Ke Mei Ou Laboratory Co., Ltd.

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

FCC TEST REPORT

Under
FCC 15 Subpart C, Paragraph 15.249: 2002

Prepared For :

Shenzhen Goodwill Electrical Co., Ltd.

3F, Bldg. 7, Century Industrial Area, E Gong Ling Village, Ping Hu Town,
Long Gang District, Shenzhen, China

FCC ID: RFQ-GW302
EUT: Wireless Monitor System
Model: GW302

September 1, 2003

Report Type: Original Report
Test Engineer: Peter Lin
Test Date: August 26, 2003
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.
Tel: +86 755 83642690 Fax: +86 755 83297077
Email: kmolab@tom.com
Internet: www.kmolab.com

1. 3 Details of Applicant

Name	**: Shenzhen Goodwill Electrical Co., Ltd.**
Address	**: 3F, Bldg. 7, Century Industrial Area, E Gong Ling Village, Ping Hu Town, Long Gang District, Shenzhen, China.**
Contact	**: Mr. Yang / Manager**
Tel	**: + 86 755 28457275**
Fax	**: + 86 755 28457324**

1. 4 Application Details

Date of Receipt of Application	: August 11, 2003
Date of Receipt of Test Item	: August 16, 2003
Date of Test	: August 26, 2003

1. 5 Test Item

Manufacturer	: See Applicant
Trade Name	: Goodwill
Model No.	: GW302, GW306, GW308
Description	: Wireless Monitor System

Additional Information

Frequency	: 2413MHz~2471MHz
Maximum Range	: 300 feet
Number of Channels	: 4
Transmitter Antenna	: Directional
Power Supply	: DC 12V
Current Consumption	: 500 mA

1. 6 Test Standards

FCC 15 Subpart C, Paragraph 15.249: 2002

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**	Complies
FCC Part 15 Subpart C Paragraph 15.249(a) and 15.249(b) Limit	Field Strength of Fundamental	**PASS**	Minimum passing margin is -30.01 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

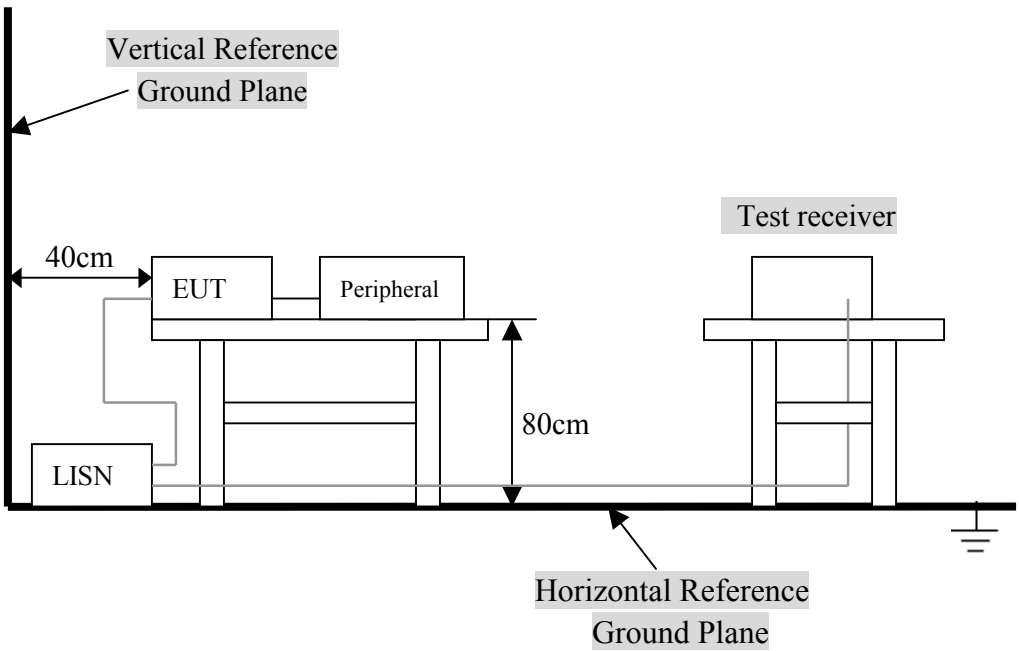
4. 1 Test Equipment

Please refer to Section 9 this report.

4. 2 Test Procedure

The EUT was tested according to ANSI C63.4 - 2001. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm / 50 uHenry as specified by section 5.1 of ANSI C63.4 - 2001. cables and peripherals were moved to find the maximum emission levels for each frequency.

