

FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : MULTI-FUNCTION WIRELESS ROUTER

Model No. : ARM904

FCC ID : MQ4ARM904

Filing Type : Certification

Applicant : **AboCom Systems Inc.**
1F, No. 21, R & D Road II Science Based Industrial Park,
Hsin-Chu, 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: Oct. 13, 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 : MULTI-FUNCTION WIRELESS ROUTER

Model No. : ARM904

FCC ID : MQ4ARM904

Filing Type : Certification

Applicant : **AboCom Systems Inc.**
1F, No. 21, R & D Road II Science Based Industrial Park,
Hsin-Chu, 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 Oct. 01, 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.

SPORTON International Inc.

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FCC ID : MQ4ARM904
Page No. : 1 of 47
Issued Date : Oct. 13, 2003

1. General Description of Equipment under Test

1.1. Applicant

AboCom Systems Inc.
1F, No. 21, R & D Road II Science Based Industrial Park,
Hsin-Chu, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

Equipment	: MULTI-FUNCTION WIRELESS ROUTER
Model No.	: ARM904
FCC ID.	: MQ4ARM904
Trade Name	: AboCom
TP Cable	: Non-Shielded, 1 m
TP Cable	: Non-Shielded, 13 m
Power Supply Type	: Linear
AC Power Cord	: Wall-mount, 2 pin
DC Power Cable	: Non-Shielded, 1.8 m, 2 pin

1.4. Feature of Equipment under Test

Model	Wireless Router
Dimensions	189mm(W) * 122mm(D) * 27mm(H)
Operating Temperature	0° C to 40° C
Storage Temperature	-10° C to 70° C
Network Protocol:	TCP/IP
Network Interface:	5 Ethernet: 4 * 10/100BaseT (RJ45) LAN connection 1 * 10/100BaseT (RJ45) for WAN
Wireless interface	Wireless Access Point via built-in wireless module.
LEDs	7
Power Adapter	DC 12V/800
Relative humidity	10% to 90%
Wireless Standards	IEEE 802.11b, IEEE 802.11g
Frequency	•2.412 - 2.462 GHz
Channels	Maximum 14 Channels, depending on regulatory authorities
Modulation	OFDM with BPSK, QPSK, 16QAM, DBPSK, DQPSK, CCK
Data Rate	1, 2, 5.5, 6, 9, 11, 12, 24, 36, 48 & 54 Mbps
Antenna Adjustable	2dBi
WEP	40-bit (also called 64-bit), 128-bit WEP encryption
ADAPTER	OEM / AA-151A / INPUT : 120VAC ~ 60Hz 20W / OUTPUT : 15VAC 1A

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 remote COMPAQ NOTEBOOK, 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.
According to 15.31(m), three channels (one near top, one near middle and one near bottom) were performed as following:
Mode 1: CH01 2412MHz (IEEE 802.11b)
Mode 2: CH06 2437MHz (IEEE 802.11b)
Mode 3: CH11 2462MHz (IEEE 802.11b)
Mode 4: CH01 2412MHz (IEEE 802.11g)
Mode 5: CH06 2437MHz (IEEE 802.11g)
Mode 6: CH11 2462MHz (IEEE 802.11g)
- 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) – for local and remote workstation

FCC ID	: N/A
Model No.	: PRESARIO 1500
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0039
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- Monitor (VIEWSONIC) – for local workstation

FCC ID	: N/A
Model No.	: VCDTS21553-3P
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0050
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) – for local workstation

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.

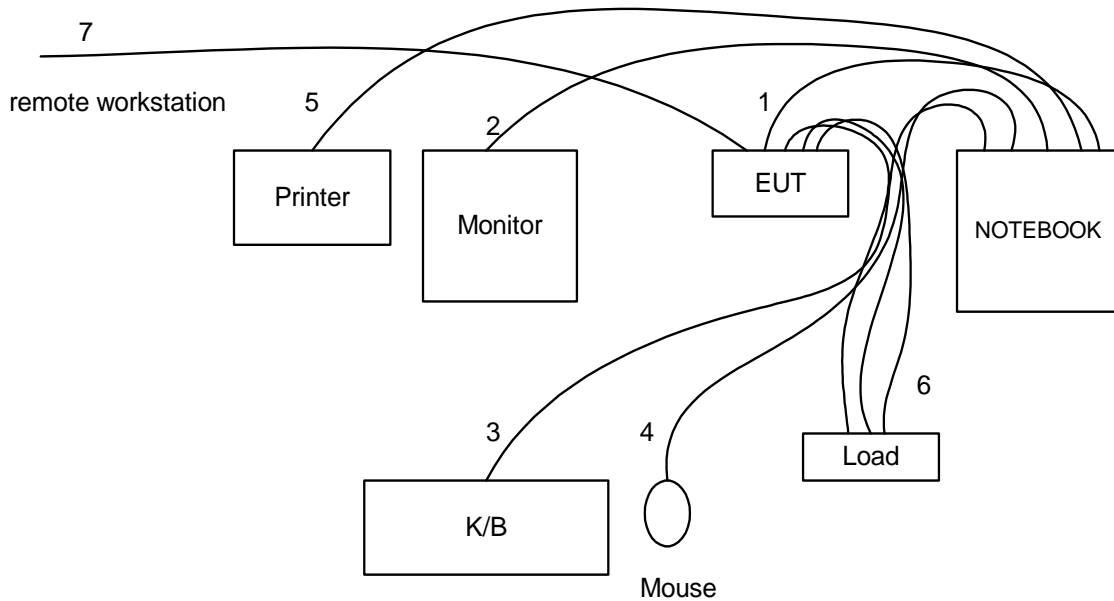
Support Unit 4. -- USB Mouse (LOGITECH) – for local workstation

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) – for local workstation

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 TP cable is connected from the EUT to the support unit 1.
2. The I/O cable is connected from the NOTEBOOK to the support unit 2.
3. The I/O cable is connected from the NOTEBOOK to the support unit 3.
4. The I/O cable is connected from the NOTEBOOK to the support unit 4.
5. The I/O cable is connected from the NOTEBOOK to the support unit 5.
6. These are loop-back TP cables.
7. The TP cable is connected from EUT to the remote workstation.

