



FCC 47 CFR PART 15 SUBPART C

TEST REPORT

For

Wireless mini pci card

Model : MP-G-BR-05

Brand Name : USI

Issued for

Universal Scientific Industrial Co., Ltd.

135, Lane 351, Taiping Road, Sec. 1, Tsao Tuen, Nan-Tou,

Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.

Hsinchu Lab.

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ChuTung Chen, Hsinchu, Taiwan 310, R.O.C

TEL: (03) 591-8012

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Test Report Certification

Applicant : Universal Scientific Industrial Co., Ltd.
Address : 135, Lane 351, Taiping Road, Sec. 1, Tsao Tuen,
Nan-Tou, Taiwan, R.O.C.
Equipment Under Test : Wireless mini pci card
Brand Name : USI
Model : MP-G-BR-05
Tested Date : April 01 ~ 16, 2005

APPLICABLE STANDARD	
STANDARD	TEST RESULT
FCC Part 15 Subpart C (2004)	No non-compliance noted

Approved by:

C. F. Wu

April 22, 2005

C. F. Wu
Manager of Hsinchu Laboratory
Compliance Certification Services Inc.

Reviewed by:

Alan Fan

April 22, 2005

Alan Fan
Test Engineer of Hsinchu Laboratory
Compliance Certification Services Inc.

WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.



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1. EUT DESCRIPTION

1.1 DESCRIPTION OF EUT & POWER

Product Name	Wireless mini pci card
Model Number	MP-G-BR-05
Operating Frequency	◆ IEEE 802.11b/g ISM Band 2.412GHz ~ 2.462GHz (CH1 ~ CH11)
Frequency Channel	2412MHz + 5×n (MHz), n=0, 1, 2,.....10
Channel Number	11
Channel Spacing	5MHz
Air Data Rate	11Mbps(802.11b Mode), 54Mbps(802.11g Mode)
Type of Modulation	◆ IEEE 802.11b (DSSS) : 5.5/11 Mbps (CCK) , 2 Mbps (DQPSK), 1 Mbps (DBPSK) ◆ IEEE 802.11g (OFDM / DSSS) : 48/54 Mbps (QAM-64), 24/36 Mbps (QAM-16), 12/18 Mbps (QPSK) , 6/9 Mbps (BPSK) , 5.5/11 Mbps (CCK) , 2 Mbps (DQPSK) , 1 Mbps (DBPSK)
Frequency Selection	by software / firmware
Transmitter Classification	Mobile device
EUT Description	2.4GHz (Direct Sequence Spread Spectrum and Orthogonal Frequency Division Multiplex) Data Transceiver for WLAN application
Antenna Type	1/2λ Dipole Antenna Antenna Cable : 15±2cm, Cable lose :1.1dB Connector type: MHF connector
Antenna	(1) Antenna Gain : Main 5dBi, Aux 5dBi (2) Antenna Gain : Main 1.8dBi, Aux 1.8dBi
Power Source	3.3VDC (From Notebook PC)

Note: Two antenna were use for this module only the data of the highest gain antenna, Antenna (1), it was show in this test report.



2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CRF 47 2.1046, 2046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, 15.207, 15.209 and 15.247.

3. FACILITIES AND ACCREDITATION

SITE DESCRIPTION :

FCC Certificate NO. : 90585
BSMI Certificate NO. : SL2-IN-E-0002
NVLAP Lab Code : 200118-0
CNLA Certificate NO. : CNLA-ZL97018E
VCCI Certificate NO. : R-1189, C-1250
TÜV Rheinland Certificate NO. : 10008375

NAME OF SITE : Compliance Certification Services Inc. Hsinchu Lab.

SITE LOCATION : Rm.258, Bldg.17, NO.195 , Sec. 4, Chung Hsing Rd.,
Chu-Tung Chen. Hsin-Chu, Taiwan 310 R.O.C.



4. CALIBRATION AND UNCERTAINTY

4.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 1000 MHz	+/- 3.2 dB
Radiated Emission, 1 to 26.5 GHz	+/- 3.2 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%

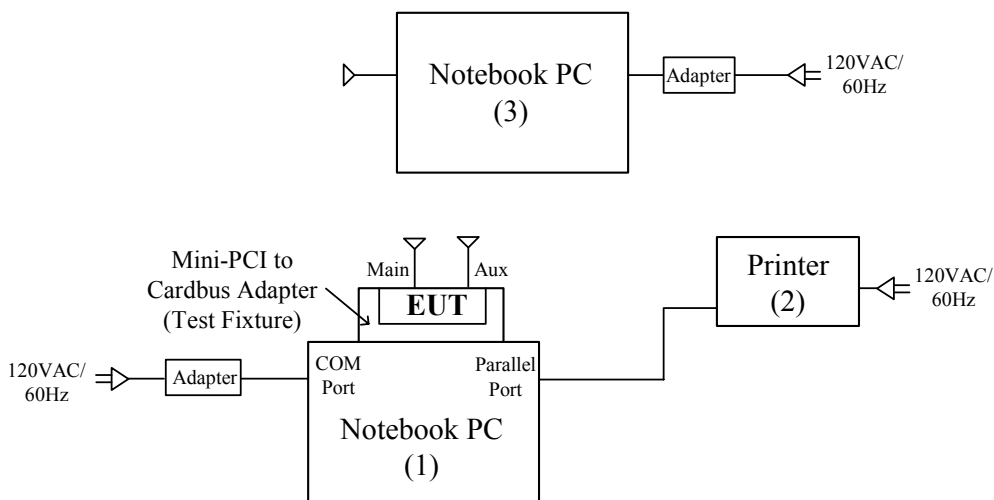


5. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

No.	Product	Manufacturer	Model No.	Serial No.	Input Power	Output Power
1	Notebook PC	DELL	PP01L	CN-09C748-48155 -1AP-6081	20VDC/3.5A (From Power Adapter)	-----
	Adapter	ILAN	F19603J	-----	100~240VAC, 50/60Hz, 1.8A	20VDC, 3.25A
2	Printer	HP	hp desk jet 948c	CN19S6S1XS	100~240VAC, 50/60Hz, 0.7A	-----
3	Notebook PC	COMPAQ	N800V	5Y31KSQZD1TJ 1YR	18.5VDC,65W, 3.5A	-----
	Adapter	COMPAQ	PPP009L	4809672405	100~240VAC, 50/60Hz, 1.6A	18.5VDC, 65W 3.5A

SETUP DIAGRAM FOR TESTS



The indicated numbers (1)(2), please refer to item 1.3



EUT OPERATING CONDITION

1. Set up all computers like the setup diagram.
2. The “**Windows Command Processor (MFGTEST)**” software was used for testing.
3. Software-instruction as below :

wl_tool up (mstart) => TX
mtest => Run TX
wl_tool rate => Set data rate
wl_tool txpwr => Set output power
wl_tool out => RX

(1) TX Mode :

- ⇒ **Tx Data Rate: 11Mbps long** (802.11b Mode) , **6Mbps** (802.11g Mode)
- ⇒ **wl_tool txpwr:** 802.11b Mode Channel 1 (2412MHz) = **100**
802.11b Mode Channel 6 (2437MHz) = **100**
802.11b Mode Channel 11 (2462MHz) = **100**

wl_tool txpwr: 802.11g Mode Channel 1 (2412MHz) = **42**
802.11g Mode Channel 6 (2437MHz) = **40**
802.11g Mode Channel 11 (2462MHz) = **40**

(2) RX Mode :

- ⇒ **wl_tool out**

4. Notebook PC (3) ping 192.168.1.10 -t -l 5000 to EUT.
5. Notebook PC (1) ping 192.168.1.20 -t -l 5000 to Notebook PC(3)
6. All of the function are under run.
7. Start test.



6. APPLICABLE LIMITS AND TEST RESULTS

6.1 6dB BANDWIDTH

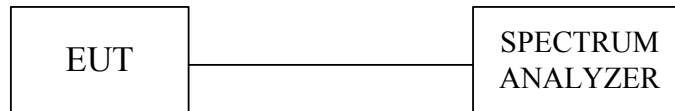
LIMIT

§ 15.207(a) (2) For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004

TEST SETUP



TEST PROCEDURE

The transmitter output was connected to a spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 KHz RBW and 1MHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

**TEST RESULTS**

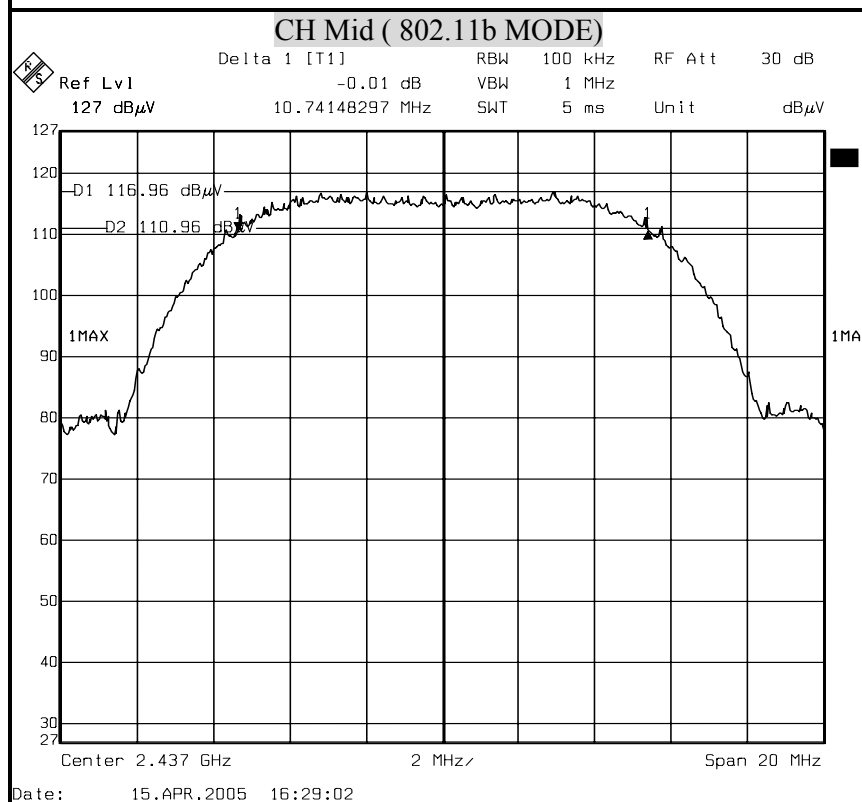
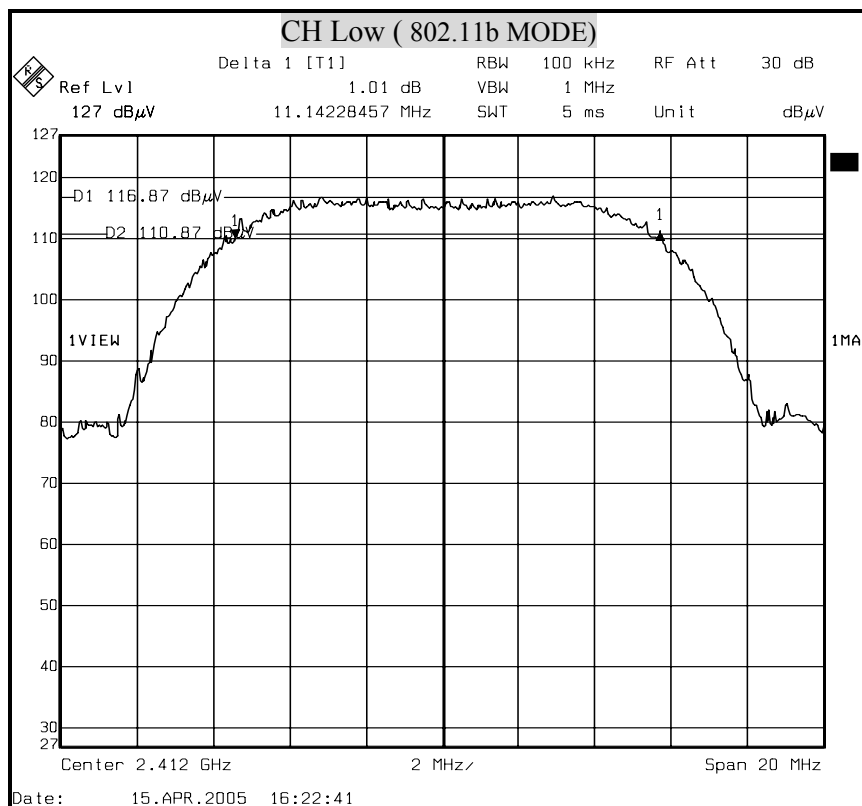
No non-compliance noted

