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Ke Mei Ou Lab Corp.
FEDERAL COMMUNICATIONS COMMISSION
Registration Number: 125782
INDUSTRY CANADA
Registration Number: IC4986

FCC TEST REPORT

Under
FCC 15 Subpart C, Paragraph 15.249: 2003

Prepared For :

ShenZhen ZhongWang Electronic Co., Ltd.

#511 Electrical Equipment Building, No.72, ZhenHua Road, Futian, ShenZhen, P.R.C

FCC ID: Q74401D
EUT: Wireless Converter
Model: 401D

January 10, 2005

Report Type: Original Report
Test Engineer: Peter Lin
Test Date: December 20, 2004
Review By: _____ Apollo Liu / Manager

The test report consists 26 pages in total. It may be duplicated completely for legal use with the allowance of the applicant. It shall not be reproduced except in full, without the written approval of Ke Mei Ou Laboratory Corporation. The test result in the report only applied to the tested sample.

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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.
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Site on File with the Federal Communications Commission – United Sates
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 : ShenZhen ZhongWang Electronic Co., Ltd.
Address : #511 Electrical Equipment Building, No.72, ZhenHua Road, Futian, ShenZhen, P.R.C
Contact : Luo Jian / Test Engineer
Tel : + 86 755 27599311
Fax : + 86 755 27599711

1. 4 Application Details

Date of Receipt of Application : December 15, 2004
Date of Receipt of Test Item : December 15, 2004
Date of Test : December 20~January 10, 2004

1. 5 Test Item

Manufacturer : See Applicant
Trade Name : ZTV
Model No. : 401D
Description : Wireless Converter

Additional Information

Frequency : 2414MHz~2468MHz
Maximum Range : N/A
Number of Channels : 4
Transmitter Antenna : N/A
Power Supply : DC 12V
Current Consumption : 500 mA

1. 6 Test Standards

FCC 15 Subpart C, Paragraph 15.249: 2003

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 15.203	Antenna Requirement	PASS	Complies
FCC Part 15, Paragraph 15.207	Conducted Test	PASS	Minimum passing margin is -26.54/-30.12dB at 0.290 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 -20.59 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

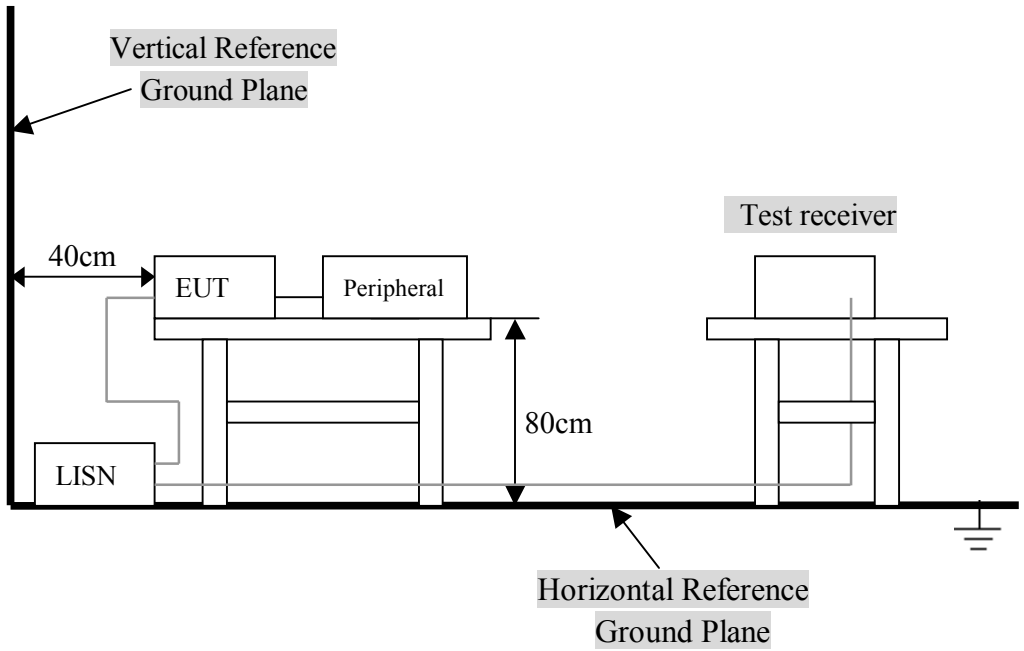
Please refer to Section 10 this report.

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 DC12V (Power by Class 2 Adaptor). The operation frequency is from 2414MHz~2468MHz. 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, 3 and 4 were pre-tested, The channel 1, worst case one, was chosen for conducted and radiated emission test.
2) Above 1GHz, the channel 1, 2, 3 and 4 were tested individually.

A. EUT

Device	Manufacturer	Model #	FCC ID
Wireless Converter	ShenZhen ZhongWang Electronic Co., Ltd.	401D	Q74401D

B. Internal Devices

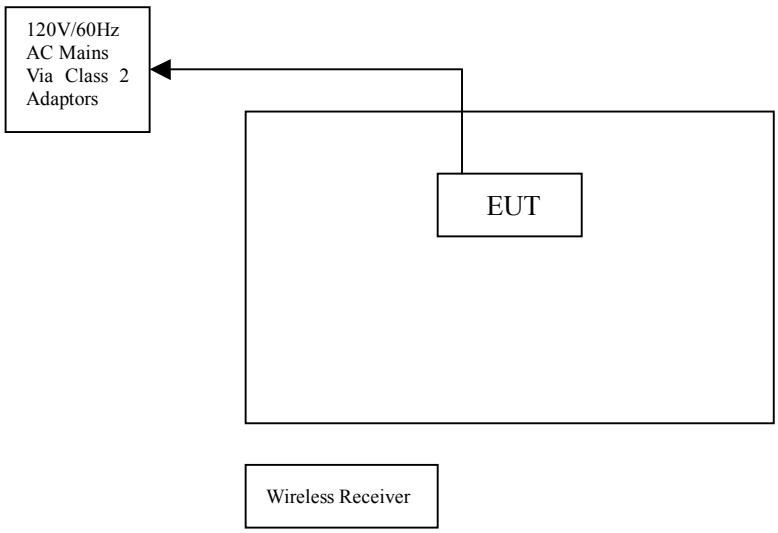
Device	Manufacturer	Model #	FCC ID
N/A			

C. Peripherals

Device	Manufacturer	Model # Serial #	FCC ID/ DoC	Cable
Wireless Receiver	ShenZhen ZhongWang Electronic Co., Ltd.	ZT-708	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	: Wireless Converter	Test Mode	: CH4
Test Item	: Conducted Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (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 ℃
- Humidity ： 53 % RH