3. Operation of Equipment under Test

An executive programs, EMCTEST.EXE under WIN XP, which generate 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, "WGR614 " was executed to keep transmitting signals at fixed frequency.

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

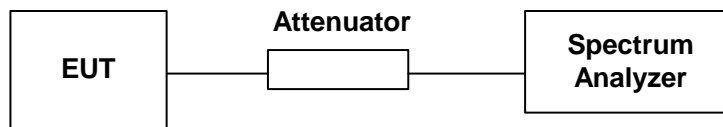
5.2.1. Measuring Instruments :

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%

▪ Test Mode : Mode 1

Channel	Frequency (MHz)	6dB Emission bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
01	2412	11.48	0.5	1
06	2437	12.00	0.5	2
11	2462	11.96	0.5	3

▪ Test Mode : Mode 2

Channel	Frequency (MHz)	6dB Emission bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
01	2412	15.36	0.5	1
06	2437	15.36	0.5	2
11	2462	15.36	0.5	3

5.3. Peak Output Power

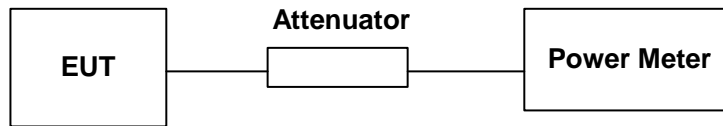
5.3.1. Measuring Instruments :

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: 2 dBi

- Test Mode: Mode 1

Channel	Frequency (MHz)	Measured Output Power (mWatt)	Measured Output Power (dBm)	Limits (Watt/dBm)
01	2412	33.57376142	15.26	1W/30 dBm
06	2437	51.05050000	17.08	1W/30 dBm
11	2462	24.60367604	13.91	1W/30 dBm

- Test Mode: Mode 2

Channel	Frequency (MHz)	Measured Output Power (mWatt)	Measured Output Power (dBm)	Limits (Watt/dBm)
01	2412	9.332543008	9.70	1W/30 dBm
06	2437	9.794899854	9.91	1W/30 dBm
11	2462	10.839269140	10.35	1W/30 dBm

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

5.4. Power Spectral Density

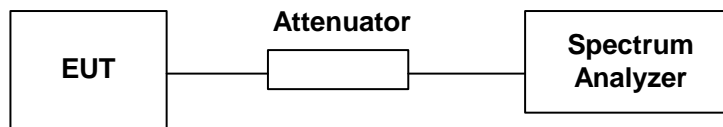
5.4.1. Measuring Instruments :

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 : 26C
- Relative Humidity : 64%
- Test Mode: Mode 1

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)	Plot Ref. No.
01	2412	-9.81	8	1
06	2437	-8.28	8	2
11	2462	-11.51	8	3

- Test Mode: Mode 2

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)	Plot Ref. No.
01	2412	-15.17	8	1
06	2437	-14.76	8	2
11	2462	-14.22	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 : 27°C
- Relative Humidity : 67 %


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

Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LIME
 EUT : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH01 2412MHz
 : F371707
 : 11b

Line	Freq	Level	Over Limit	Limit	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.170	48.27	-16.69	64.96	48.12	0.10	0.05	QP
2	0.170	19.57	-35.39	54.96	19.42	0.10	0.05	Average
3	0.398	44.22	-13.68	57.90	43.97	0.10	0.15	QP
4	0.398	16.59	-31.31	47.90	16.34	0.10	0.15	Average
5	0.693	39.46	-16.54	56.00	39.23	0.10	0.13	QP
6	0.693	12.52	-32.48	46.00	12.29	0.10	0.13	Average
7	0.796	38.71	-17.29	56.00	38.48	0.10	0.13	QP
8	0.796	11.97	-34.03	46.00	11.74	0.10	0.13	Average
9	11.360	31.42	-28.58	60.00	31.00	0.20	0.22	QP
10	11.360	28.55	-21.45	50.00	28.13	0.20	0.22	Average
11	15.381	29.06	-30.94	60.00	28.57	0.21	0.28	QP
12	15.381	26.35	-23.65	50.00	25.86	0.21	0.28	Average

Site : CO01-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH01 2412MHz
 : F371707
 : 11b

Line	Freq	Level	Over Limit	Limit	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.165	47.16	-18.05	65.21	47.01	0.10	0.05	QP
2	0.165	19.34	-35.87	55.21	19.19	0.10	0.05	Average
3	0.197	45.41	-18.33	63.74	45.26	0.10	0.05	QP
4	0.197	17.11	-36.63	53.74	16.96	0.10	0.05	Average
5	0.367	17.05	-31.52	48.57	16.81	0.10	0.14	Average
6	0.367	44.90	-13.67	58.57	44.66	0.10	0.14	QP
7	0.402	45.05	-12.76	57.81	44.80	0.10	0.15	QP
8	0.402	16.94	-30.87	47.81	16.69	0.10	0.15	Average
9	0.444	43.26	-13.73	56.99	43.01	0.10	0.15	QP
10	0.444	16.98	-30.01	46.99	16.73	0.10	0.15	Average
11	14.255	27.06	-32.94	60.00	26.50	0.29	0.27	QP
12	14.255	24.56	-25.44	50.00	24.00	0.29	0.27	Average

Test Engineer: 
 Kevin Huang

- Test Mode : Mode 2
- Temperature : 27°C
- Relative Humidity : 67 %

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 : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH06 2437MHz
 : F371707
 : 11b

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.168	48.31	-16.75	65.06	48.16	0.10	0.05	QP
2	0.168	19.74	-35.32	55.06	19.59	0.10	0.05	Average
3	0.197	18.24	-35.50	53.74	18.09	0.10	0.05	Average
4	0.197	46.82	-16.92	63.74	46.67	0.10	0.05	QP
5	0.402	16.51	-31.30	47.81	16.26	0.10	0.15	Average
6	0.402	44.24	-13.57	57.81	43.99	0.10	0.15	QP
7	0.779	38.87	-17.13	56.00	38.64	0.10	0.13	QP
8	0.779	12.14	-33.86	46.00	11.91	0.10	0.13	Average
9	11.362	28.13	-21.87	50.00	27.71	0.20	0.22	Average
10	11.362	30.84	-29.16	60.00	30.42	0.20	0.22	QP
11	15.380	29.20	-30.80	60.00	28.71	0.21	0.28	QP
12	15.380	26.96	-23.04	50.00	26.47	0.21	0.28	Average