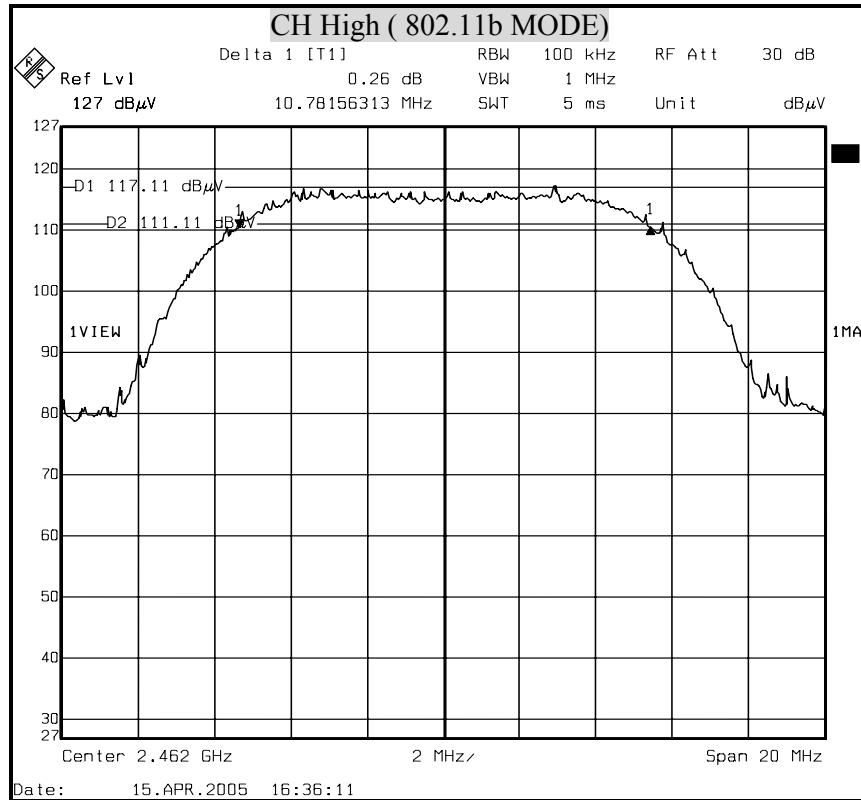
802.11b MODE

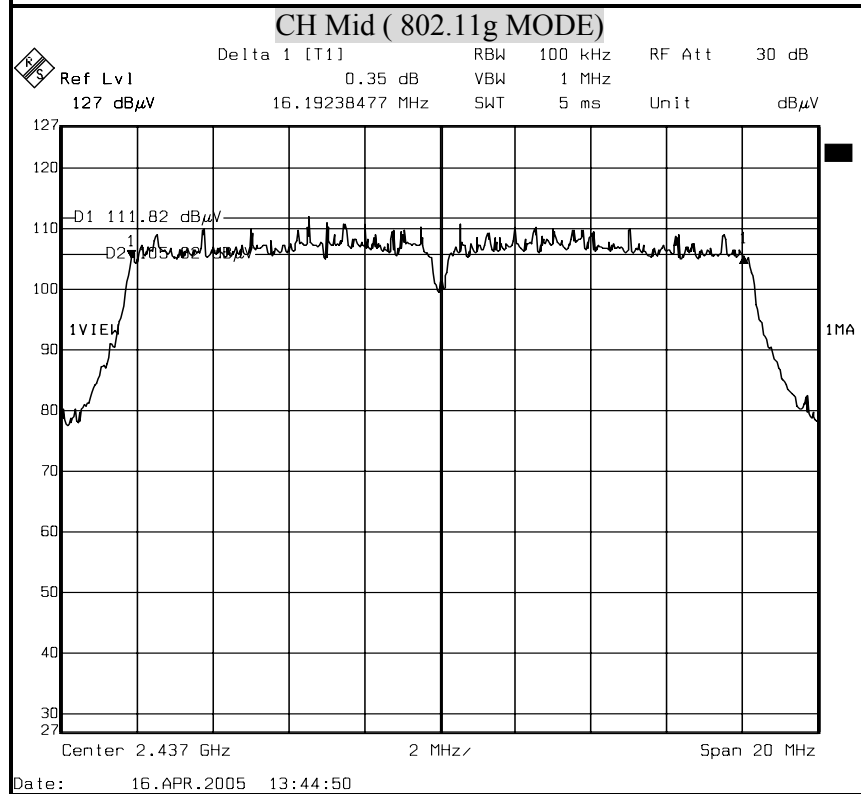
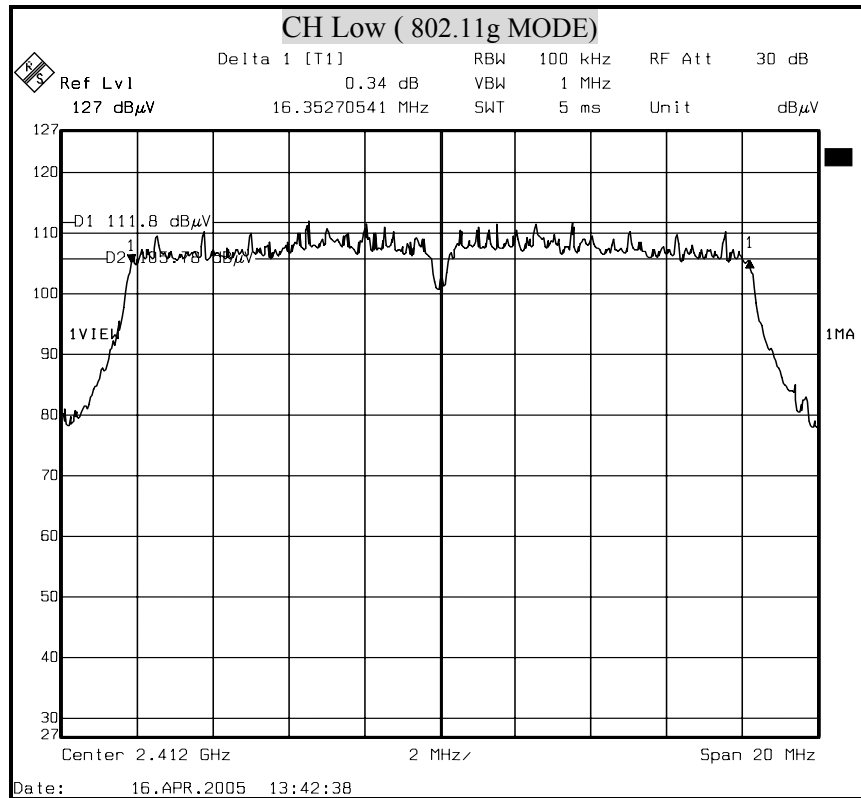
Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	11142	500	PASS
Middle	2437	10741	500	PASS
High	2462	10781	500	PASS

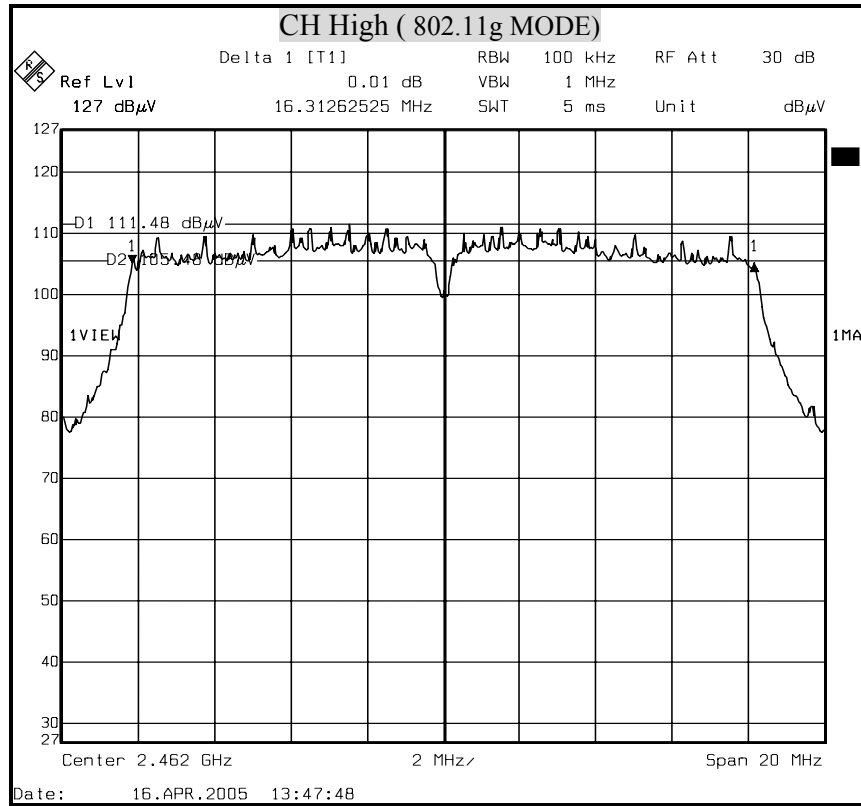
802.11g MODE

Channel	Channel Frequency (MHz)	6dB Bandwidth (kHz)	Minimum Limit (kHz)	Pass / Fail
Low	2412	16352	500	PASS
Middle	2437	16192	500	PASS
High	2462	16312	500	PASS

**6dB BANDWIDTH (802.11b MODE)**



**6dB BANDWIDTH (802.11g MODE)**





6.2 99% BANDWIDTH

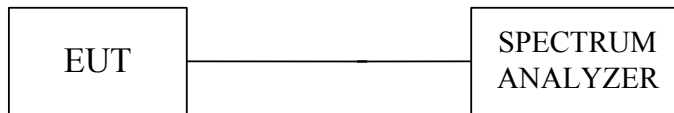
LIMIT

None; for reporting purposes only.

TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004

TEST SETUP



TEST PROCEDURE

1. The spectrum shall be set as follows :

Span : The minimum span to fully display the emission and approximately 20dB below peak level.

RBW : The set to 1% to 3% of the approximate emission width.

2. Compute the combined power of all signal responses contained in the trace by covering all the data points.
3. For 99% occupied BW, place the markers at the frequency at which 0.5% of the power lies to the right of the right marker and 0.5% of the power lies to the left of the left marker.
4. The 99% BW is the bandwidth between the right and left markers.