CH4: 2468MHz

FCC Part 15 Paragraph 15.207							
Frequency (MHz)	**Emission (dBuV) QP**	**AV**	**LINE/ NEUTRAL**	**Limit (dBuV) QP**	**AV**	**Margin (dB) QP**	**AV**
0.162	36.92	22.25	LINE	65.36	55.36	-28.44	-33.11
0.158	37.78	22.36	NEUTRAL	65.57	55.57	-27.79	-33.21
0.202	35.41	21.25	LINE	63.53	53.53	-28.12	-32.28
0.290	33.98	20.40	NEUTRAL	60.52	50.52	-26.54	-30.12
0.470	28.28	18.26	LINE	56.51	46.51	-28.23	-28.25
0.558	27.21	18.24	NEUTRAL	56.00	46.00	-28.79	-27.76

Note: NF = No Significant Peak was Found.

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: Wireless Converter M/N: 401D

Manufacturer: ShenZhen ZhongWang Electronic Co., Ltd.

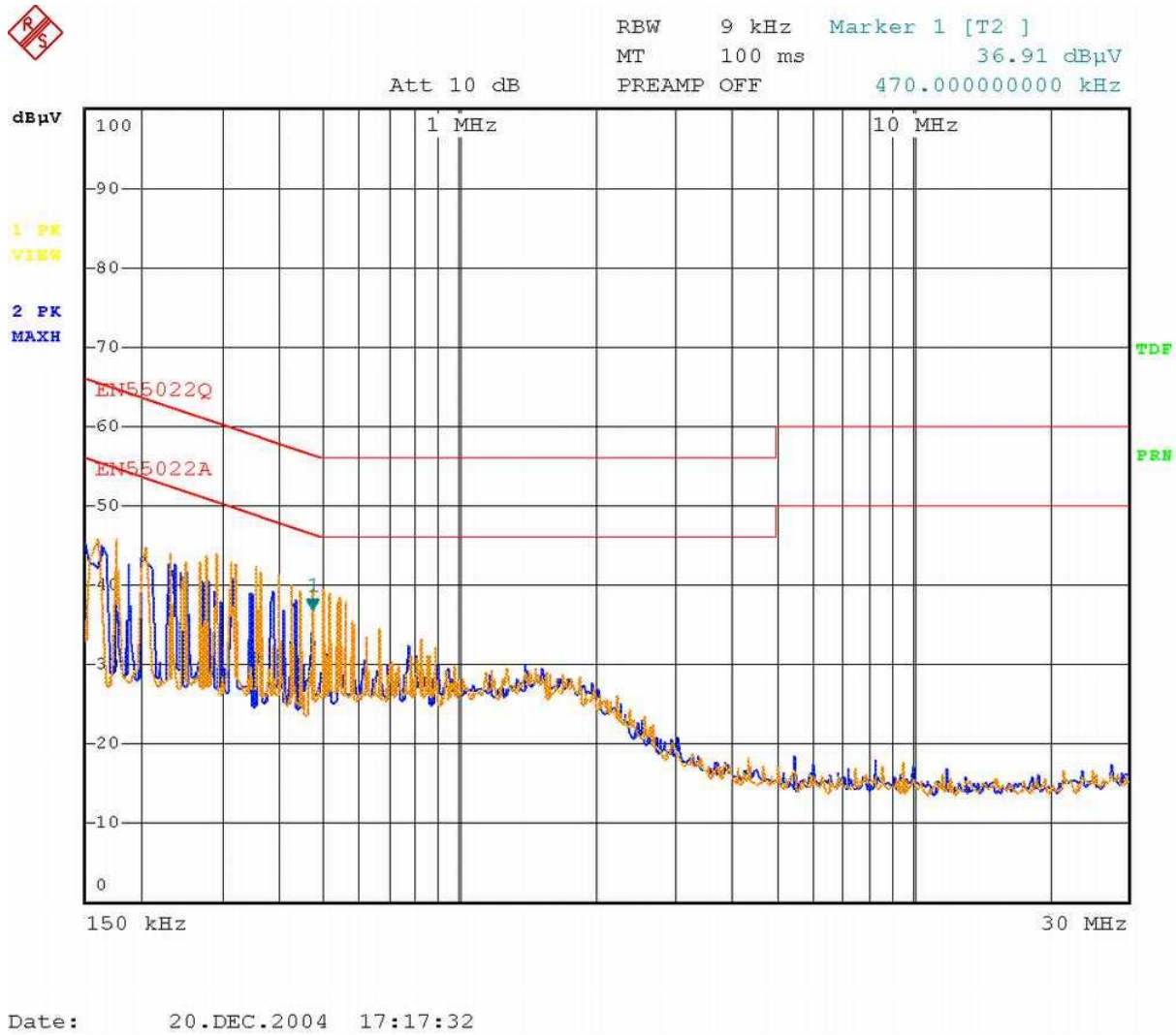
Operating Condition: Transmitter

Test Site: Ke Mei Ou Laboratory

Operator: Peter Lin

Test Specification: LINE&NEUTRAL

Comment:



