - 2001.

- 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.



4. 6 Conducted Power Line Emission Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency Range (MHz)	Class A QP/AV	Class B QP/AV
0.15 – 0.5	79/66	66-56/56-46
0.5 – 5.0	73/60	56/46
5.0 - 30	73/60	60/50

NOTE : In the above table, the tighter limit applies at the band edges.

4. 7 Conducted Power Line Test Result

Product	: 2.4GHz Wireless TV & Monitor System	Test Mode	: CH1
Test Item	: Conducted Emission Data	Temperature	: 25 °C
Test Voltage	: DC 9V (Power by Class 2 Adaptor)	Humidity	: 56%RH
Test Result	: PASS		

The frequency spectrum from 0.15 MHz to 30 MHz was investigated. All readings are quasi -peak values with a resolution bandwidth of 9 KHz.

- Temperature : 26 °C
- Humidity : 53 % RH

CH1: 2414MHz

FCC Part 15 Paragraph 15.207				
Frequency (MHz)	Emission Level QP/AV (dBuV)	LINE/ NEUTRAL	Limit (dBuV) QP/AV	Margin (dB) QP/AV
0.174	40.22/22.31	LINE	64.96/54.96	-24.7/-32.7
0.162	41.06/22.80	NEUTRAL	65.46/55.46	-24.4/-32.7
0.254	37.37/21.91	LINE	61.76/51.76	-24.4/-29.9
0.410	36.43/19.52	NEUTRAL	57.65/47.65	-21.2/-28.1
0.354	34.88/19.56	LINE	58.96/48.96	-24.1/-29.4
0.454	35.39/19.34	NEUTRAL	56.88/46.88	-21.5/-27.5

Note:

- 1.Uncertainty in conducted emission measured is <+/- 2dB.
- 2.The emission levels of other frequencies were very low against the limit.
- 3.All Reading Levels are Quasi-Peak and Average value.
- 4.Emission = Meter Reading + Factor; Factor = Insertion Loss + Cable Loss.
- 5.Margin Value = Emission Level - Limit Value.

