FCC TEST REPORT

for

47 CFR Part 15 Subpart C

Equipment : **W11 GPRS with WLAN PC Card**

Model No. : **56W11**

FCC ID : **JVP56W11**

Filing Type : **Certification**

Applicant : **BENQ Corporation**
No. 157, Shan-Ying Road, Gueishan Taoyuan 333, Taiwan, R.O.C.

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SPORTON International Inc.
6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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History of this test report

Original Report Issue Date: Feb. 13, 2004

■ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description
	March 02, 2004	Highest frequency and 6 dB bandwidth

Certificate No. : F413003-01

CERTIFICATE OF COMPLIANCE

for

47 CFR Part 15 Subpart C

Equipment	:	**W11 GPRS with WLAN PC Card**
Model No.	:	**56W11**
FCC ID	:	**JVP56W11**
Filing Type	:	**Certification**
Applicant	:	**BENQ Corporation** No. 157, Shan-Ying Road, Gueishan Taoyuan 333, Taiwan, R.O.C.

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 2001** and the equipment under test was ***passed*** all test items required in FCC Part 15 subpart C, relative to the equipment under test. Testing was carried out on Feb. 12, 2004 at **SPORTON International Inc.** LAB.

Daniel Lee

Manager

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

BENQ Corporation
No. 157, Shan-Ying Road, Gueishan Taoyuan 333, Taiwan, R.O.C.

1.2 Manufacturer

Same as 1.1

1.3 Basic Description of Equipment under Test

Equipment	: W11 GPRS with WLAN PC Card
Trade Name	: BenQ
Model No.	: 56W11
Power Supply Type	: From system
AC Power Cord	: AC 100~240V, Non-shielded, Wall-Mount
DC Power Cable	: DC 12V, Non-shielded, 1.8 meter, 3 pin

1.4 Feature of Equipment under Test

Product Feature & Specification				
1. Type of Modulation	DBPSK , DQPSK, CCK			
2. Number of Channels	USA/Canada: 11	V	European: 13	V
	Japan: 13,14	X	Other:	
3. Frequency Band	2.400 ~ 2.4835GHz			
4. Carrier Frequency of each channel	2412MHz+(n-1)*5MHz, n=1~13			
5. Channel Spacing of each channel	5MHz			
6. Maximum Output Power to Antenna	18.3dBm			
7. Antenna Type / Class and Gain	PCB Antenna / 0dBi			
8. Function Type	Transmitter		Transceiver	V
9. Power Rating (DC/AC , Voltage)	DC 5V+/-0.5V			
10. Basic function of product	Wireless data communication			
11. Temperature Range (Operating)	0°C ~ 55°C			
12. Humidity	15% at 85%RH			

2 Test Configuration of Equipment under Test

2.1 Test Manner

a. The EUT has been associated with peripherals pursuant to ANSI C63.4-2001 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
b. The complete test system included LOGITECH USB Mouse, EPSON Printer, ACEEX Modem, and EUT as local workstation and DELL Notebook, Gateway USB Keyboard as Remote workstation for EMI test.
b. For WLAN emission The EUT can operate on eleven channels from 2412.0MHz to 2462.0MHz. (as listed in section 1.4).
c. The following test modes were pretested for conduction test:
   Mode 1: Tx CH01（2412MHz）
   Mode 2: Tx CH06（2437MHz）
   Mode 3: Tx CH11（2462MHz）
d. The following test modes were pretested for radiation test:
   Mode 1: Tx CH01_HF（2412MHz）
   Mode 2: Tx CH06_HF（2437MHz）
   Mode 3: Tx CH11_LF（2462MHz）
   Mode 4: Tx CH11_HF（2462MHz）
e. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 25000MHz.

2.2 Description of Test System

Support Unit 1. – Notebook (DELL)-local workstation and remote workstation

FCC ID	: E2K24CLNS
Model No.	: PP05L
Power Supply Type	: From system
Power Cord	: Shielded, 0.9m
Serial No.	: SP0037
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. –(USB) Mouse (LOGITECH) –local workstation

FCC ID	: N/A
Model No.	: M-BE58
Serial No.	: SP0052
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 3. – Printer (EPSON) –local workstation

FCC ID	: N/A
Model No.	: STYLUS COLOR 680
Serial No.	: SP0041
Power Cord	: Non-Shielded
Data Cable	: Shielded, 1.35m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