Site : C001-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH06 2437MHz
 : F371707
 : 11b

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.176	47.04	-17.63	64.67	46.89	0.10	0.05	QP
2	0.176	18.89	-35.78	54.67	18.74	0.10	0.05	Average
3	0.356	16.49	-32.33	48.82	16.26	0.10	0.13	Average
4	0.356	44.41	-14.41	58.82	44.18	0.10	0.13	QP
5	0.381	17.26	-31.00	48.26	17.02	0.10	0.14	Average
6	0.381	45.30	-12.96	58.26	45.06	0.10	0.14	QP
7	0.679	9.34	-36.66	46.00	9.11	0.10	0.13	Average
8	0.679	34.30	-21.70	56.00	34.07	0.10	0.13	QP
9	11.255	30.93	-29.07	60.00	30.48	0.23	0.22	QP
10	11.255	28.67	-21.33	50.00	28.22	0.23	0.22	Average
11	14.148	26.29	-33.71	60.00	25.73	0.29	0.27	QP
12	14.148	24.10	-25.90	50.00	23.54	0.29	0.27	Average

Test Engineer: 
 Kevin Huang

- Test Mode : Mode 3
- Temperature : 27°C
- Relative Humidity : 67 %

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 : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH11 2462MHz
 : F371707
 : 11b

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.172	48.33	-16.53	64.86	48.18	0.10	0.05	QP
2	0.172	19.57	-35.29	54.86	19.42	0.10	0.05	Average
3	0.406	44.22	-13.81	57.73	43.97	0.10	0.15	QP
4	0.406	16.47	-31.26	47.73	16.22	0.10	0.15	Average
5	0.716	39.38	-16.62	56.00	39.15	0.10	0.13	QP
6	0.716	12.52	-33.48	46.00	12.29	0.10	0.13	Average
7	11.200	30.05	-29.95	60.00	29.63	0.20	0.22	QP
8	11.200	27.30	-22.70	50.00	26.88	0.20	0.22	Average
9	14.845	30.40	-29.60	60.00	29.92	0.20	0.28	QP
10	14.845	29.31	-20.69	50.00	28.83	0.20	0.28	Average
11	23.020	10.32	-39.68	50.00	9.52	0.43	0.37	Average
12	23.020	19.74	-40.26	60.00	18.94	0.43	0.37	QP

Site : C001-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH11 2462MHz
 : F371707
 : 11b

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.169	47.13	-17.88	65.01	46.98	0.10	0.05	QP
2	0.169	18.61	-36.40	55.01	18.46	0.10	0.05	Average
3	0.209	44.10	-19.14	63.24	43.94	0.10	0.06	QP
4	0.209	16.12	-37.12	53.24	15.96	0.10	0.06	Average
5	0.400	45.17	-12.60	57.85	44.92	0.10	0.15	QP
6	0.400	17.10	-30.75	47.85	16.95	0.10	0.15	Average
7	0.469	41.33	-15.20	56.53	41.09	0.10	0.14	QP
8	0.469	14.11	-32.42	46.53	13.87	0.10	0.14	Average
9	11.361	31.24	-28.76	60.00	30.79	0.23	0.22	QP
10	11.361	28.59	-21.41	50.00	28.14	0.23	0.22	Average
11	14.844	26.89	-33.11	60.00	26.31	0.30	0.28	QP
12	14.844	25.78	-24.22	50.00	25.20	0.30	0.28	Average

Test Engineer: 
 Kevin Huang

- Test Mode : Mode 4
- Temperature : 27°C
- Relative Humidity : 67 %

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 : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH01 2412MHz
 : F371707
 : l1g

	Freq	Level	Over Limit	Limit Line	Dead Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.169	49.33	-15.68	65.01	49.18	0.10	0.05	QP
2	0.169	20.59	-34.42	55.01	20.44	0.10	0.05	Average
3	0.387	45.03	-13.10	58.13	44.78	0.10	0.15	QP
4	0.387	18.33	-29.80	48.13	18.08	0.10	0.15	Average
5	0.708	40.22	-15.78	56.00	39.99	0.10	0.13	QP
6	0.708	13.25	-32.75	46.00	13.02	0.10	0.13	Average
7	14.153	29.32	-20.68	50.00	28.85	0.20	0.27	Average
8	14.153	33.11	-26.89	60.00	32.64	0.20	0.27	QP
9	17.144	30.42	-19.58	50.00	29.87	0.25	0.30	Average
10	17.144	30.87	-29.13	60.00	30.32	0.25	0.30	QP
11	24.401	20.62	-39.38	60.00	19.76	0.48	0.38	QP
12	24.401	17.52	-32.48	50.00	16.66	0.48	0.38	Average

Site : C001-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH01 2412MHz
 : F371707
 : l1g

	Freq	Level	Over Limit	Limit Line	Dead Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.162	47.87	-17.49	65.36	47.72	0.10	0.05	QP
2	0.162	21.11	-34.25	55.36	20.96	0.10	0.05	Average
3	0.381	46.56	-11.70	58.26	46.32	0.10	0.14	QP
4	0.381	18.39	-29.87	48.26	18.15	0.10	0.14	Average
5	1.468	24.85	-31.15	56.00	24.69	0.10	0.06	QP
6	1.468	23.07	-22.93	46.00	22.91	0.10	0.06	Average
7	6.295	26.64	-33.36	60.00	26.30	0.20	0.14	QP
8	6.295	25.50	-24.50	50.00	25.16	0.20	0.14	Average
9	7.682	24.09	-25.91	50.00	23.73	0.20	0.16	Average
10	7.682	27.54	-32.46	60.00	27.18	0.20	0.16	QP
11	17.726	17.29	-42.71	60.00	16.68	0.30	0.31	QP
12	17.726	14.86	-35.14	50.00	14.25	0.30	0.31	Average