Conducted Emission**EN55022**

EUT: 2.4GHz Wireless TV & Monitor System M/N: 00899

Manufacturer: Satow Electronic Co., Ltd

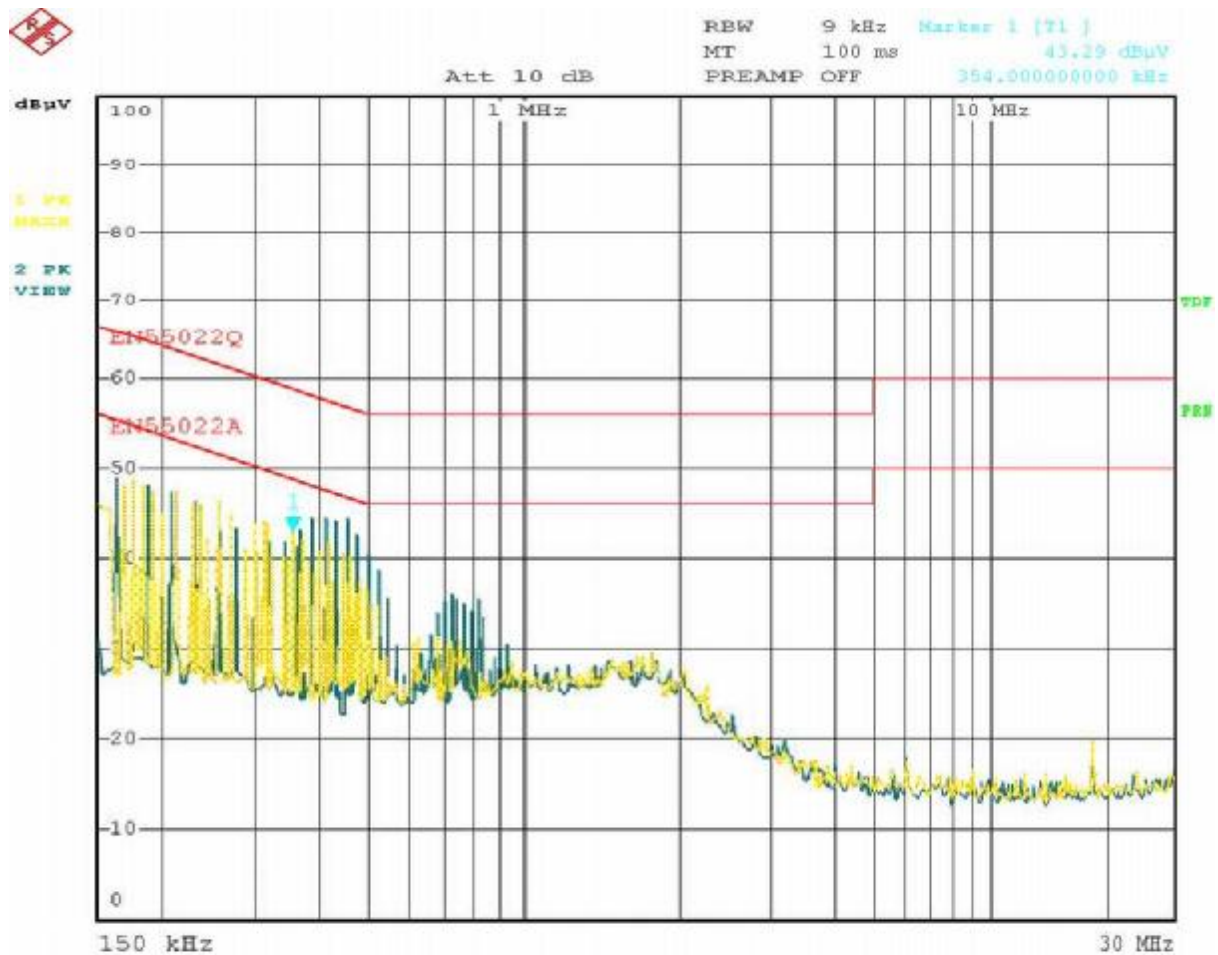
Operating Condition: Transmitter

Test Site: Ke Mei Ou Laboratory

Operator: Peter Lin

Test Specification: LINE&NEUTRAL

Comment:



Date: 14.MAR.2004 20:21:07

5. Radiated Emission Test

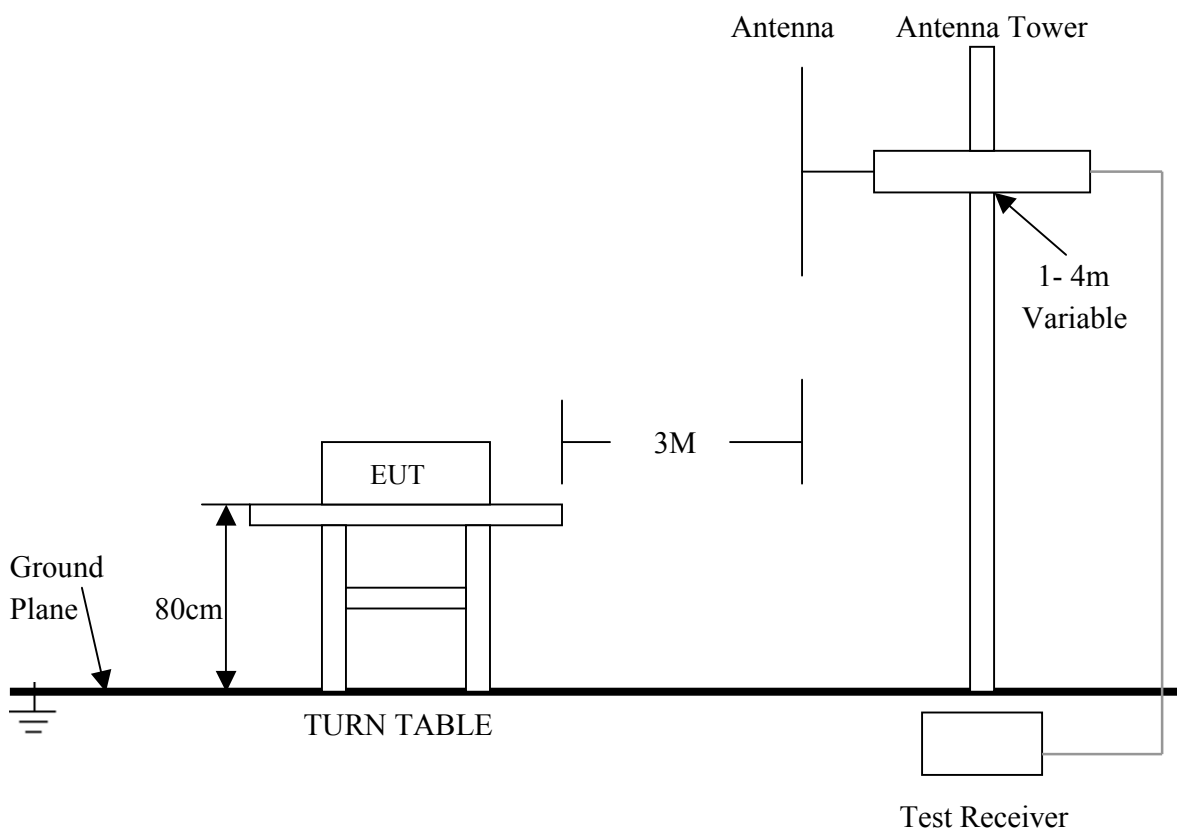
5.1 Test Equipment

Please refer to Section 10 this report.

5.2 Test Procedure

1. The EUT was tested according to ANSI C63.4 - 2001. The radiated test was performed at Ke Mei Ou Laboratory .This site is on file with the FCC laboratory division, Registration No. 125782.
2. The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2001.
3. The frequency spectrum from 30 MHz to 1 GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 KHz. All readings are above 1 GHz , peak values with a resolution bandwidth of 1 MHz . Measurements were made at 3 meters.
4. The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
5. Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. 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 dB of specification limit), and are distinguished with a "QP" in the data table.
6. The antenna polarization: Vertical polarization and Horizontal polarization.

5.3 Radiated Test Setup



For the actual test configuration, please refer to the related items – Photos of Testing.

5.4 Configuration of the EUT

Same as section 4.4 of this report

5.5 EUT Operating Condition

Same as section 4.5 of this report.