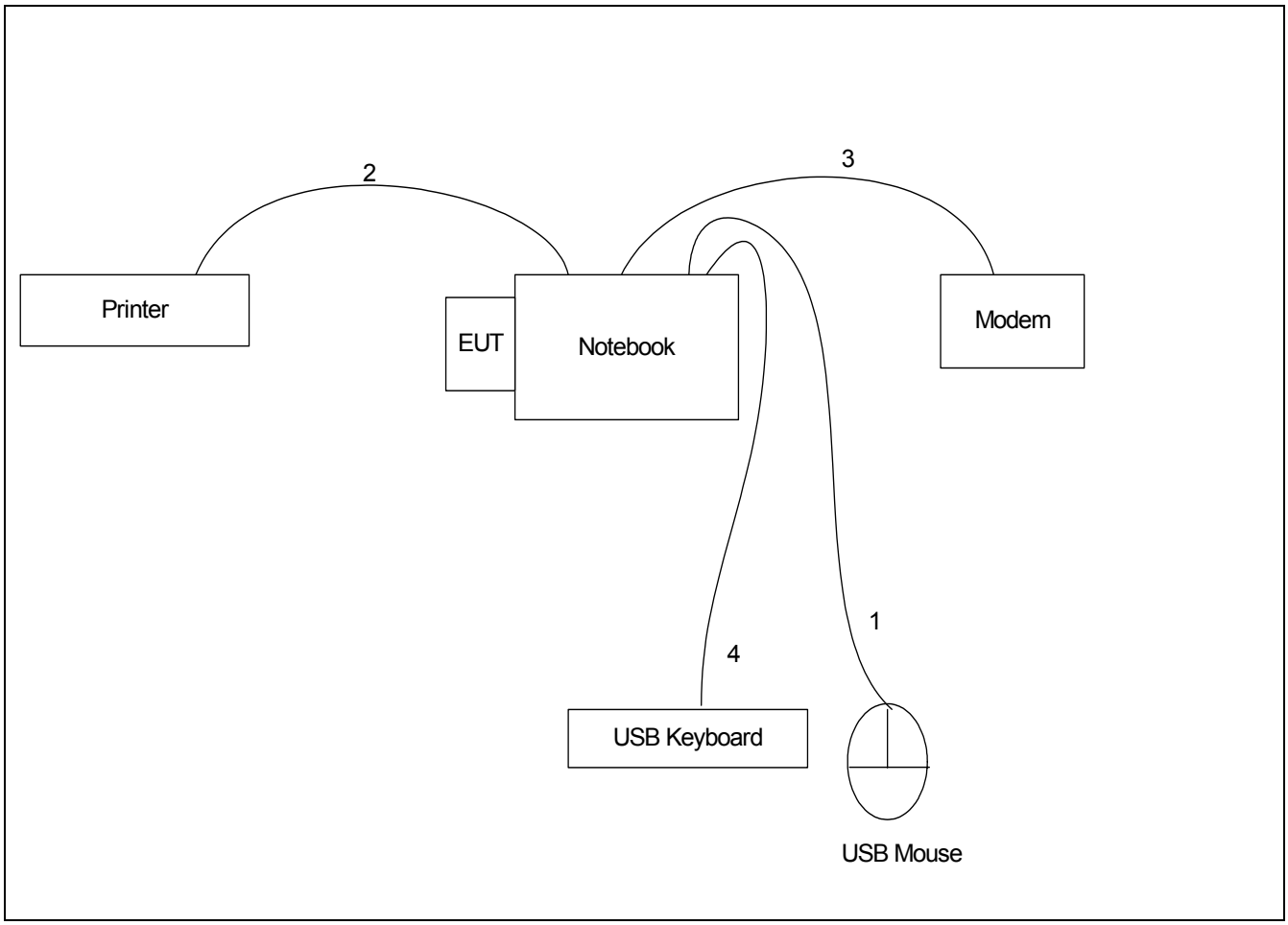
Support Unit 4. – Modem (ACEEX) –local workstation

FCC ID	: IFAXDM141
Model No.	: DM141
Power Supply Type	: Linear
Power Cord	: Shielded, 1.15m
Serial No.	: SP0048
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 5. – USB keyboard (Gateway) –local workstation

FCC ID	: N/A
Model No.	: SK-9900V
Serial No.	: SP0049
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

2.3 Connection Diagram of Test System



1. The I/O cable is connected from Notebook to the support unit 2
2. The I/O cable is connected from Notebook to the support unit 3
3. The I/O cable is connected from Notebook to the support unit 4
4. The I/O cable is connected from Notebook to the support unit 5

3 Operation of Equipment under Test

An executive program, EMCTEST.EXE on WIN2000 continuously generating a complete line of “H“ pattern, was used as the test software.

The program was executed as follows:

a. Turn on the power of all equipment.
b. The PC reads the test program from the hard disk drive and runs it.
c. The PC sends “H” messages to the monitor, and the monitor displays “H“ patterns on the screen.
d. The PC sends “H” messages to the printer, then the printer prints them on the paper.
e. The PC sends “H” messages to the internal hard disk , and the hard disk reads and writes the message.
f. Repeat the steps from c to e.

At the same time, the following program was executed:

“RF Hard ware Test” sends continuous Tx.

4 General Information of Test

Test Site Location	:	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-318-0055
Test Site No	:	CO01-HY, 03CH03-HY

4.1 Test Voltage

110V/ 60Hz

4.2 Standard for Methods of Measurement

ANSI C63.4-2001

4.3 Test in Compliance with

47 CFR Part 15 Subpart C

4.4 Frequency Range Investigated

a. Conduction: from 150 kHz to 30 MHz
b. Radiation: from 30 MHz to 12750 MHz

4.5 Test Distance

The test distance of radiated emission from antenna to EUT is 3 M.

5 Report of Measurements and Examinations

5.1 List of Measurements and Examinations

FCC Rule	Description of Test	Result
15.207	Conducted Emission	Pass
15.247(a)(2)	6dB Bandwidth	Pass
15.247(b)	Maximum Peak Output Power	Pass
15.209	Radiated Emission	Pass
15.247(c)	100kHz Bandwidth of Frequency Band Edges	Pass
15.247(d)	Power Spectral Density	Pass
15.203	Antenna Requirement	Pass

5.2 6dB Bandwidth

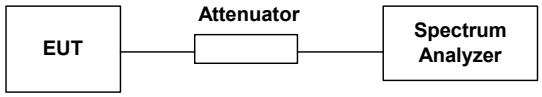
5.2.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.2.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 100KHz and VBW to 100KHz.
3. The 6 dB bandwidth is defined as the frequency range where the power is higher than the peak power minus 6dB.