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 12V (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, 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 Monitor System	Shenzhen Goodwill Electrical Co., Ltd.	GW302	RFQ-GW302

B. Internal Devices

DEVICE	MANUFACTURER	MODEL #	FCCID / DoC
N/A			

C. Peripherals

DEVICE	MANUFAC-TURER	MODEL # SERIAL #	FCC ID/ DoC	CABLE
Wireless receiver	Shenzhen Goodwill Electrical Co., Ltd.	2302	N/A	No-Shielded, 1.6m

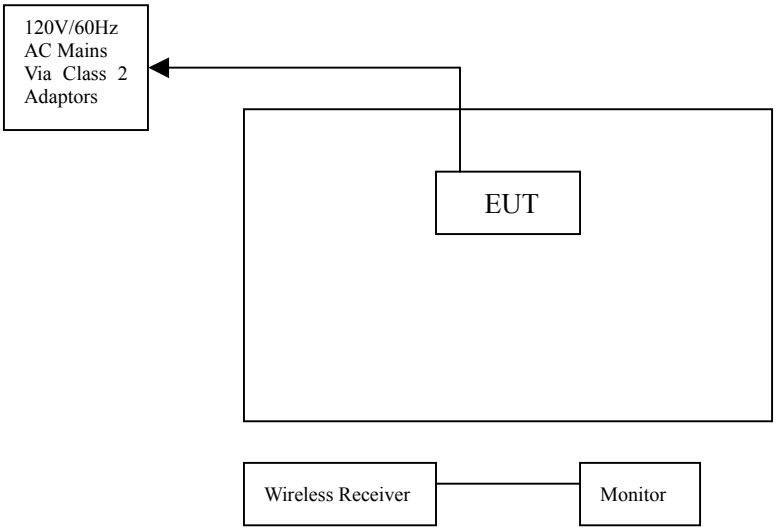
4. 5 EUT Operating Condition

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

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

Note: The RF voltage was scanned from 150KHz to 30MHz on each AC lines (hot and neutral) of the EUT and no significant emissions were found in this frequency band.

Conducted Emission

EN55022

EUT: Wireless Monitor System M/N: GW302

Manufacturer: Shenzhen Goodwill Electrical Co., Ltd.

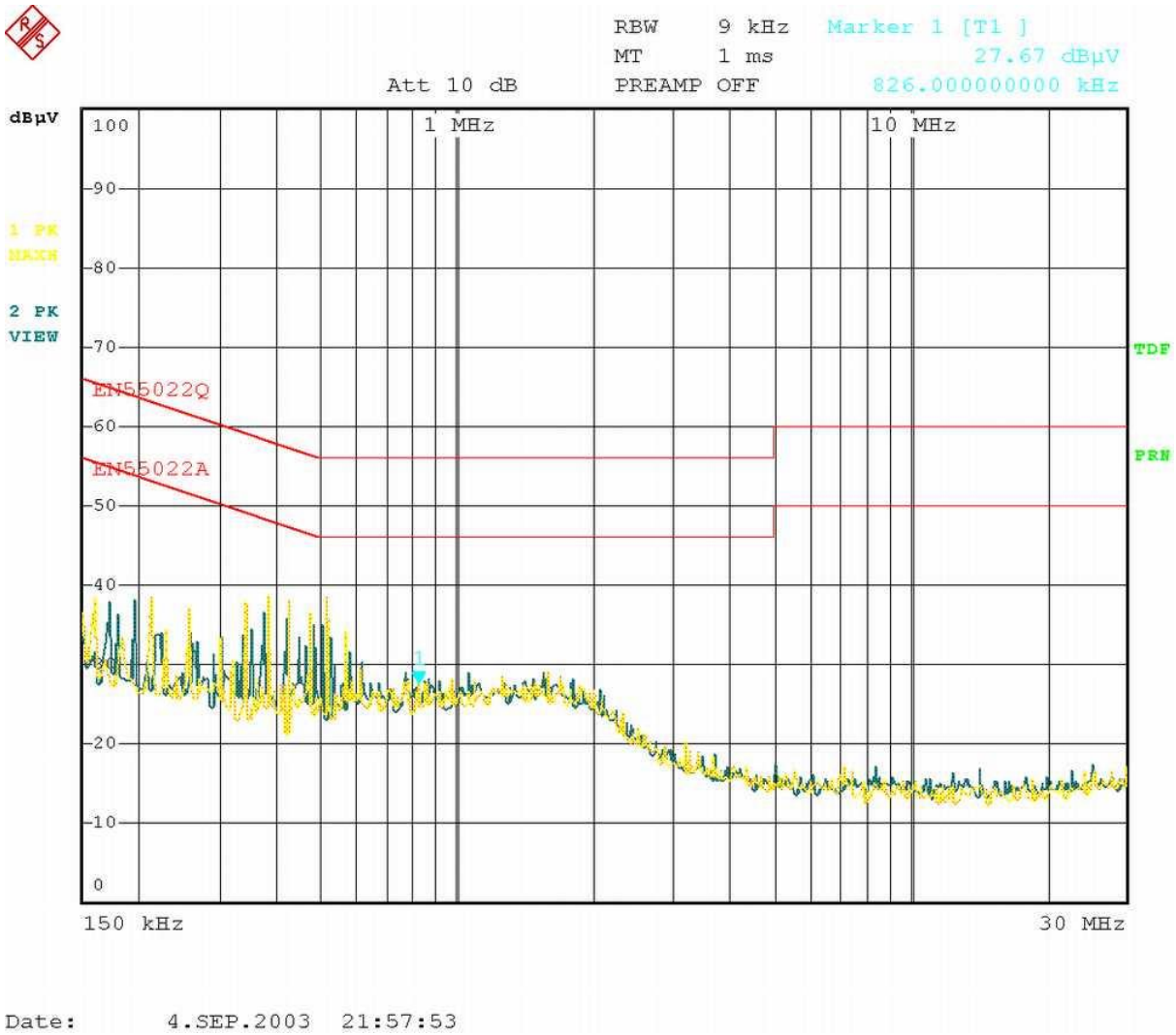
Operating Condition: Transmitter

Test Site: Ke Mei Ou Laboratory

Operator: Peter Lin

Test Specification: LINE&NEUTRAL

Comment:



