FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment	:	Wireless AP
Model No.	:	RT211W
FCC ID	:	H8N-RT211W
Filing Type	:	Certification
Applicant	:	**ASKEY COMPUTER CORP.** 10F, No. 119, Chienkang Rd., Chung-Ho, Taipei, Taiwan, R.O.C.

SPORTON International Inc.

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

Table of Contents

History of this test report

Original Report Issue Date: Nov. 12, 2003

■ No additional attachment.

□ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

Certificate No. : F391911

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 15, Subpart C

Equipment : Wireless AP

Model No. : RT211W

FCC ID : H8N-RT211W

Filing Type : Certification

Applicant : **ASKEY COMPUTER CORP.**
10F, No. 119, Chienkang Rd., Chung-Ho, Taipei,
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 Nov. 11, 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

ASKEY COMPUTER CORP.
10F, No. 119, Chienkang Rd., Chung-Ho, Taipei, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

Equipment	: Wireless AP
Model No.	: RT211W
FCC ID	: H8N-RT211W
Trade Name	: ASKEY
TP Cable	: Non-Shielded, 1m
Power Supply Type	: Switching
AC Power Input	: Wall-Mount, 2 pin
DC Power Cable	: Non-Shielded, 1.8m, 2 pin

1.4. Feature of Equipment under Test

Product Feature & Specification	
1. Host/Radio Interface	DSSS
2. Type of Modulation	CCK, DQPSK, DBPSK
3. Number of Channels	11
4. Frequency Band	2400MHz~2483.5MHz
5. Carrier Frequency of each channel	2412MHz+(n-1)5MHz, n=Channel NO.
6. Bandwidth of each channel	11 MHz
7. Maximum Output Power to Antenna	18.75 dBm
8. IF & L.O. frequency	IF: 374 MHz, L.O.: 2036MHz
9. Type of Antenna Connector (Ex: SMA, TNC, MCX, MMCX, UFC…etc)	Outside: Undetachable, Inside: U.FL
10. Antenna Type/ Class and Gain	Dipole Antenna, 2dBi
11. Function Type	Transceiver
12. Power Rating (DC/AC, Voltage)	Input: AC 100V-240V, 0.4A, 50-60Hz Output: DC 5 V, 2A
13. Duty Cycle	100%
14. Basic function of product	Wireless router

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 DELL 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. (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: CH01（2412MHz）
   Mode 2: CH06（2437MHz）
   Mode 3: CH11（2462MHz）

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 workstation

FCC ID	: N/A
Model No.	: PRESARIO 1500
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0127
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.	: SP0051
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to compy 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.

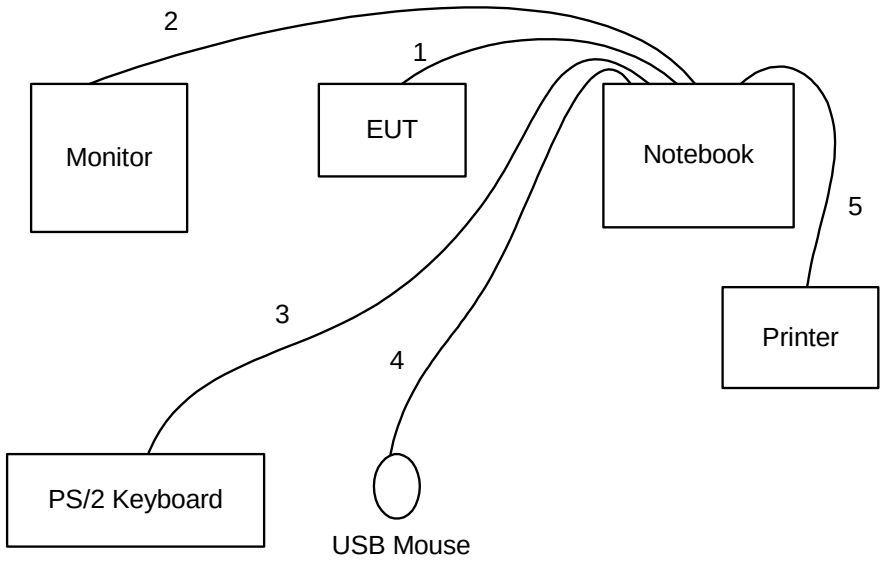
Support Unit 5. -- Printer (EPSON) – for local workstation

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
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 6. -- Notebook (DELL) – for remote workstation

FCC ID	: N/A
Model No.	: PP01L
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0131
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

2.3. Connection Diagram of Test System



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

3. Test Software

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, the following programs were executed:
-Executed “MFGTEST.EXE” to keep transmitting signals at fixed frequency.
-Executed “EXPLOR.EXE” to link with the remote workstation to receive and transmit data by wireless.

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, 15.247

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

5.2. 6dB Bandwidth

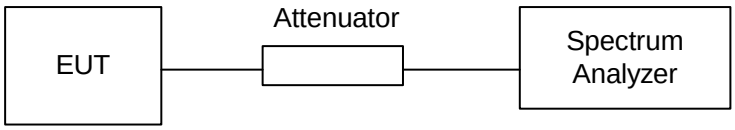
5.2.1. Measuring Instruments：

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 : 25°C
- Relative Humidity : 65 %

Channel	Frequency (MHz)	6dB Emission bandwidth (MHz)	Limits (MHz)	Plot Ref. No.
1	2412	11.12	0.5	1
6	2437	9.52	0.5	2
11	2462	11.04	0.5	3

5.3. Peak Output Power

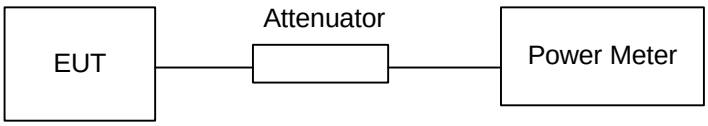
5.3.1. Measuring Instruments：

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 : 25°C
- Relative Humidity : 65 %