5.2.3 Test Setup Layout：



5.2.4 Test Result：

- Mode 1~3 : WLAN Tx mode
- Temperature : 23 °C
- Relative Humidity : 51%

Channel	Frequency (MHz)	6dB Emission bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
01	2412	8.5	0.5	1
06	2437	8.5	0.5	2
11	2462	8.5	0.5	3

5.3 Power Spectral Density

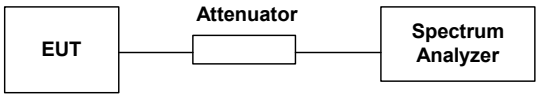
5.3.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.3.2 Test Procedure：

1. The transmitter output was connected to spectrum analyzer through an attenuator.
2. The spectrum analyzer's resolution bandwidth was set at 3KHz RBW and 30KHz VBW as that of the fundamental frequency. Set the sweep time=span/3KHz.
3. The power spectral density was measured and recorded.
4. The sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

5.3.3 Test Setup Layout：



5.3.4 Test Result：

- Mode 1~3: WLAN Tx mode
- Temperature : 23°C,
- Relative Humidity : 51%

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)	Plot Ref. No.
01	2412	-13.53	8	4
06	2437	-13.61	8	5
11	2462	-13.52	8	6

5.4 Band Edges Measurement

5.4.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.4.2 Test Procedure：

1. The transmitter output was connected to the spectrum analyzer via a low lose cable.
2. Set both RBW and VBW of spectrum analyzer to 100KHz with suitable frequency span including 100 KHz bandwidth from band edge.
3. The band edges was measured and recorded.

5.4.3 Test Result：

- Mode 1 and 3 : WLAN Tx mode
- Temperature : 23°C,
- Relative Humidity : 51%

- Test Result in lower band (Channel 1) : PASS
- Test Result in higher band (Channel 11) : PASS

5.4.4 Note on Band edge Emission

The band edge emission plot on appendix B page B7 shows 53.29 dB delta between carrier maximum power and local maximum emission in the restricted band (2366.5 MHz).

The band edge emission plot on appendix B page B8 shows 54.26 dB delta between carrier maximum power and local maximum emission in the restricted band (2493.9 MHz).

Channel	Polarity	The emission of carrier power strength	The maximum field strength in restricted band	Limit	Margin	Result
		(dB μ V/m)	(dB μ V/m)	(dB μ V/m)	(dB)	
CH01	V	110.07	56.78	74	-17.22	Peak
	V	101.84	48.55	54	-5.45	Average
	H	107.68	54.39	74	-19.61	Peak
	H	99.9	46.61	54	-7.39	Average

Channel	Polarity	The emission of carrier power strength	The maximum field strength in restrict band	Limit	Margin	Result
		(dB μ V/m)	(dB μ V/m)	(dB μ V/m)	(dB)	
Ch11	V	106.12	51.86	74	-22.14	Peak
	V	98.37	44.11	54	-9.89	Average
	H	105.66	51.4	74	-22.6	Peak
	H	97.51	43.25	54	-10.75	Average

＊The maximum field strength in restricted band is the emission of carrier power strength minus the delta between carrier maximum power and local maximum emission in the restricted band.

5.5 Peak Output Power

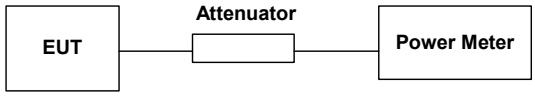
5.5.1 Measuring Instruments：

As described in chapter 7 of this test report.

5.5.2 Test Procedure：

The antenna port（RF output）of the EUT was connected to the input（RF input）of a power meter. The power is equal to the reading land on power meter plus cable loss at the EUT antenna terminal.

5.5.3 Test Setup Layout：



5.5.4 Test Result：

- Mode 1~3 : WLAN Tx mode
- Temperature : 23°C
- Relative Humidity : 51 %
- Antenna Gain: 0 dBi

Channel	Frequency (MHz)	Measured Output Power (mWatt)	Measured Output Power (dBm)	Limits (Watt/dBm)
01	2412	67.60	18.30	1W/30 dBm
06	2437	60.25	17.80	1W/30 dBm
11	2462	57.80	17.62	1W/30 dBm

5.6 Test of Conducted Emission

Conducted emissions were measured from 150 KHz to 30 MHz with a bandwidth of 9 KHz and return leads of the EUT according to the methods defined in ANSI C63.4-2001 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

5.6.1 Major Measuring Instruments：

● Test Receiver	(R&S ESCS 30)
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

5.6.2 Test Procedures：

a. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
b. Connect EUT to the power port of the line impedance stabilization network (LISN).
c. All the support units are connect to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 KHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

5.6.3 Test Result of Conducted Emission：

Frequency Range of Test : from 150KHz to 30 MHz. 6dB Bandwidth : 9KHz

- Test Mode : Mode 1
- Temperature : 22.5°C
- Relative Humidity : 50 %

■ The test that passed at minimum margin was marked by the frame in the following table.