5.6 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below :

A. FCC Part 15 Subpart C Paragraph 15.249(a) Limit

Fundamental Frequency (MHz)	Field Strength of Fundamental (3m)		Field Strength of Harmonics (3m)		
	mV/m	dBuV/m		uV/m	dBuV/m
902~928	50	94(Average)	114(Peak)	500	54(Average) 74(Peak)
2400~2493.5	50	94(Average)	114(Peak)	500	54(Average) 74(Peak)

- 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 instrumentation employing an average detector. Measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

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 and the closed point of any part of the device or system.

5. 7 Radiated Emission Test Result

A. Fundamental Radiated Emission Data

Product : 2.4GHz Wireless TV & Monitor System Test Mode : CH1~CH3
 Test Item : Fundamental Radiated Emission Data Temperature : 25 °C
 Test Voltage : DC 9 (Power by Class 2 Adaptor) Humidity : 56%RH
 Test Result : **PASS**

CH1

Freq. (GHz)	Emission (dBuV/m) Peak Detector	HORIZ /VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
2.414	92.10	HORIZ	114 / 94	-21.90
2.414	90.21	VERT	114 / 94	-23.79

CH2

Freq. (GHz)	Emission (dBuV/m) Peak Detector	HORIZ /VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
2.432	91.04	HORIZ	114 / 94	-22.96
2.432	90.10	VERT	114 / 94	-23.90

CH3

Freq. (GHz)	Emission (dBuV/m) Peak Detector	HORIZ /VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
2.468	91.34	HORIZ	114 / 94	-22.66
2.468	90.68	VERT	114 / 94	-23.32

- Note:**
- (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
 - (2) Emission Level = Reading Level + Probe Factor + Cable Loss.
 - (3) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

B. Harmonics Radiated Emission Data

Product : 2.4GHz Wireless TV & Monitor System Test Mode : CH1~CH3
 Test Item : Harmonics Radiated Emission Data Temperature : 25 °C
 Test Voltage : DC 9V (Power by Class 2 Adaptor) Humidity : 56%RH
 Test Result : **PASS**

CH1: 2414MHz

Freq. (MHz)	Emission (dBuV/m) Peak Detector	HORIZ / VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
4828.0	51.1	HORZ	74.0 / 54.0	-22.9
4828.0	49.8	VERT	74.0 / 54.0	-24.2
7242.0	42.3	HORZ	74.0 / 54.0	-31.7
7242.0	40.1	VERT	74.0 / 54.0	-33.9
9656.0	38.7	HORZ	74.0 / 54.0	-35.3
9656.0	37.2	VERT	74.0 / 54.0	-36.8

CH2: 2432MHz

Freq. (MHz)	Emission (dBuV/m) Peak Detector	HORIZ / VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
4864.0	49.3	HORZ	74.0 / 54.0	-24.7
4864.0	48.1	VERT	74.0 / 54.0	-25.9
7296.0	42.2	HORZ	74.0 / 54.0	-31.8
7296.0	40.8	VERT	74.0 / 54.0	-33.2
9727.9	35.7	HORZ	74.0 / 54.0	-38.3
9727.9	35.0	VERT	74.0 / 54.0	-39.0

CH3: 2468MHz

Freq. (MHz)	Emission (dBuV/m) Peak Detector	HORIZ / VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
4936.0	49.2	HORZ	74.0 / 54.0	-4.8
4936.0	48.6	VERT	74.0 / 54.0	-5.4
7404.2	43.4	HORZ	74.0 / 54.0	-10.6
7404.2	42.1	VERT	74.0 / 54.0	-11.9
9872.1	37.6	HORZ	74.0 / 54.0	-16.4
9872.1	35.7	VERT	74.0 / 54.0	-18.3

- Note:**
- (1) All Reading Levels below 1GHz are Quasi-Peak, above are peak and average value.
 - (2) Emission Level = Reading Level + Probe Factor + Cable Loss.
 - (3) Receiver setting (Peak Detector) : RBW=1MHz; VBW=1MHz; Span=100MHz
 - (4) Receiver setting (AVG Detector): RBW=1MHz; VBW=30Hz; Span=20MHz
 - (5) The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

C. General Radiated Emission Data

Product	: 2.4GHz Wireless TV & Monitor System	Test Mode	: CH1
Test Item	: General Radiated Emission Data	Temperature	: 25 °C
Test Voltage	: DC 9V (Power by Class 2 Adaptor)	Humidity	: 56%RH
Test Result	: PASS		

CH1: 2414MHz

Freq. (MHz)	Emission (dBuV/m) QP Detector	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
36.869	26.8	HORIZ	40.0	-13.2
36.869	24.6	VERT	40.0	-15.4
43.026	27.6	HORIZ	40.0	-12.4
43.026	25.4	VERT	40.0	-14.6
55.032	21.8	HORIZ	40.0	-18.2
55.037	21.6	VERT	40.0	-18.4
150.000	19.6	HORZ	43.5	-23.9
150.000	19.3	VERT	43.5	-24.2
250.000	18.2	HORZ	46.0	-27.8
250.000	18.1	VERT	46.0	-27.9
800.000	20.3	HORZ	46.0	-25.7
800.000	20.0	VERT	46.0	-26.0

- Note:**
- (1) All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
 - (2) Emission Level = Reading Level + Probe Factor + Cable Loss.