Test Engineer: 
 Kevin Huang

- Test Mode : Mode 5
- Temperature : 27°C
- Relative Humidity : 67 %

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 : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH06 2437MHz
 : F371707
 : llg

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.173	49.29	-15.53	64.82	49.14	0.10	0.05	QP
2	0.173	20.54	-34.28	54.82	20.39	0.10	0.05	Average
3	0.387	45.01	-13.12	58.13	44.76	0.10	0.15	QP
4	0.387	19.26	-29.87	48.13	19.01	0.10	0.15	Average
5	0.679	40.44	-15.56	56.00	40.21	0.10	0.13	QP
6	0.679	14.19	-31.81	46.00	13.96	0.10	0.13	Average
7	14.153	30.23	-29.77	60.00	29.76	0.20	0.27	QP
8	14.153	28.72	-21.28	50.00	28.25	0.20	0.27	Average
9	17.694	36.27	-23.73	60.00	35.70	0.26	0.31	QP
10	17.694	35.94	-14.06	50.00	35.37	0.26	0.31	Average
11	24.400	17.98	-32.02	50.00	17.12	0.48	0.38	Average
12	24.400	20.46	-39.54	60.00	19.60	0.48	0.38	QP

Site : C001-HY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH06 2437MHz
 : F371707
 : llg

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.164	47.93	-17.33	65.26	47.78	0.10	0.05	QP
2	0.164	20.91	-34.35	55.26	20.76	0.10	0.05	Average
3	0.371	46.55	-11.93	58.48	46.31	0.10	0.14	QP
4	0.371	19.34	-30.14	48.48	19.10	0.10	0.14	Average
5	5.832	25.79	-34.21	60.00	25.46	0.20	0.13	QP
6	5.832	23.22	-26.78	50.00	22.89	0.20	0.13	Average
7	12.958	26.85	-33.15	60.00	26.34	0.26	0.25	QP
8	12.958	25.17	-24.83	50.00	24.66	0.26	0.25	Average
9	17.754	18.61	-41.39	60.00	18.00	0.30	0.31	QP
10	17.754	15.96	-34.04	50.00	15.35	0.30	0.31	Average
11	24.414	16.70	-43.30	60.00	15.84	0.48	0.38	QP
12	24.414	13.46	-36.54	50.00	12.60	0.48	0.38	Average

Test Engineer: Kevin
 Kevin Huang

- Test Mode : Mode 6
- Temperature : 27°C
- Relative Humidity : 67 %

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

Site : C001-MY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 LINE
 EUT : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH11 2462MHz
 : F371707
 : llg

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.165	49.26	-15.95	65.21	49.11	0.10	0.05	QP
2	0.165	21.32	-33.89	55.21	21.17	0.10	0.05	Average
3	0.417	44.79	-12.72	57.51	44.54	0.10	0.15	QP
4	0.417	17.23	-30.28	47.51	16.98	0.10	0.15	Average
5	0.651	40.54	-15.46	56.00	40.31	0.10	0.13	QP
6	0.651	13.51	-32.49	46.00	13.28	0.10	0.13	Average
7	7.055	18.82	-41.18	60.00	18.51	0.16	0.15	QP
8	7.055	17.23	-32.77	50.00	16.92	0.16	0.15	Average
9	17.694	36.31	-23.69	60.00	35.74	0.26	0.31	QP
10	17.694	35.94	-14.06	50.00	35.37	0.26	0.31	Average
11	24.403	19.34	-40.66	60.00	18.48	0.48	0.38	QP
12	24.403	16.35	-33.65	50.00	15.49	0.48	0.38	Average

Site : C001-MY
 Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
 EUT : AP
 Power : 110V/60Hz
 Model : IEEE 802.11(b+g)
 Memo : TX CH11 2462MHz
 : F371707
 : llg

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.164	47.93	-17.33	65.26	47.78	0.10	0.05	QP
2	0.164	13.87	-41.39	55.26	13.72	0.10	0.05	Average
3	0.391	46.32	-11.72	58.04	46.07	0.10	0.15	QP
4	0.391	26.17	-21.87	48.04	25.92	0.10	0.15	Average
5	6.293	26.12	-33.88	60.00	25.78	0.20	0.14	QP
6	6.293	24.98	-25.02	50.00	24.64	0.20	0.14	Average
7	7.682	27.38	-32.62	60.00	27.02	0.20	0.16	QP
8	7.682	23.65	-26.35	50.00	23.29	0.20	0.16	Average
9	14.153	26.52	-23.48	50.00	25.96	0.29	0.27	Average
10	14.153	27.41	-32.59	60.00	26.85	0.29	0.27	QP
11	17.751	16.38	-43.62	60.00	15.77	0.30	0.31	QP
12	17.751	13.04	-36.96	50.00	12.43	0.30	0.31	Average

Test Engineer: Kevin Huang
 Kevin 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 (HP 8447D)
 - RF Gain 30 dB
 - Signal Input 100 KHz to 1.3 GHz

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

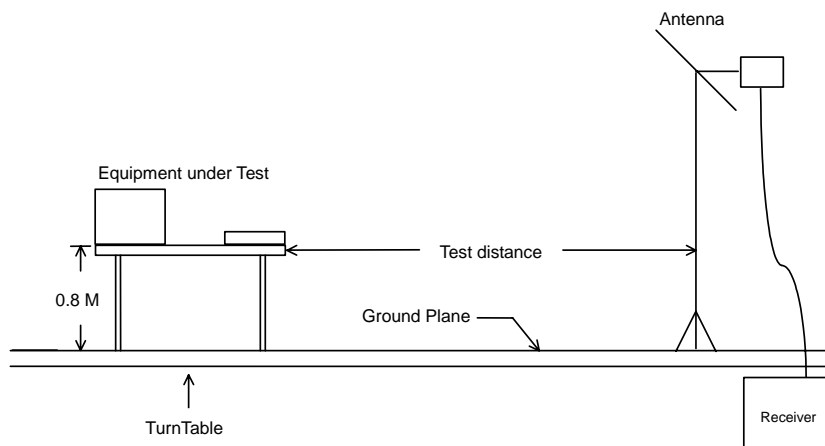
- Spectrum analyzer (R&S FSP40)
 - Attenuation 10 dB
 - Start Frequency 1 GHz
 - Stop Frequency 25 GHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 9 KHz to 40 GHz