**TEST RESULTS**

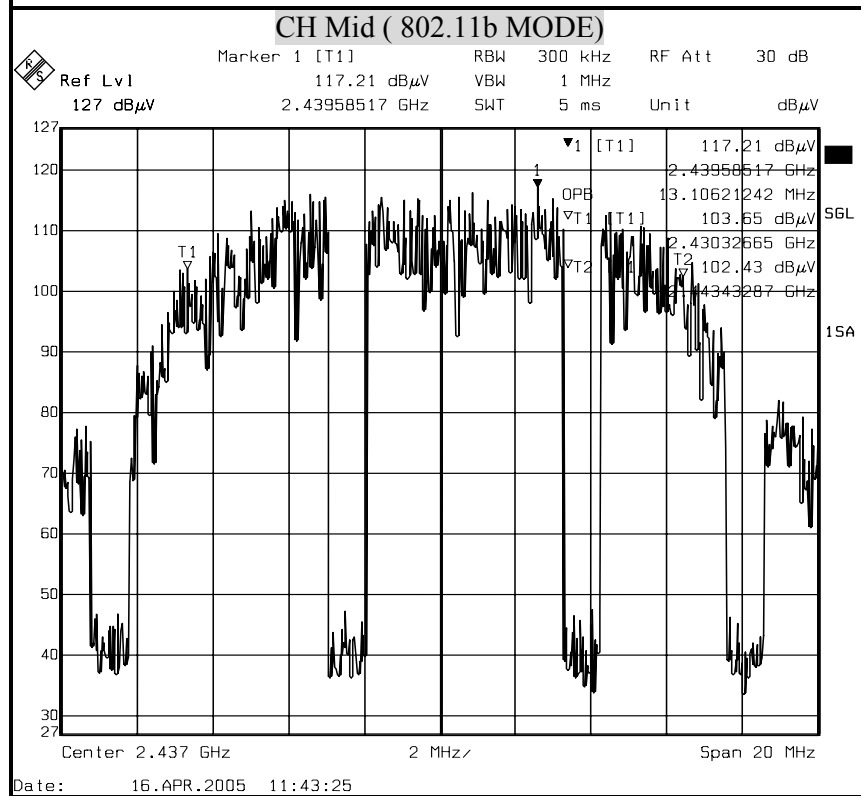
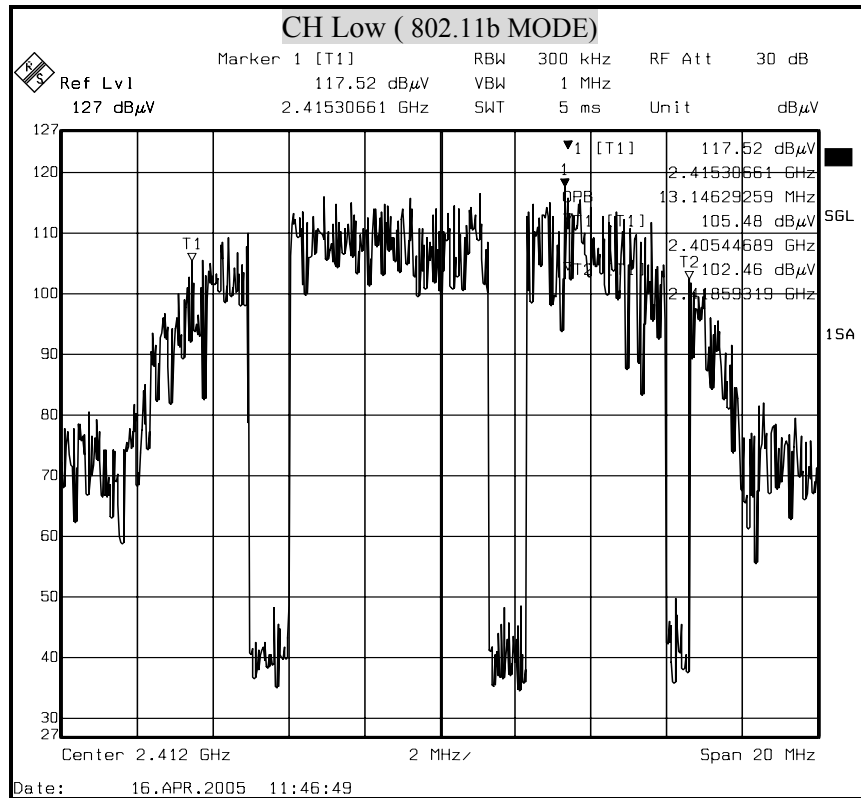
No non-compliance noted

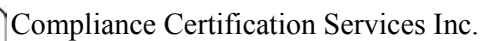
802.11b MODE

Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)
Low	2412.00	13.14
Middle	2437.00	13.11
High	2462.00	13.23

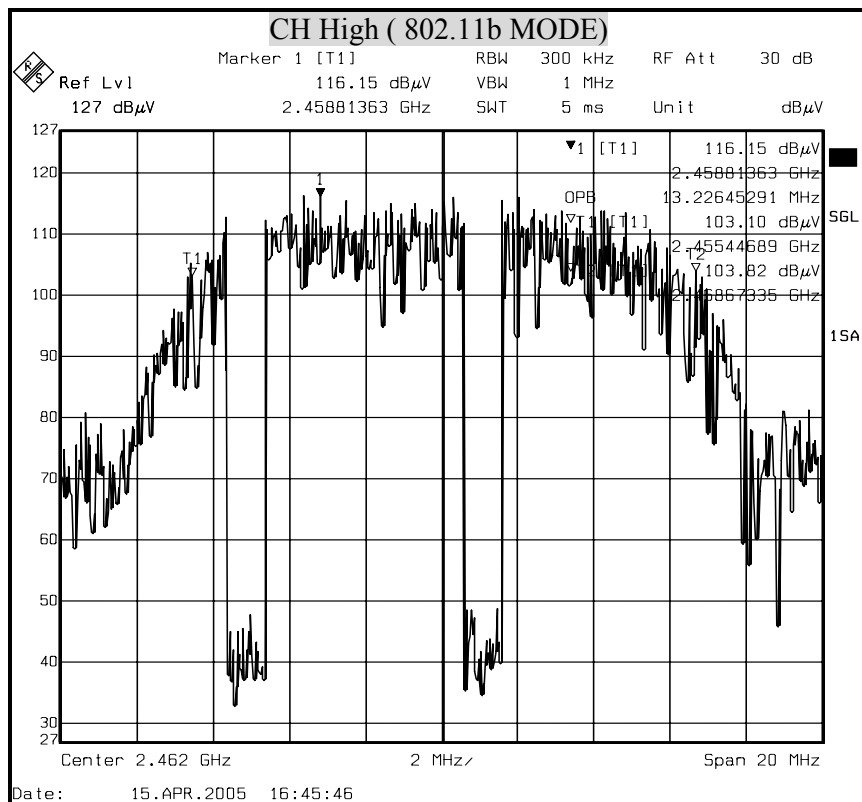
802.11g MODE

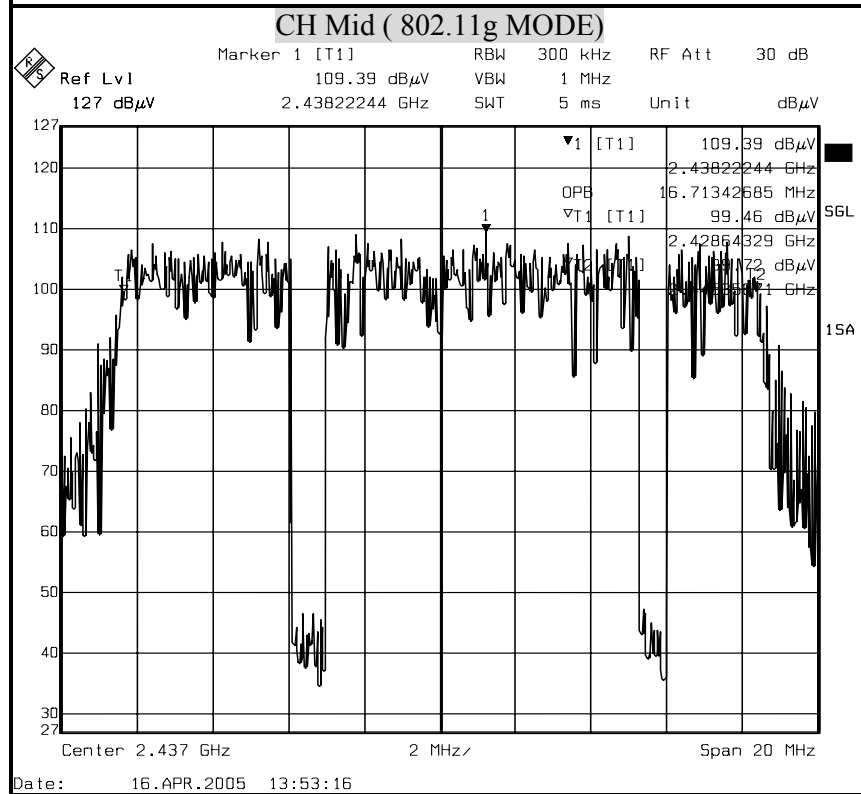
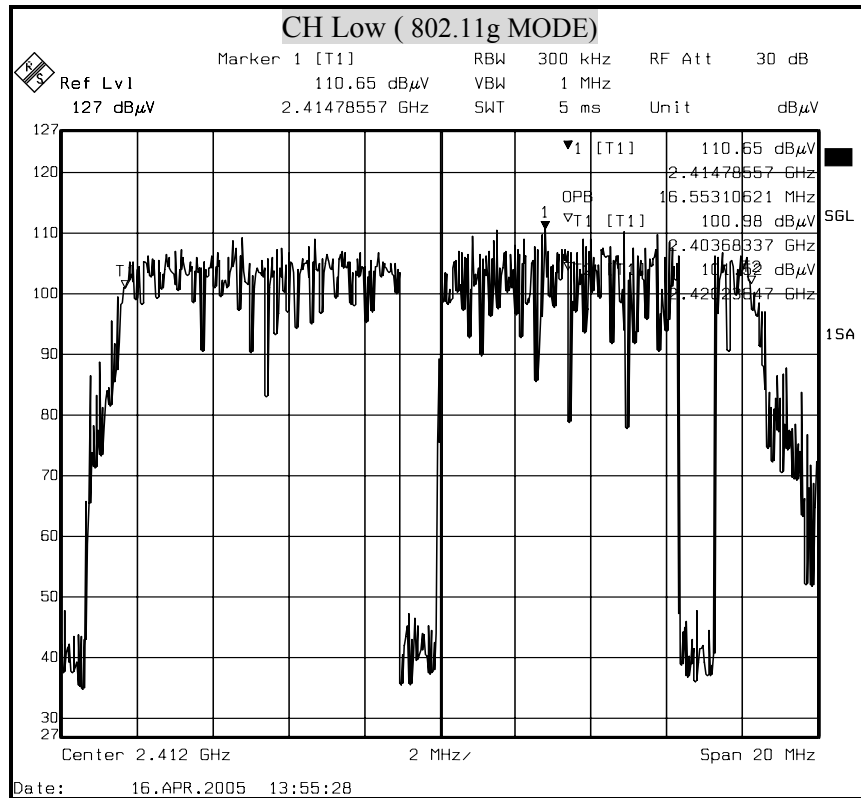
Channel	Channel Frequency (MHz)	99% Occupied power bandwidth (MHz)
Low	2412.00	16.55
Middle	2437.00	16.71
High	2462.00	16.59

