

FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : Wireless LAN USB Adaptor

Model No. : GWM2-UBA

FCC ID : RGWGWM2UBA

Filing Type : Certification

Applicant : **Gincom Technology Corp.**
15F, No. 284, Sec. 3, Sanmin Rd.,
Taoyuan City, Taoyuan, Taiwan 330, 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: Oct. 16, 2003

No additional attachment.

Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 15, Subpart C

Equipment : Wireless LAN USB Adaptor

Model No. : GWM2-UBA

FCC ID : RGWGWM2UBA

Filing Type : Certification

Applicant : **Gincom Technology Corp.**
15F, No. 284, Sec. 3, Sanmin Rd.,
Taoyuan City, Taoyuan, Taiwan 330, 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 Oct. 15, 2003 at **SPORTON International Inc. LAB.**



Alex Chen
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

Gincom Technology Corp.
15F, No. 284, Sec. 3, Sanmin Rd.,
Taoyuan City, Taoyuan, Taiwan 330, R.O.C.

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

Equipment	: Wireless LAN USB Adaptor
Model No.	: GWM2-UBA
FCC ID.	: RGWGWM2UBA
Trade Name	: Gincom
Power Supply Type	: For system
AC Power Input	: N/A

1.4. Feature of Equipment under Test

Host/Radio Interface	DSSS
Type of Modulation	11M/5Mbps:CCK, 2Mbps:DQPSK, 1Mbps:DBPSK
Number of Channels	11
Frequency Band	2.4~2.4835GHz (subject to local regulations)
Carrier Frequency of each channel	$[(N-1)*5+2412]$ GHz
Bandwidth of each channel	22MHz
Maximum Output Power of Antenna	15.66dBm
IF & L.O. frequency	Zero IF, Direct conversion
Type of Antenna Connector (Ex: SMA, TNC, MCX, MMCX, UFC.....etc)	N/A, No connector
Antenna Type / Class and Gain	Chip Antenna, Gain=2dBi
Function Type	Transceiver
Power Rating (DC/AC , Voltage)	DC 5V
Duty Cycle	50%
Basic function of product	Wireless Networking
Temperature Range (Operating)	0 - 50 °C
Humidity	Max 95%, non-condensing

2. Test Configuration of Equipment under Test

2.1. Test Manner

- a. The EUT has been associated with notebook and peripherals pursuant to ANSI C63.4-2001 and configuration operated in a manner, which tended to maximize its emission characteristics in a typical application.
- b. The complete test system included COMPAQ NOTEBOOK, VIEWSONIC Monitor, LOGITECH PS/2 Keyboard, LOGITECH USB Mouse, EPSON Printer and EUT for EMI test.
- c. The EUT can operate on eleven channels from 2412.0MHz to 2462.0MHz. (as listed in section 1.4). According to 15.31(m), three channels (one near top, one near middle and one near bottom) were performed as following:
Mode 1: 2412MHz (Channel 01)
Mode 2: 2437MHz (Channel 06)
Mode 3: 2462MHz (Channel 11)
- d. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 25000MHz.

2.2. Description of Test System

Support Unit 1. – Notebook (COMPAQ)

FCC ID	: N/A
Model No.	: PRESARIO 1500
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0037
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- Monitor (VIEWSONIC)

FCC ID	: N/A
Model No.	: VCDTS21553-3P
Power Supply Type	: Switching
Power Cord	: Non-Shielded
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. -- PS/2 Keyboard (LOGITECH)

FCC ID : N/A
Model No. : Y-SJ17
Serial No. : SP0054
Data Cable : Shielded, 360 degree via metal backshells, 1.7m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