Site : CO01-HV
Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
EUT : Tri Band GSM/WLAN(802-11B) PCMCIA Card
Power : AC 110V/60Hz
Model : 56W11
Memo : 802.11b Tx CH01 2412MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.162	45.24	-20.14	65.38	45.02	0.10	0.12	QP
2	0.162	32.11	-23.27	55.38	31.89	0.10	0.12	Average
3	0.164	44.95	-20.32	65.27	44.73	0.10	0.12	QP
4	0.164	30.88	-24.39	55.27	30.66	0.10	0.12	Average
5	0.213	26.96	-26.13	53.09	26.73	0.10	0.13	Average
6	0.213	40.75	-22.34	63.09	40.52	0.10	0.13	QP
7	0.282	33.13	-27.63	60.76	32.94	0.10	0.09	QP
8	0.282	18.76	-32.00	50.76	18.57	0.10	0.09	Average
9	0.334	23.27	-36.09	59.36	23.10	0.10	0.07	QP
10	0.334	9.82	-39.54	49.36	9.65	0.10	0.07	Average
11	8.906	34.52	-25.48	60.00	34.20	0.19	0.13	QP
12	8.906	28.52	-21.48	50.00	28.20	0.19	0.13	Average

Site : CO01-HV
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : Tri Band GSM/WLAN(802-11B) PCMCIA Card
Power : AC 110V/60Hz
Model : 56W11
Memo : 802.11b Tx CH01 2412MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	51.32	-14.68	66.00	51.11	0.10	0.11	QP
2	0.150	35.12	-20.88	56.00	34.91	0.10	0.11	Average
3	0.159	33.58	-21.94	55.52	33.36	0.10	0.12	Average
4	0.159	49.96	-15.56	65.52	49.74	0.10	0.12	QP
5	0.187	41.75	-22.42	64.17	41.52	0.10	0.13	QP
6	0.187	25.12	-29.05	54.17	24.89	0.10	0.13	Average
7	0.223	41.03	-21.67	62.70	40.81	0.10	0.12	QP
8	0.223	27.94	-24.76	52.70	27.72	0.10	0.12	Average
9	0.270	13.86	-37.26	51.12	13.66	0.10	0.10	Average
10	0.270	29.42	-31.70	61.12	29.22	0.10	0.10	QP
11	8.581	28.64	-21.36	50.00	28.31	0.20	0.13	Average
12	8.581	34.75	-25.25	60.00	34.42	0.20	0.13	QP

Test Engineer : Jones Tsai Jones Tsai

Frequency Range of Test : from 150KHz to 30 MHz. 6dB Bandwidth : 9KHz

- Test Mode : Mode 2
- Temperature : 22.5°C
- Relative Humidity : 50 %

■ The test that passed at minimum margin was marked by the frame in the following table.

Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
EUT : Tri Band GSM/WLAN(802-11B) PCMCIA Card
Power : AC 110V/60Hz
Model : 56W11
Memo : 802.11b Tx CH06 2437MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	48.25	-17.64	65.89	48.04	0.10	0.11	QP
2	0.152	32.71	-23.18	55.89	32.50	0.10	0.11	Average
3	0.202	40.52	-23.01	63.53	40.28	0.10	0.14	QP
4	0.202	25.48	-28.05	53.53	25.24	0.10	0.14	Average
5	0.227	42.41	-20.15	62.56	42.19	0.10	0.12	QP
6	0.227	30.88	-21.68	52.56	30.66	0.10	0.12	Average
7	0.289	31.99	-28.56	60.55	31.80	0.10	0.09	QP
8	0.289	20.52	-30.03	50.55	20.33	0.10	0.09	Average
9	0.367	32.24	-26.33	58.57	32.09	0.10	0.05	QP
10	0.367	26.35	-22.22	48.57	26.20	0.10	0.05	Average
11	8.640	33.85	-26.15	60.00	33.54	0.18	0.13	QP
12	8.640	28.42	-21.58	50.00	28.11	0.18	0.13	Average

Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : Tri Band GSM/WLAN(802-11B) PCMCIA Card
Power : AC 110V/60Hz
Model : 56W11
Memo : 802.11b Tx CH06 2437MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.151	50.23	-15.71	65.94	50.02	0.10	0.11	QP
2	0.151	29.13	-26.81	55.94	28.92	0.10	0.11	Average
3	0.151	44.97	-20.97	65.94	44.76	0.10	0.11	QP
4	0.151	30.12	-25.82	55.94	29.91	0.10	0.11	Average
5	0.172	42.31	-22.55	64.86	42.08	0.10	0.13	QP
6	0.172	27.30	-27.56	54.86	27.07	0.10	0.13	Average
7	0.200	41.85	-21.76	63.61	41.61	0.10	0.14	QP
8	0.200	24.50	-29.11	53.61	24.26	0.10	0.14	Average
9	0.264	24.15	-37.15	61.30	23.95	0.10	0.10	QP
10	0.264	13.75	-37.55	51.30	13.55	0.10	0.10	Average
11	0.370	33.87	-24.64	58.51	33.72	0.10	0.05	QP
12	0.370	28.26	-20.25	48.51	28.11	0.10	0.05	Average

Test Engineer : Jones Tsai Jones Tsai

Frequency Range of Test : from 150KHz to 30 MHz. 6dB Bandwidth : 9KHz

- Test Mode : Mode 3
- Temperature : 22.5°C
- Relative Humidity : 50 %

■ The test that passed at minimum margin was marked by the frame in the following table.

Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
EUT : Tri Band GSM/WLAN(802-11B) PCMCIA Card
Power : AC 110V/60Hz
Model : 56W11
Memo : 802.11b Tx CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.159	46.86	-18.66	65.52	46.64	0.10	0.12	QP
2	0.159	35.04	-20.48	55.52	34.82	0.10	0.12	Average
3	0.169	43.05	-21.96	65.01	42.83	0.10	0.12	QP
4	0.169	28.26	-26.75	55.01	28.04	0.10	0.12	Average
5	0.194	42.78	-21.08	63.86	42.54	0.10	0.14	QP
6	0.194	25.42	-28.44	53.86	25.18	0.10	0.14	Average
7	0.209	41.47	-21.77	63.24	41.24	0.10	0.13	QP
8	0.209	28.25	-24.99	53.24	28.02	0.10	0.13	Average
9	0.232	42.05	-20.33	62.38	41.83	0.10	0.12	QP
10	0.232	30.20	-22.18	52.38	29.98	0.10	0.12	Average
11	0.292	32.03	-28.44	60.47	31.84	0.10	0.09	QP
12	0.292	23.53	-26.94	50.47	23.34	0.10	0.09	Average

Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : Tri Band GSM/WLAN(802-11B) PCMCIA Card
Power : AC 110V/60Hz
Model : 56W11
Memo : 802.11b Tx CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.150	49.19	-16.81	66.00	48.98	0.10	0.11	QP
2	0.150	32.71	-23.29	56.00	32.50	0.10	0.11	Average
3	0.180	42.26	-22.23	64.49	42.03	0.10	0.13	QP
4	0.180	25.92	-28.57	54.49	25.69	0.10	0.13	Average
5	0.197	41.30	-22.44	63.74	41.06	0.10	0.14	QP
6	0.197	25.61	-28.13	53.74	25.37	0.10	0.14	Average
7	0.223	42.39	-20.32	62.71	42.17	0.10	0.12	QP
8	0.223	31.01	-21.70	52.71	30.79	0.10	0.12	Average
9	0.252	28.72	-32.97	61.69	28.51	0.10	0.11	QP
10	0.252	17.36	-34.33	51.69	17.15	0.10	0.11	Average
11	0.369	33.85	-24.67	58.52	33.70	0.10	0.05	QP
12	0.369	28.22	-20.30	48.52	28.07	0.10	0.05	Average

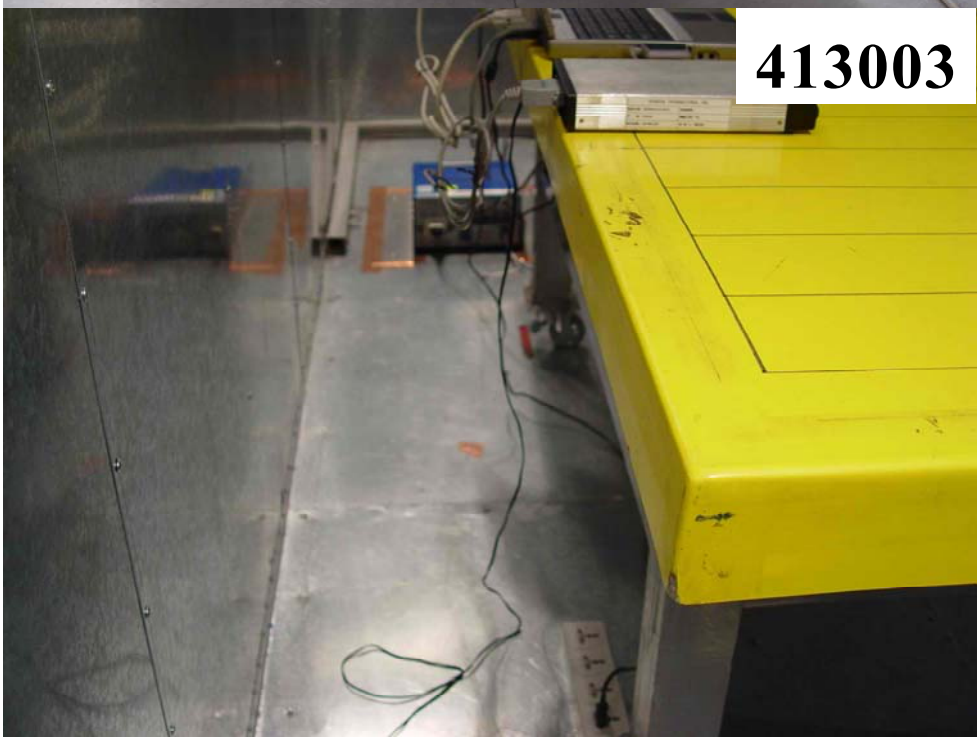
Test Engineer : Jones Tsai Jones Tsai

5.6.4 Photographs of Conducted Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW

REAR VIEW



SIDE VIEW

5.7 Test of Radiated Emission

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2001. The EUT was placed, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