5. Radiated Emission Test

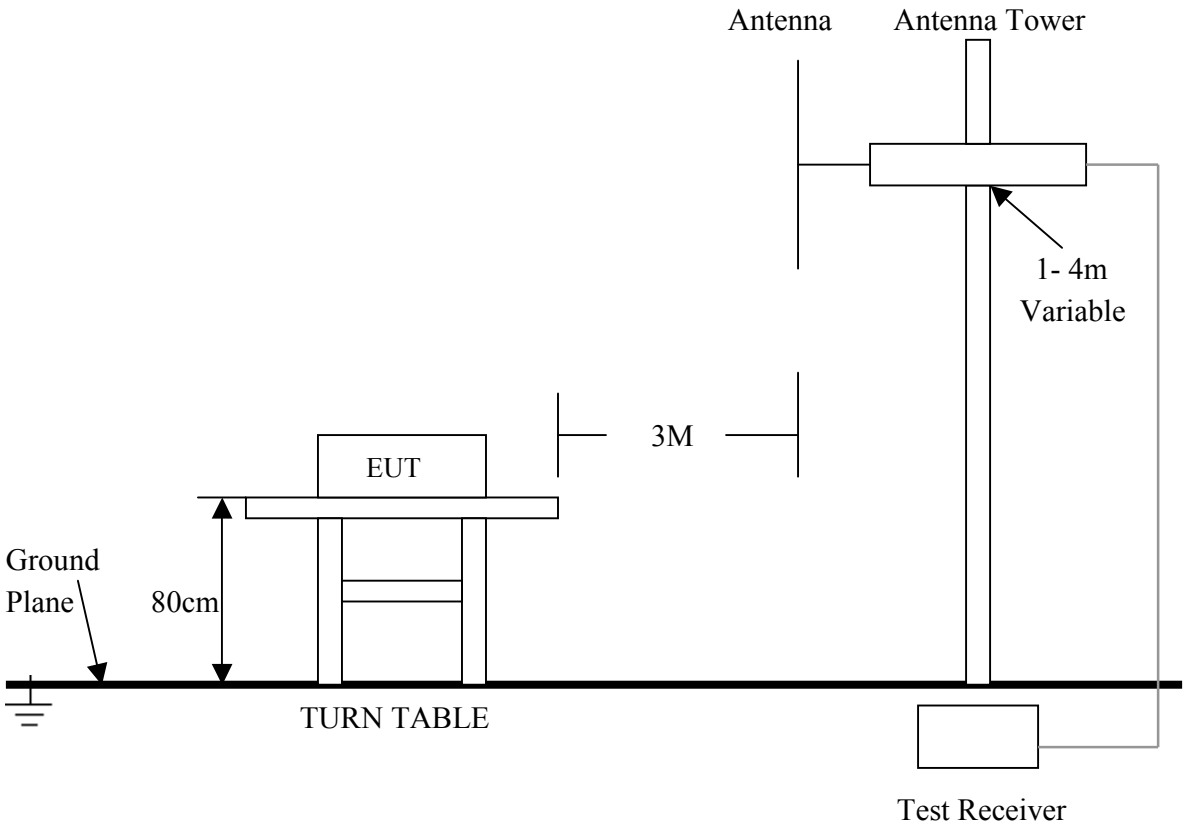
5. 1 Test Equipment

Please refer to Section 9 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	: Wireless Monitor System	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. (MHz)	Emission (dBuV/m)	HORIZ /VERT	Limits (dBuV/m)	Margin (dB)
2.414	83.99	HORIZ	114	-30.01
2.413	83.12	VERT	114	-30.88

CH2

Freq. (MHz)	Emission (dBuV/m)	HORIZ /VERT	Limits (dBuV/m)	Margin (dB)
2.433	82.64	HORIZ	114	-31.36
2.432	82.03	VERT	114	-31.97

CH3

Freq. (MHz)	Emission (dBuV/m)	HORIZ /VERT	Limits (dBuV/m)	Margin (dB)
2.452	79.56	HORIZ	114	-34.44
2.451	78.61	VERT	114	-35.39

CH4

Freq. (MHz)	Emission (dBuV/m)	HORIZ /VERT	Limits (dBuV/m)	Margin (dB)
2.471	78.91	HORIZ	114	-35.09
2.470	78.11	VERT	114	-35.89

Note:
(1) All Readings are Peak value.
(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.