Channel	Frequency (MHz)	Measured Output Power (mWatt)	Measured Output Power (dBm)	Limits (Watt/dBm)
1	2412	65.464	18.16	1W/30 dBm
6	2437	60.117	17.79	1W/30 dBm
11	2462	74.989	18.75	1W/30 dBm

-

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

5.4. Power Spectral Density

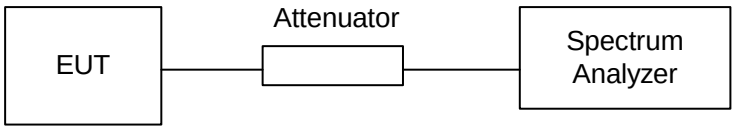
5.4.1. Measuring Instruments：

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 : 25°C
- Relative Humidity : 65 %

Channel	Frequency (MHz)	Power Spectral Density (dBm)	Limits (dBm)	Plot Ref. No.
1	2412	-11.56	8	1
6	2437	-11.69	8	2
11	2462	-11.88	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

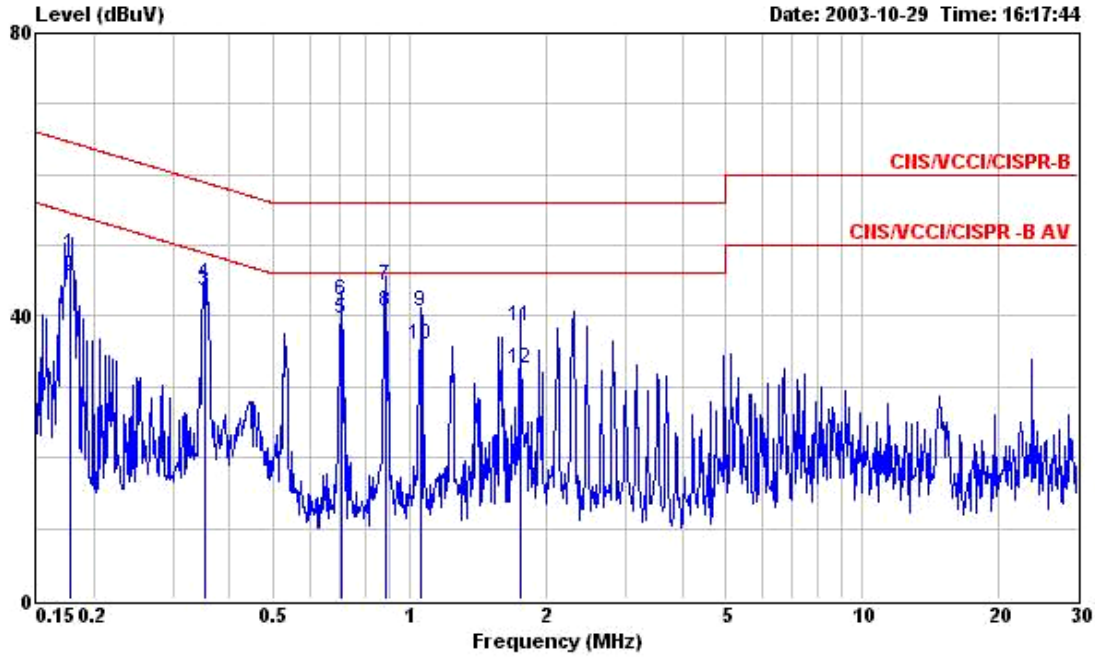
5.5.2. Test Procedures：

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：

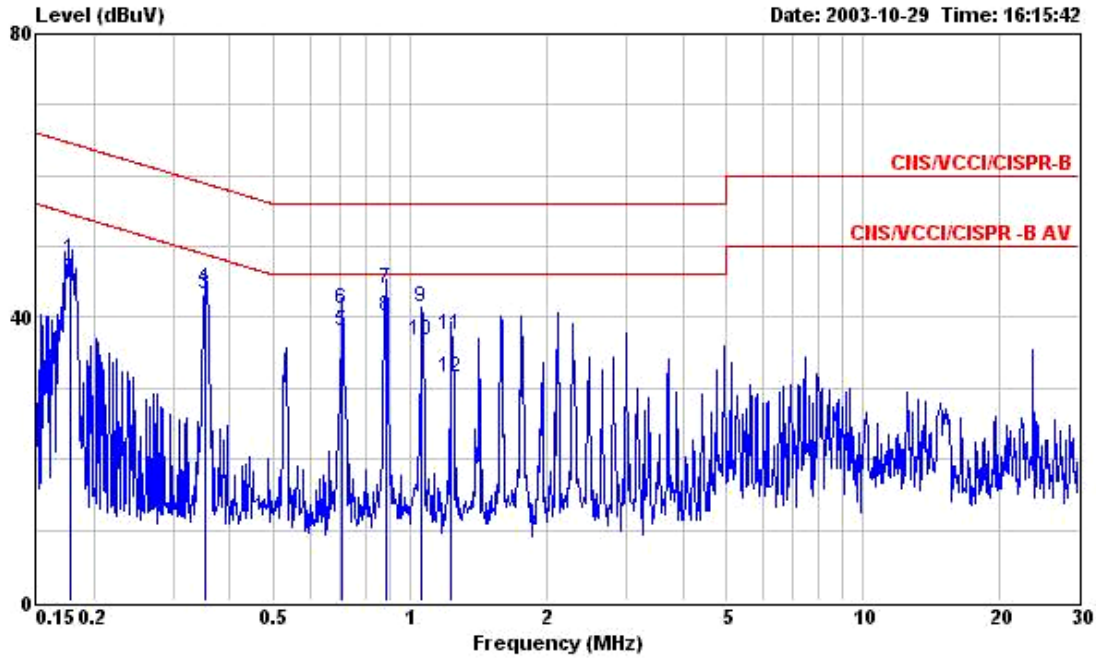
- Test Mode: Mode 1
- Frequency Range of Test: from 150KHz to 30 MHz
- Temperature: 25.9°C
- Relative Humidity: 60 %