6. Band Edge

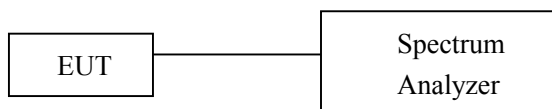
6.1 Test Equipment

Please refer to Section 10 this report.

6.2 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instruments. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Measure the highest amplitude appearing on spectral display and set it as reference level. Plot the graph with marking the highest point and edge frequency.
4. Repeat above procedures until all measured frequencies were complete.

6.3 Test Setup



6.4 Configuration of The EUT

Same as section 4 . 4 of this report

6.5 EUT Operating Condition

Same as section 4 . 5 of this report.

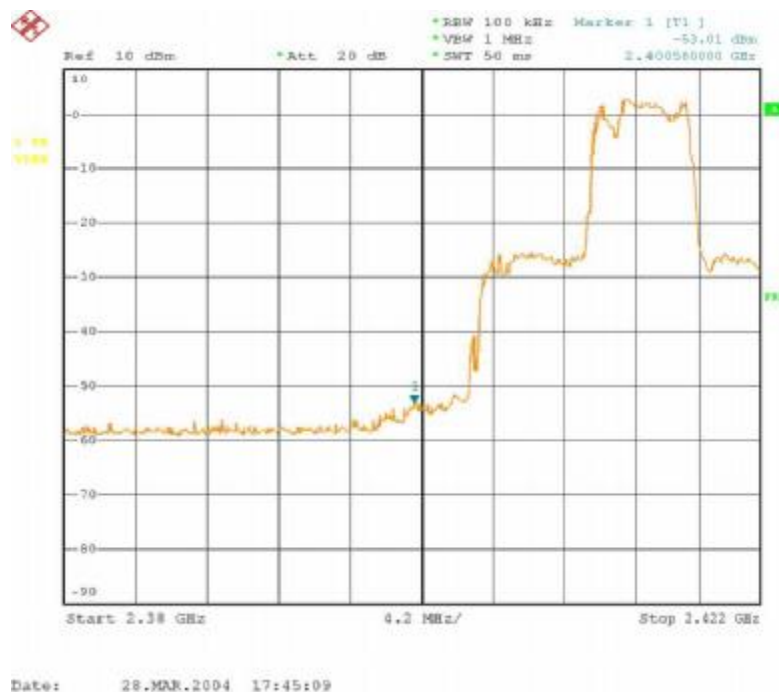
6.6 Band Edge FCC 15.249(d) Limit

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

6.7 Band Edge Test Result

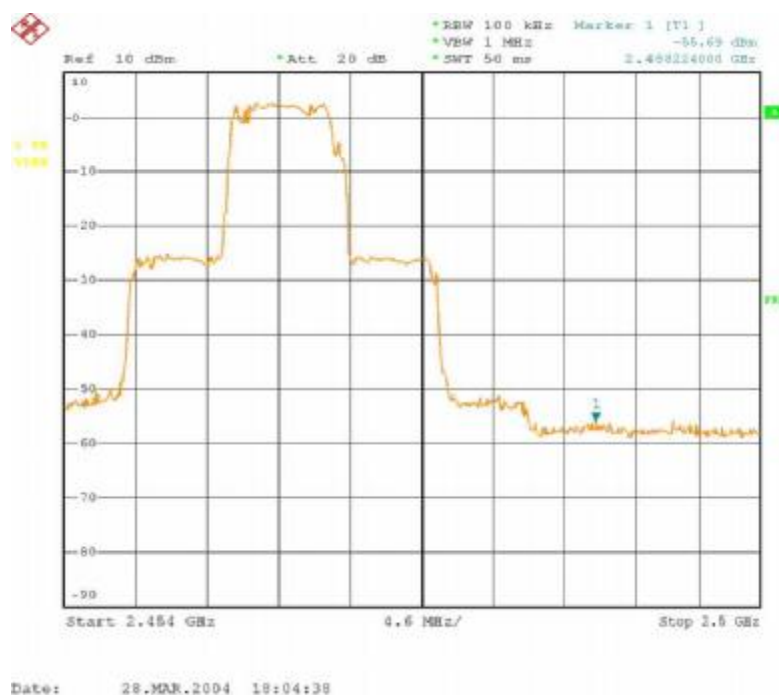
Product	: 2.4GHz Wireless TV & Monitor System	Test Mode	: CH1, CH3
Test Item	: Band Edge Data	Temperature	: 25 °C
Test Voltage	: DC 9V (Power by Class 2 Adaptor)	Humidity	: 56%RH
Test Result	: PASS		

CH1: 2414MHz



Note: Lower band edge: Emission radiated outside of the lower band edge are attenuated by at least 50dB below the level of the fundamental. The maximum is -53.01dBm at 2.4058GHz which complies with the limits.

CH3: 2468MHz



Note: Upper band edge: Emission radiated outside of the upper band edge are attenuated by at least 50dB below the level of the fundamental. The maximum is -55.69dBm at 2.4822GHz which complies with the limits.

7. Antenna Requirement

According to Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

The EUT's antenna is integrated on the Main PCB, no consideration of replacement.