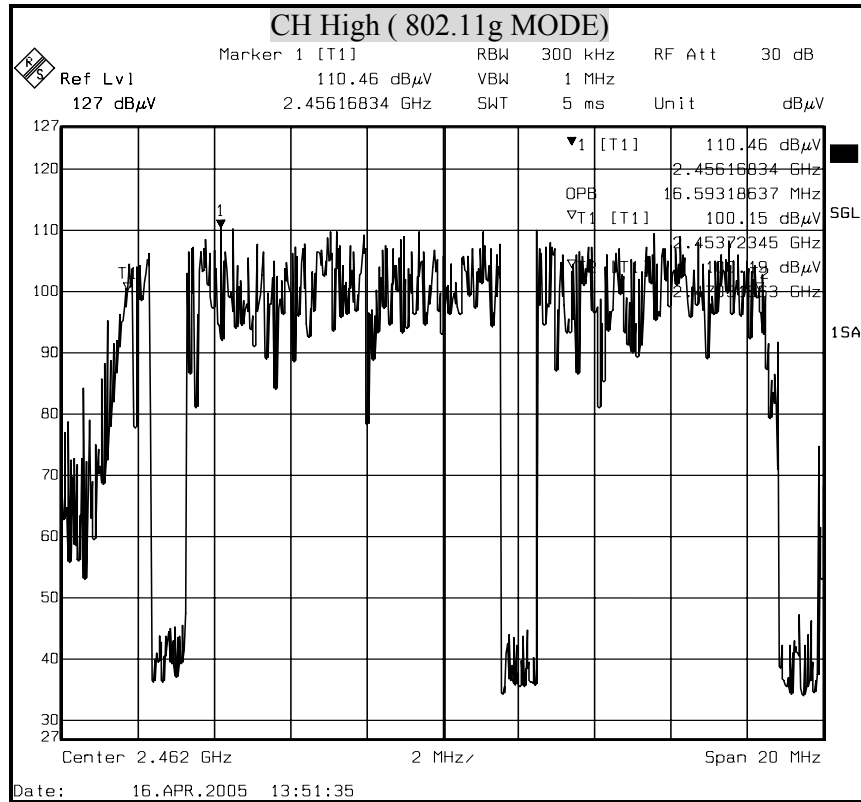
**99% BANDWIDTH (802.11b MODE)**



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**99% BANDWIDTH (802.11g MODE)**





6.3 MAXIMUM PEAK OUTPUT POWER

LIMIT

§ 15.247(b) The maximum peak output power of the intentional radiator shall not exceed the following :

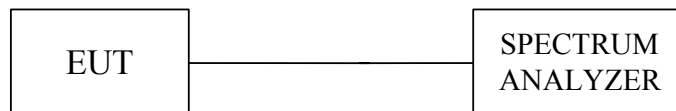
§ 15.247(b) (3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands : 1 watt.

§ 15.247(b) (4) Except as shown in paragraphs (c) of this section , if transmitting antennas of directional gain greater than 6 dBi are used the peak output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1) or (b)(2), and (b)(3) of this section , as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004

TEST SETUP



TEST PROCEDURE

1. The spectrum shall be set as follows :
Span : 1.5 times channel integration bandwidth.
RBW : 1MHz
VBW : 3MHz
Detector : Peak
Sweep : Single trace
2. Compute the combined power of all signal responses contained in the trace by covering all the data points.
3. For 99% occupied BW, place the markers at the frequency at which 0.5% of the power lies to the right of the right marker and 0.5% of the power lies to the left of the left marker.
4. The peak output power is the channel power integrated over 99% bandwidth.

**TEST RESULTS**

No non-compliance noted

802.11b MODE

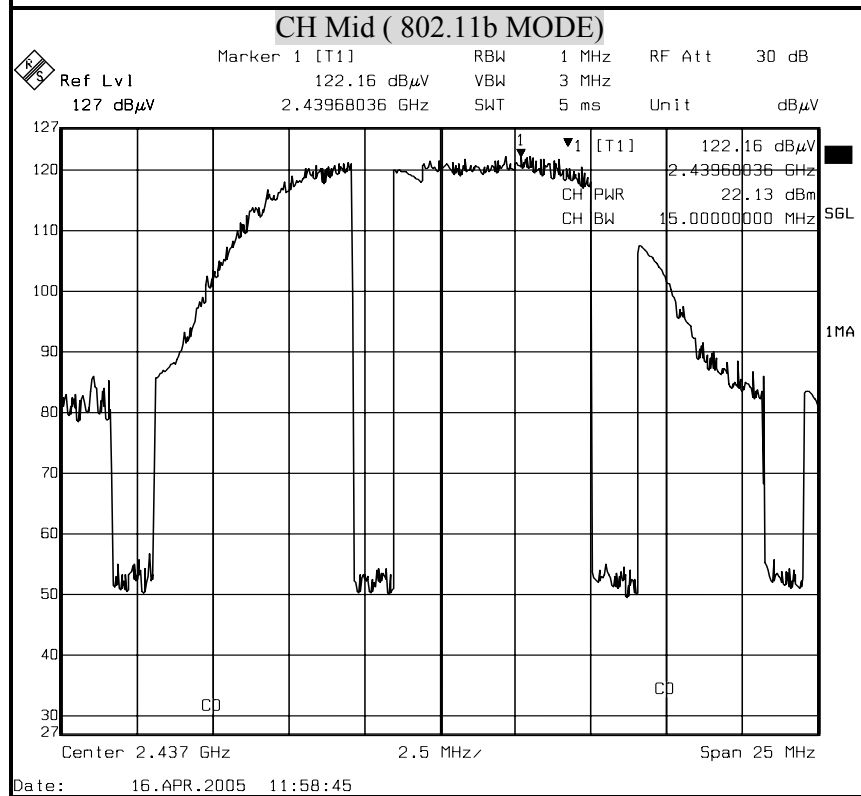
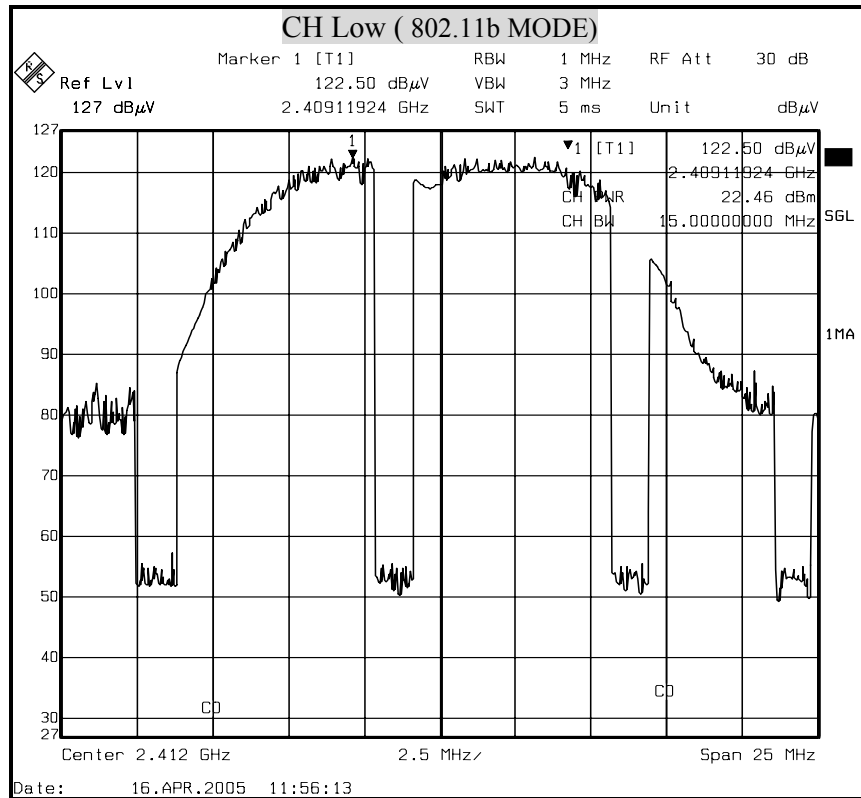
Channel	Channel Frequency (MHz)	Peak Power Output Reading (dBm)	Cable loss (dBm)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2412	22.46	0.5	22.96	30	PASS
Middle	2437	22.13	0.5	22.63	30	PASS
High	2462	22.36	0.5	22.86	30	PASS

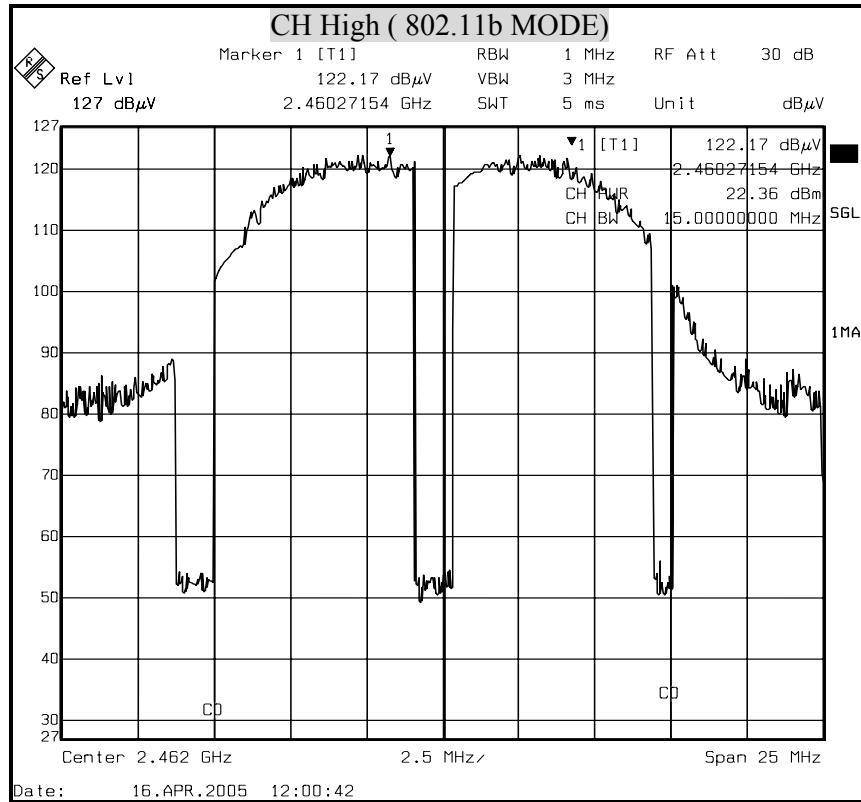
Note : 1 At final test to get the worst-case emission at 11Mbps.
2. The result basic equation calculation as follow :
Peak Power Output = Peak Power Reading + Cable loss