■ **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 LINE
EUT : Wireless AP
Power : 110V/60Hz
Model : RT211W
Memo : TX CH01

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.178	48.85	-15.74	64.59	48.69	0.10	0.06	QP
2	0.178	45.63	-8.96	54.59	45.47	0.10	0.06	Average
3	0.354	43.58	-5.29	48.87	43.40	0.10	0.08	Average
4	0.354	44.46	-14.41	58.87	44.28	0.10	0.08	QP
5	0.707	39.72	-6.28	46.00	39.53	0.10	0.09	Average
6	0.707	42.25	-13.75	56.00	42.06	0.10	0.09	QP
7	0.882	44.32	-11.68	56.00	44.12	0.10	0.10	QP
8	0.882	40.69	-5.31	46.00	40.49	0.10	0.10	Average
9	1.060	40.59	-15.41	56.00	40.39	0.10	0.10	QP
10	1.060	35.87	-10.13	46.00	35.67	0.10	0.10	Average
11	1.758	38.57	-17.43	56.00	38.35	0.10	0.12	QP
12	1.758	32.52	-13.48	46.00	32.30	0.10	0.12	Average



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : Wireless AP
Power : 110V/60Hz
Model : RT211W
Memo : TX CH01

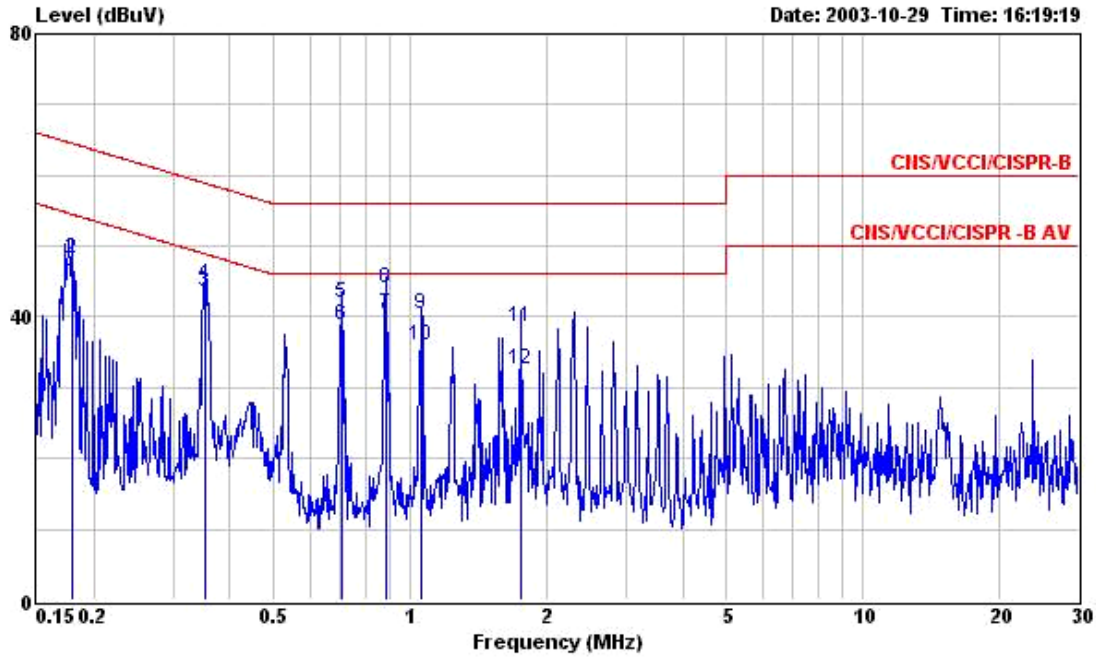
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.177	48.31	-16.32	64.63	48.15	0.10	0.06	QP
2	0.177	45.32	-9.31	54.63	45.16	0.10	0.06	Average
3	0.352	43.38	-5.54	48.92	43.20	0.10	0.08	Average
4	0.352	44.14	-14.78	58.92	43.96	0.10	0.08	QP
5	0.708	37.93	-8.07	46.00	37.74	0.10	0.09	Average
6	0.708	41.12	-14.88	56.00	40.93	0.10	0.09	QP
7	0.884	44.10	-11.90	56.00	43.90	0.10	0.10	QP
8	0.884	40.07	-5.93	46.00	39.87	0.10	0.10	Average
9	1.060	41.49	-14.51	56.00	41.29	0.10	0.10	QP
10	1.060	36.79	-9.21	46.00	36.59	0.10	0.10	Average
11	1.232	37.56	-18.44	56.00	37.35	0.10	0.11	QP
12	1.232	31.43	-14.57	46.00	31.22	0.10	0.11	Average