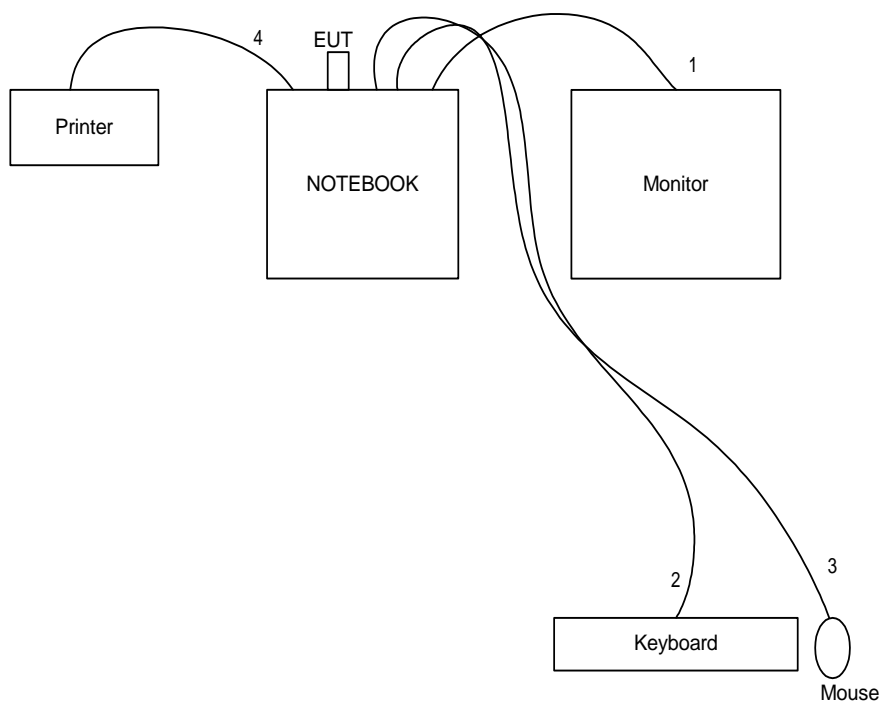
Support Unit 4. -- USB Mouse (LOGITECH)

FCC ID : N/A
Model No. : M-BE58
Serial No. : SP0041
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 5. -- Printer (EPSON)

FCC ID : N/A
Model No. : STYLUS COLOR 680
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0048
Data Cable : Shielded, 1.35m

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 under WIN XP, which generates a complete line of continuously repeating "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, one self test program to keep sending signals.

4. General Information of Test

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,
Kwei-Shan Hsiag, 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 for conducted power line test and radiated emission test,
"Guidance on Measurements for Direct Sequence Spread Spectrum Systems" for test of 6dB Bandwidth
"Guidance on Measurements for Direct Sequence Spread Spectrum Systems" for test of Maximum Peak Output Power
"Guidance on Measurements for Direct Sequence Spread Spectrum Systems" for test of 100kHz Bandwidth of Frequency Band Edges
"Guidance on Measurements for Direct Sequence Spread Spectrum Systems" for test of Power Spectral Density

4.3. Test in Compliance with

FCC Part 15, Subpart C

4.4. Frequency Range Investigated

- a. Conduction: from 150 kHz to 30 MHz
- b. Radiation: from 30 MHz to 25000MHz

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
<u>15.247(a)(2)</u>	6dB Bandwidth	Pass
<u>15.247(b)</u>	Maximum Peak Output Power	Pass
15.209	Radiated Emission	Pass
<u>15.247(c)</u>	100kHz Bandwidth of Frequency Band Edges	Pass
<u>15.247(d)</u>	Power Spectral Density	Pass
<u>15.203</u>	Antenna Requirement	Pass
1.1307 1.1310 2.1091 2.1093	RF Exposure Compliance	Pass

5.2. 6dB Bandwidth

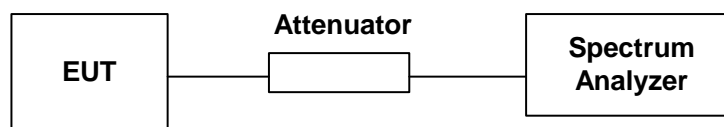
5.2.1. Measuring Instruments :

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 total spectrum the power of which is higher than peak power minus 6 dB.

5.2.3. Test Setup Layout :



5.2.4. Test Result : The spectrum analyzer plots are attached as below

- Temperature : 26 °C
- Relative Humidity : 64%

Channel	Frequency (MHz)	6dB Emission bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
01	2412	10.94	0.5	1
06	2437	11.04	0.5	2
11	2462	11.04	0.5	3

5.3. Peak Output Power

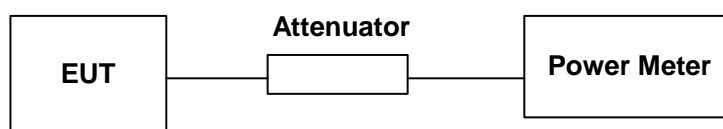
5.3.1. Measuring Instruments :

As described in chapter 7 of this test report.

5.3.2. Test Procedure :

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

5.3.3. Test Setup Layout :



5.3.4. Test Result : See spectrum analyzer plots below

- Temperature : 26°C
- Relative Humidity : 64 %
- Antenna Gain: 10 dBi

Channel	Frequency (MHz)	Measured Output Power (mWatt)	Measured Output Power (dBm)	Limits (Watt/dBm)
01	2412	36.81289736	15.66	1W/30 dBm
06	2437	34.83373150	15.42	1W/30 dBm
11	2462	32.58367010	15.13	1W/30 dBm

- Comments : Maximum Peak Output Power < 30dBm (1Watt)

5.4. Power Spectral Density

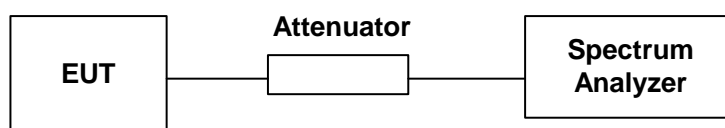
5.4.1. Measuring Instruments :

As described in chapter 7 of this test report.