B. Harmonics Radiated Emission Data

Product	: Wireless Monitor System	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

Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
4828.3	69.1	HORZ	74.0	-4.9
4827.8	68.2	VERT	74.0	-5.8
7242.6	60.5	HORZ	74.0	-13.5
7242.2	60.1	VERT	74.0	-13.9
9656.2	59.7	HORZ	74.0	-14.3
9657.1	59.2	VERT	74.0	-14.8

CH2

Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
4868.4	68.3	HORZ	74.0	-5.7
4867.7	68.1	VERT	74.0	-5.9
7302.2	62.2	HORZ	74.0	-11.8
7302.7	62.8	VERT	74.0	-11.2
9735.9	65.7	HORZ	74.0	-8.3
9735.8	65.0	VERT	74.0	-9.0

CH3

Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
4905.6	60.5	HORZ	74.0	-13.5
4905.2	60.1	VERT	74.0	-13.9
7358.7	56.5	HORZ	74.0	-17.5
7358.6	56.6	VERT	74.0	-17.4
9811.8	58.7	HORZ	74.0	-15.3
9811.5	58.8	VERT	74.0	-15.2

CH4

Freq. (MHz)	Emission (dBuV/m)	HORIZ / VERT	Limits (dBuV/m)	Margin (dB)
4947.4	61.3	HORZ	74.0	-12.7
4947.7	61.1	VERT	74.0	-12.9
7421.2	54.2	HORZ	74.0	-19.8
7421.7	54.8	VERT	74.0	-19.2
9895.9	57.7	HORZ	74.0	-16.3
9895.8	57.0	VERT	74.0	-17.0

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.

C. General Radiated Emission Data

Product	: Wireless Monitor System	Test Mode	: CH1
Test Item	: General Radiated Emission Data	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Class 2 Adaptor)	Humidity	: 56%RH
Test Result	: PASS		

FREQ. (MHz)	EMISSION (dBuV/m)	HORIZ / VERT	LIMITS (dBuV/m)	MARGIN (dB)
62.816	21.2	HORIZ	40.0	-18.8
54.201	25.6	VERT	40.0	-14.4
86.263	23.7	HORIZ	40.0	-16.3
71.364	20.9	VERT	40.0	-19.1
113.784	16.8	HORIZ	43.5	-26.7
201.651	21.6	VERT	43.5	-21.9
169.587	18.2	HORZ	43.5	-25.3
244.874	19.3	VERT	46.0	-26.7
198.741	15.6	HORZ	43.5	-27.9
689.262	28.1	VERT	46.0	-17.9
398.011	18.6	HORZ	46.0	-27.4
987.562	29.6	VERT	54.0	-24.4

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.