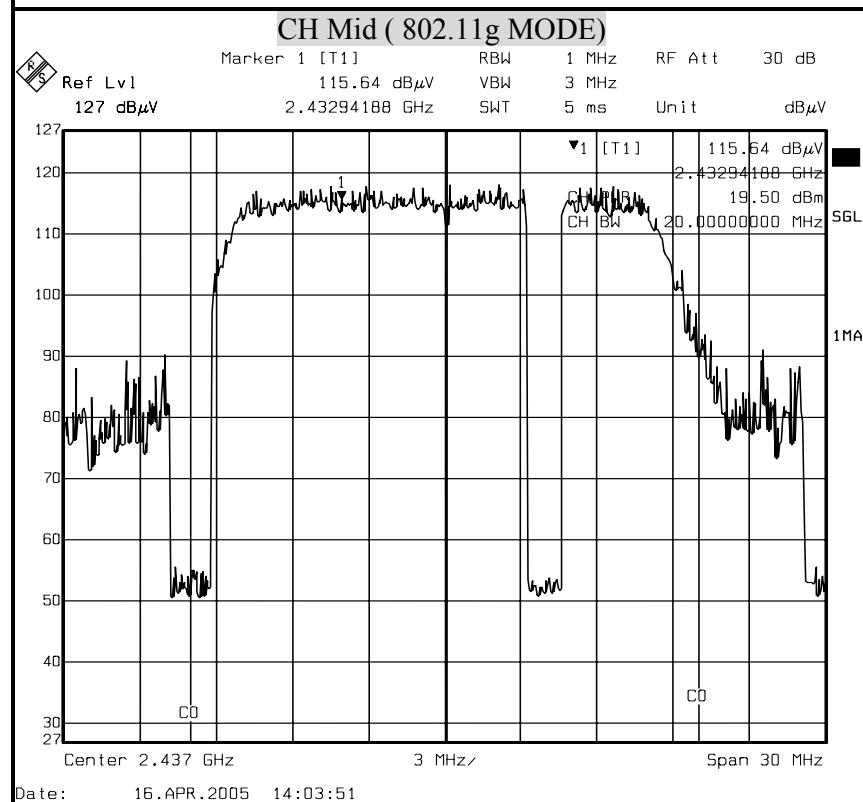
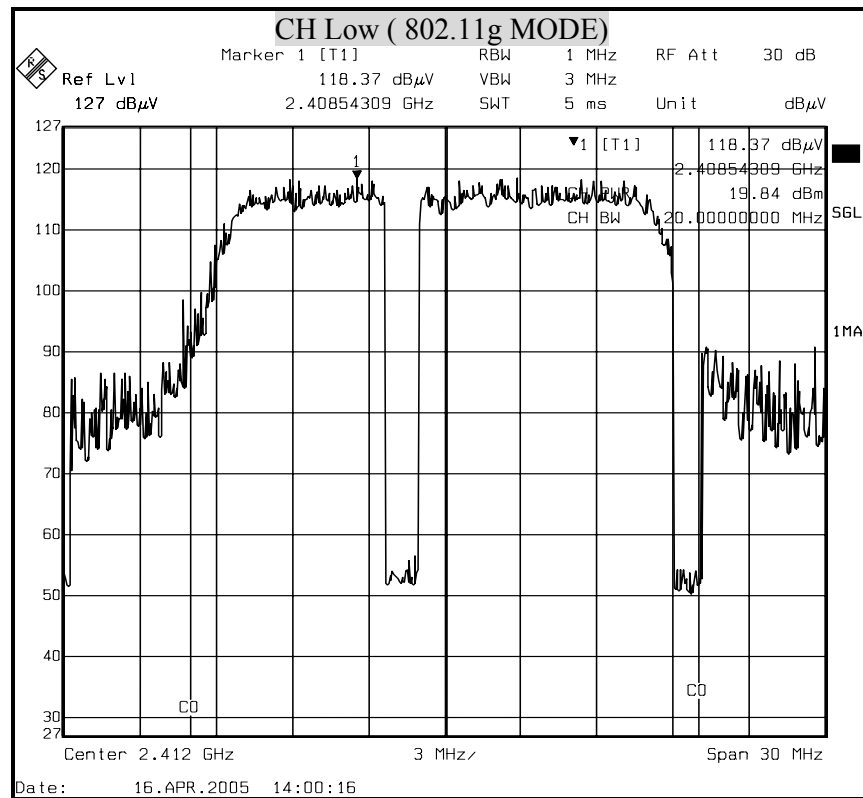
802.11g MODE

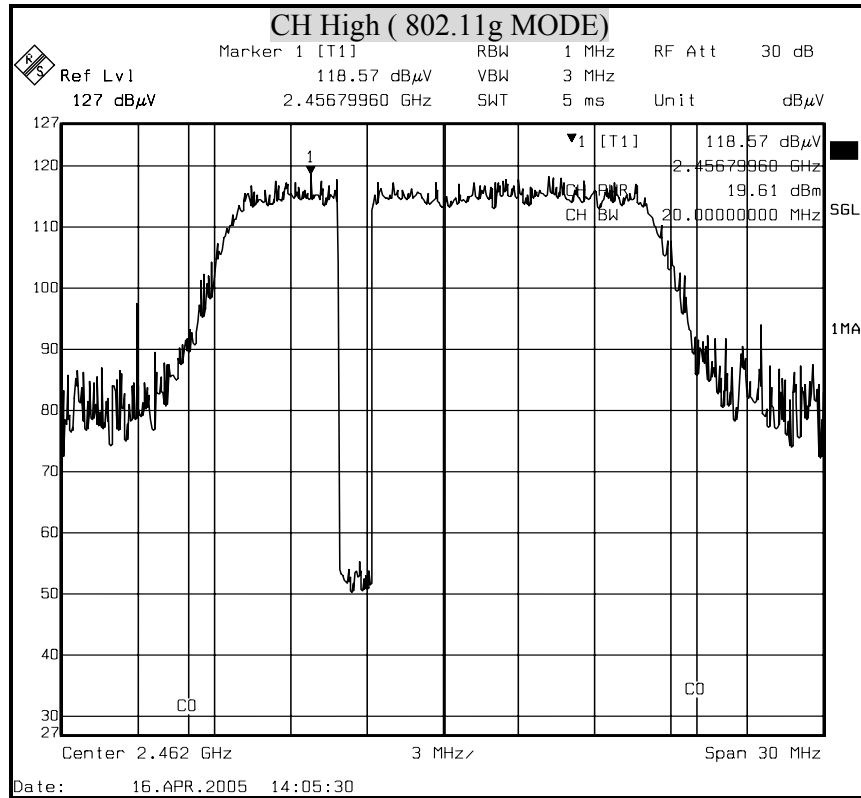
Channel	Channel Frequency (MHz)	Peak Power Output Reading (dBm)	Cable loss (dBm)	Peak Power Output (dBm)	Peak Power Limit (dBm)	Pass / Fail
Low	2412	19.84	0.5	20.34	30	PASS
Middle	2437	19.50	0.5	20.00	30	PASS
High	2462	19.61	0.5	20.11	30	PASS

Note : 1 At final test to get the worst-case emission at 6Mbps.
2. The result basic equation calculation as follow :
Peak Power Output = Peak Power Reading + Cable loss

**MAXIMUM PEAK OUTPUT POWER (802.11b MODE)**



**MAXIMUM PEAK OUTPUT POWER (802.11g MODE)**





6.4 MAXIMUM PERMISSIBLE EXPOSURE

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b) LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

CALCULATIONS

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields:

$$d = \sqrt{((30 * P * G) / (3770 * S))}$$

Changing to units of Power to mW and Distance to cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

yields

$$d = 100 \sqrt{((30 * (P / 1000) * G) / (3770 * S))}$$

$$d = 0.282 * \sqrt{(P * G / S)}$$

where

d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW/cm²

Substituting the logarithmic form of power and gain using:

$$P \text{ (mW)} = 10^{(P \text{ (dBm)} / 10)} \text{ and}$$

$$G \text{ (numeric)} = 10^{(G \text{ (dBi)} / 10)}$$

yields

$$d = 0.282 * 10^{((P+G) / 20)} / \sqrt{S} \quad \text{Equation (1)}$$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm²

Equation (1) and the measured peak power is used to calculate the MPE distance.

**LIMIT**

Power Density Limit, $S=1.0\text{mW}/\text{cm}^2$

TEST RESULTS

No non-compliance noted

Mode	Power Density Limit (mW/cm ²)	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
802.11b	1.0	22.96	5	7.05
802.11g	1.0	20.34	5	5.21

Note : For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.



6.5 AVERAGE POWER

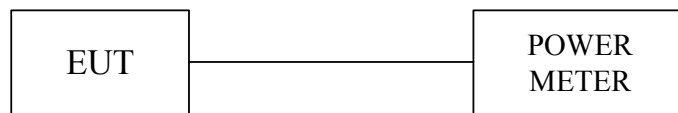
LIMIT

None; for reporting purposes only.

TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ANRITSU POWER METER	ML2487A MAL2491A	6K00001783 030982	March 02, 2005

TEST SETUP



TEST PROCEDURE

The transmitter output is connected to a power meter.

TEST RESULTS

No non-compliance noted

802.11b MODE

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	19.20
Middle	2437	19.36
High	2462	19.20

802.11g MODE

Channel	Channel Frequency (MHz)	Average Power (dBm)
Low	2412	15.46
Middle	2437	15.26
High	2462	15.40



6.6 POWER SPECTRAL DENSITY

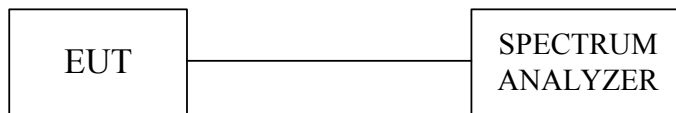
LIMIT

§ 15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004

TEST SETUP



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3KHz RBW and 30KHz VBW, set sweep time=span / 3KHz.

The power spectral density was measured and recorded.

The sweep time is allowed to be longer than span / 3KHz for a full response of the mixer in the spectrum analyzer.