Test Engineer : John

John Huang

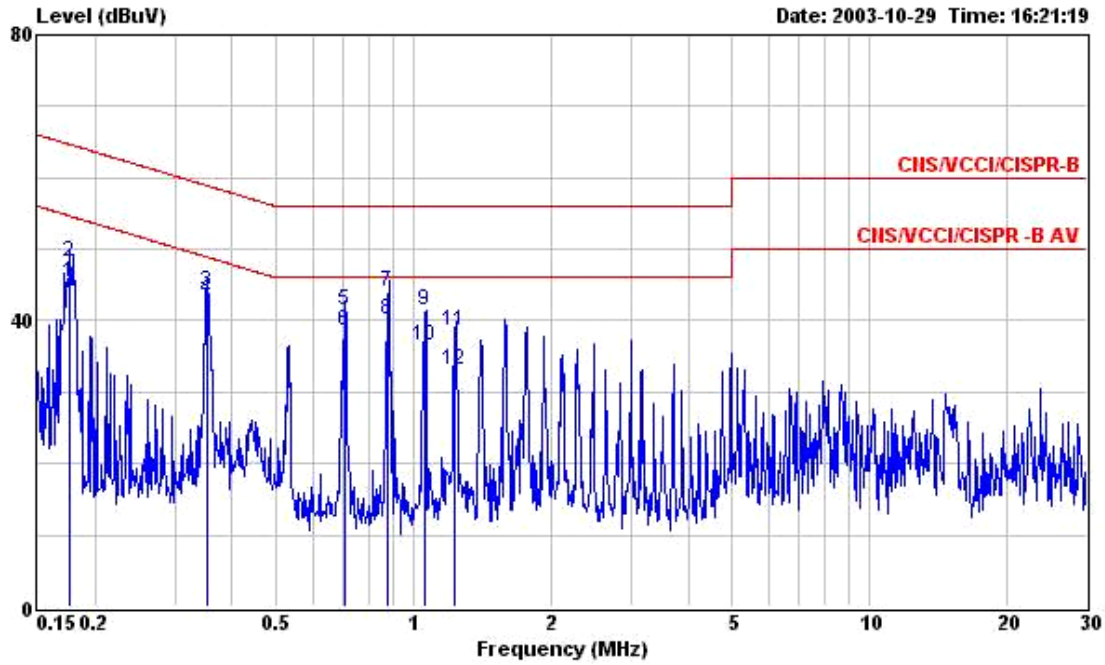
- Test Mode: Mode 2
- Frequency Range of Test: from 150KHz to 30 MHz
- Temperature: 25.9°C
- Relative Humidity: 60 %

■ **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 LINE
EUT : Wireless AP
Power : 110V/60Hz
Model : RT211W
Memo : TX CH06

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.179	44.91	-9.63	54.54	44.75	0.10	0.06	Average
2	0.179	48.33	-16.21	64.54	48.17	0.10	0.06	QP
3	0.354	43.50	-5.37	48.87	43.32	0.10	0.08	Average
4	0.354	44.55	-14.32	58.87	44.37	0.10	0.08	QP
5	0.708	41.91	-14.09	56.00	41.72	0.10	0.09	QP
6	0.708	38.77	-7.23	46.00	38.58	0.10	0.09	Average
7	0.884	40.52	-5.48	46.00	40.32	0.10	0.10	Average
8	0.884	44.16	-11.84	56.00	43.96	0.10	0.10	QP
9	1.060	40.50	-15.50	56.00	40.30	0.10	0.10	QP
10	1.060	35.87	-10.13	46.00	35.67	0.10	0.10	Average
11	1.758	38.64	-17.36	56.00	38.42	0.10	0.12	QP
12	1.758	32.68	-13.32	46.00	32.46	0.10	0.12	Average



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : Wireless AP
Power : 110V/60Hz
Model : RT211W
Memo : TX CH06

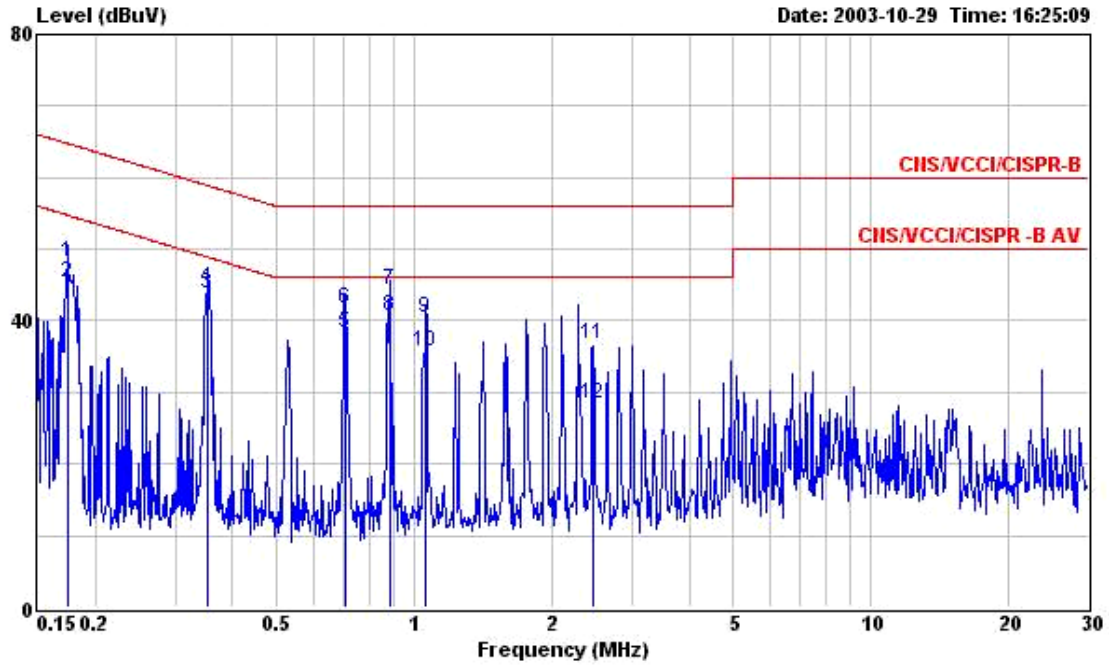
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.176	45.42	-9.24	54.66	45.26	0.10	0.06	Average
2	0.176	48.27	-16.39	64.66	48.11	0.10	0.06	QP
3	0.354	43.92	-14.95	58.87	43.74	0.10	0.08	QP
4	0.354	43.12	-5.75	48.87	42.94	0.10	0.08	Average
5	0.705	41.50	-14.50	56.00	41.31	0.10	0.09	QP
6	0.705	38.61	-7.39	46.00	38.42	0.10	0.09	Average
7	0.881	44.16	-11.84	56.00	43.96	0.10	0.10	QP
8	0.881	40.20	-5.80	46.00	40.00	0.10	0.10	Average
9	1.060	41.39	-14.61	56.00	41.19	0.10	0.10	QP
10	1.060	36.59	-9.41	46.00	36.39	0.10	0.10	Average
11	1.235	38.51	-17.49	56.00	38.30	0.10	0.11	QP
12	1.235	33.21	-12.79	46.00	33.00	0.10	0.11	Average