5.7.1 Major Measuring Instruments

● Amplifier	(MITEQ AFS44)
RF Gain	40 dB
Signal Input	100 MHz to 26.5 GHz

● Amplifier	(HP8447D)
RF Gain	30 dB
Signal Input	100 MHz to 1.3 GHz

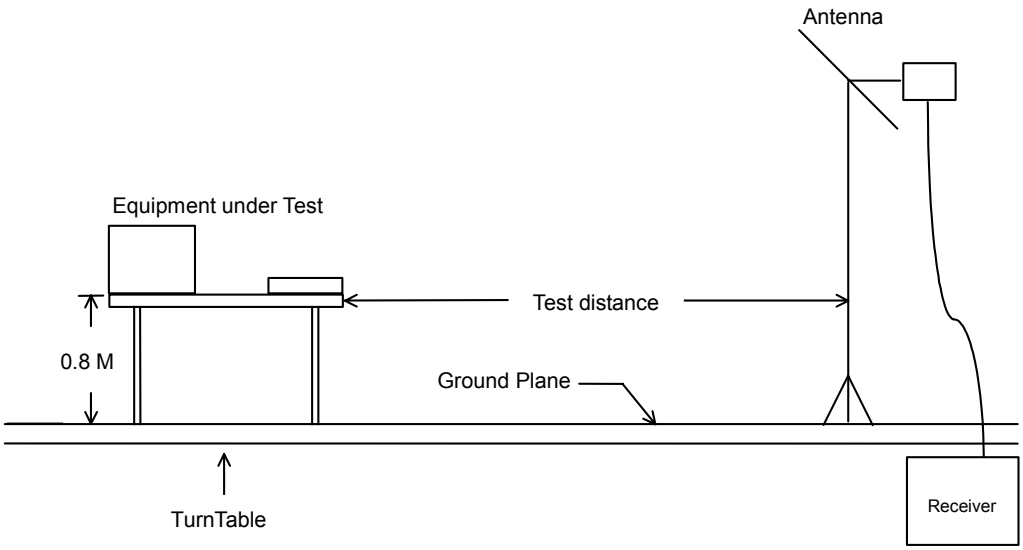
● Spectrum analyzer	(R&S FSP40)
Attenuation	10 dB
Start Frequency	1 GHz
Stop Frequency	25 GHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	9 KHz to 40 GHz

● Spectrum analyzer	(R&S FSP40)
Attenuation	10 dB
Start Frequency	30MHz
Stop Frequency	1 GHz
Resolution Bandwidth	120 KHz
Video Bandwidth	300KHz
Signal Input	9 KHz to 40 GHz

5.7.2 Test Procedures

1. The EUT was placed on a rotatable table top 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported.
8. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

5.7.3 Typical Test Setup Layout of Radiated Emission



5.7.4 Test Result of Radiated Emission

- Test Mode: Mode 1
- Test Distance : 3 M
- Temperature : 23 °C
- Relative Humidity :51 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test that passed at minimum margin was marked by the frame in the following table.

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 VERTICAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH01 2412MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	2390.000	41.90	-12.10	54.00	53.12	28.20	1.72	41.14	Average	121	324
2	2390.000	53.04	-20.96	74.00	64.26	28.20	1.72	41.14	Peak	121	324
5	2483.500	41.14	-12.86	54.00	52.13	28.39	1.82	41.20	Average	128	337
6	2483.500	52.04	-21.96	74.00	63.03	28.39	1.82	41.20	Peak	128	337

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 HORIZONTAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH01 2412MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	2390.000	51.85	-22.15	74.00	63.07	28.20	1.72	41.14	Peak	124	346
2	2390.000	41.12	-12.88	54.00	52.34	28.20	1.72	41.14	Average	124	346
5	2483.500	42.12	-11.88	54.00	53.11	28.39	1.82	41.20	Average	124	346
6	2483.500	53.16	-20.84	74.00	64.15	28.39	1.82	41.20	Peak	124	346

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 VERTICAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH01 2412MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	4821.000	47.20	-26.80	74.00	54.03	33.06	2.47	42.36	Peak	142	348

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 HORIZONTAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH01 2412MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	4821.000	44.66	-29.34	74.00	51.49	33.06	2.47	42.36	Peak	132	326

- For 4.821GHz ~ 25GHz

  Remark: Frequency from 4821MHz to 25GHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2414.000	V	28.25	1.74	80.08	-	-	110.07	318786.56	-	Peak
2414.000	V	28.25	1.74	71.85	-	-	101.84	123594.74	-	AV
2414.000	H	28.25	1.74	77.69	-	-	107.68	242102.90	-	Peak
2414.000	H	28.25	1.74	69.91	-	-	99.90	98855.31	-	AV
4821.000	V/H	33.06	2.47	11.67	74.00	5011.87	47.20	229.09	-26.80	AV/Peak
7236.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
9648.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
12060.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
14472.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
16884.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
19296.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
21708.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
24120.000	V/H	-	-	-	-	-	-	-	-	AV/Peak

Remark:
1. The emission emitted by the EUT is too low to be measured except the emission listed above,
2. Reading = Reading on SA-Preamp Factor

Test Engineer : Jones Tsai

Jones Tsai

- Test Mode: Mode 2 (2437 MHz)
- Test Distance : 3 M
- Temperature : 23 °C
- Relative Humidity : 51 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test that passed at minimum margin was marked by the frame in the following table.