5. Radiated Emission Test

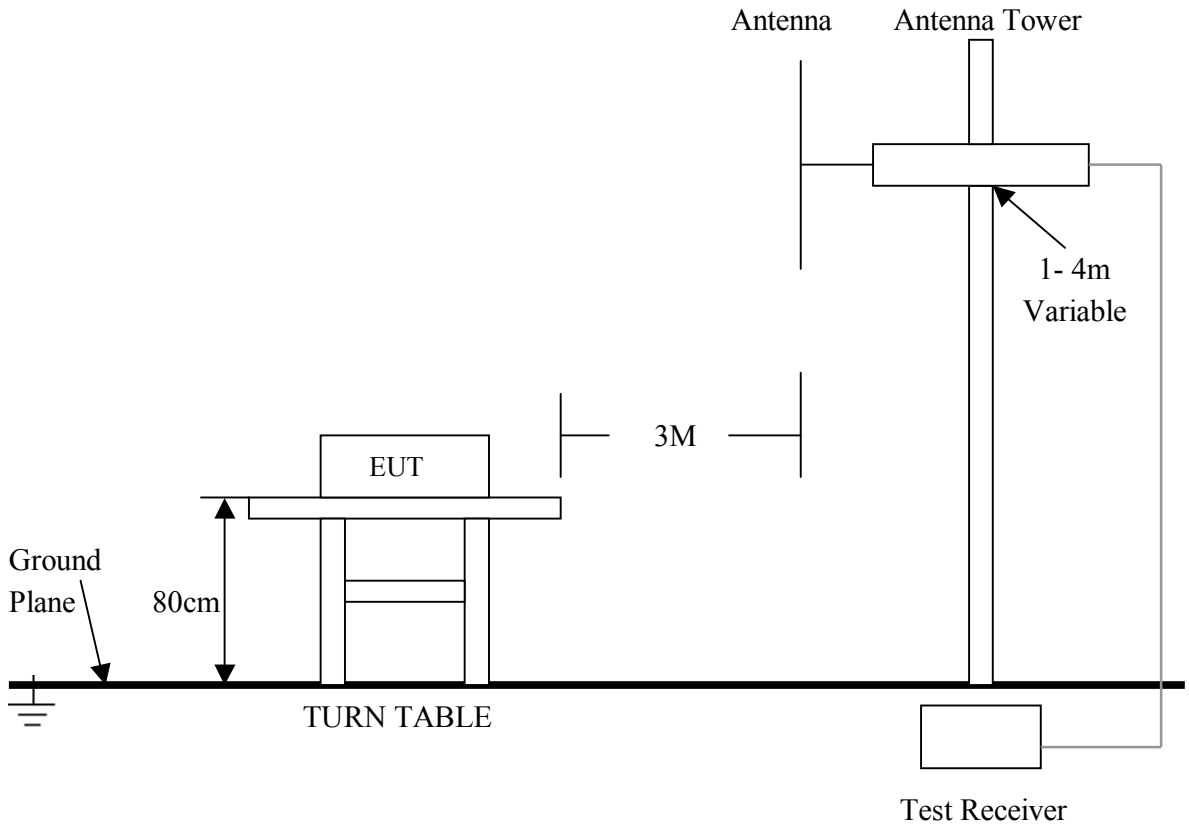
5. 1 Test Equipment

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)
2400~2483.5	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	: Wireless Converter	Test Mode	: CH1~CH4
Test Item	: Fundamental Radiated Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (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	93.41	HORIZ	114 / 94	-20.59
2.414	89.39	VERT	114 / 94	-24.61

CH2

Freq. (GHz)	Emission (dBuV/m) Peak Detector	HORIZ /VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
2.432	88.14	HORIZ	114 / 94	-25.86
2.432	89.81	VERT	114 / 94	-24.19

CH3

Freq. (GHz)	Emission (dBuV/m) Peak Detector	HORIZ /VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
2.450	88.59	HORIZ	114 / 94	-25.41
2.450	93.06	VERT	114 / 94	-20.94

CH4

Freq. (GHz)	Emission (dBuV/m) Peak Detector	HORIZ /VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
2.468	87.15	HORIZ	114 / 94	-26.85
2.468	90.89	VERT	114 / 94	-23.11

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	: Wireless Converter	Test Mode	: CH1~CH4
Test Item	: Harmonics Radiated Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (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	53.7	HORZ	74.0 / 54.0	-20.3
4828.0	51.0	VERT	74.0 / 54.0	-23.0
7242.0	53.2	HORZ	74.0 / 54.0	-20.8
7242.0	51.9	VERT	74.0 / 54.0	-22.1

CH2: 2432MHz

Freq. (MHz)	Emission (dBuV/m) Peak Detector	HORIZ / VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
4864.0	51.6	HORZ	74.0 / 54.0	-22.4
4864.0	51.9	VERT	74.0 / 54.0	-22.1
7296.0	50.8	HORZ	74.0 / 54.0	-23.2
7296.0	51.2	VERT	74.0 / 54.0	-22.8

CH3: 2450MHz

Freq. (MHz)	Emission (dBuV/m) Peak Detector	HORIZ / VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
4890.0	51.2	HORZ	74.0 / 54.0	-22.8
4890.0	53.4	VERT	74.0 / 54.0	-20.6
7350.0	51.6	HORZ	74.0 / 54.0	-22.4
7350.0	52.2	VERT	74.0 / 54.0	-21.8

CH4: 2468MHz

Freq. (MHz)	Emission (dBuV/m) Peak Detector	HORIZ / VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
4936.0	51.6	HORZ	74.0 / 54.0	-22.4
4936.0	52.7	VERT	74.0 / 54.0	-21.3
7404.2	53.0	HORZ	74.0 / 54.0	-21.0
7404.2	53.4	VERT	74.0 / 54.0	-20.6

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	: Wireless Converter	Test Mode	: CH1
Test Item	: General Radiated Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Battery)	Humidity	: 56%RH
Test Result	: **PASS**		