Test Engineer : John

John Huang

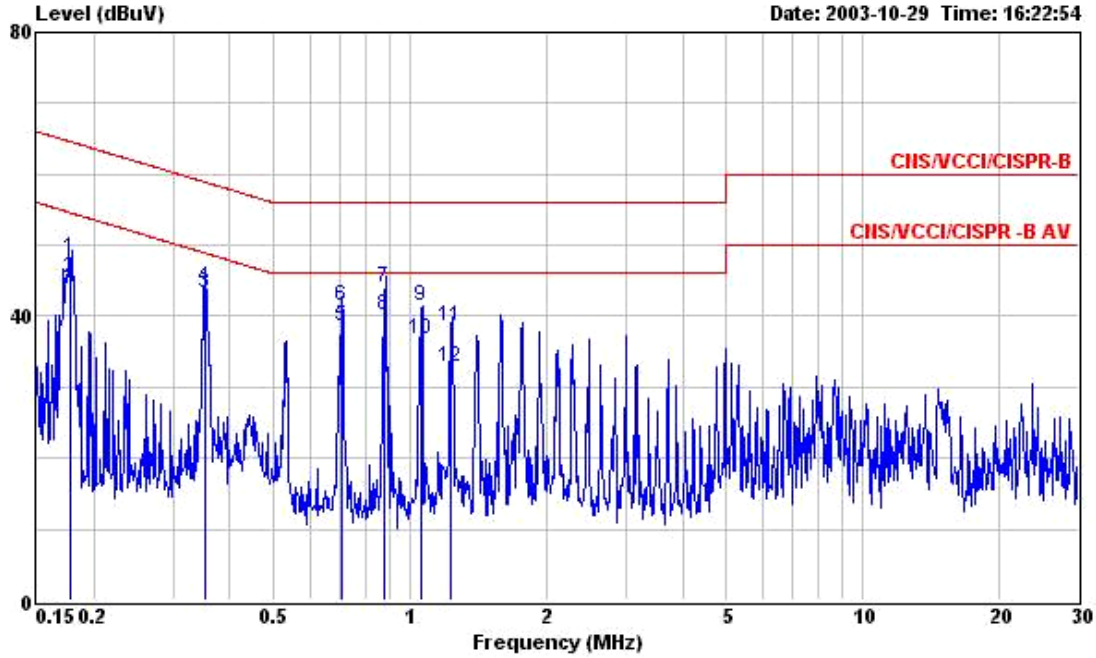
- Test Mode: Mode 3
- Frequency Range of Test: from 150KHz to 30 MHz
- Temperature: 25.9°C
- Relative Humidity: 60 %

■ **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 : Wireless AP
Power : 110V/60Hz
Model : RT211W
Memo : TX CH11

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.174	48.15	-16.62	64.77	47.99	0.10	0.06	QP
2	0.174	45.33	-9.44	54.77	45.17	0.10	0.06	Average
3	0.352	43.83	-5.09	48.92	43.65	0.10	0.08	Average
4	0.352	44.67	-14.25	58.92	44.49	0.10	0.08	QP
5	0.708	38.39	-7.61	46.00	38.20	0.10	0.09	Average
6	0.708	41.78	-14.22	56.00	41.59	0.10	0.09	QP
7	0.882	44.30	-11.70	56.00	44.10	0.10	0.10	QP
8	0.882	40.69	-5.31	46.00	40.49	0.10	0.10	Average
9	1.060	40.42	-15.58	56.00	40.22	0.10	0.10	QP
10	1.060	35.73	-10.27	46.00	35.53	0.10	0.10	Average
11	2.475	36.65	-19.35	56.00	36.41	0.10	0.14	QP
12	2.475	28.47	-17.53	46.00	28.23	0.10	0.14	Average



Site : CO01-HY
Condition : CNS/VCCI/CISPR-B 2003 2001/008 NEUTRAL
EUT : Wireless AP
Power : 110V/60Hz
Model : RT211W
Memo : TX CH11

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.177	48.23	-16.40	64.63	48.07	0.10	0.06	QP
2	0.177	45.22	-9.41	54.63	45.06	0.10	0.06	Average
3	0.353	43.38	-5.52	48.90	43.20	0.10	0.08	Average
4	0.353	44.10	-14.80	58.90	43.92	0.10	0.08	QP
5	0.705	38.61	-7.39	46.00	38.42	0.10	0.09	Average
6	0.705	41.54	-14.46	56.00	41.35	0.10	0.09	QP
7	0.881	44.14	-11.86	56.00	43.94	0.10	0.10	QP
8	0.881	40.20	-5.80	46.00	40.00	0.10	0.10	Average
9	1.059	41.43	-14.57	56.00	41.23	0.10	0.10	QP
10	1.059	36.86	-9.14	46.00	36.66	0.10	0.10	Average
11	1.234	38.57	-17.43	56.00	38.36	0.10	0.11	QP
12	1.234	32.90	-13.10	46.00	32.69	0.10	0.11	Average

Test Engineer : John

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 on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 4.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions

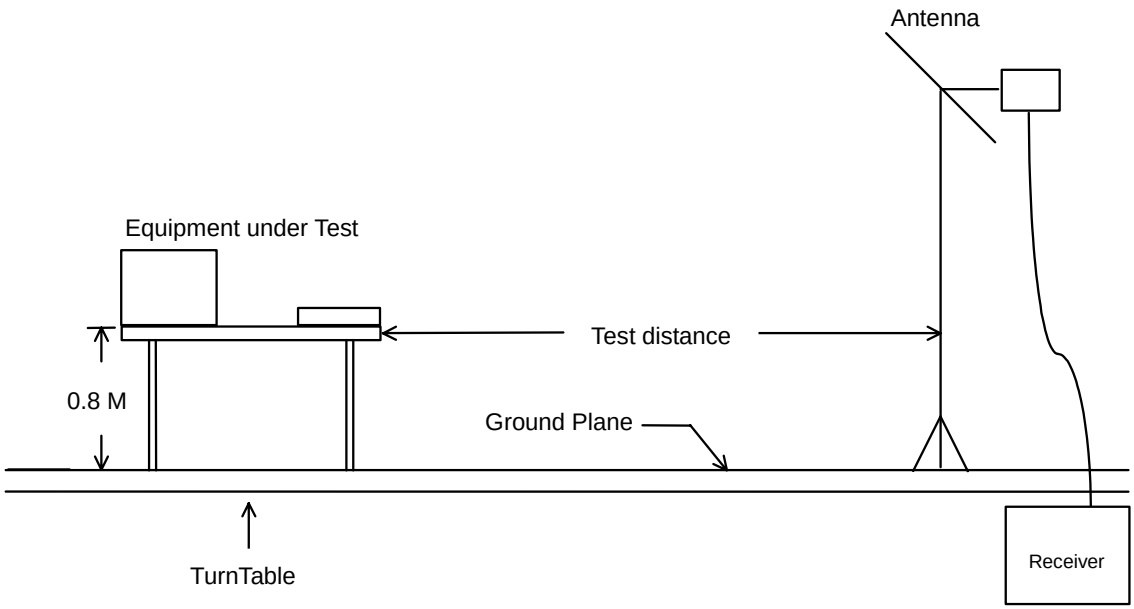
5.6.1. Major Measuring Instruments

● 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 FSEK30)
Attenuation	10 dB
Start Frequency	1 GHz
Stop Frequency	25 GHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	20 Hz 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
- Test Distance: 3 M
- Temperature: 22 °C
- Relative Humidity: 56 %
- Test Date: Feb. 25, 2003
- 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 under gray area in the following table, and its antenna height is_1_m, turn table degree is _133_°

■ Spurious Emission

- For 30MHz to 1GHz

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
47.820	H	8.01	1.27	26.46	40.00	100	35.74	61.24	-4.26	Peak
358.100	H	13.28	3.99	24.66	46.00	200	41.93	124.88	-4.07	Peak
264.090	V	11.71	3.26	27.88	46.00	200	42.85	138.84	-3.15	Peak
357.400	V	13.26	3.98	24.38	46.00	200	41.62	120.50	-4.38	Peak
624.100	V	17.46	5.62	18.76	46.00	200	41.84	123.59	-4.16	Peak
662.600	V	17.73	5.89	18.61	46.00	200	42.23	129.27	-3.77	Peak

- For above 1GHz

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
1590.000	H	28.15	4.13	10.83	74.00	5012	43.11	143.05	-30.89	Peak
1476.000	V	27.36	3.92	15.64	74.00	5012	46.92	221.82	-27.08	Peak
1590.000	V	28.15	4.13	14.75	74.00	5012	47.03	224.65	-26.97	Peak
1750.000	V	29.27	4.41	13.38	74.00	5012	47.06	225.42	-26.94	Peak
2318.000	V	30.67	5.44	12.73	74.00	5012	48.84	276.69	-25.16	Peak
2462.000	V	30.53	5.72	14.30	74.00	5012	50.55	336.90	-23.45	Peak
3214.000	V	30.34	7.06	11.38	74.00	5012	48.78	274.79	-25.22	Peak

■ Field strength of fundamental and harmonics

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2412.000	H	30.58	5.62	54.02	-	-	90.22	32433.96	-	Peak
2412.000	H	30.58	5.62	51.44	-	-	87.64	24099.05	-	A.V.
2412.000	V	30.58	5.62	60.44	-	-	96.64	67920.36	-	Peak
2412.000	V	30.58	5.62	56.15	-	-	92.35	41447.66	-	A.V.
4824.000	V/H						-			Peak, A.V.
7236.000	V/H						-			Peak, A.V.
9648.000	V/H						-			Peak, A.V.
12060.000	V/H						-			Peak, A.V.
14472.000	V/H						-			Peak, A.V.
16884.000	V/H						-			Peak, A.V.
19296.000	V/H						-			Peak, A.V.
21708.000	V/H						-			Peak, A.V.
24120.000	V/H						-			Peak, A.V.

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

Test Engineer : Jay

Jay Zhong

- Test Mode: Mode 2
- Test Distance: 3 M
- Temperature: 25 °C
- Relative Humidity: 65 %
- Test Date: Nov. 07, 2003
- 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 under gray area in the following table, and its antenna height is _1_m, turn table degree is 105°

■ Spurious Emission

- For 30MHz to 1GHz

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
85.620	H	7.70	1.59	20.93	40.00	100.00	30.22	32.43	-9.78	Peak
398.000	H	14.57	3.51	15.65	46.00	199.53	33.73	48.58	-12.27	Peak
430.200	H	15.06	3.54	16.53	46.00	199.53	35.13	57.08	-10.87	Peak
441.400	H	15.21	3.54	13.94	46.00	199.53	32.69	43.10	-13.31	Peak
64.290	V	4.84	1.42	24.38	40.00	100.00	30.64	34.04	-9.36	Peak
131.790	V	10.46	1.96	18.66	43.50	149.62	31.08	35.81	-12.42	Peak

- For above 1GHz

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
1596.000	H	25.75	4.89	11.75	74.00	5011.87	42.39	131.67	-31.61	Peak
1596.000	H	25.75	4.89	-0.47	54.00	501.19	30.17	32.25	-23.83	A.V.
1324.000	V	24.91	4.43	15.54	74.00	5011.87	44.88	175.39	-29.12	Peak
1324.000	V	24.91	4.43	-0.33	54.00	501.19	29.01	28.22	-24.99	A.V.
1454.000	V	25.22	4.63	10.69	74.00	5011.87	40.54	106.41	-33.46	Peak
1454.000	V	25.22	4.63	-1.81	54.00	501.19	28.04	25.23	-25.96	A.V.
1596.000	V	25.75	4.89	15.32	74.00	5011.87	45.96	198.61	-28.04	Peak
1596.000	V	25.75	4.89	0.90	54.00	501.19	31.54	37.76	-22.46	A.V.