**TEST RESULTS**

No non-compliance noted

802.11b MODE

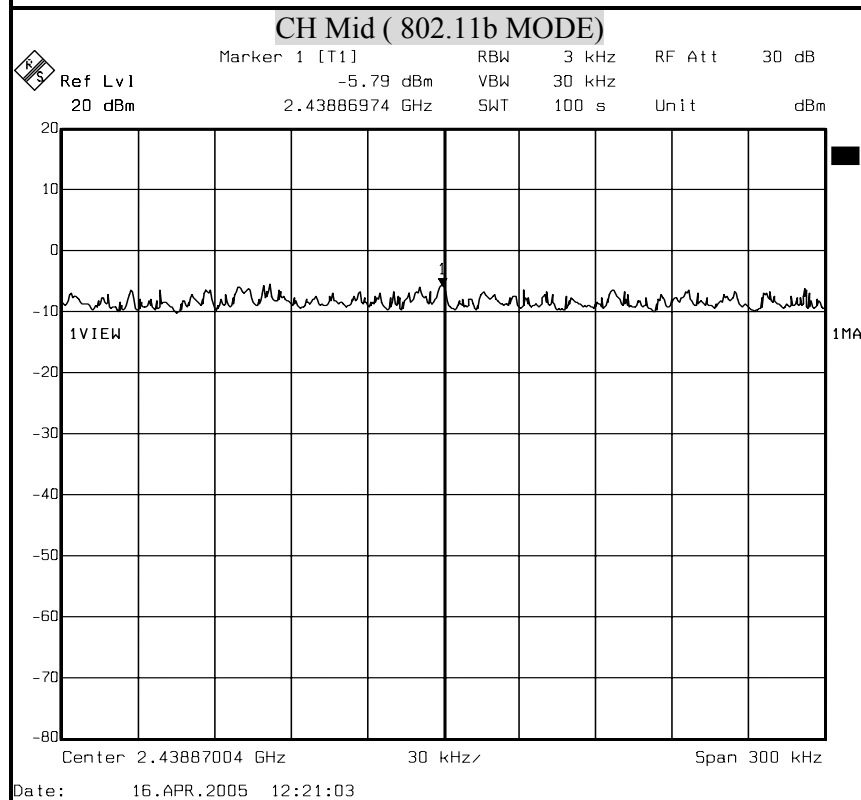
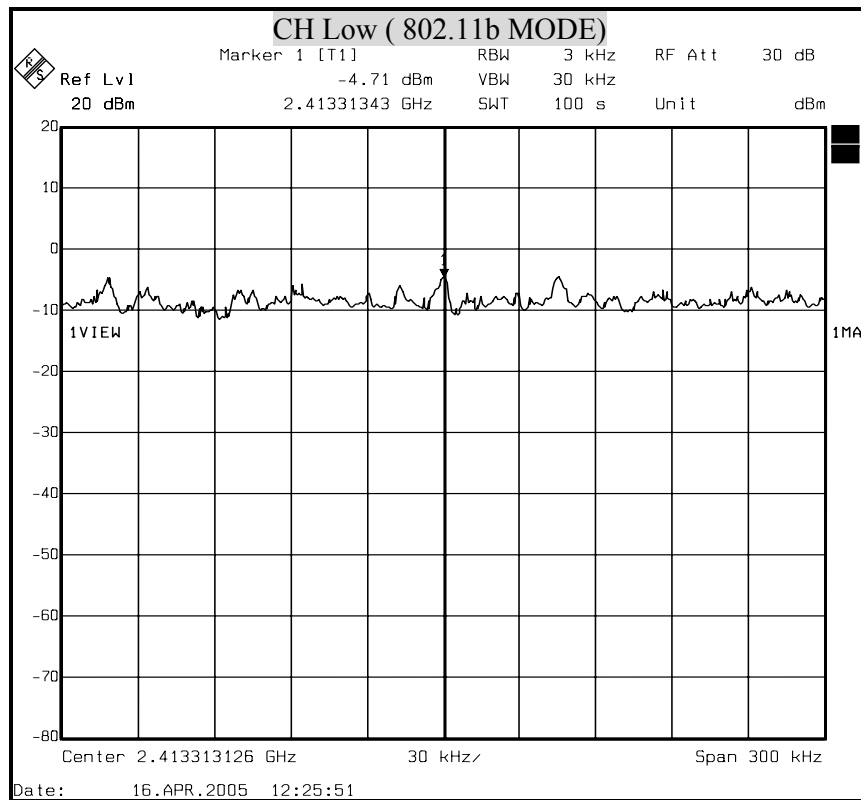
Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maximum Limit (dBm)	Pass / Fail
Low	2412	-4.71	8	PASS
Middle	2437	-5.79	8	PASS
High	2462	-5.96	8	PASS

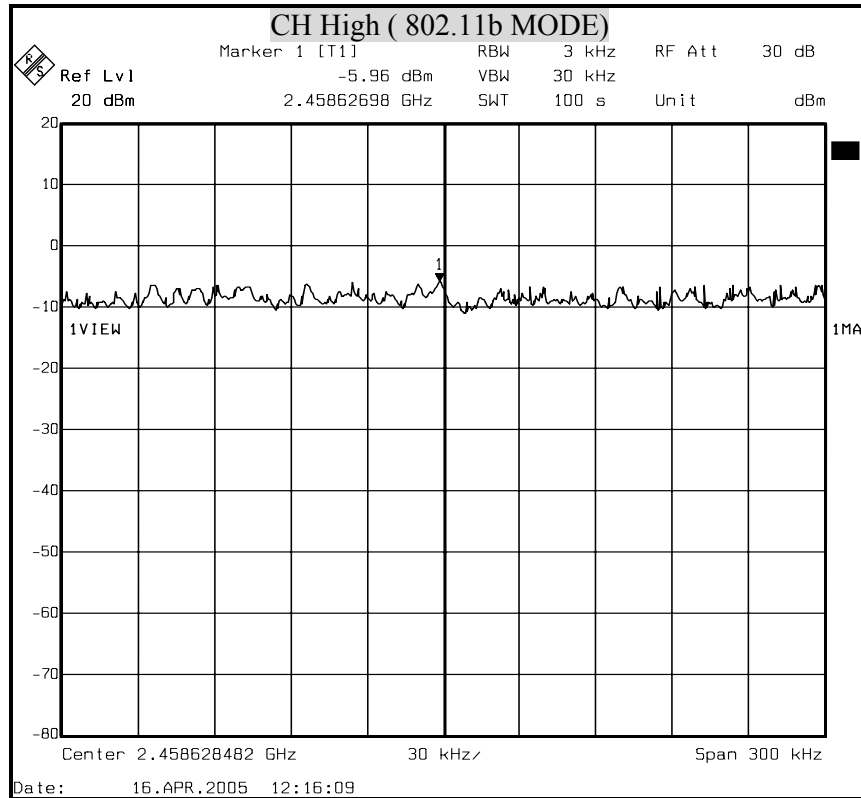
Note: 1. At final test to get the worst-case emission at 11Mbps.

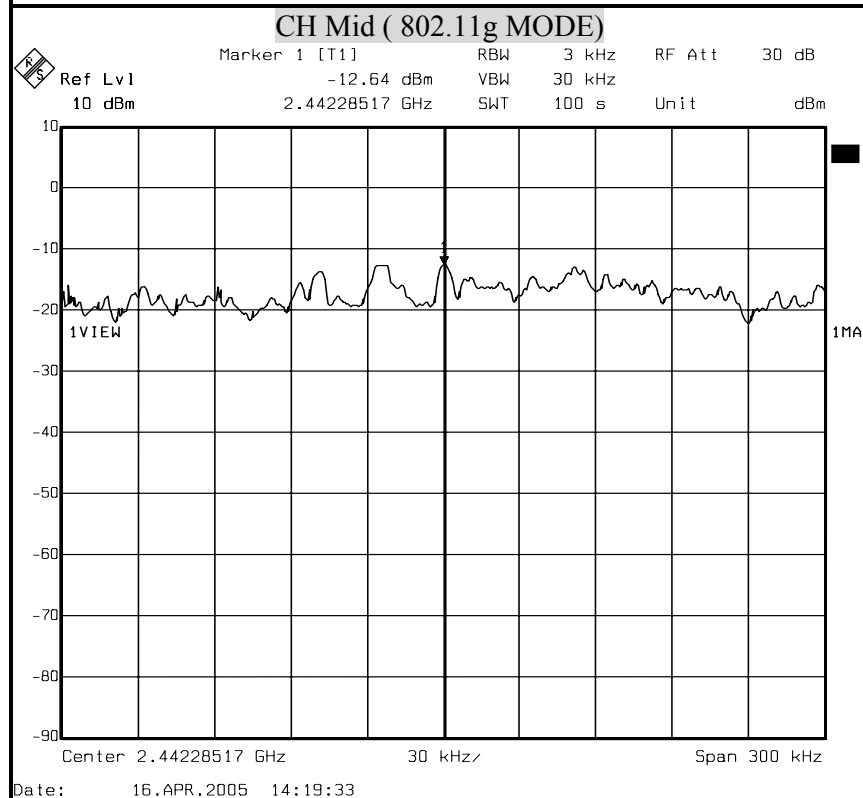
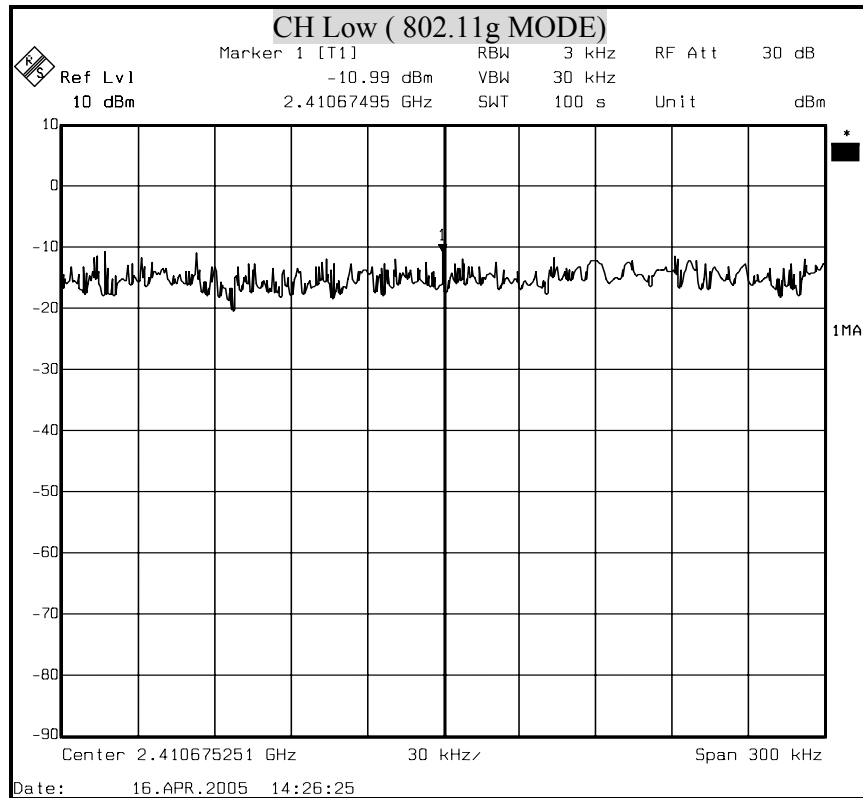
802.11g MODE

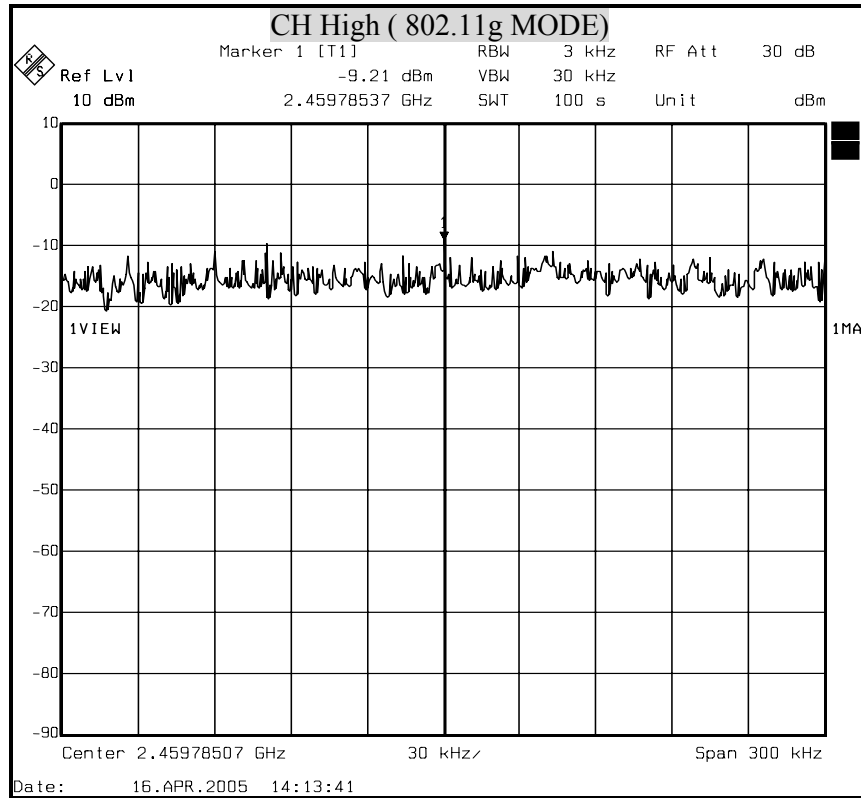
Channel	Channel Frequency (MHz)	Final RF Power Level in 3KHz BW (dBm)	Maximum Limit (dBm)	Pass / Fail
Low	2412	-10.99	8	PASS
Middle	2437	-12.64	8	PASS
High	2462	-9.21	8	PASS

Note: 1. At final test to get the worst-case emission at 6Mbps.