5.4.2. Test Procedure :

1. The transmitter output was connected to spectrum analyzer through an attenuator.
2. The spectrum analyzer's resolution bandwidth were 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.

5.4.3. Test Setup Layout :



5.4.4. Test Result : See spectrum analyzer plots below

- Temperature : 26°C
- Relative Humidity : 64%

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)	Plot Ref. No.
01	2412	-12.12	8	1
06	2437	-11.83	8	2
11	2462	-10.94	8	3

5.5. 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.

5.5.1. 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

5.5.2. 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 mains through a 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.

5.5.3. Test Result of Conducted Emission :

Frequency Range of Test : from 150KHz to 30 MHz

6dB Bandwidth : 9KHz

- Test Mode : Mode 1
- Temperature : 28°C
- Relative Humidity : 56 %

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

Site : C001-HY

Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE

EUT : USB WLAN

Power : 110V/60Hz

Model : GWM2-UBA

Memo : TX CH01

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.156	46.07	-9.63	55.70	45.93	0.10	0.04	Average
2	0.156	47.02	-18.68	65.70	46.88	0.10	0.04	QP
3	0.181	40.00	-24.44	64.44	39.86	0.10	0.04	QP
4	0.181	13.75	-40.69	54.44	13.61	0.10	0.04	Average
5	1.540	24.90	-31.10	56.00	24.71	0.10	0.09	QP
6	1.540	20.31	-25.69	46.00	20.12	0.10	0.09	Average
7	2.120	22.00	-24.00	46.00	21.79	0.10	0.11	Average
8	2.120	28.72	-27.28	56.00	28.51	0.10	0.11	QP
9	4.340	30.62	-25.38	56.00	30.35	0.11	0.16	QP
10	4.340	25.58	-20.42	46.00	25.31	0.11	0.16	Average
11	12.190	35.44	-24.56	60.00	34.90	0.20	0.34	QP
12	12.190	30.75	-19.25	50.00	30.21	0.20	0.34	Average

Site : C001-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : USB WLAN
Power : 110V/60Hz
Model : GWM2-UBA
Memo : TX CH01

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.159	44.76	-10.76	55.52	44.62	0.10	0.04	Average
2	0.159	45.85	-19.67	65.52	45.71	0.10	0.04	QP
3	0.886	29.85	-26.15	56.00	29.68	0.10	0.07	QP
4	0.886	23.96	-22.04	46.00	23.79	0.10	0.07	Average
5	1.540	29.23	-26.77	56.00	29.04	0.10	0.09	QP
6	1.540	22.52	-23.48	46.00	22.33	0.10	0.09	Average
7	2.205	21.60	-24.40	46.00	21.37	0.11	0.12	Average
8	2.205	28.73	-27.27	56.00	28.50	0.11	0.12	QP
9	4.270	30.75	-25.25	56.00	30.39	0.20	0.16	QP
10	4.270	24.92	-21.08	46.00	24.56	0.20	0.16	Average
11	12.060	35.45	-24.55	60.00	34.86	0.25	0.34	QP
12	12.060	30.56	-19.44	50.00	29.97	0.25	0.34	Average

Test Engineer :



John Huang

- Test Mode : Mode 2
- Temperature : 28°C
- Relative Humidity : 56 %

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

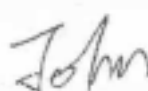
Site : C001-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : USB WLAN
 Power : 110V/60Hz
 Model : GWM2-UBA
 Memo : TX CH06

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.167	44.80	-10.32	55.12	44.66	0.10	0.04	Average
2	0.167	46.43	-18.69	65.12	46.29	0.10	0.04	QP
3	1.158	23.77	-22.23	46.00	23.60	0.10	0.07	Average
4	1.158	29.83	-26.17	56.00	29.66	0.10	0.07	QP
5	1.817	23.31	-22.69	46.00	23.11	0.10	0.10	Average
6	1.817	30.40	-25.60	56.00	30.20	0.10	0.10	QP
7	2.400	28.75	-27.25	56.00	28.53	0.10	0.12	QP
8	2.400	22.56	-23.44	46.00	22.34	0.10	0.12	Average
9	4.110	24.80	-21.20	46.00	24.55	0.10	0.15	Average
10	4.110	31.10	-24.90	56.00	30.85	0.10	0.15	QP
11	12.320	30.77	-19.23	50.00	30.22	0.20	0.35	Average
12	12.320	35.62	-24.38	60.00	35.07	0.20	0.35	QP