CH1: 2414MHz

Freq. (MHz)	Emission (dBuV/m) QP Detector	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
32.140	32.08	HORZ	40.0	-7.92
30.640	32.45	VERT	40.0	-7.55
56.740	30.29	HORZ	40.0	-9.71
87.120	28.49	VERT	40.0	-11.51
664.080	32.34	HORZ	46.0	-13.66
576.400	33.12	VERT	46.0	-12.88

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

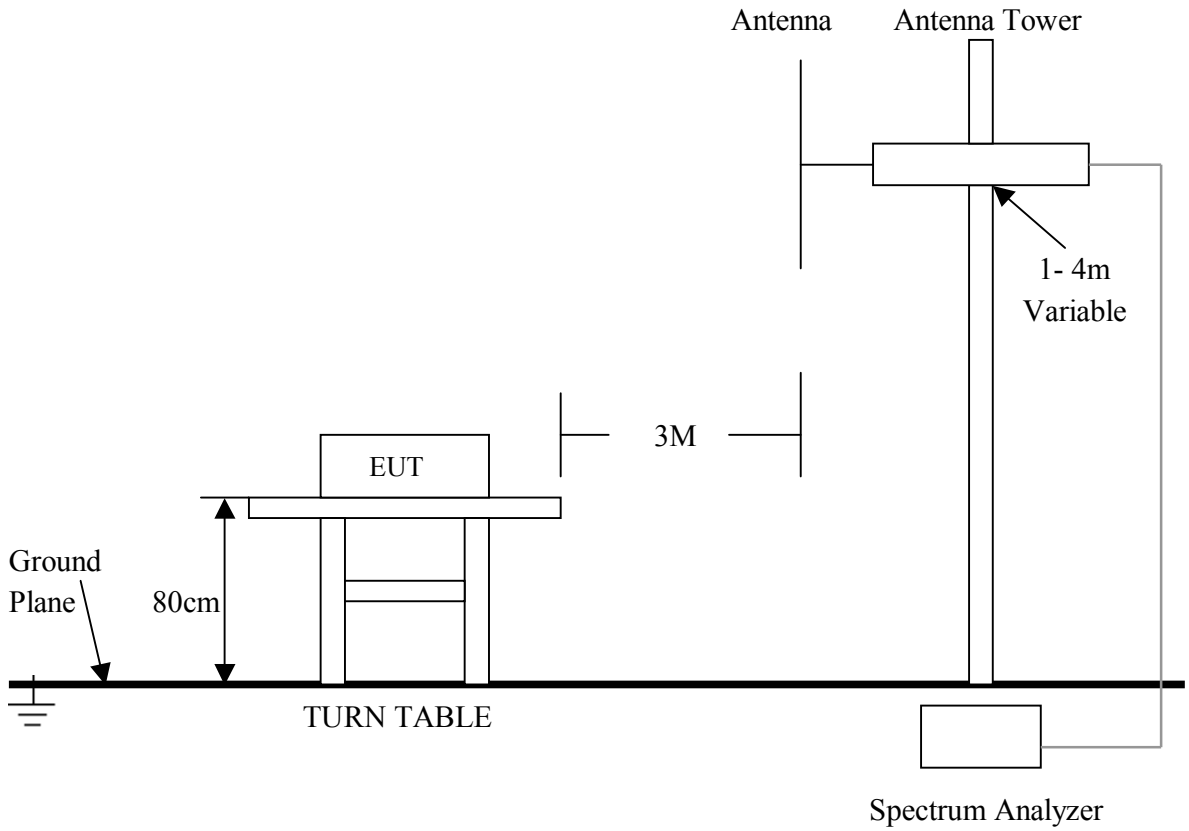
6. 1 Test Equipment

Please refer to Section 10 this report.

6. 2 Test Procedure

1. 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.

6. 3 Radiated Test Setup



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

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

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

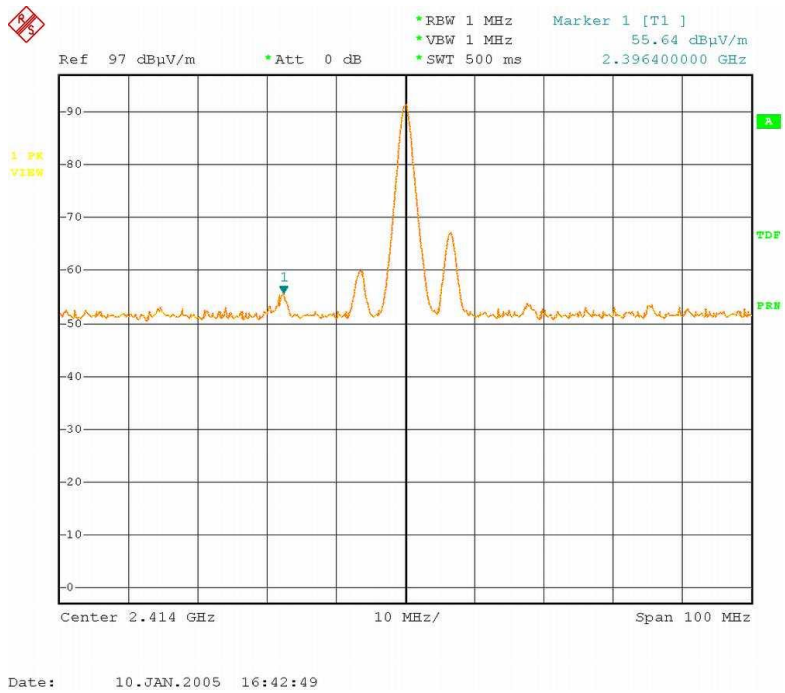
6. 7 Band Edge Test Result

Product	: Wireless Converter	Test Mode	: CH1, CH4
Test Item	: Band Edge Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Class 2 Adaptor)	Humidity	: 56%RH
Test Result	: **PASS**		