6. Band Edge

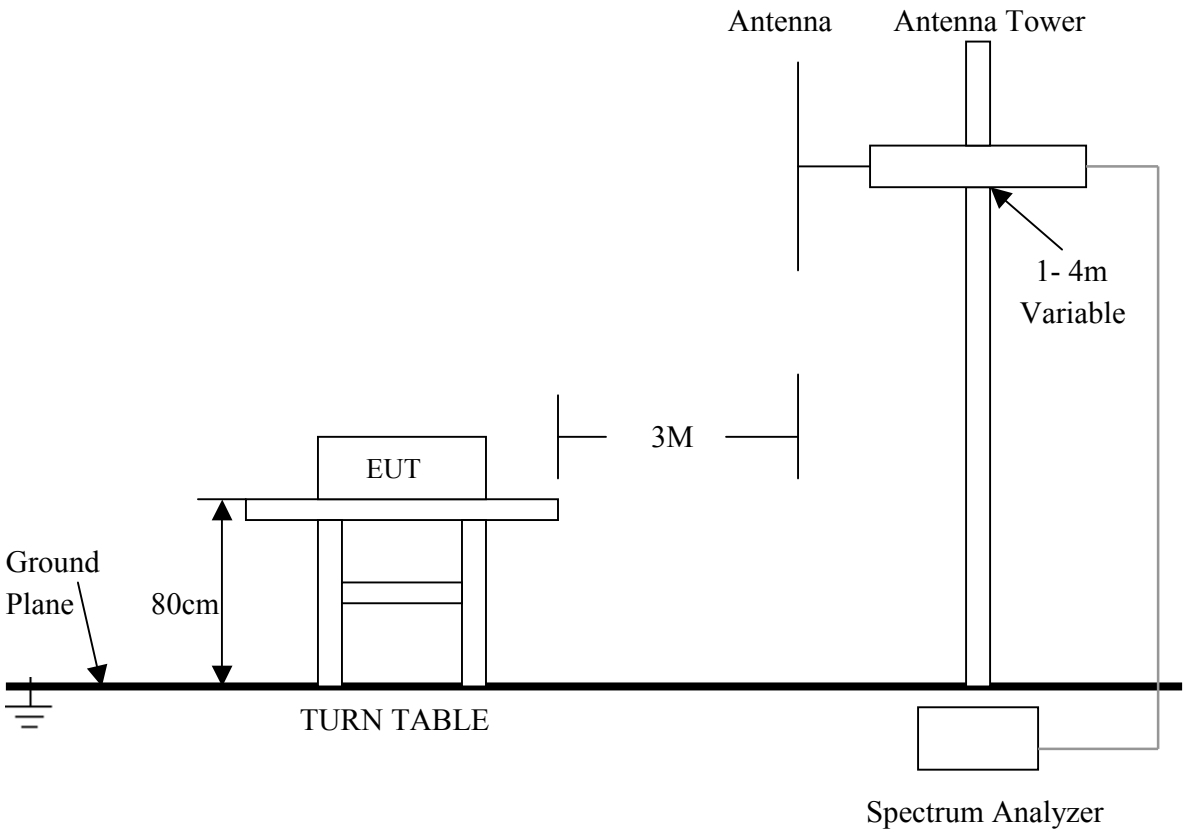
6. 1 Test Equipment

Please refer to Section 9 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

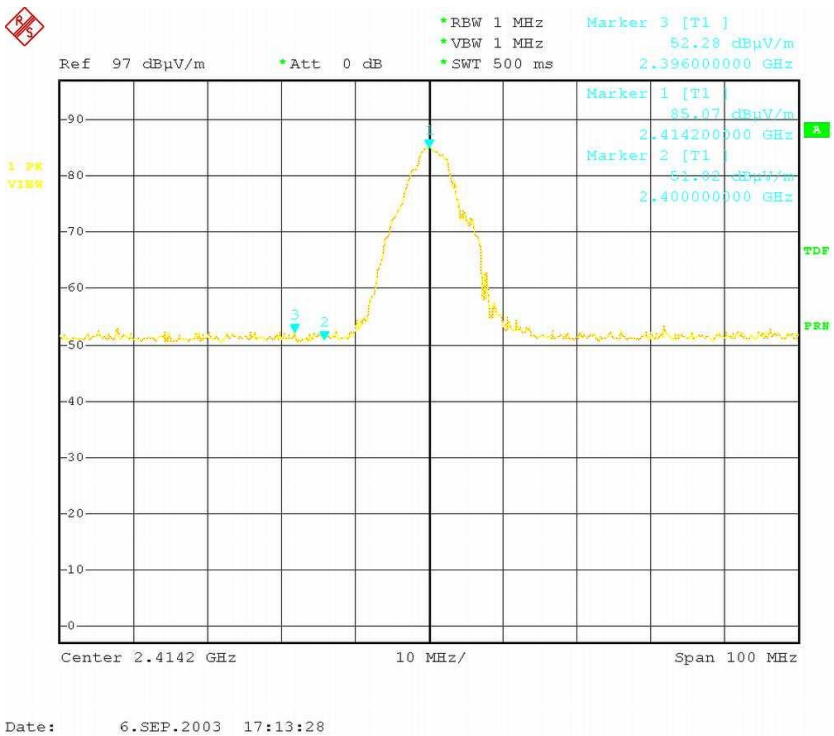
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 50dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired 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 Monitor System	Test Mode	: CH1
Test Item	: Band Edge	Temperature	: 25 ℃
Test Voltage	: DC 12V (Power by Class 2 Adaptor)	Humidity	: 56%RH
Test Result	: PASS		

CH1

Freq. (MHz)	Emission (dBuV/m)	Limits (dBuV/m)	Margin (dB)
2396.000	50.16	74.0	-23.84

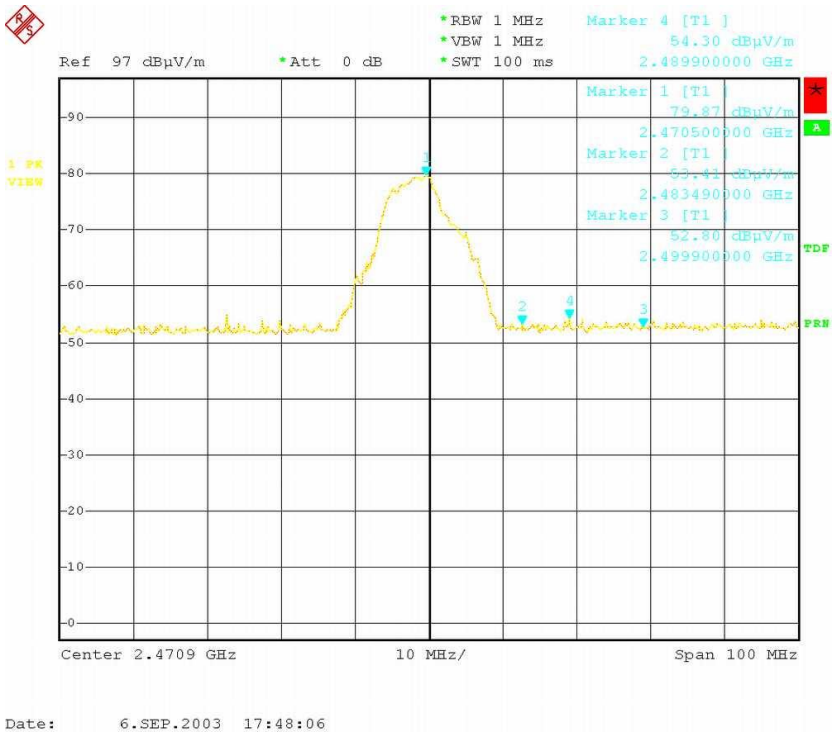


Note: (1) The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

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

CH4

Freq. (MHz)	Emission (dBuV/m)	Limits (dBuV/m)	Margin (dB)
2489.900	52.19	74.0	-21.81



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.