Site : C001-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : USB WLAN
Power : 110V/60Hz
Model : GWM2-UBA
Memo : TX CH06

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.164	45.43	-9.83	55.26	45.29	0.10	0.04	Average
2	0.164	46.10	-19.16	65.26	45.96	0.10	0.04	QP
3	0.900	24.66	-21.34	46.00	24.49	0.10	0.07	Average
4	0.900	30.07	-25.93	56.00	29.90	0.10	0.07	QP
5	1.810	30.34	-25.66	56.00	30.14	0.10	0.10	QP
6	1.810	24.15	-21.85	46.00	23.95	0.10	0.10	Average
7	2.200	21.69	-24.31	46.00	21.46	0.11	0.12	Average
8	2.200	28.51	-27.49	56.00	28.28	0.11	0.12	QP
9	4.270	25.42	-20.58	46.00	25.06	0.20	0.16	Average
10	4.270	31.32	-24.68	56.00	30.96	0.20	0.16	QP
11	12.060	35.59	-24.41	60.00	35.00	0.25	0.34	QP
12	12.060	30.63	-19.37	50.00	30.04	0.25	0.34	Average

Test Engineer :



John Huang

- Test Mode : Mode 3
- Temperature : 28°C
- Relative Humidity : 56 %

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

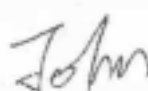
Site : C001-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : USB WLAN
 Power : 110V/60Hz
 Model : GWM2-UBA
 Memo : TX CH11

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.168	44.75	-10.30	55.05	44.61	0.10	0.04	Average
2	0.168	46.41	-18.64	65.05	46.27	0.10	0.04	QP
3	1.195	21.52	-24.48	46.00	21.35	0.10	0.07	Average
4	1.195	26.03	-29.97	56.00	25.86	0.10	0.07	QP
5	1.800	28.05	-27.95	56.00	27.85	0.10	0.10	QP
6	1.800	22.49	-23.51	46.00	22.29	0.10	0.10	Average
7	2.170	27.46	-28.54	56.00	27.25	0.10	0.11	QP
8	2.170	22.39	-23.61	46.00	22.18	0.10	0.11	Average
9	4.110	31.10	-24.90	56.00	30.85	0.10	0.15	QP
10	4.110	25.12	-20.88	46.00	24.87	0.10	0.15	Average
11	12.320	30.77	-19.23	50.00	30.22	0.20	0.35	Average
12	12.320	35.48	-24.52	60.00	34.93	0.20	0.35	QP

Site : C001-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : USB WLAN
Power : 110V/60Hz
Model : GWM2-UBA
Memo : TX CH11

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.165	44.90	-10.32	55.22	44.76	0.10	0.04	Average
2	0.165	46.12	-19.10	65.22	45.98	0.10	0.04	QP
3	0.190	27.95	-36.09	64.04	27.81	0.10	0.04	QP
4	0.190	17.19	-36.85	54.04	17.05	0.10	0.04	Average
5	0.994	25.37	-30.63	56.00	25.21	0.10	0.06	QP
6	0.994	22.70	-23.30	46.00	22.54	0.10	0.06	Average
7	2.190	27.80	-28.20	56.00	27.57	0.11	0.12	QP
8	2.190	23.56	-22.44	46.00	23.33	0.11	0.12	Average
9	4.200	25.08	-20.92	46.00	24.72	0.20	0.16	Average
10	4.200	30.94	-25.06	56.00	30.58	0.20	0.16	QP
11	12.250	30.59	-19.41	50.00	30.00	0.25	0.34	Average
12	12.250	35.29	-24.71	60.00	34.70	0.25	0.34	QP

Test Engineer :