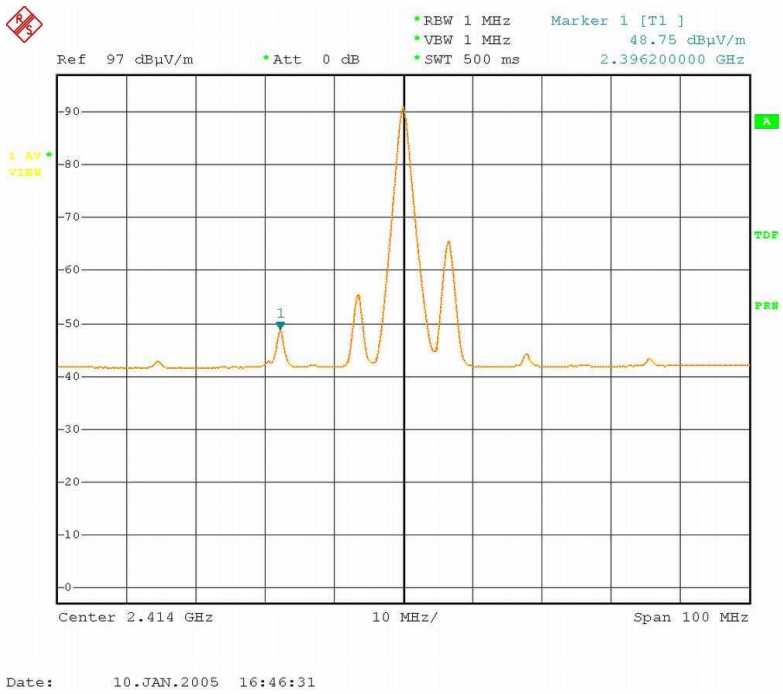
CH1

Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
2396.400	54.46 (Peak)	HORZ	74.0 / 54.0	-19.54
2396.200	47.55 (Average)	HORZ	74.0 / 54.0	-6.45
2396.200	51.43 (Peak)	VERT	74.0 / 54.0	-22.57
2396.200	44.32 (Average)	VERT	74.0 / 54.0	-9.68

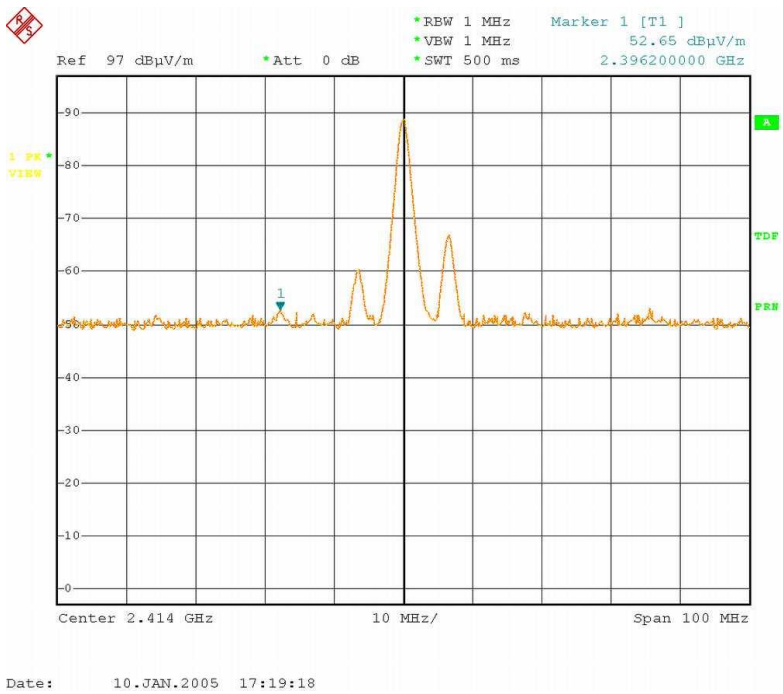
Horizontal (Peak)



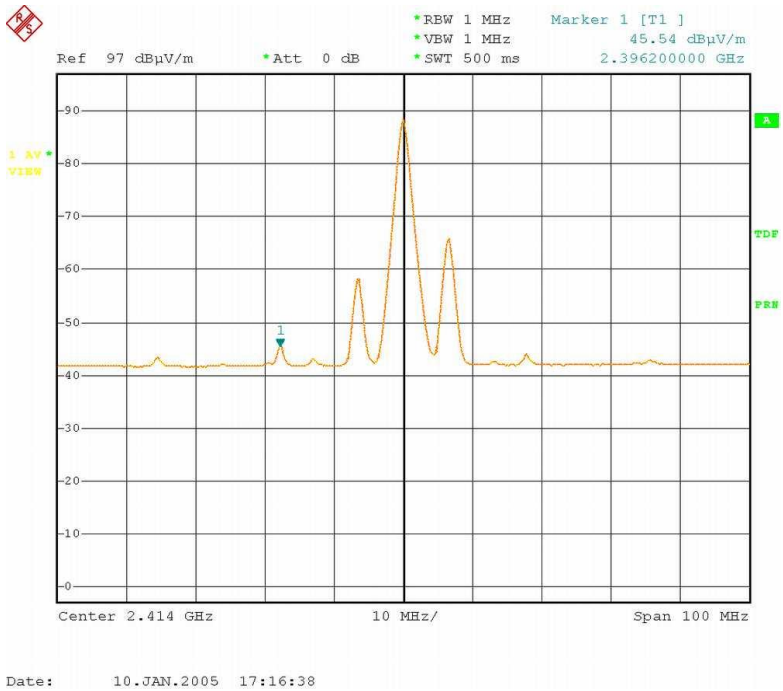
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