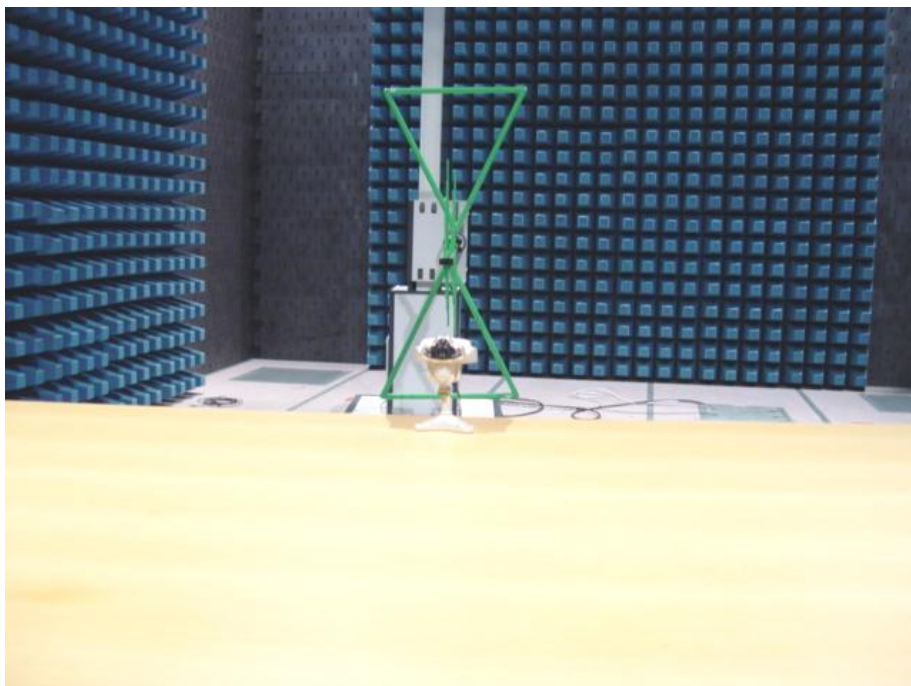
8. Photos of Testing

8.1 EUT Test Photographs

Conducted emission test view



Radiated emission test view



8.2 EUT Detailed Photographs