John Huang

5.6. Test of Radiated Emission

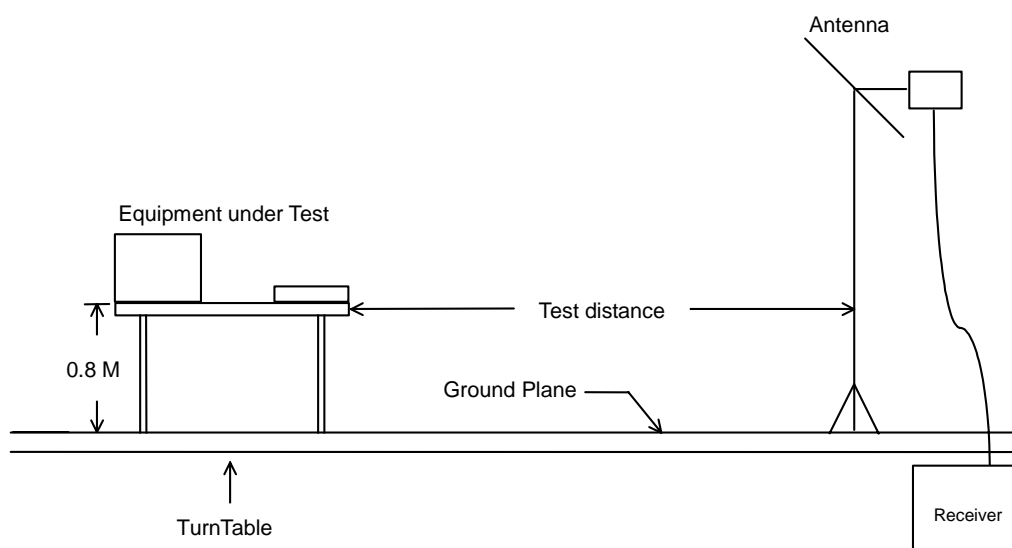
Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2001. The EUT was placed, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the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

5.6.1. Major Measuring Instruments

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

5.6.2. 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 both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
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 turn table (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 which do not have 3 dB margin 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 peak 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.

5.6.3. Typical Test Setup Layout of Radiated Emission

5.6.4. Test Result of Radiated Emission

- Test Mode: Mode 1 (2412MHz)
- Test Distance : 3 M
- Temperature : 26 °C
- Relative Humidity : 64 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

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

■ Spurious Emission

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : GWM2-UBA
 Power : FOR N/B
 MODEL :
 MEMO : TX CH01 2412MHz
 : F382701

	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	98.580	34.61	-8.89	43.50	50.62	9.28	1.71	27.00	Peak	---	---
2	219.810	33.48	-12.52	46.00	48.53	9.13	2.42	26.60	Peak	---	---
3	275.970	35.69	-10.31	46.00	47.96	11.59	2.74	26.60	Peak	---	---

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : GWM2-UBA
 Power : FOR N/B
 MODEL :
 MEMO : TX CH01 2412MHz
 : F382701

	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	388.900	34.33	-11.67	46.00	43.67	14.28	3.51	27.13	Peak	---	---
2	455.400	33.75	-12.25	46.00	42.25	15.40	3.58	27.48	Peak	---	---
3	931.400	36.87	-9.13	46.00	39.33	19.52	5.73	27.71	Peak	---	---

FCC TEST REPORT

Report No. : F382701

Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : GWM2-UBA
Power : FOR N/B
MODEL :
MEMO : TX CH01 2412MHz
: F382701

	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	39.450	30.38	-9.62	40.00	45.39	11.00	1.09	27.10	Peak	---	---
2	88.860	36.07	-7.43	43.50	52.99	8.65	1.45	27.02	Peak	---	---
3	245.730	31.31	-14.69	46.00	44.17	11.16	2.58	26.60	Peak	---	---

Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : GWM2-UBA
Power : FOR N/B
MODEL :
MEMO : TX CH01 2412MHz
: F382701

	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	397.300	36.88	-9.12	46.00	46.01	14.54	3.51	27.18	Peak	---	---
2	441.400	36.03	-9.97	46.00	44.69	15.21	3.54	27.41	Peak	---	---
3 !	455.400	41.52	-4.48	46.00	50.02	15.40	3.58	27.48	Peak	100	102

Site : 03CH03-HY
 Condition : 3m HORN-ANT-6741 VERTICAL
 EUT : GWM2-UBA
 Power : FOR N/B
 MODEL :
 MEMO : TX CH01 2412MHz
 : F382701

	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	1060.000	41.79	-32.21	74.00	53.66	24.27	4.03	40.17	Peak	---	---
2	1060.000	35.25	-18.75	54.00	47.12	24.27	4.03	40.17	Average	---	---
3	1454.000	44.60	-29.40	74.00	55.32	25.22	4.63	40.57	Peak	---	---
4	1454.000	37.91	-16.09	54.00	48.63	25.22	4.63	40.57	Average	---	---
5	1588.000	47.28	-26.72	74.00	57.34	25.72	4.88	40.66	Peak	---	---
6	1588.000	40.06	-13.94	54.00	50.12	25.72	4.88	40.66	Average	---	---