- Test Receiver (SCHAFFNER SCR3501)
 - Resolution Bandwidth 120 KHz
 - Frequency Band 9 K – 1 GHz
 - Quasi-Peak Detector ON for Quasi-Peak Mode
OFF for Peak Mode

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       : AP
Power     : 110V/60Hz
MODEL     : IEEE 802.11(b+g)
MEMO     : TX CH01 2412MHz
          : F371707
          : 11b
    
```

	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	200.100	39.78	-3.72	43.50	56.81	7.28	2.29	26.60	QP	---	---
2	280.020	39.63	-6.37	46.00	51.93	11.54	2.76	26.60	Peak	---	---
3	299.730	38.06	-7.94	46.00	50.45	11.36	2.85	26.60	Peak	---	---
1	358.100	42.30	-3.70	46.00	52.49	13.27	3.49	26.95	QP	---	---
2	365.800	40.04	-5.96	46.00	50.01	13.53	3.49	26.99	Peak	---	---
3	396.600	38.14	-7.86	46.00	47.29	14.52	3.51	27.18	Peak	---	---
1	1000.000	43.12	-30.88	74.00	42.07	24.10	3.92	26.97	Peak	---	---
2	1000.000	30.73	-23.27	54.00	29.68	24.10	3.92	26.97	Average	---	---
3	1150.000	42.91	-31.09	74.00	41.25	24.48	4.17	26.99	Peak	---	---
4	1150.000	32.94	-21.06	54.00	31.28	24.48	4.17	26.99	Average	---	---
5	1198.000	42.96	-31.04	74.00	41.11	24.60	4.24	26.99	Peak	---	---
6	1198.000	30.61	-23.39	54.00	28.76	24.60	4.24	26.99	Average	---	---
1	4956.000	57.18	-16.82	74.00	42.49	33.34	9.14	27.79	Peak	---	---
2	4956.000	50.84	-3.16	54.00	36.15	33.34	9.14	27.79	Average	---	---

Site : 03CH03-NY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH01 2412MHz
 : F371707
 : 11b

	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	99.660	30.59	-12.91	43.50	46.57	9.34	1.68	27.00	Peak	---	---
2	200.100	34.66	-8.84	43.50	51.69	7.28	2.29	26.60	Peak	---	---
3	299.730	31.96	-14.04	46.00	44.35	11.36	2.85	26.60	Peak	---	---
1	343.400	35.85	-10.15	46.00	46.52	12.79	3.40	26.86	Peak	---	---
2	399.400	36.00	-10.00	46.00	45.09	14.60	3.51	27.20	Peak	---	---
3	934.200	37.50	-8.50	46.00	39.92	19.53	5.75	27.70	Peak	---	---
1	1000.000	42.38	-31.62	74.00	41.33	24.10	3.92	26.97	Peak	---	---
2	1000.000	29.84	-24.16	54.00	28.79	24.10	3.92	26.97	Average	---	---
3	1198.000	43.45	-30.55	74.00	41.60	24.60	4.24	26.99	Peak	---	---
4	1198.000	32.11	-21.89	54.00	30.26	24.60	4.24	26.99	Average	---	---
1	3956.000	57.22	-16.78	74.00	42.83	32.52	9.26	27.39	Peak	---	---
2	3956.000	50.88	-3.12	54.00	36.49	32.52	9.26	27.39	Average	100	105

➤ For 5GHz ~ 25GHz

Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Antenna Polarity	Cable Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Detect (dB)	Mode
2412.000	H	28.24	6.22	67.62	-	-	102.08	127057.41		Peak
2412.000	H	28.24	6.22	56.64	-	-	91.10	35892.19		AV
2412.000	V	28.24	6.22	76.33	-	-	110.79	346337.88		Peak
2412.000	V	28.24	6.22	67.41	-	-	101.87	124022.36		AV
4822.000	V/H						-			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: 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-NY
 Condition : 3m 03CH03-MAT HORIZONTAL
 EUT : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH06 2437MHz
 : F371707
 : 11b

	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	200.100	40.14	-3.96	43.50	57.17	7.28	2.29	26.60	QP	---	---
2	200.020	38.15	-7.85	46.00	50.45	11.54	2.76	26.60	Peak	---	---
3	299.730	37.26	-8.74	46.00	49.65	11.36	2.85	26.60	Peak	---	---
1	358.100	42.81	-3.19	46.00	53.00	13.27	3.49	26.95	QP	100	243
2	365.800	40.60	-5.40	46.00	50.57	13.53	3.49	26.99	Peak	---	---
3	951.000	38.71	-7.29	46.00	40.87	19.59	5.90	27.65	Peak	---	---
1	1000.000	41.31	-32.69	74.00	40.26	24.10	3.92	26.97	Peak	---	---
2	1000.000	28.93	-25.07	54.00	27.88	24.10	3.92	26.97	Average	---	---
3	1198.000	42.25	-31.75	74.00	40.40	24.60	4.24	26.99	Peak	---	---
4	1198.000	31.91	-22.09	54.00	30.06	24.60	4.24	26.99	Average	---	---
5	1916.000	45.66	-28.34	74.00	40.15	27.07	5.53	27.09	Peak	---	---
6	1916.000	40.26	-13.74	54.00	34.75	27.07	5.53	27.09	Average	---	---

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH06 2437MHz
 : F371707
 : 11b

	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	101.010	30.77	-12.73	43.50	46.69	9.39	1.69	27.00	Peak	---	---
2	133.140	31.51	-11.99	43.50	45.97	10.44	1.97	26.87	Peak	---	---
3	200.100	34.50	-9.00	43.50	51.53	7.28	2.29	26.60	Peak	---	---
1	343.400	36.32	-9.68	46.00	46.99	12.79	3.40	26.86	Peak	---	---
2	799.800	37.19	-8.81	46.00	41.34	18.79	5.06	28.00	Peak	---	---
3	934.200	37.14	-8.86	46.00	39.56	19.53	5.75	27.70	Peak	---	---
1	1000.000	43.26	-30.74	74.00	42.21	24.10	3.92	26.97	Peak	---	---
2	1000.000	30.82	-23.18	54.00	29.77	24.10	3.92	26.97	Average	---	---
3	1164.000	41.12	-32.88	74.00	39.40	24.52	4.19	26.99	Peak	---	---
4	1164.000	31.00	-22.20	54.00	30.08	24.52	4.19	26.99	Average	---	---
5	1198.000	42.75	-31.25	74.00	40.90	24.60	4.24	26.99	Peak	---	---
6	1198.000	33.11	-20.89	54.00	31.26	24.60	4.24	26.99	Average	---	---
1	4956.000	57.27	-16.73	74.00	42.58	33.34	9.14	27.79	Peak	---	---