**POWER SPECTRAL DENSITY (802.11b MODE)**



**POWER SPECTRAL DENSITY (802.11g MODE)**





6.7 CONDUCTED SPURIOUS EMISSION

LIMITS

§ 15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

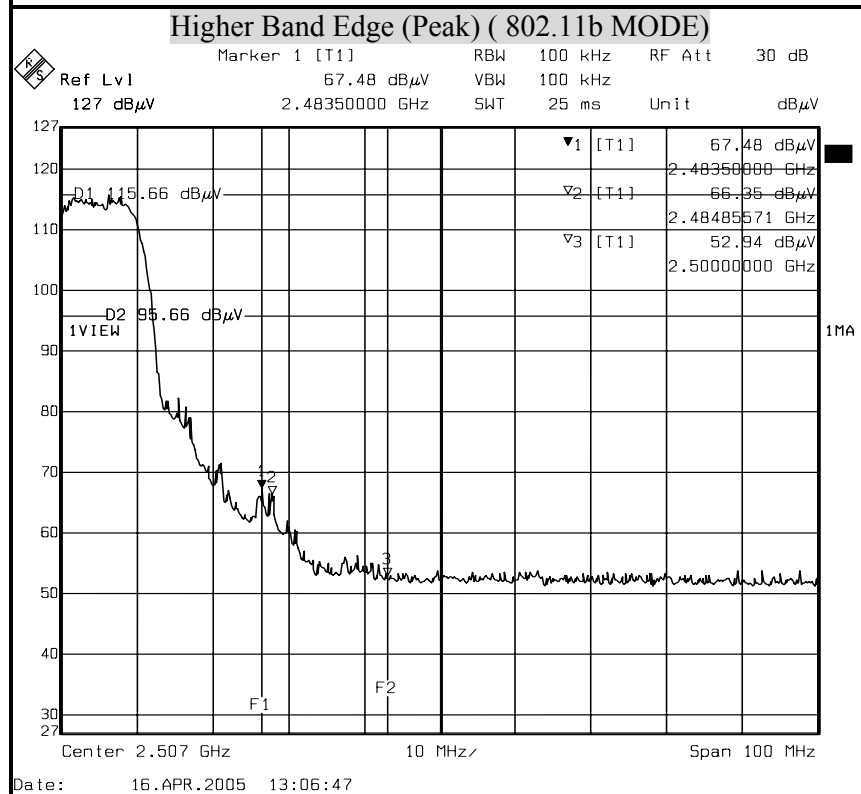
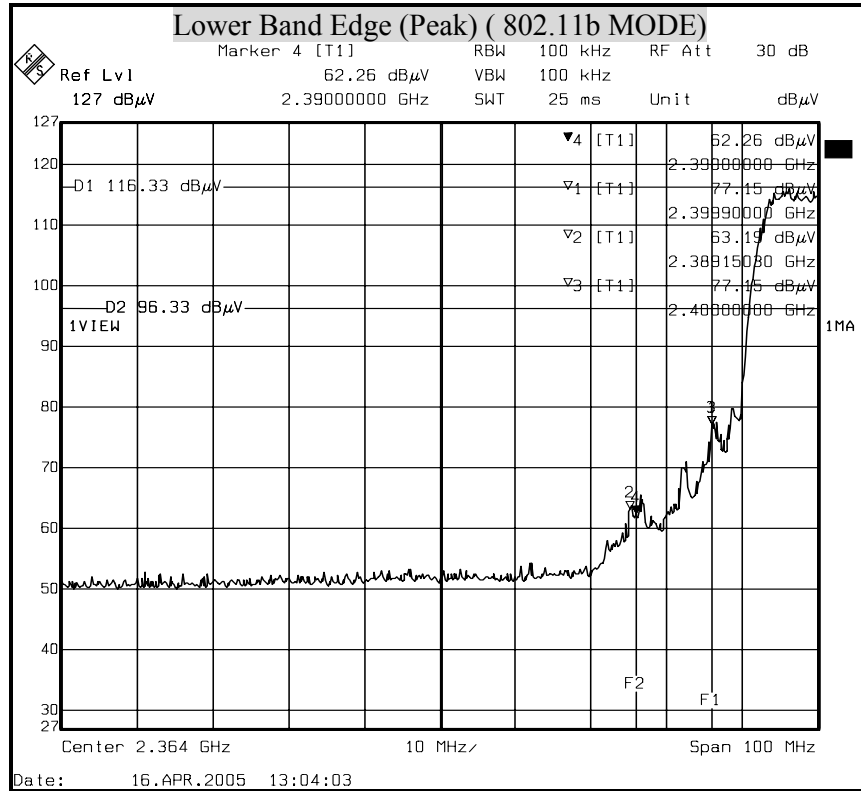
TEST PROCEDURE

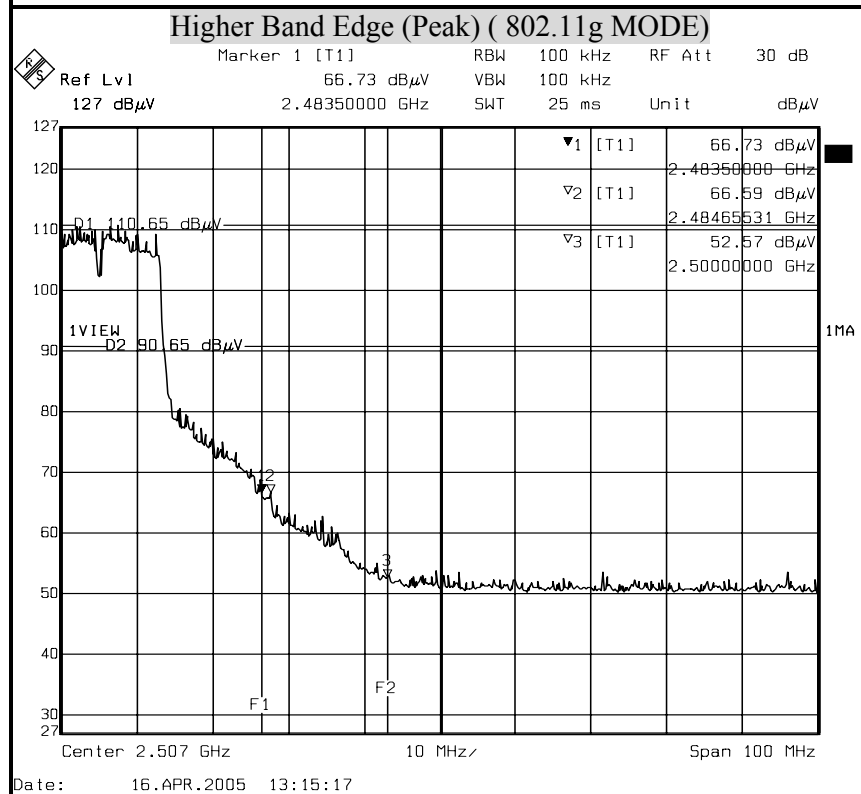
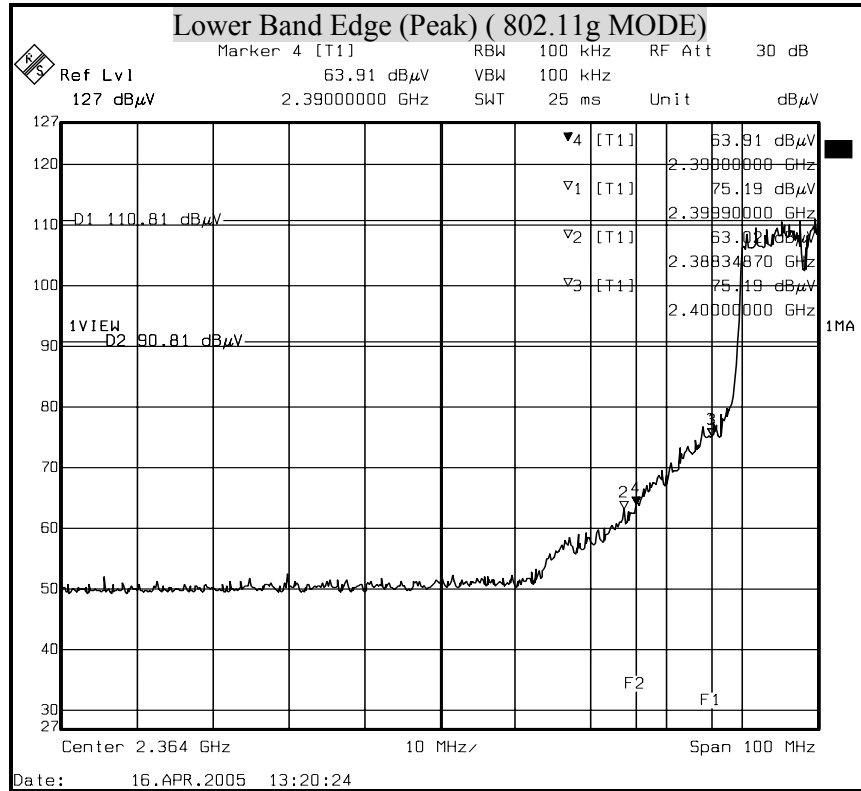
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 100 kHz.