➤ For 3GHz ~ 25GHz

Remark: Frequency from 3000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Antenna	Cable	Reading	Limits			Emission	Level	Margin	Detect
Polarity	Factor	Loss								
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)		Mode
2412.000	H	28.24	6.22	67.12	-	-	101.58	119949.93		Peak
2412.000	H	28.24	6.22	63.83	-	-	98.29	82129.66		AV
2412.000	V	28.24	6.22	69.76	-	-	104.22	162554.88		Peak
2412.000	V	28.24	6.22	67.67	-	-	102.13	127790.92		AV
4822.000	H	33.06	9.06	12.86	74.00	5011.87	54.98	561.05	-19.02	Peak
4822.000	H	33.06	9.06	7.81	54.00	501.19	49.93	313.69	-4.07	AV
4822.000	V	33.06	9.06	10.09	74.00	5011.87	52.21	407.85	-21.79	Peak
4822.000	V	33.06	9.06	8.19	54.00	501.19	50.31	327.72	-3.69	AV
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: The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer :

Steve

Steve Chen

- Test Mode: Mode 2 (2437 MHz)
- Test Distance : 3 M
- Temperature : 26 °C
- Relative Humidity : 64 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

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

■ Spurious Emission

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : GWM2-UBA
 Power : FOR N/B
 MODEL :
 MEMO : TX CH06 2437MHz
 : F382701

	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	88.050	31.58	-11.92	43.50	48.73	8.39	1.48	27.02	Peak	---	---
2	98.580	33.61	-9.89	43.50	49.62	9.28	1.71	27.00	Peak	---	---
3	219.810	33.07	-12.93	46.00	48.12	9.13	2.42	26.60	Peak	---	---

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : GWM2-UBA
 Power : FOR N/B
 MODEL :
 MEMO : TX CH06 2437MHz
 : F382701

	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	396.600	33.57	-12.43	46.00	42.72	14.52	3.51	27.18	Peak	---	---
2	663.300	34.46	-11.54	46.00	40.06	17.74	4.66	28.00	Peak	---	---
3	929.300	34.35	-11.65	46.00	36.84	19.52	5.70	27.71	Peak	---	---

FCC TEST REPORT

Report No. : F382701

Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : GWM2-UBA
Power : FOR N/B
MODEL :
MEMO : TX CH06 2437MHz
: F382701

	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	70.500	33.42	-6.58	40.00	54.45	4.58	1.45	27.06	Peak	---	---
2 !	98.850	37.96	-5.54	43.50	53.97	9.29	1.70	27.00	Peak	---	---
3 !	102.900	38.42	-5.08	43.50	54.26	9.45	1.70	26.99	Peak	102	199

Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : GWM2-UBA
Power : FOR N/B
MODEL :
MEMO : TX CH06 2437MHz
: F382701

	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	343.400	33.91	-12.09	46.00	44.58	12.79	3.40	26.86	Peak	---	---
2	397.300	35.62	-10.38	46.00	44.75	14.54	3.51	27.18	Peak	---	---
3 !	455.400	40.26	-5.74	46.00	48.76	15.40	3.58	27.48	Peak	---	---

Site : 03CH03-HY
Condition : 3m HORN-ANT-6741 VERTICAL
EUT : GWM2-UBA
Power : FOR N/B
MODEL :
MEMO : TX CH06 2437MHz
: F382701

	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	1590.000	50.81	-23.19	74.00	60.86	25.73	4.88	40.66	Peak	---	---
2	1590.000	42.74	-11.26	54.00	52.79	25.73	4.88	40.66	Average	---	---

➤ For 3GHz ~ 25GHz

Remark: Frequency from 3000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Antenna	Cable	Reading	Limits			Emission	Level	Margin	Detect
Polarity	Factor	Loss								
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)		Mode
2438.000	H	28.30	6.26	67.67	-	-	102.23	129270.67		Peak
2438.000	H	28.30	6.26	63.13	-	-	97.69	76647.85		AV
2436.000	V	28.29	6.26	69.20	-	-	103.75	153992.65		Peak
2436.000	V	28.29	6.26	67.29	-	-	101.84	123594.74		AV
4876.000	H	33.17	9.09	13.01	74.00	5011.87	55.27	580.10	-18.73	Peak
4876.000	H	33.17	9.09	10.07	54.00	501.19	52.33	413.52	-1.67	AV
4876.000	V	33.17	9.09	10.19	74.00	5011.87	52.45	419.28	-21.55	Peak
4876.000	V	33.17	9.09	4.70	54.00	501.19	46.96	222.84	-7.04	AV
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: The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer :

Steve

Steve Chen

- Test Mode: Mode 3 (2462 MHz)
- Test Distance : 3 M
- Temperature : 26 °C
- Relative Humidity : 64 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