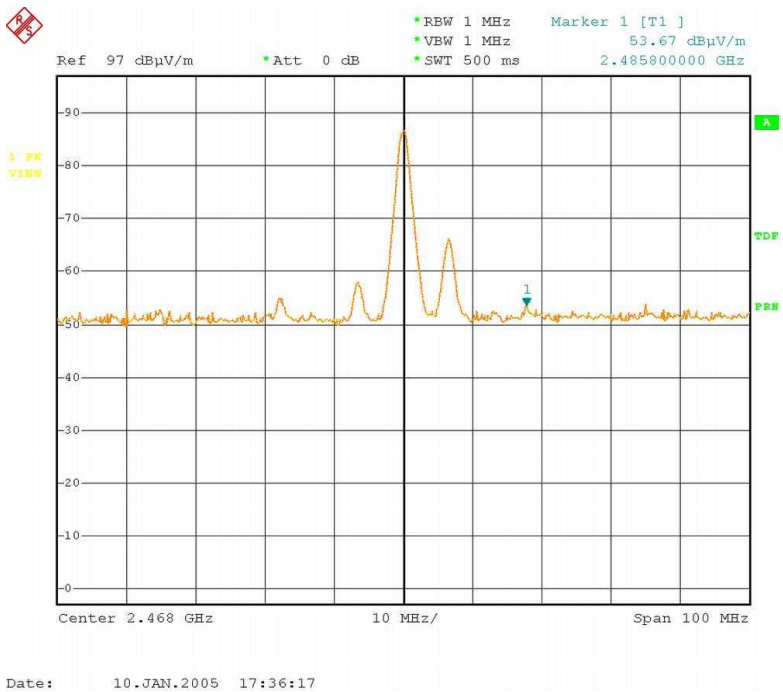
Note: (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

(2) The average measurement was not performed when the peak measured data under the limit of average detection.

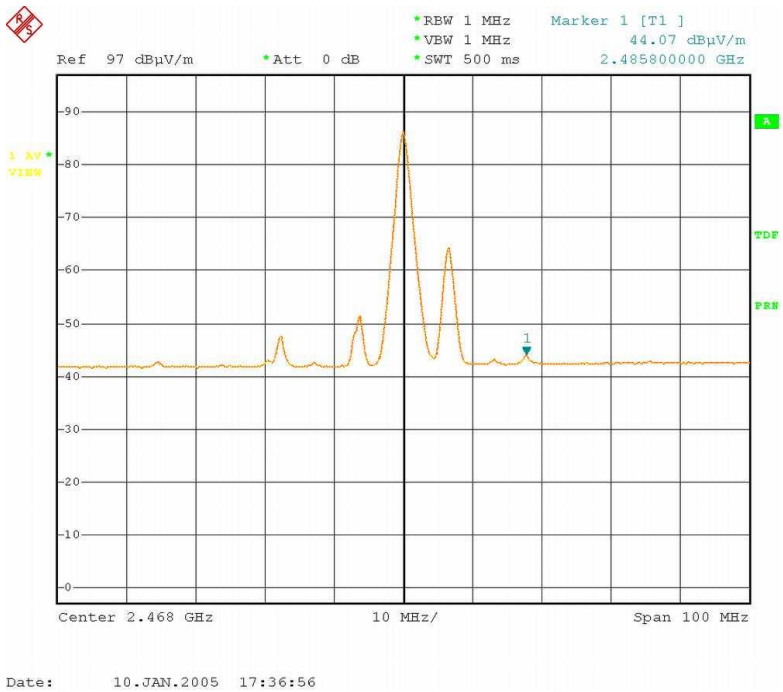
CH4

Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m) Peak / Average	Margin (dB)
2485.800	52.25 (Peak)	HORZ	74.0 / 54.0	-21.75
2485.800	42.87 (Average)	HORZ	74.0 / 54.0	-11.13
2485.600	52.38 (Peak)	VERT	74.0 / 54.0	-21.62
2485.800	42.29 (Average)	VERT	74.0 / 54.0	-11.71

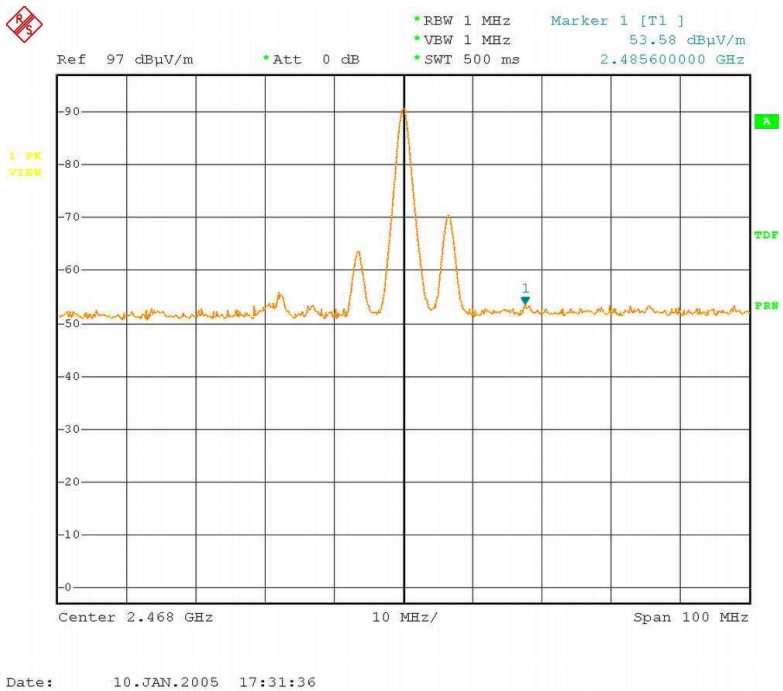
Horizontal (Peak)