7. Photos of Testing

7. 1 EUT Test Photographs

Conducted emission test view

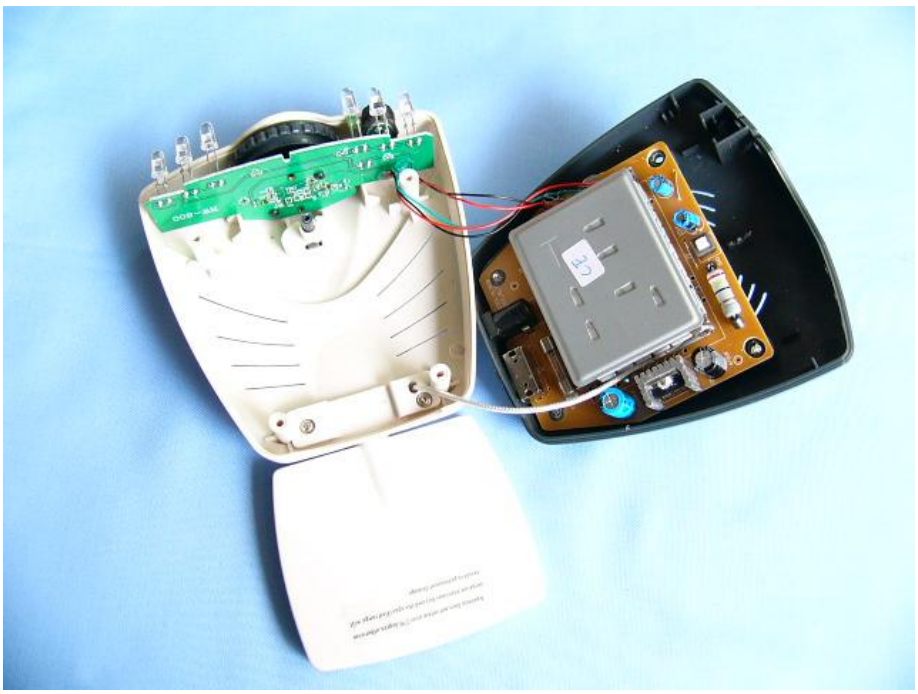
Radiated emission test view

7. 2 EUT Detailed Photographs

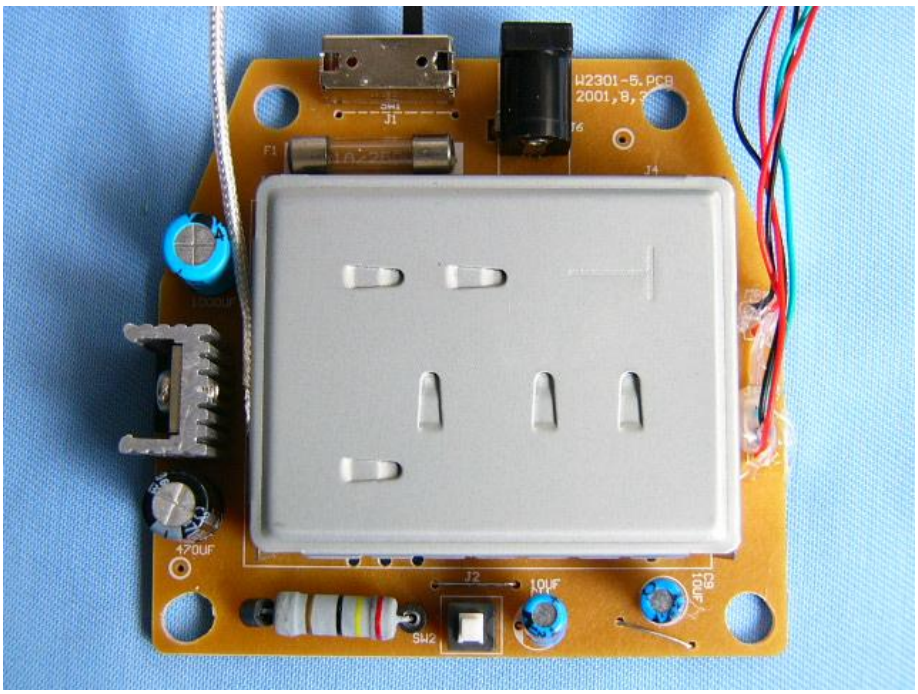
(1) EUT top view

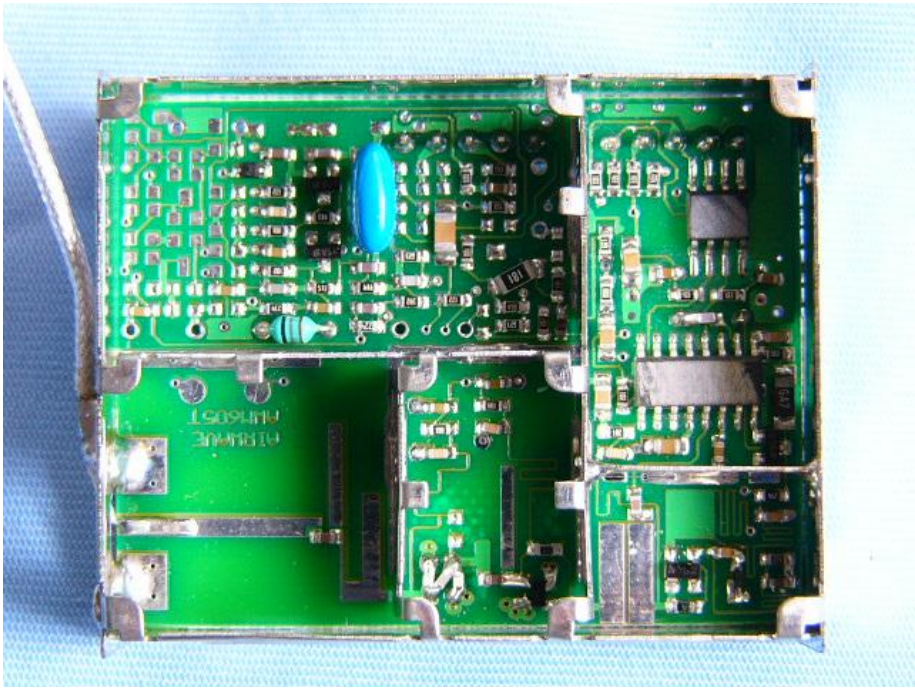
(2) EUT bottom view

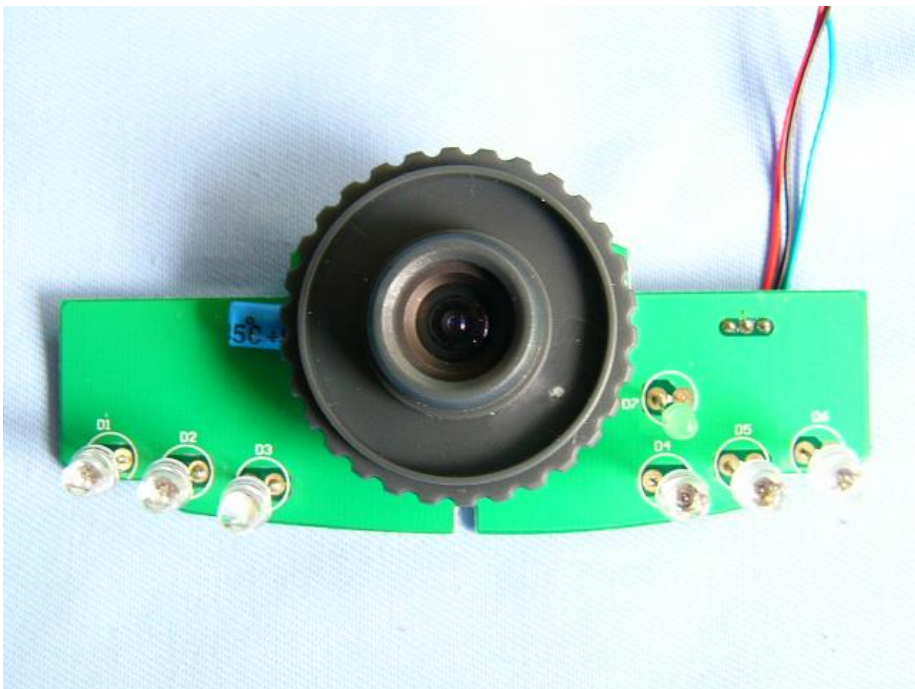
(3) EUT inside whole view



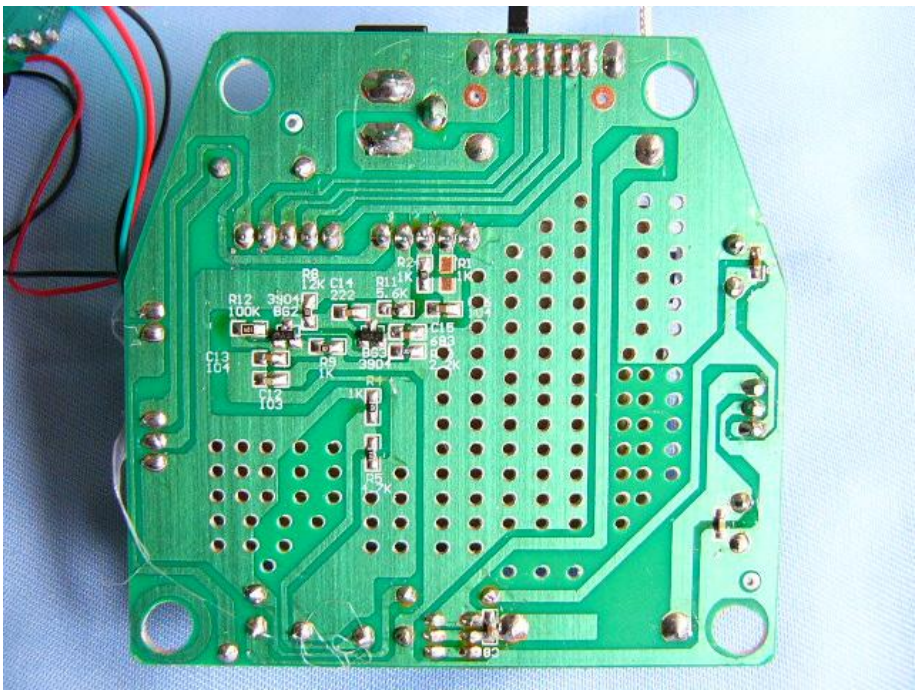
(4) Main board component side

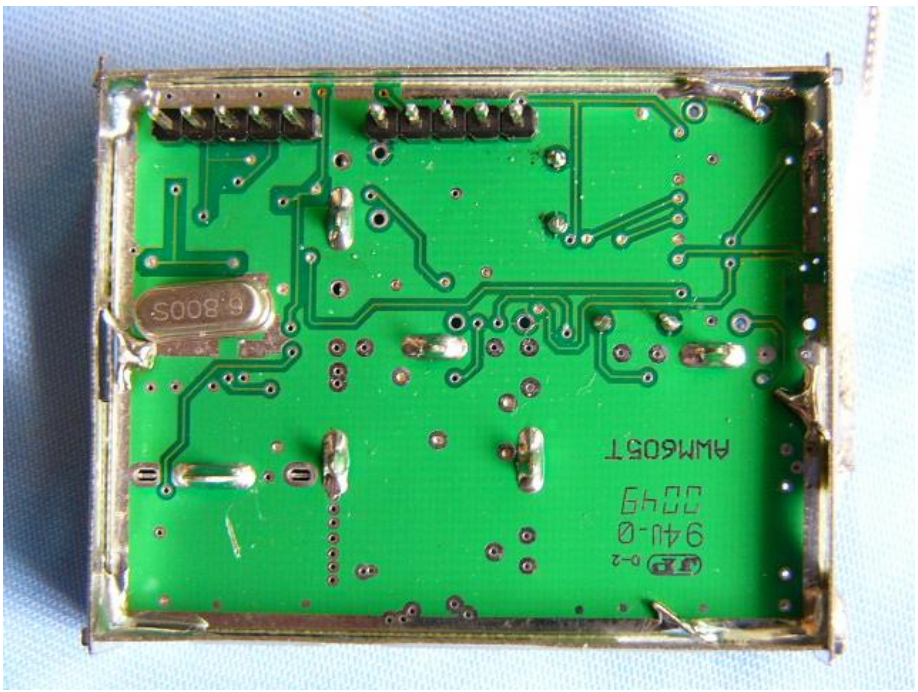


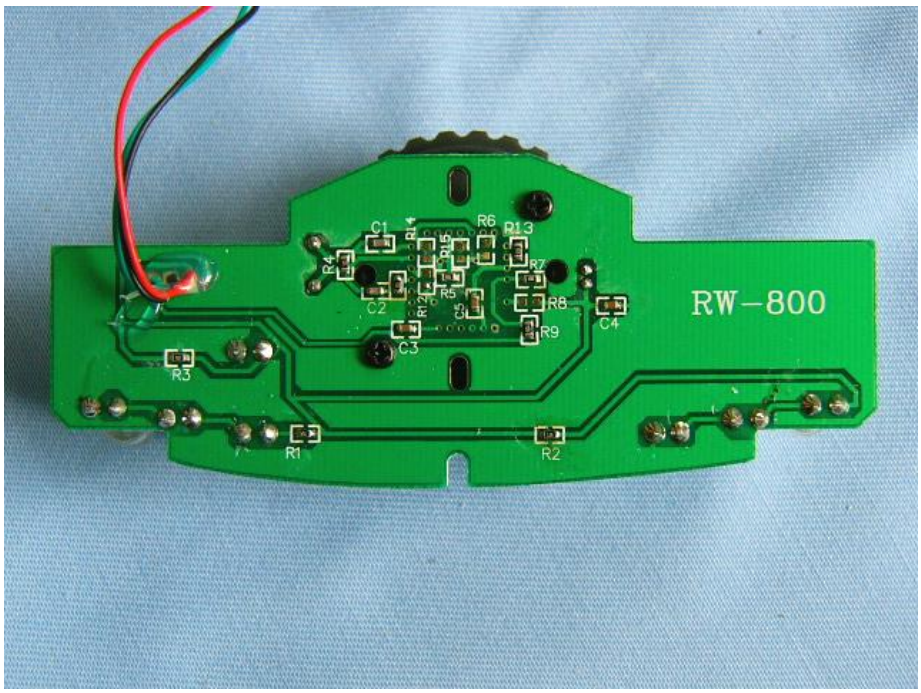