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 VERTICAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH06 2437MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	2390.000	40.90	-13.10	54.00	52.12	28.20	1.72	41.14	Average	121	341
2	2390.000	51.90	-22.10	74.00	63.12	28.20	1.72	41.14	Peak	121	341
5	2483.500	41.20	-12.80	54.00	52.19	28.39	1.82	41.20	Average	126	325
6	2483.500	52.43	-21.57	74.00	63.42	28.39	1.82	41.20	Peak	---	---

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 HORIZONTAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH06 2437MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	2390.000	40.91	-13.09	54.00	52.13	28.20	1.72	41.14	Average	125	346
2	2390.000	52.11	-21.89	74.00	63.33	28.20	1.72	41.14	Peak	125	326
5	2483.500	52.69	-21.31	74.00	63.68	28.39	1.82	41.20	Peak	118	336
6	2483.500	42.14	-11.86	54.00	53.13	28.39	1.82	41.20	Average	118	336

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 VERTICAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH06 2437MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	4869.000	50.54	-23.46	74.00	57.29	33.16	2.52	42.43	Peak	140	329

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 HORIZONTAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH06 2437MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	4878.000	46.37	-27.63	74.00	53.12	33.18	2.51	42.44	Peak	137	343

- For 4.878GHz ~ 25GHz

  Remark: Frequency from 4878MHz to 25GHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2436.000	V	28.29	1.76	79.28	-	-	109.33	292752.09	-	AV
2436.000	V	28.29	1.76	72.24	-	-	102.29	130166.73	-	Peak
2438.000	H	28.30	1.76	76.07	-	-	106.13	202534.96	-	AV
2438.000	H	28.30	1.76	68.81	-	-	98.87	87801.11	-	Peak
4869.000	V/H	33.16	2.52	14.86	74.00	5011.87	50.54	336.51	-23.46	AV/Peak
7311.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
9748.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
12185.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
14622.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
17059.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
19496.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
21933.000	V/H	-	-	-	-	-	-	-	-	AV/Peak
24370.000	V/H	-	-	-	-	-	-	-	-	AV/Peak

Remark:
1. The emission emitted by the EUT is too low to be measured except the emission listed above,
2. Reading = Reading on SA-Preamp Factor

Test Engineer : Jones Tsai

Jones Tsai

- Test Mode: Mode 3 (2462 MHz)
- Test Distance : 3 M
- Temperature : 23 °C
- Relative Humidity : 51 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test that passed at minimum margin was marked by the frame in the following table.

Site : 03CH03-HY
Condition : FCC CLASS-B 3m BIC-9124--301 VERTICAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	40.710	25.02	-14.98	40.00	40.41	11.41	1.22	28.02	QP	152	352
2 !	66.380	36.94	-3.06	40.00	54.18	9.17	1.56	27.97	Peak	---	---

Site : 03CH03-HY
Condition : FCC CLASS-B 3m BIC-9124--301 HORIZONTAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1 !	66.380	35.74	-4.26	40.00	52.98	9.17	1.56	27.97	Peak	135	332
2	198.470	35.21	-8.29	43.50	45.39	14.76	2.76	27.70	Peak	---	---

Site : 03CH03-HY
Condition : FCC CLASS-B 3m LOG-9111-221 VERTICAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	452.000	37.88	-8.12	46.00	45.21	16.57	4.37	28.27	Peak	131	340
2	732.800	34.32	-11.68	46.00	37.48	19.94	5.63	28.73	Peak	---	---

Site : 03CH03-HY
Condition : FCC CLASS-B 3m LOG-9111-221 HORIZONTAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	265.600	39.73	-6.27	46.00	51.34	12.50	3.33	27.44	Peak	141	341
2	363.200	38.69	-7.31	46.00	46.96	15.26	4.08	27.61	Peak	---	---

Test Engineer : Jones Tsai

Jones Tsai

- Test Mode: Mode 4 (2402MHz)
- Test Distance : 3 M
- Temperature : 23 °C
- Relative Humidity : 51 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test that passed at minimum margin was marked by the frame in the following table.

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 VERTICAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	2390.000	52.00	-22.00	74.00	63.22	28.20	1.72	41.14	Peak	120	323
2	2390.000	37.01	-16.99	54.00	48.23	28.20	1.72	41.14	Average	120	323
5	2483.500	54.25	-19.75	74.00	65.24	28.39	1.82	41.20	Peak	100	323
6	2483.500	40.02	-13.98	54.00	51.01	28.39	1.82	41.20	Average	100	323

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 HORIZONTAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	2390.000	51.41	-22.59	74.00	62.63	28.20	1.72	41.14	Peak	118	342
2	2390.000	39.43	-14.57	54.00	50.65	28.20	1.72	41.14	Average	118	342
5	2483.500	40.91	-13.09	54.00	51.90	28.39	1.82	41.20	Average	121	323
6	2483.500	52.14	-21.86	74.00	63.13	28.39	1.82	41.20	Peak	121	323

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 VERTICAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1 !	4926.000	48.62	-5.38	54.00	55.39	33.27	2.47	42.51	Average	125	323

Site : 03CH03-HY
Condition : FCC CLASS-B 3m HORN-ANT-6741 HORIZONTAL
EUT : Tri Band GSM/WLAN (802.11b) PCMCIA Card
Power : AC 110V / 60Hz
Model : 56W11
Memo : TX CH11 2462MHz

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	4926.000	47.48	-26.52	74.00	54.25	33.27	2.47	42.51	Peak	131	342