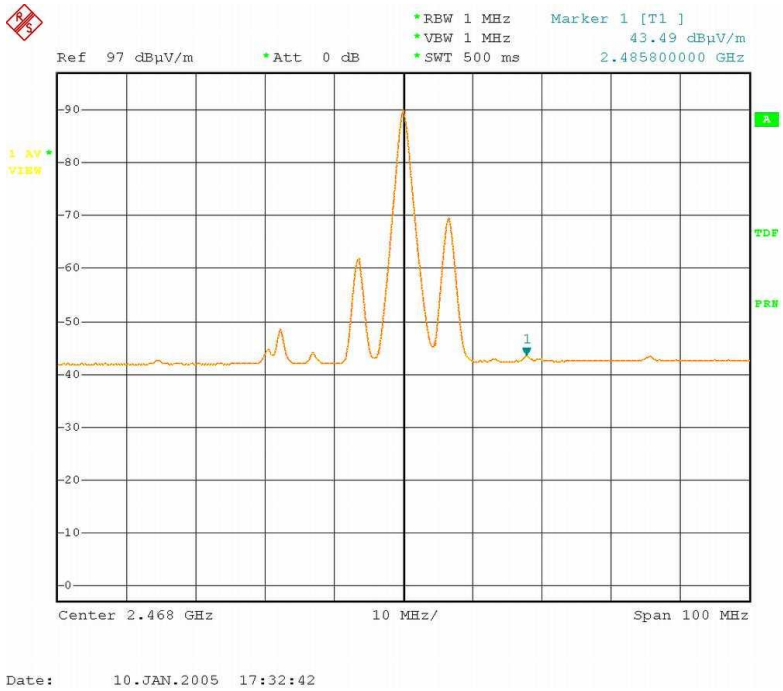
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



Note:
(3) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.
(4) The average measurement was not performed when the peak measured data under the limit of average detection.

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 has a built in antenna which is a short wire solder on the PCB, this is permanently attached antenna and meets the requirements of this section.