2	4956.000	50.76	-3.24	54.00	36.07	33.34	9.14	27.79	Average	---	---

➤ For 5GHz ~ 25GHz

Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Antenna Polarity	Cable Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Detect (dB)	Mode
2436.000	H	28.29	6.26	78.35	-	-	112.90	441570.45		Peak
2436.000	H	28.29	6.26	70.47	-	-	105.02	178237.88		AV
2436.000	V	28.29	6.26	68.13	-	-	102.68	136144.47		Peak
2436.000	V	28.29	6.26	60.26	-	-	94.81	55017.39		AV
4876.000	H	33.17	9.09	17.07	74.00	5011.87	59.33	925.76	-14.67	Peak
4876.000	H	33.17	9.09	11.38	54.00	501.19	53.64	480.84	-0.36	AV
4874.000	V						-			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: 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 : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH11 2462MHz
 : F371707
 : 11b

	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	200.100	40.11	-3.99	43.50	57.14	7.28	2.29	26.60	QP	---	---
2	233.580	36.13	-9.87	46.00	49.85	10.37	2.51	26.60	Peak	---	---
3	280.020	38.06	-7.94	46.00	50.36	11.54	2.76	26.60	Peak	---	---
1	300.000	38.24	-7.76	46.00	50.63	11.36	2.85	26.60	Peak	---	---
2	358.100	42.30	-3.70	46.00	52.49	13.27	3.49	26.95	QP	---	---
3	399.400	38.37	-7.63	46.00	47.46	14.60	3.51	27.20	Peak	---	---
1	1198.000	43.80	-30.20	74.00	41.95	24.60	4.24	26.99	Peak	---	---
2	1198.000	32.11	-21.89	54.00	30.26	24.60	4.24	26.99	Average	---	---

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH11 2462MHz
 : F371707
 : 11b

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Dreamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	101.820	31.08	-12.42	43.50	46.97	9.41	1.69	26.99	Peak	---	---
2	133.140	30.59	-12.91	43.50	45.05	10.44	1.97	26.87	Peak	---	---
3	200.100	34.31	-9.19	43.50	51.34	7.28	2.29	26.60	Peak	---	---
1	358.100	35.23	-10.77	46.00	45.42	13.27	3.49	26.95	Peak	---	---
2	399.400	35.98	-10.02	46.00	45.07	14.60	3.51	27.20	Peak	---	---
3	786.500	37.11	-8.89	46.00	41.40	18.68	5.03	28.00	Peak	---	---
1	1000.000	42.55	-31.45	74.00	41.50	24.10	3.92	26.97	Peak	---	---
2	1000.000	30.83	-23.17	54.00	29.78	24.10	3.92	26.97	Average	---	---
3	1158.000	41.83	-32.17	74.00	40.14	24.50	4.18	26.99	Peak	---	---
4	1158.000	31.81	-22.19	54.00	30.12	24.50	4.18	26.99	Average	---	---
5	1158.000	32.25	-21.75	54.00	30.56	24.50	4.18	26.99	Average	---	---
6	1198.000	43.07	-30.93	74.00	41.22	24.60	4.24	26.99	Peak	---	---
1	4254.000	57.24	-16.76	74.00	43.17	32.49	9.09	27.51	Peak	---	---
2	4254.000	50.79	-3.21	54.00	36.72	32.49	9.09	27.51	Average	100	112

➤ For 5GHz ~ 25GHz

Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Antenna Polarity	Cable Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Detect (dB)	Mode
2458.000	H	28.34	6.28	71.18	-	-	105.80	194984.46		Peak
2458.000	H	28.34	6.28	64.08	-	-	98.70	86099.38		AV
2460.000	V	28.34	6.29	62.22	-	-	96.85	69582.50		Peak
2460.000	V	28.34	6.29	55.16	-	-	89.79	30867.40		AV
4924.000	H	33.27	9.12	14.94	74.00	5011.87	57.33	735.36	-16.67	Peak
4924.000	H	33.27	9.12	8.07	54.00	501.19	50.46	333.43	-3.54	AV
4924.000	V/H						-			AV/ Peak
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 Chen
Steve Chen

- Test Mode: Mode 4 (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 : 3a 03CH03-MAT HORIZONTAL
 EUT : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH01 2412MHz
 : F371707
 : llg

	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	133.140	33.02	-10.48	43.50	47.48	10.44	1.97	26.07	Peak	---	---
2	200.100	40.00	-3.50	43.50	57.03	7.28	2.29	26.60	QP	---	---
3	280.020	37.55	-8.45	46.00	49.85	11.54	2.76	26.60	Peak	---	---
1	358.100	42.67	-3.33	46.00	52.86	13.27	3.49	26.95	Peak	100	240
2	365.800	39.77	-6.23	46.00	49.74	13.53	3.49	26.99	Peak	---	---
3	951.000	38.63	-7.37	46.00	40.79	19.59	5.90	27.65	Peak	---	---

Site : 03CH03-HY
 Condition : 3a 03CH03-MAT VERTICAL
 EUT : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH01 2412MHz
 : F371707
 : llg

	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	99.660	30.52	-12.98	43.50	46.50	9.34	1.60	27.00	Peak	---	---
2	133.140	30.48	-13.02	43.50	44.94	10.44	1.97	26.87	Peak	---	---
3	200.100	34.06	-9.44	43.50	51.09	7.28	2.29	26.60	Peak	---	---
1	786.500	37.57	-8.43	46.00	41.86	18.68	5.03	28.00	Peak	---	---
2	799.800	36.30	-9.70	46.00	40.45	18.79	5.06	28.00	Peak	---	---
3	934.200	38.31	-7.69	46.00	40.73	19.53	5.75	27.70	Peak	---	---
1	1000.000	43.82	-30.18	74.00	42.77	24.10	3.92	26.97	Peak	---	---
2	1000.000	30.92	-23.08	54.00	29.87	24.10	3.92	26.97	Average	---	---
3	1198.000	43.74	-30.26	74.00	41.89	24.60	4.24	26.99	Peak	---	---
4	1198.000	32.16	-21.84	54.00	30.31	24.60	4.24	26.99	Average	---	---
1	4036.000	57.17	-16.83	74.00	42.69	32.58	9.32	27.42	Peak	---	---
2	4036.000	50.77	-3.23	54.00	36.29	32.58	9.32	27.42	Average	100	104

➤ For 5GHz ~ 25GHz

Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Antenna Polarity	Cable Factor Loss	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Detect (dB)	Mode	