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

■ Spurious Emission

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : GWM2-UBA
 Power : FOR N/B
 MODEL :
 MEMO : TX CH11 2462MHz
 : F382701

	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	97.770	32.90	-10.60	43.50	48.94	9.23	1.73	27.00	Peak	---	---
2	156.090	31.76	-11.74	43.50	47.83	8.59	2.11	26.77	Peak	---	---
3	219.810	33.46	-12.54	46.00	48.51	9.13	2.42	26.60	Peak	---	---

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : GWM2-UBA
 Power : FOR N/B
 MODEL :
 MEMO : TX CH11 2462MHz
 : F382701

	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	396.600	34.09	-11.91	46.00	43.24	14.52	3.51	27.18	Peak	---	---
2	467.300	36.53	-9.47	46.00	44.86	15.57	3.64	27.54	Peak	---	---
3	930.700	33.86	-12.14	46.00	36.33	19.52	5.72	27.71	Peak	---	---

FCC TEST REPORT

Report No. : F382701

Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : GWM2-UBA
Power : FOR N/B
MODEL :
MEMO : TX CH11 2462MHz
: F382701

	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	71.850	32.65	-7.35	40.00	53.46	4.76	1.49	27.06	Peak	---	---
2 !	97.770	37.90	-5.60	43.50	53.94	9.23	1.73	27.00	Peak	101	127
3 !	101.820	37.87	-5.63	43.50	53.76	9.41	1.69	26.99	Peak	---	---

Site : 03CH03-HY
Condition : 3m 03CH03-MAT VERTICAL
EUT : GWM2-UBA
Power : FOR N/B
MODEL :
MEMO : TX CH11 2462MHz
: F382701

	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	397.300	36.28	-9.72	46.00	45.41	14.54	3.51	27.18	Peak	---	---
2	455.400	39.47	-6.53	46.00	47.97	15.40	3.58	27.48	Peak	---	---
3	651.400	35.28	-10.72	46.00	41.00	17.65	4.63	28.00	Peak	---	---

Site : 03CH03-HY
 Condition : 3m HORN-ANT-6741 VERTICAL
 EUT : GWM2-UBA
 Power : FOR N/B
 MODEL :
 MEMO : TX CH11 2462MHz
 : F382701

	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	1590.000	49.52	-24.48	74.00	59.57	25.73	4.88	40.66	Peak	---	---
2	1590.000	41.74	-12.26	54.00	51.79	25.73	4.88	40.66	Average	---	---

➤ For 3GHz ~ 25GHz

Remark: Frequency from 3000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency	Antenna	Cable	Reading	Limits			Emission	Level	Margin	Detect
Polarity	Factor	Loss								
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)		Mode
2462.000	H	28.35	6.29	73.65	-	-	108.29	259716.77		Peak
2462.000	H	28.35	6.29	69.74	-	-	104.38	165577.00		AV
2462.000	V	28.35	6.29	69.25	-	-	103.89	156494.83		Peak
2462.000	V	28.35	6.29	66.78	-	-	101.42	117760.60		AV
4926.000	H	33.28	9.12	11.44	74.00	5011.87	53.84	492.04	-20.16	Peak
4926.000	H	33.28	9.12	7.84	54.00	501.19	50.24	325.09	-3.76	AV
4926.000	V	33.28	9.12	11.64	74.00	5011.87	54.04	503.50	-19.96	Peak
4926.000	V	33.28	9.12	6.81	54.00	501.19	49.21	288.74	-4.79	AV
7386.000	V/H						-			AV/ Peak
9848.000	V/H						-			AV/ Peak
12310.000	V/H						-			AV/ Peak
14772.000	V/H						-			AV/ Peak
17234.000	V/H						-			AV/ Peak
19696.000	V/H						-			AV/ Peak
22158.000	V/H						-			AV/ Peak
24620.000	V/H						-			AV/ Peak

Remark: The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer :

Steve

Steve Chen

5.7. Band Edges Measurement

5.7.1. Measuring Instruments :

As described in chapter 7 of this test report.

5.7.2. 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 convenient frequency span including 100 KHz bandwidth from band edge.
3. The band edges was measured and recorded.

5.7.3. Test Result :

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

5.7.4. Note on Band edge Emission

The band edge emission plot on appendix B page B8. shows 52.44dB delta between carrier maximum power and local maximum emission in the restricted band (2.4835GHz).