■ Field strength of fundamental and harmonics

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2436.000	H	28.29	6.26	47.13	-	-	81.68	12133.89	-	Peak
2436.000	H	28.29	6.26	43.85	-	-	78.40	8317.64	-	A.V.
2430.000	V	28.28	6.25	55.86	-	-	90.39	33075.01	-	Peak
2430.000	V	28.28	6.25	52.68	-	-	87.21	22935.07	-	A.V.
4874.000	V/H						-			Peak, A.V.
7311.000	V/H						-			Peak, A.V.
9748.000	V/H						-			Peak, A.V.
12185.000	V/H						-			Peak, A.V.
14622.000	V/H						-			Peak, A.V.
17059.000	V/H						-			Peak, A.V.
19496.000	V/H						-			Peak, A.V.
21933.000	V/H						-			Peak, A.V.
24370.000	V/H						-			Peak, A.V.

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
- Test Distance: 3 M
- Temperature: 22 °C
- Relative Humidity: 56 %
- Test Date: Feb. 25, 2003
- 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 under gray area in the following table, and its antenna height is _2_m, turn table degree is _54_°

■ Spurious Emission

- For 30MHz to 1GHz

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
47.820	H	8.01	1.27	26.39	40.00	100	35.67	60.74	-4.33	Peak
355.300	H	13.19	3.94	24.65	46.00	200	41.78	122.74	-4.22	Peak
396.600	H	14.53	4.07	24.08	46.00	200	42.68	136.14	-3.32	Peak
31.890	V	14.55	1.04	20.45	40.00	100	36.04	63.39	-3.96	Peak
623.400	V	17.46	5.61	18.67	46.00	200	41.74	122.18	-4.26	Peak
662.600	V	17.73	5.89	17.89	46.00	200	41.51	118.99	-4.49	Peak

- For above 1GHz

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
1590.000	V	28.15	4.13	15.21	74.00	5012	47.49	236.86	-26.51	Peak
2318.000	V	30.67	5.44	15.49	74.00	5012	51.60	380.19	-22.40	Peak
2558.000	V	30.47	5.91	12.61	74.00	5012	48.99	281.51	-25.01	Peak

■ Field strength of fundamental and harmonics

Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission Level		Margin	Detect
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
2462.000	H	30.53	5.72	52.28	-	-	88.53	26699.31	-	Peak
2462.000	H	30.53	5.72	48.70	-	-	84.95	17680.72	-	A.V.
2462.000	V	30.53	5.72	62.42	-	-	98.67	85802.51	-	Peak
2462.000	V	30.53	5.72	59.42	-	-	95.67	60743.53	-	A.V.
4924.000	V/H						-			Peak, A.V.
7386.000	V/H						-			Peak, A.V.
9848.000	V/H						-			Peak, A.V.
12310.000	V/H						-			Peak, A.V.
14772.000	V/H						-			Peak, A.V.
17234.000	V/H						-			Peak, A.V.
18696.000	V/H						-			Peak, A.V.
22158.000	V/H						-			Peak, A.V.
24620.000	V/H						-			Peak, A.V.

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

Test Engineer : 

Jay Zhong

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 44.49dB 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	88.53	44.04	74.00	-29.96	Peak
H	84.95	40.46	54.00	-13.54	Average
V	98.67	54.18	74.00	-19.82	Peak
V	95.67	51.18	54.00	-2.82	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 undetachable Dipole antenna. (antenna via U.FL 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 U.FL. The coaxial cable of the antenna is fixed to the antenna.

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/ cm2)	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/cm2)	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

$$\text{E (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: Pd (mW/cm}^2\text{)} = \frac{E^2}{377}$$

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 1.0 mW/cm^2. We can change the formula to:

$$d = \sqrt{\frac{30 \times P \times G}{377}}$$

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 1	2.00	1.58	18.16	65.46	2.87	20
Channel 6	2.00	1.58	17.79	60.12	2.75	20
Channel 11	2.00	1.58	18.75	74.99	3.07	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 two gaskets on rear side of daughter board.
   (As the Internal photo No.8)

7. Antenna Factor & Cable Loss

<Mode 1, 3>

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	15.35	1.00	1000	24.30	3.89
35	13.63	1.08	2000	31.10	5.41
40	11.11	1.18	3000	29.60	6.92
45	10.59	1.24	4000	30.80	8.24
50	6.47	1.30	5000	34.20	9.22
55	5.83	1.38	6000	33.30	10.25
60	5.18	1.44	7000	37.80	11.61
65	4.81	1.52	8000	39.40	11.78
70	4.43	1.59	9000	38.40	12.59
75	5.10	1.68	10000	38.90	13.84
80	5.91	1.75	11000	41.10	14.64
85	7.33	1.77	12000	42.70	14.12
90	8.74	1.83	13000	43.90	16.01
100	9.36	1.90	14000	43.70	13.76
110	9.65	2.01	15000	43.40	14.30
120	9.97	2.06	16000	40.90	15.16
130	10.51	2.16	17000	44.40	15.88
140	10.32	2.24	18000	47.10	16.09
150	9.42	2.34	19000	37.60	16.98
160	8.09	2.42	20000	37.30	16.21
170	7.43	2.56	21000	37.00	20.13
180	7.60	2.62	22000	38.00	19.24
190	7.43	2.67	23000	38.70	19.64
200	7.26	2.76	24000	38.60	20.54
220	9.11	2.92	25000	38.90	20.14
240	10.88	3.09			
260	11.75	3.23			
280	11.55	3.38			
300	11.36	3.51			
320	12.03	3.63			
340	12.69	3.73			
360	13.33	4.03			
380	14.00	4.00			
400	14.63	4.09			
450	15.33	4.31			
500	16.03	4.64			
550	16.65	5.09			
600	17.29	5.49			
650	17.64	5.82			
700	18.00	5.94			
750	18.39	6.16			
800	18.79	6.58			
850	19.10	6.72			
900	19.42	6.81			
950	19.58	7.10			
1000	19.75	7.41			