(5) Main board solder side






RW-800
C1
R6
R13
R4
R7
C2
R5
R8
C4
R9
C3
R3
R1
R2

8. FCC ID Label

FCC ID: RFQ-GW302

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 Mark Location

9. 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, 2002	Oct.18, 2003
Signal Generator	Rohde & Schwarz	SMT03	100059	Feb.01, 2003	Feb.01, 2004
Bilog Antenna	Chase	CBL6111C	2576	Feb.01, 2003	Feb.01, 2004
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, 2003	Feb.27, 2004
AMN	Rohde & Schwarz	ESH3-Z5	100002	Feb. 01, 2003	Feb.01, 2004
LISN	Kyoritsu	KNW-407	8-1441-8	Feb. 23, 2003	Feb.23, 2004
EMI Test Receiver	Rohde & Schwarz	ESI26	838786/013	Feb. 01, 2003	Feb.01, 2004
Bilog Antenna	Chase	CBL6112B	2591	Feb. 01, 2003	Feb.01, 2004
Horn Antenna	Rohde & Schwarz	HF906	100014	Feb. 01, 2003	Feb.01, 2004
Radio Communication Test Set	IFR	2955B	100015	Feb 01, 2003	Feb 01, 2004
Multifunction Synthesizer	Hewlett-Packard	8904A	100016	Feb 01, 2003	Feb 01, 2004
Temperature Chamber	TABAI	PSL-4GTW	N/A	Feb 06,2003	Feb 06, 2004
3m Semi-Anechoic Chamber	Albatross Projects	9mX6mX6m	N/A	Feb. 01, 2003	Feb.01, 2004