EUT top view

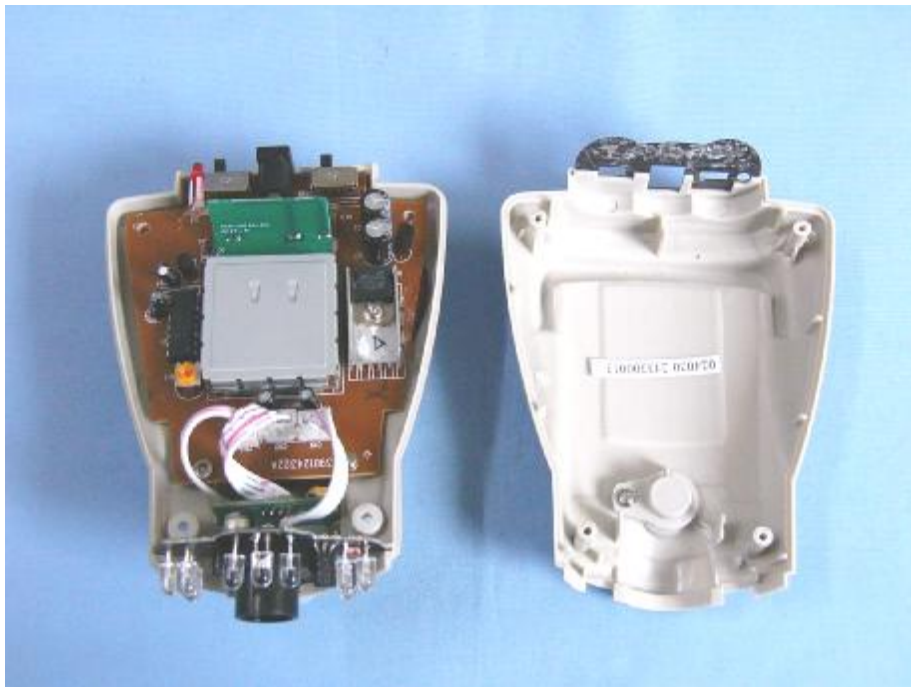


EUT bottom view

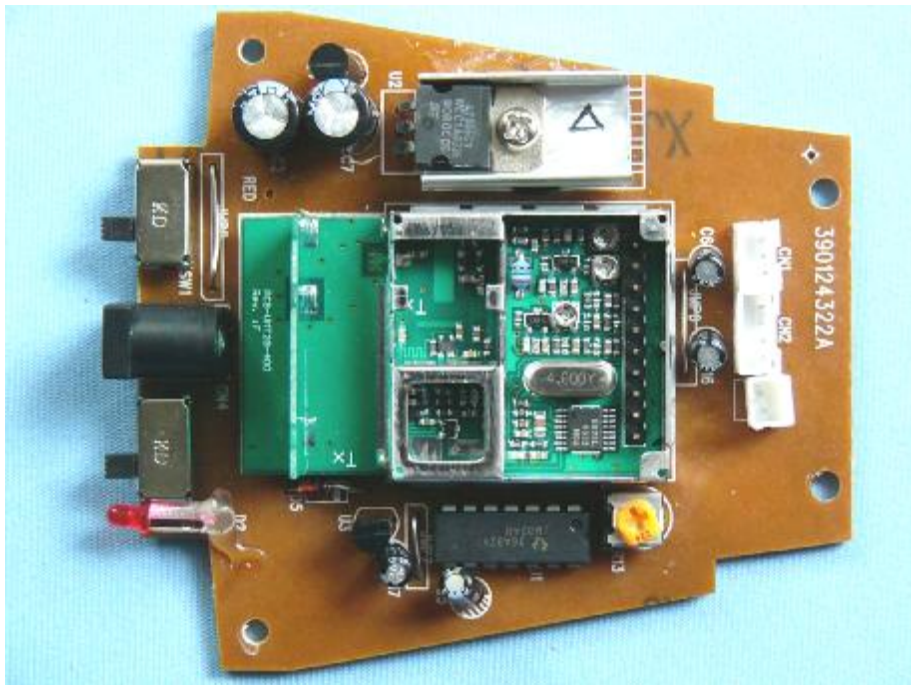
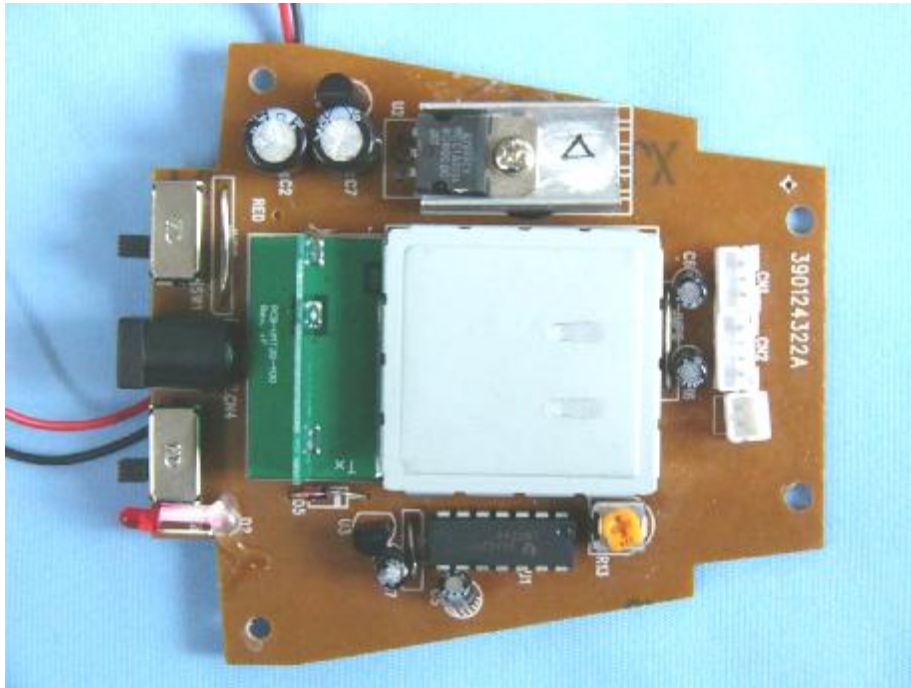