<Mode 2>

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	15.35	1.01	1000	24.30	3.89
35	13.63	1.04	2000	31.10	5.41
40	11.11	1.09	3000	29.60	6.92
45	10.59	1.24	4000	30.80	8.24
50	6.47	1.43	5000	34.20	9.22
55	5.83	1.39	6000	33.30	10.25
60	5.18	1.59	7000	37.80	11.61
65	4.81	1.41	8000	39.40	11.78
70	4.43	1.43	9000	38.40	12.59
75	5.10	1.55	10000	38.90	13.84
80	5.91	1.56	11000	41.10	14.64
85	7.33	1.62	12000	42.70	14.12
90	8.74	1.41	13000	43.90	16.01
95	9.05	1.81	14000	43.70	13.76
100	9.36	1.68	15000	43.40	14.30
110	9.65	1.73	16000	40.90	15.16
120	9.97	1.79	17000	44.40	15.88
130	10.51	1.93	18000	47.10	16.09
140	10.32	2.06	19000	37.60	16.98
150	9.42	2.09	20000	37.30	16.21
160	8.09	2.12	21000	37.00	20.13
170	7.43	2.12	22000	38.00	19.24
180	7.60	2.12	23000	38.70	19.64
190	7.43	2.21	24000	38.60	20.54
200	7.26	2.29	25000	38.90	20.14
220	9.11	2.42			
240	10.88	2.54			
260	11.75	2.66			
280	11.55	2.76			
300	11.36	2.85			
320	12.03	3.10			
340	12.69	3.36			
360	13.33	3.49			
380	14.00	3.50			
400	14.63	3.51			
450	15.33	3.55			
500	16.03	3.81			
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

<Conduction & Conducted>

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	(CO01-HY)
LISN	MessTec	NNB-2/16Z	2001-008	9 KHz – 30 MHz	Apr. 29, 2003	(CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001-009	9 KHz – 30 MHz	Apr. 29, 2003	(CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450 Hz	N/A	(CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 ~ 60 Hz	N/A	(CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9KHz~30MHz	Jan. 07, 2003	(CO01-HY)
50 ohm BNC type Terminal	NOBLE	50ohm	TM013	50 ohm	Apr. 24, 2003	(CO01-HY)
Power meter	R&S	NRVS	100444	DC~40GHz	May 28, 2002	Conducted
Power sensor	R&S	NRV-Z55	100049	DC~40GHz	May 28, 2002	Conducted
Power Sensor	R&S	NRV-Z32	100057	30MHz-6GHz	May 28, 2002	Conducted
AC power source	HPC	HPA-500W	HPA-9100024	AC 0~300V	May 27, 2002	Conducted
Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 02, 2002	Conducted

< Radiation>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Receiver	R&S	ESCS30	100174	9KHz~2.75GHz	Dec. 12, 2002	(03CH03-HY) (for Mode 1, 3)
Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170154	15GHz~40GHz	May 09, 2001	(03CH03-HY) (for Mode 1, 3)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Oct. 21, 2002	(03CH03-HY) (for Mode 1, 3)
Bilog Antenna	SCHAFFNER	CBL6112B	2687	30MHz –2GHz	Dec. 21, 2002	(03CH03-HY) (for Mode 1, 3)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	(03CH03-HY) (for Mode 1, 3)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	(03CH03-HY) (for Mode 1, 3)
Half-wave dipole antenna	R&S	HZ12 HZ13	83924403 83924503	30MHz - 1GHz	Sep. 23, 2002	(03CH03-HY) (for Mode 1, 3)
Horn Antenna	COM-POWER	AH-118	10094	1GHz – 18GHz	Apr. 09, 2002	(03CH03-HY) (for Mode 1, 3)
Spectrum analyzer	R&S	FSP40	100004/040	9KHZ~40GHZ	Aug. 07, 2002	(03CH03-HY) (for Mode 1, 3)
Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Aug. 12, 2002	(03CH03-HY) (for Mode 1, 3)
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2003	(03CH03-HY) (for Mode 2)
Spectrum analyzer	R&S	FSEK30	100189	20Hz~40GHz	Aug. 04, 2003	(03CH03-HY) (for Mode 2)
Receiver	SCHAFFNER	SCR 3501	417	9 KHz –1GHz	Feb. 20, 2003	(03CH03-HY) (for Mode 2)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Feb. 19, 2003	(03CH03-HY) (for Mode 2)
Bilog Antenna	SCHAFFNER	CBL6112B	2687	30MHz –2GHz	Dec. 21, 2002	(03CH03-HY) (for Mode 2)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Jan. 02, 2003	(03CH03-HY) (for Mode 2)
Amplifier	MITEQ	NSP2650-NF	805858	100MHz~26.5GHz	Jul. 10, 2003	(03CH03-HY) (for Mode 2)
Horn Antenna	COM-POWER	AH-118	10094	1GHz – 18GHz	Apr. 10, 2003	(03CH03-HY) (for Mode 2)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	(03CH03-HY) (for Mode 2)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	(03CH03-HY) (for Mode 2)
Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170154	15GHz~40GHz	Jun. 02, 2003	(03CH03-HY) (for Mode 2)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Mar. 14, 2003	(03CH03-HY) (for Mode 2)

※ 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 Γ1=0.09 Antenna VSWR Γ2=0.67 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	±0.54
combined standard uncertainty Ue(y)	normal	±2.7
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±5.4

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

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

Uncertainty of Conducted Emission Measurement

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

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