Polarity	The emission of carrier power strength (dB μ V/m)	The maximum field strength in restrict band (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Result
H	101.58	46.76	74.00	-27.24	Peak
H	108.29	56.15	74.00	-17.85	Peak
H	98.29	43.47	54.00	-10.53	Average
H	104.38	52.24	54.00	-1.76	Average
V	104.22	49.40	74.00	-24.60	Peak
V	103.89	51.75	74.00	-22.25	Peak
V	102.13	47.31	54.00	-6.69	Average
V	101.42	49.28	54.00	-4.72	Average

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

5.8. Antenna Requirements

The EUT use a fixed antenna without external connector. It is considered 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 antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.8.2. Antenna Connected Construction

The maximum Gain antenna used in this product is chip antenna. No antenna connector.

5.9. RF Exposure

This EUT is in compliance with SAR for general population /uncontrolled exposure limits in ANSI/IEEE C95.1-1999 and had been tested in accordance with the measurement methods and procedures specified in OET Bulletin 65 Supplement C. Please refer to the SAR report.

6. EMI Suppression Component List

No EMI suppression components.

7. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	15.35	1.01	1000	24.10	3.92
35	13.63	1.04	2000	27.40	5.66
40	11.11	1.09	3000	30.00	7.20
45	10.59	1.24	4000	32.60	9.36
50	6.47	1.43	5000	33.40	9.16
55	5.83	1.39	6000	34.20	10.70
60	5.18	1.59	7000	35.30	12.16
65	4.81	1.41	8000	36.90	13.12
70	4.43	1.43	9000	38.10	13.81
75	5.10	1.55	10000	39.00	14.83
80	5.91	1.56	11000	38.60	15.83
85	7.33	1.62	12000	39.50	17.11
90	8.74	1.41	13000	39.30	17.62
95	9.05	1.81	14000	41.60	18.37
100	9.36	1.68	15000	40.60	19.10
110	9.65	1.73	16000	37.20	19.72
120	9.97	1.79	17000	40.20	21.98
130	10.51	1.93	18000	48.90	21.22
140	10.32	2.06	19000	37.60	23.90
150	9.42	2.09	20000	37.30	24.07
160	8.09	2.12	21000	37.00	25.49
170	7.43	2.12	22000	38.00	24.92
180	7.60	2.12	23000	38.70	25.60
190	7.43	2.21	24000	38.60	25.70
200	7.26	2.29	25000	24.10	3.92
220	9.11	2.42	14000	27.40	5.66
240	10.88	2.54	15000	30.00	7.20
260	11.75	2.66	16000	32.60	9.36
280	11.55	2.76	17000	33.40	9.16
300	11.36	2.85	18000	34.20	10.70
320	12.03	3.10	19000	35.30	12.16
340	12.69	3.36	20000	36.90	13.12
360	13.33	3.49	21000	38.10	13.81
380	14.00	3.50	22000	39.00	14.83
400	14.63	3.51	23000	38.60	15.83
450	15.33	3.55	24000	39.50	17.11
500	16.03	3.81	25000	39.30	17.62
550	16.65	4.05			
600	17.29	4.23			
650	17.64	4.63			
700	18.00	4.74			
750	18.39	4.95			
800	18.79	5.06			
850	19.10	5.18			
900	19.42	5.40			
950	19.58	5.91			
1000	19.75	5.58			

8. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9 KHz – 2.75 GHz	Jun. 12, 2003	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001-008	9 KHz – 30 MHz	Apr. 29, 2003	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001-009	9 KHz – 30 MHz	Apr. 29, 2003	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450 Hz	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 ~ 60 Hz	N/A	Conduction (CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9KHz~30MHz	Jan. 07, 2003	Conduction (CO01-HY)
50 ohm BNC type Terminal	NOBLE	50ohm	TM009	50 ohm	Apr. 24, 2003	Conduction (CO01-HY)
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. 07, 2003	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Jul. 23, 2003	Radiation (03CH03-HY)
Horn Antenna	COM-POWER	AH-118	10094	1GHz – 18GHz	Apr. 10, 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)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Mar. 14, 2003	Radiation (03CH03-HY)

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

9. 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 $\Gamma_1=0.09$ Antenna VSWR $\Gamma_2=0.67$ Uncertainty= $20\log(1-\Gamma_1\Gamma_2)$	U-shaped	±0.54
combined standard uncertainty $U_e(y)$	normal	±2.7
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±5.4

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

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

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 $\Gamma_1=0.09$ LISN VSWR $\Gamma_2=0.33$ Uncertainty= $20\log(1-\Gamma_1\Gamma_2)$	U-shaped	0.2
combined standard uncertainty $U_e(y)$	normal	±1.66
Measuring uncertainty for a level of confidence of 95% $U=2U_e(y)$	normal (k=2)	±3.32

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