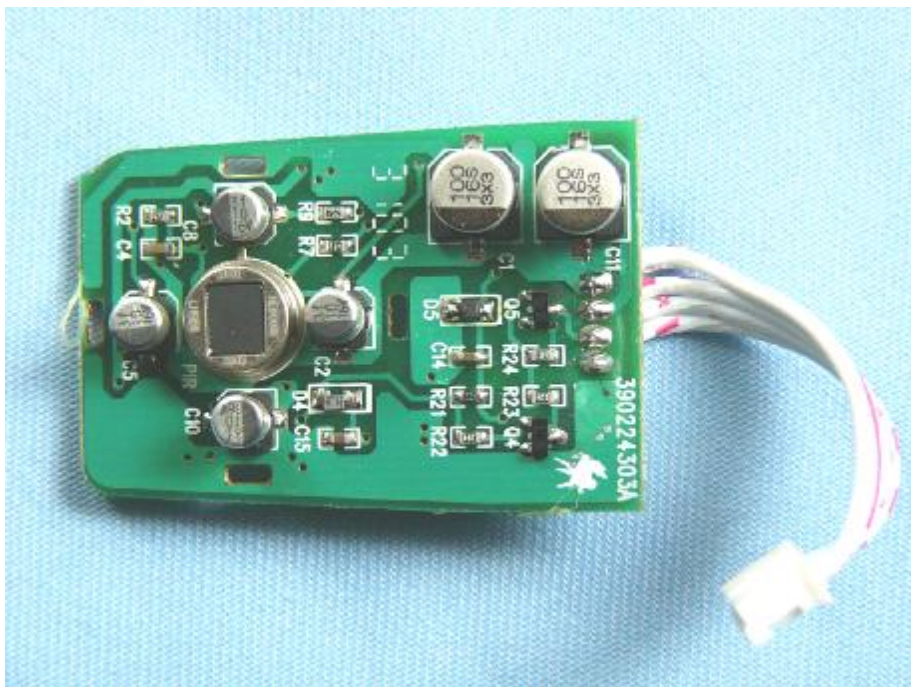


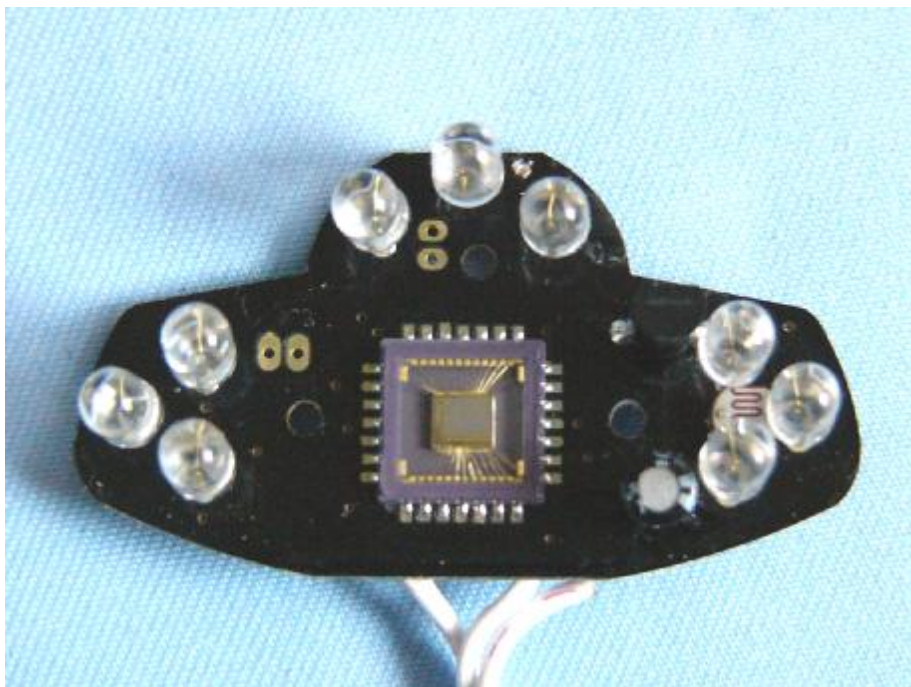
EUT inside whole view



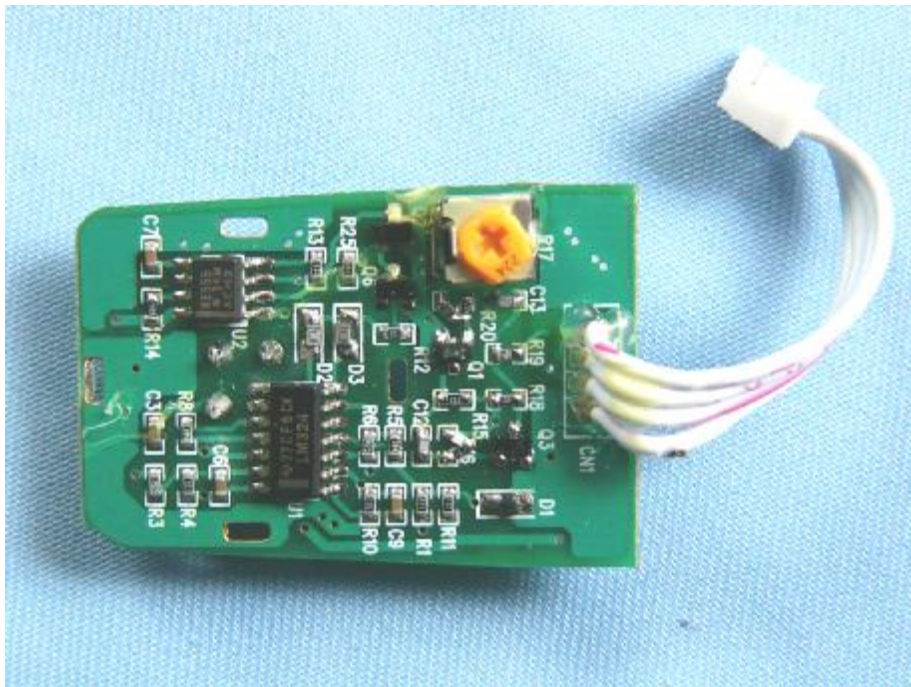
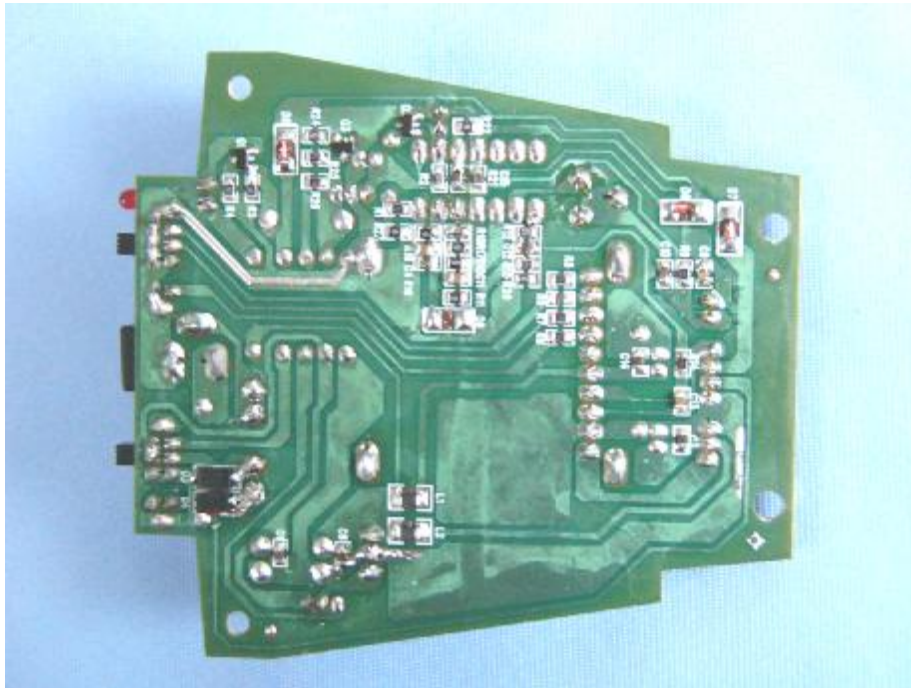
Main board component side