- For 4.926GHz ~ 25GHz

  Remark: Frequency from 4926MHz to 25GHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2462.000	V	28.35	1.79	75.98	-	-	106.12	202301.92	-	Peak
2462.000	V	28.35	1.79	68.23	-	-	98.37	82889.59	-	AV
2462.000	H	28.35	1.79	75.52	-	-	105.66	191866.87	-	Peak
2462.000	H	28.35	1.79	67.37	-	-	97.51	75075.81	-	AV
4926.000	V/H	33.27	2.47	12.88	54.00	501.19	48.62	269.77	-5.38	AV/Peak
7236.000	V/H									AV/Peak
9648.000	V/H									AV/Peak
12060.000	V/H									AV/Peak
14472.000	V/H									AV/Peak
16884.000	V/H					-	-			AV/Peak
19296.000	V/H						-			AV/Peak
21708.000	V/H						-			AV/Peak
24120.000	V/H						-			AV/Peak

Remark:
1. The emission emitted by the EUT is too low to be measured except the emission listed above,
2. Reading = Reading on SA-Preamp Factor

Test Engineer : Jones Tsai

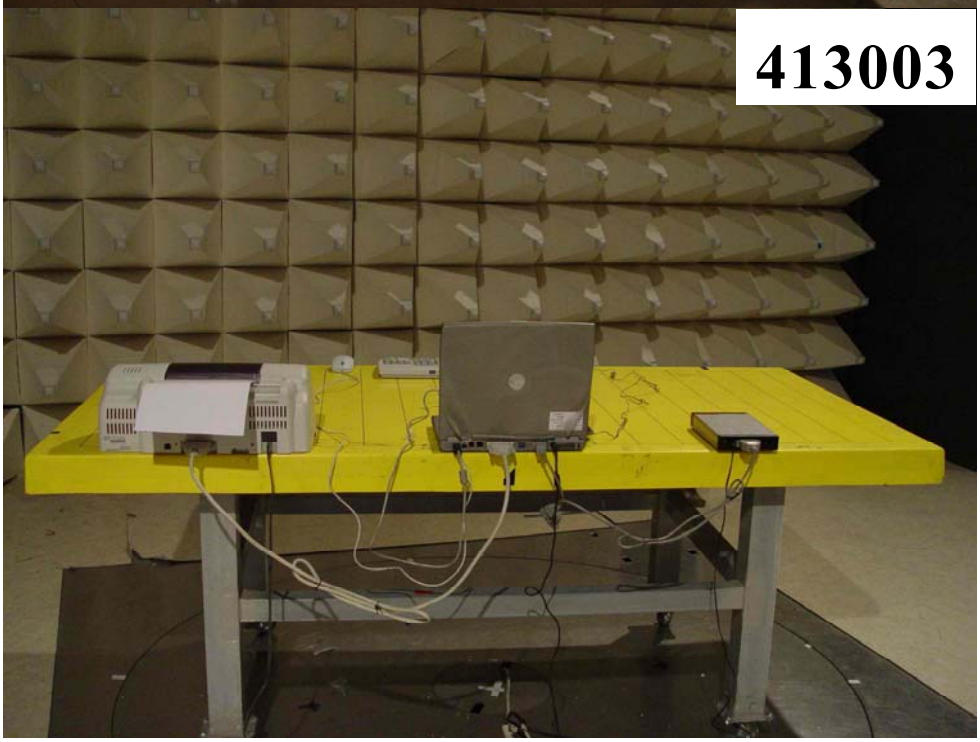
Jones Tsai

5.7.5 Photographs of Radiated Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW

REAR VIEW



5.8 Antenna Requirements

The EUT use an embedded PCB antenna without connector. It is considered to meet antenna requirement of FCC.

5.8.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no other antenna except assembled by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

5.8.2 Antenna Connected Construction

The antenna used in this product is embedded PCB antenna without connector.

6 List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2003	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 23, 2003	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Radiation (03CH03-HY)
Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 24, 2003	Radiation (03CH03-HY)
Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 24, 2003	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 03, 2003	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Jul. 23, 2003	Radiation (03CH03-HY)
Horn Antenna	COM-POWER	3115	6741	1GHz – 18GHz	Apr. 08, 2003	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Horn Antenna	Schwarzbeck	BBHA9170	154	15GHz~40GHz	Jun. 02, 2003	Radiation (03CH03-HY)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Dec. 05, 2003	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year, except for Horn Antenna, BBHA9170.

※ Calibration Interval of Horn Antenna, BBHA9170, is three years.

7 Uncertainty of Test Site

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	3m
Antenna factor calibration	normal(k=2)	±1
cable loss calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
Antenna Directivity	rectangular	±3
Antenna Factor V.S. Height	rectangular	±2
Antenna Factor Interpolation for Frequency	rectangular	±0.25
site imperfection	rectangular	±2
Mismatch Receiver VSWR Γ1=0.09 Antenna VSWR Γ2=0.67 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	±0.54
combined standard uncertainty Ue(y)	normal	±2.7
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±5.4

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+0.5^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.2$ for 10m test distance

$U=\sqrt{\{(1/2)^2+(0.3/2)^2+(2^2+3^2+2^2+0.25^2+2^2)/3+(0.54)^2/2\}}=2.7$ for 3m test distance

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	±0.3
RCV/SPA specification	rectangular	±2
LISN coupling specification	rectangular	±1.5
Transducer factor frequency interpolation	rectangular	±0.2
Mismatch Receiver VSWR Γ1=0.09 LISN VSWR Γ2=0.33 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	0.2
combined standard uncertainty Ue(y)	normal	±1.66
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±3.32

$U=\sqrt{\{(0.3/2)^2+(2^2+1.5^2+0.2^2)/3+(0.2)^2/2\}}=1.66$