2412.000	H	28.24	6.22	75.68	-	-	110.14	321366.05	Peak	
2412.000	H	28.24	6.22	66.52	-	-	100.98	111943.79	AV	
2412.000	V	28.24	6.22	65.18	-	-	99.64	95940.06	Peak	
2412.000	V	28.24	6.22	56.27	-	-	90.73	34395.37	AV	
4822.000	H	33.06	9.06	14.64	74.00	5011.87	56.76	688.65	-17.24	Peak
4822.000	H	33.06	9.06	8.67	54.00	501.19	50.79	346.34	-3.21	AV
4824.000	V						-			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: The emission emitted by the EUT is too low to be measured except the emission listed above,

Test Engineer : Steve Chen
Steve Chen

- Test Mode: Mode 5 (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 : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH06 2437MHz
 : llg

	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	133.140	32.00	-10.70	43.50	47.26	10.44	1.97	26.07	Peak	---	---
2	200.100	40.14	-3.36	43.50	57.17	7.28	2.29	26.60	QP	200	185
3	280.020	37.48	-8.52	46.00	49.78	11.54	2.76	26.60	Peak	---	---
1	358.100	42.61	-3.39	46.00	52.80	13.27	3.49	26.95	Peak	---	---
2	365.800	39.81	-6.19	46.00	49.78	13.53	3.49	26.99	Peak	---	---
3	951.000	38.89	-7.11	46.00	41.05	19.59	5.90	27.65	Peak	---	---

Site : 03CH03-HY
 Condition : 3a 03CH03-MAT VERTICAL
 EUT : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH06 2437MHz
 : F371707
 : llg

	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	74.820	31.78	-8.22	40.00	52.07	5.21	1.55	27.05	Peak	---	---
2	133.140	30.61	-12.89	43.50	45.07	10.44	1.97	26.87	Peak	---	---
3	200.100	34.18	-9.32	43.50	51.21	7.28	2.29	26.60	Peak	---	---
1	399.400	36.56	-9.44	46.00	45.65	14.60	3.51	27.20	Peak	---	---
2	786.500	37.76	-8.24	46.00	42.05	18.68	5.03	28.00	Peak	---	---
3	934.200	37.87	-8.13	46.00	40.29	19.53	5.75	27.70	Peak	---	---
1	1000.000	43.50	-30.50	74.00	42.45	24.10	3.92	26.97	Peak	---	---
2	1198.000	43.67	-30.33	74.00	41.82	24.60	4.24	26.99	Peak	---	---
3	1198.000	31.98	-22.02	54.00	30.13	24.60	4.24	26.99	Average	---	---
1	4276.000	56.86	-17.14	74.00	42.81	32.49	9.07	27.51	Peak	---	---
2	4276.000	50.75	-3.25	54.00	36.70	32.49	9.07	27.51	Average	100	125

➤ For 5GHz ~ 25GHz

Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Antenna Polarity	Cable Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Detect (dB)	Mode
2436.000	H	28.29	6.26	77.44	-	-	111.99	397649.10		Peak
2436.000	H	28.29	6.26	68.44	-	-	102.99	141091.22		AV
2438.000	V	28.30	6.26	63.79	-	-	98.35	82698.95		Peak
2438.000	V	28.30	6.26	55.47	-	-	90.03	31732.19		AV
4876.000	H	33.17	9.09	16.06	74.00	5011.87	58.32	824.14	-15.68	Peak
4876.000	H	33.17	9.09	10.94	54.00	501.19	53.20	457.09	-0.80	AV
4876.000	V						-			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: 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 6 (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 : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH11 2462MHz
 : F371707
 : 11g

	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	200.100	40.11	-3.39	43.50	57.14	7.28	2.29	26.60	QP	200	183
2	233.580	36.35	-9.65	46.00	50.07	10.37	2.51	26.60	Peak	---	---
3	280.020	37.54	-8.46	46.00	49.84	11.54	2.76	26.60	Peak	---	---
1	358.100	42.55	-3.45	46.00	52.74	13.27	3.49	26.95	Peak	---	---
2	365.800	39.29	-6.71	46.00	49.26	13.53	3.49	26.99	Peak	---	---
3	399.400	37.94	-8.06	46.00	47.03	14.60	3.51	27.20	Peak	---	---
1	1198.000	43.55	-30.45	74.00	41.70	24.60	4.24	26.99	Peak	---	---
2	1198.000	32.10	-21.90	54.00	30.25	24.60	4.24	26.99	Average	---	---
1	4422.000	56.93	-17.07	74.00	43.15	32.43	8.92	27.57	Peak	---	---
2	4422.000	50.84	-3.16	54.00	37.06	32.43	8.92	27.57	Average	100	136

Site : 03CH03-HY
 Condition : 3m 03CH03-MAT VERTICAL
 EUT : AP
 Power : 110V/60Hz
 MODEL : IEEE 802.11(b+g)
 MEMO : TX CH11 2462MHz
 : F371707
 : ilg

	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	133.140	31.11	-12.39	43.50	45.57	10.44	1.97	26.87	Peak	---	---
2	200.100	34.51	-8.99	43.50	51.54	7.28	2.29	26.60	Peak	---	---
3	299.730	30.99	-15.01	46.00	43.38	11.36	2.85	26.60	Peak	---	---
1	358.100	34.12	-11.88	46.00	44.31	13.27	3.49	26.95	Peak	---	---
2	399.400	34.98	-11.02	46.00	44.07	14.60	3.51	27.20	Peak	---	---
3	786.500	37.86	-8.14	46.00	42.15	18.68	5.03	28.00	Peak	---	---
1	1000.000	42.44	-31.56	74.00	41.39	24.10	3.92	26.97	Peak	---	---
2	1000.000	30.73	-23.27	54.00	29.68	24.10	3.92	26.97	Average	---	---
3	1164.000	41.12	-32.88	74.00	39.40	24.52	4.19	26.99	Peak	---	---
4	1164.000	31.93	-22.07	54.00	30.21	24.52	4.19	26.99	Average	---	---
5	1198.000	43.24	-30.76	74.00	41.39	24.60	4.24	26.99	Peak	---	---
1	4980.000	57.04	-16.96	74.00	42.31	33.38	9.15	27.80	Peak	---	---
2	4980.000	50.76	-3.24	54.00	36.03	33.38	9.15	27.80	Average	---	---

➤ For 5GHz ~ 25GHz

Remark: Frequency from 5000MHz to 25000MHz, the emission emitted by the EUT is too low to be measured