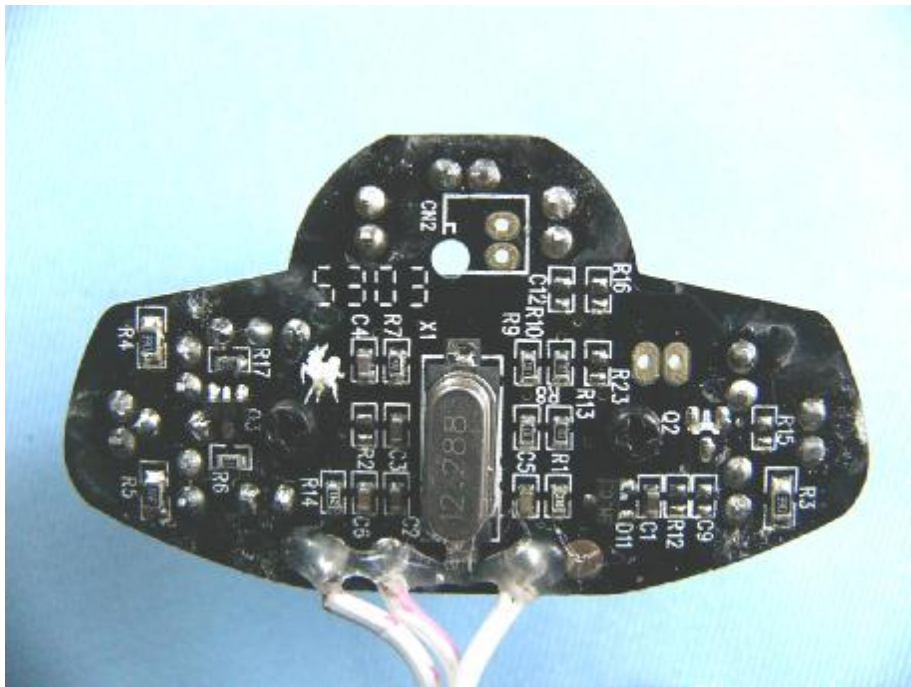






Main board solder side





9. FCC ID Label

FCC ID: PTN00899

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 label. 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 ID Label Location



10. Test Equipment

The following test equipments were used during the radiated & conducted emission test:

Equipment/ Facilities	Manufacturer	Model #	Serial No.	Date of Cal.	Due Date
Turntable	KMO	KSZ001T	200306	NCR	NCR
Antenna Tower	KMO	KSZ002AT	200307	NCR	NCR
OATS	KMO	KSZSITE001	N/A	July 06, 2003	July 06, 2004
EMI Test Receiver	Rohde & Schwarz	ESPI3	100180	Oct.18, 2003	Oct.18, 2004
Signal Generator	Rohde & Schwarz	SMT03	100059	Feb.01, 2004	Feb.01, 2005
Bilog Antenna	Chase	CBL6111C	2576	Feb.01, 2004	Feb.01, 2005
Ultra Broadband Antenna	Rohde & Schwarz	HL 562	100110	June.05, 2003	June.05, 2004
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct. 23,2003	Oct. 23, 2004
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct. 23,2003	Oct. 23, 2004
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
KMO Shielded Room	KMO	KMO-001	N/A	N/A	N/A
EMI Test Receiver	Rohde & Schwarz	ESCS30	100003	Feb. 27, 2004	Feb.27, 2005
AMN	Rohde & Schwarz	ESH3-Z5	100002	Feb. 01, 2004	Feb.01, 2005
LISN	Kyoritsu	KNW-407	8-1441-8	Feb. 23, 2004	Feb.23, 2005
EMI Test Receiver	Rohde & Schwarz	ESI26	838786/013	Feb. 01, 2004	Feb.01, 2005
Bilog Antenna	Chase	CBL6112B	2591	Feb. 01, 2004	Feb.01, 2005
Horn Antenna	Rohde & Schwarz	HF906	100014	Feb. 01, 2004	Feb.01, 2005
3m Semi-Anechoic Chamber	Albatross Projects	9mX6mX6m	N/A	Feb. 01, 2004	Feb.01, 2005