8. Photos of Testing

8. 1 EUT Test Photographs

Conducted emission test view

Radiated emission test view

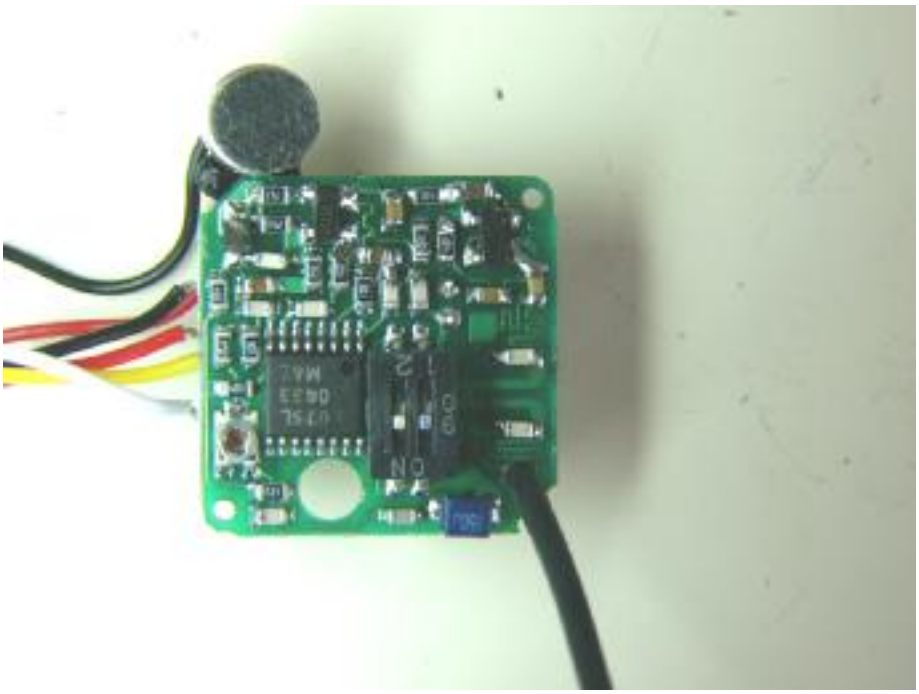
8. 2 EUT Detailed Photographs

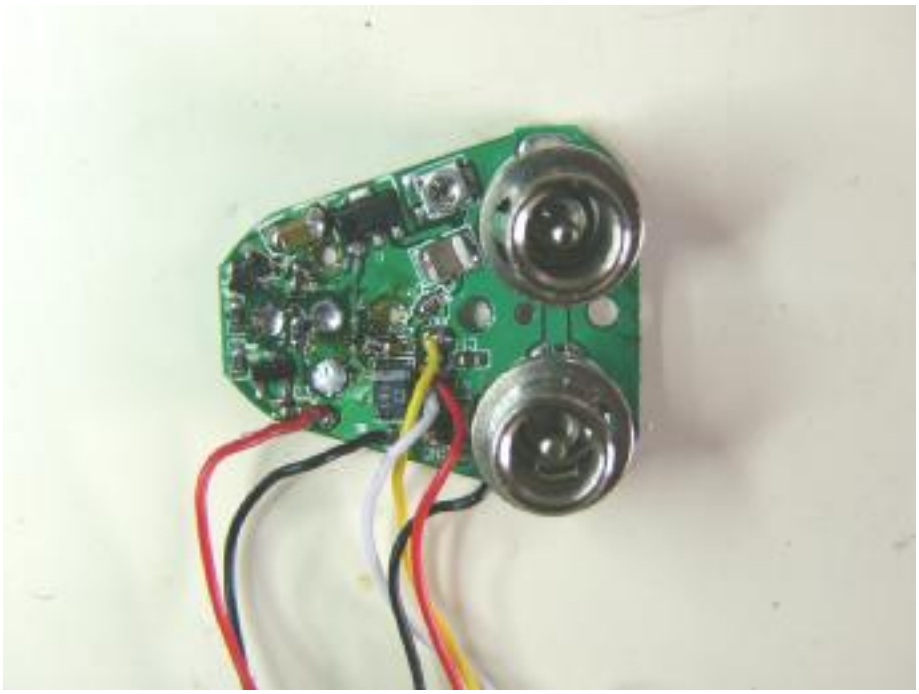
EUT top view

EUT bottom view

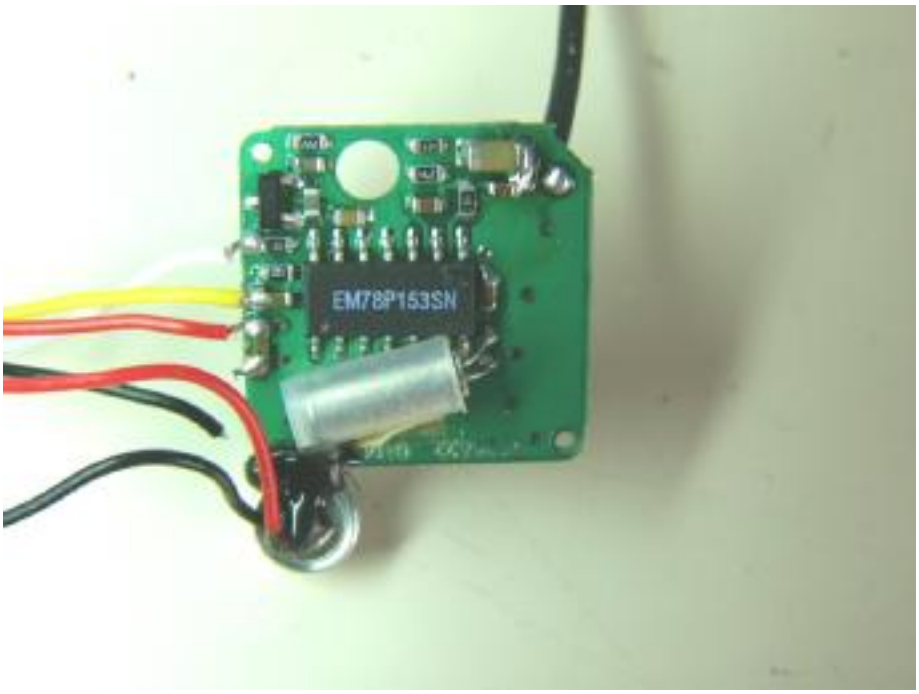
EUT inside whole view

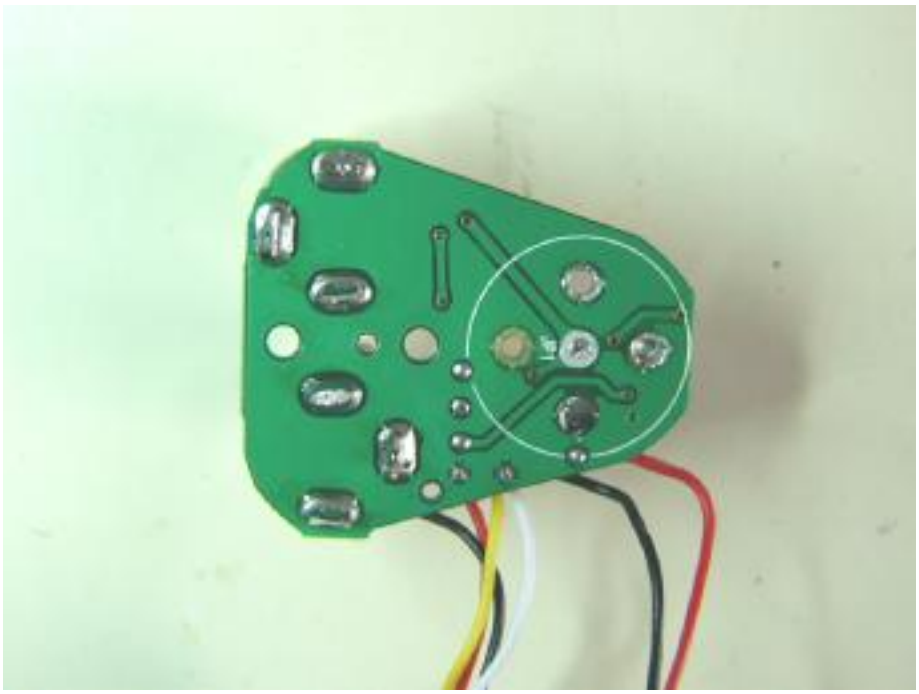
Main & RF board component side





Main & RF board solder side





9. FCC ID Label

FCC ID: Q74401D

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, 2004	July 06, 2005
EMI Test Receiver	Rohde & Schwarz	ESPI3	100180	Oct.18, 2004	Oct.18, 2005
Signal Generator	Rohde & Schwarz	SMT03	100059	Feb.01, 2004	Feb.01, 2005
Signal Generator	FLUKE	PM5418+Y/C	LO747012	Feb 01, 2004	Feb 01, 2005
Signal Generator	FLUKE	PM5418TX	LO738007	Feb 01, 2004	Feb 01, 2005
Biconical Antenna	Rohde & Schwarz	HK116	EMC0502	Dec. 14,2004	Dec. 14,2005
Bilog Antenna	Chase	CBL6111C	2576	Feb.01, 2004	Feb.01, 2005
Ultra Broadband Antenna	Rohde & Schwarz	HL 562	100110	June.05, 2004	June.05, 2005
AMN	Rohde & Schwarz	ESH3-Z5	100196	Oct. 23,2004	Oct. 23, 2005
AMN	Rohde & Schwarz	ESH3-Z5	100197	Oct. 23,2004	Oct. 23, 2005
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	N/A	N/A	N/A
Absorbing Clamp	Rohde & Schwarz	MDS-21	N/A	Oct. 29,2004	Oct. 29,2005
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
Power Meter	Rohde & Schwarz	NRVD	100041	Feb. 01, 2004	Feb.01, 2005
Radio Communication Test Set	Rohde & Schwarz	CMS 54	846621/024	Feb 01, 2004	Feb 01, 2005
Modulation Analyzer	Hewlett-Packard	8901B	2303A00362	Feb 01, 2004	Feb 01, 2005
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb 06,2004	Feb 06, 2005
3m Semi-Anechoic Chamber	Albatross Projects	9mX6mX6m	N/A	Feb. 01, 2004	Feb.01, 2005