■ Field strength of fundamental and harmonics

Frequency (MHz)	Antenna Polarity	Cable Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Detect (dB)	Mode
2460.000	H	28.34	6.29	73.28	-	-	107.91	248599.36		Peak
2460.000	H	28.34	6.29	61.48	-	-	96.11	63899.87		AV
2460.000	V	28.34	6.29	63.82	-	-	98.45	83656.56		Peak
2460.000	V	28.34	6.29	53.87	-	-	88.50	26607.25		AV
4920.000	V/H						-			AV/ Peak
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 B14. shows 46.09 dB delta between carrier maximum power and local maximum emission in the restricted band (2.4835GHz).

- Test Mode: Mode 1

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	105.80	59.71	74.00	-14.29	Peak
H	98.70	52.61	54.00	-1.39	Average
V	96.85	50.76	74.00	-23.24	Peak
V	89.79	43.70	54.00	-10.30	Average

The band edge emission plot on appendix B page B16. shows 44.69dB delta between carrier maximum power and local maximum emission in the restricted band (2.4835GHz).

- Test Mode: Mode 2

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	107.91	63.22	74.00	-10.78	Peak
H	96.11	51.42	54.00	-2.58	Average
V	98.45	53.76	74.00	-20.24	Peak
V	88.50	43.81	54.00	-10.19	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 detachable dipole antenna via inverse-SMA 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 dipole antenna. The antenna connector type is inverse-SMA.

5.9. RF Exposure

FCC Rules and Regulations Part 1.1307,1.1310,2.1091,2.1093:
RF Exposure Compliance

5.9.1. Limit For Maximum Permissible Exposure (MPE)

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

F=frequency in MHz

*Plane-wave equivalent power density

5.9.2. MPE Calculations

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (mW/cm}^2\text{)} = \frac{E^2}{3770}$$

E = Electric field (V/m)

P = Peak output power (mW)

G = Antenna numeric gain (numeric)

d = Separation distance (m)

Because the EUT is belong to General Population/ Uncontrolled Exposure. So the Limit of Power Density is 10 W/m². We can change the formula to:

$$d = \sqrt{\frac{30 \times P \times G}{3770}}$$

• Test Mode: Mode 1

Channel No.	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Calculated RF Exposure Separation Distance (cm)	Minimum RF Exposure Separation Distance (cm)
Channel 01	2.00	1.58	15.26	33.6	2.06	20
Channel 06	2.00	1.58	17.08	51.1	2.54	20
Channel 11	2.00	1.58	13.91	24.6	1.76	20

• Test Mode: Mode 2

Channel No.	Antenna Gain (dBi)	Antenna Gain (numeric)	Peak Output Power (dBm)	Peak Output Power (mW)	Calculated RF Exposure Separation Distance (cm)	Minimum RF Exposure Separation Distance (cm)
Channel 01	2.00	1.58	9.70	9.3	1.08	20
Channel 06	2.00	1.58	9.91	9.8	1.11	20
Channel 11	2.00	1.58	10.35	10.8	1.17	20

5.9.3. FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation. Proposed RF exposure safety information to include in User's Manual.

6. EMI Suppression Component List

1. Add a core to antenna wire.
(As the Internal photo No. 2)

2. Use a copper flame building on solder side of M/B.
(As the Internal photo No. 7)

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)
Receiver	SCHAFFNER	SCR 3501	417	9 KHz –1GHz	Feb. 20, 2003	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Oct. 21, 2002	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2687	30MHz –2GHz	Dec. 21, 2002	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Jan. 02, 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)
Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170154	15GHz~40GHz	Jun. 02, 2003	Radiation (03CH03-HY)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Mar. 14, 2003	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP7	838858/014	9KHz~7GHZ	Sep. 03, 2003	Conducted
Power meter	R&S	NRVS	100444	DC~40GHz	May 28, 2003	Conducted
Power sensor	R&S	NRV-Z55	100049	DC~40GHz	May 28, 2003	Conducted
Power Sensor	R&S	NRV-Z32	100057	30MHz-6GHz	May 28, 2003	Conducted
AC power source	HPC	HPA-500W	HPA-9100024	AC 0~300V	May 27, 2003	Conducted
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 02, 2002	Conducted
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz~7GHz	Jan. 01, 2003	Conducted
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz~1GHz	Jan. 01, 2003	Conducted

Calibration Interval of instruments listed above is one year.

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 Ue(y)	normal	±2.7
Measuring uncertainty for a level of confidence of 95% $U=2Ue(y)$	normal (k=2)	±5.4

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

$U = \{((1/2)^2 + (0.3/2)^2 + (2^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2)\} = 2.7$ 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 Ue(y)	normal	±1.66
Measuring uncertainty for a level of confidence of 95% $U=2Ue(y)$	normal (k=2)	±3.32

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