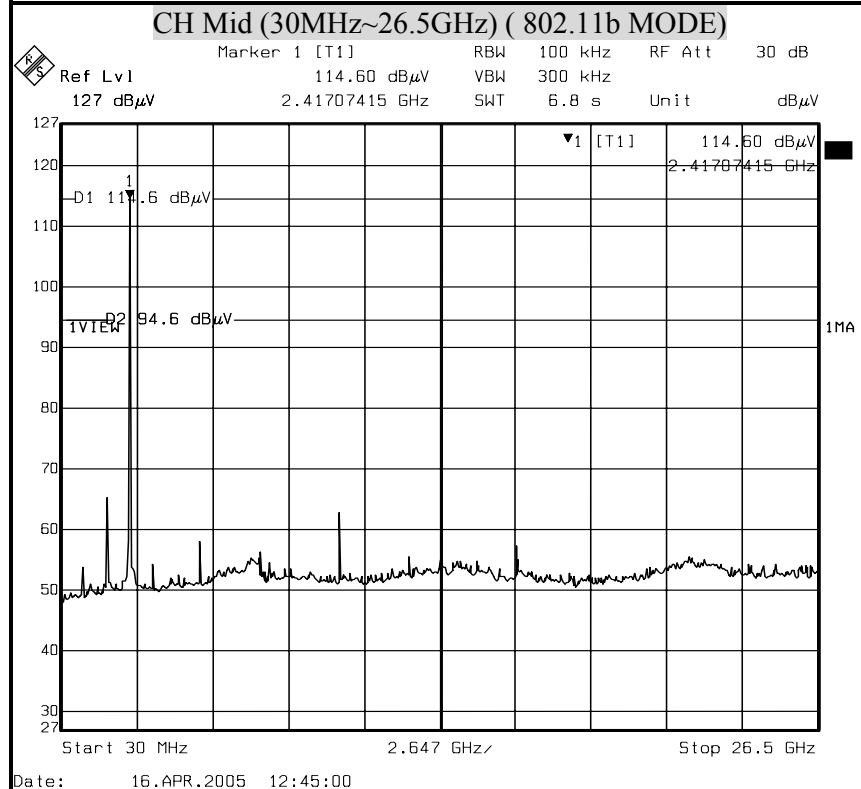
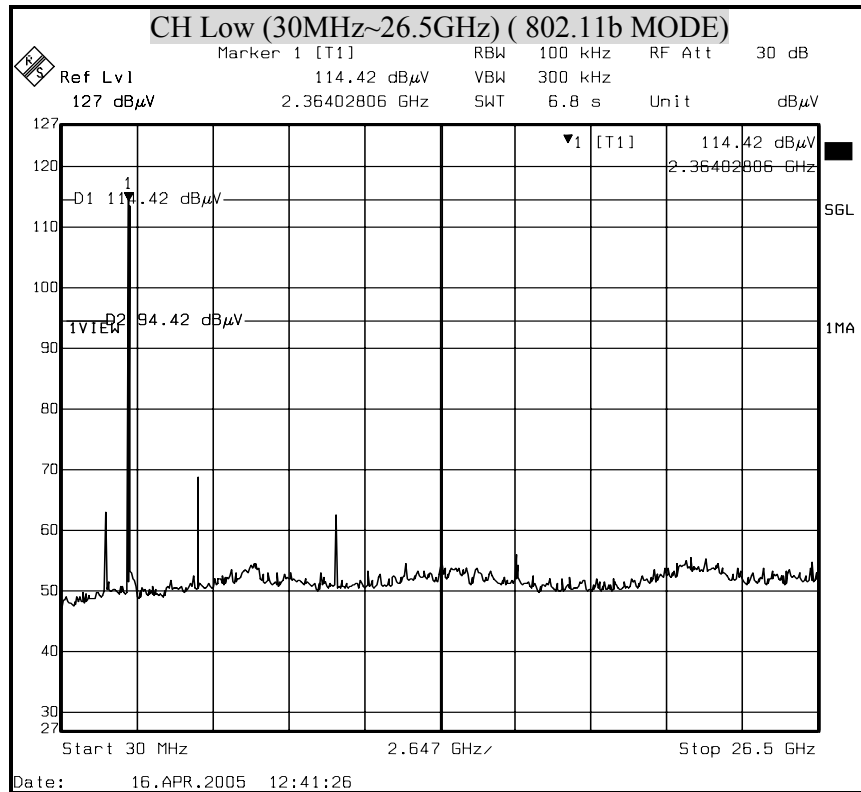
The spectrum from 30 MHz to 26.5 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

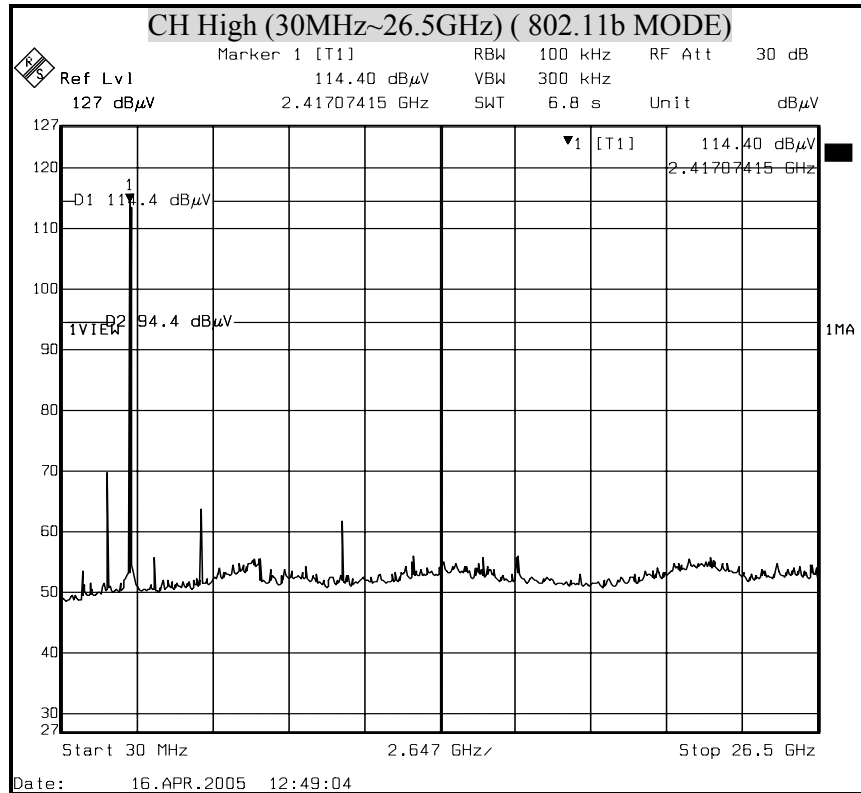
TEST RESULTS

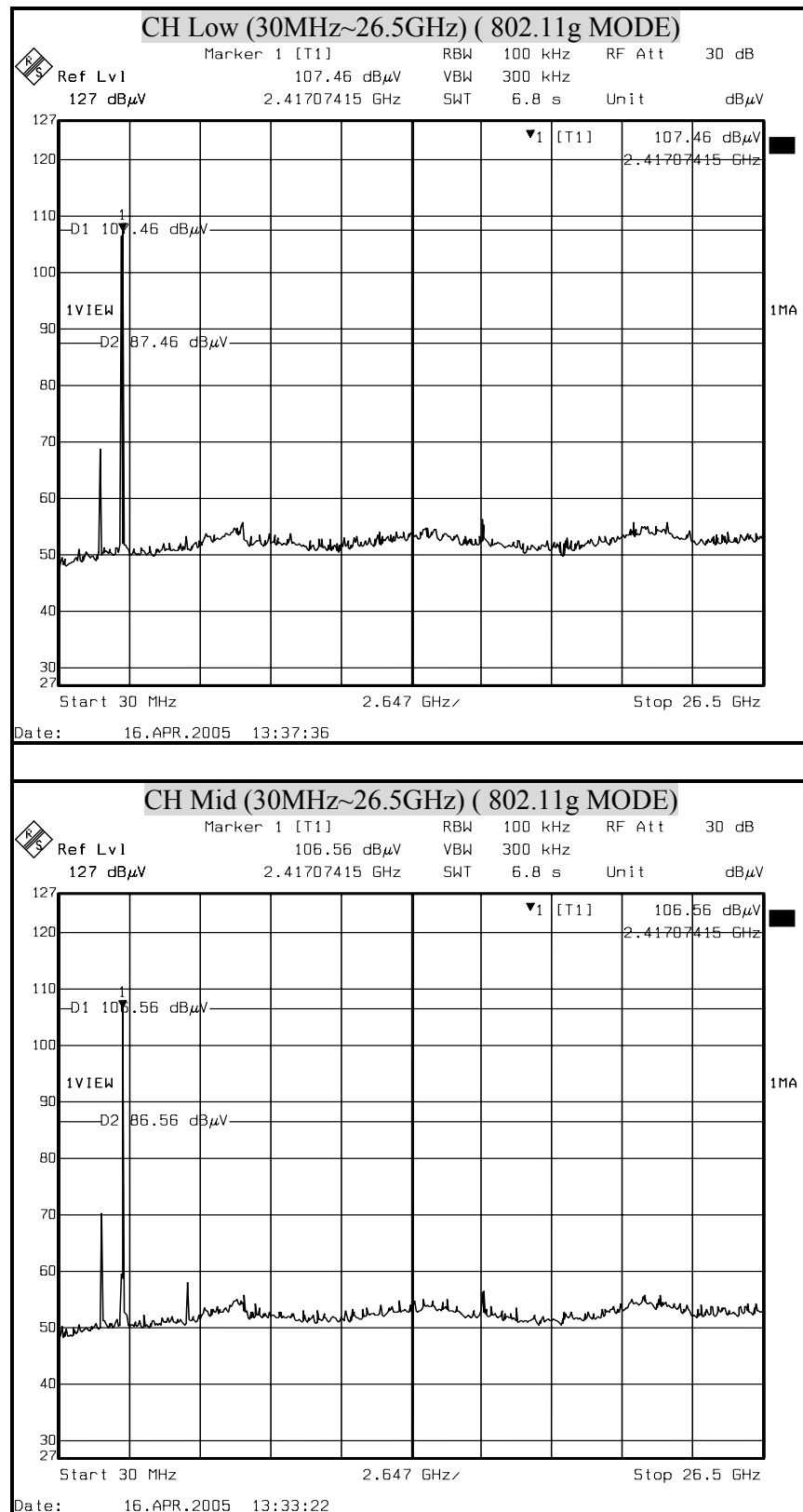
No non-compliance noted

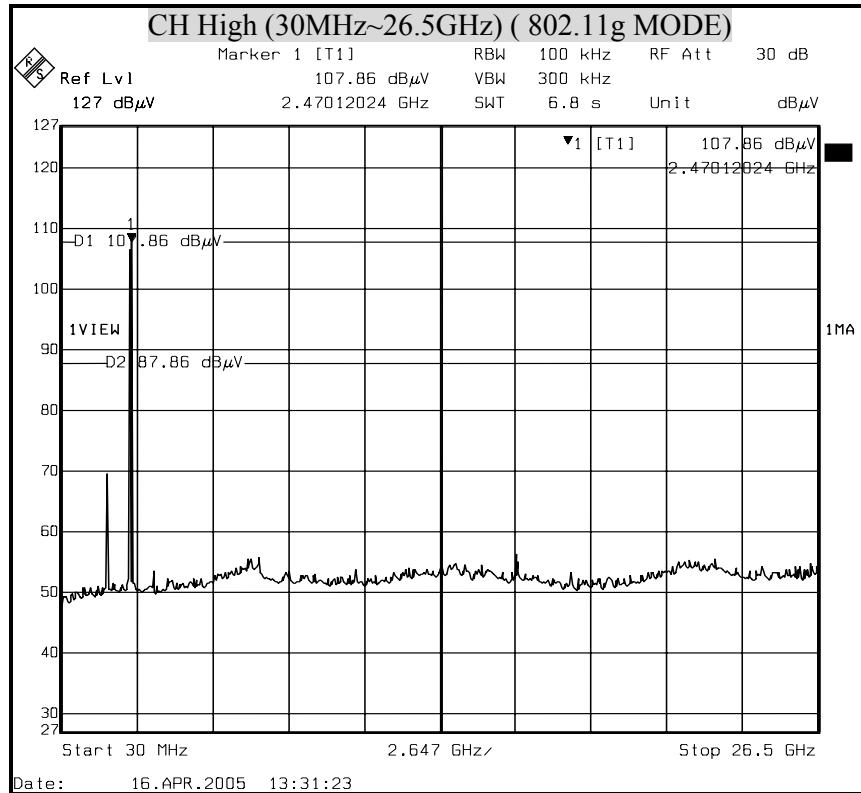
**BAND EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS(802.11b MODE)**

**BAND EDGE COMPLIANCE OF RF CONDUCTED EMISSIONS(802.11g MODE)**

**OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT(802.11b MODE)**



**OUT-OF-BAND SPURIOUS EMISSIONS-CONDUCTED MEASUREMENT(802.11g MODE)**





6.8 RADIATED EMISSIONS

6.8.1 TRANSMITTER RADIATED SUPURIOUS EMSSIONS

LIMITS

§ 15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3338	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

§ 15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.



§ 15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table :

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz, However, operation within these frequency bands is permitted under other sections of this Part, e-g, Sections 15.231 and 15.241.

§ 15.209 (b) In the emission table above, the tighter limit applies at the band edges.

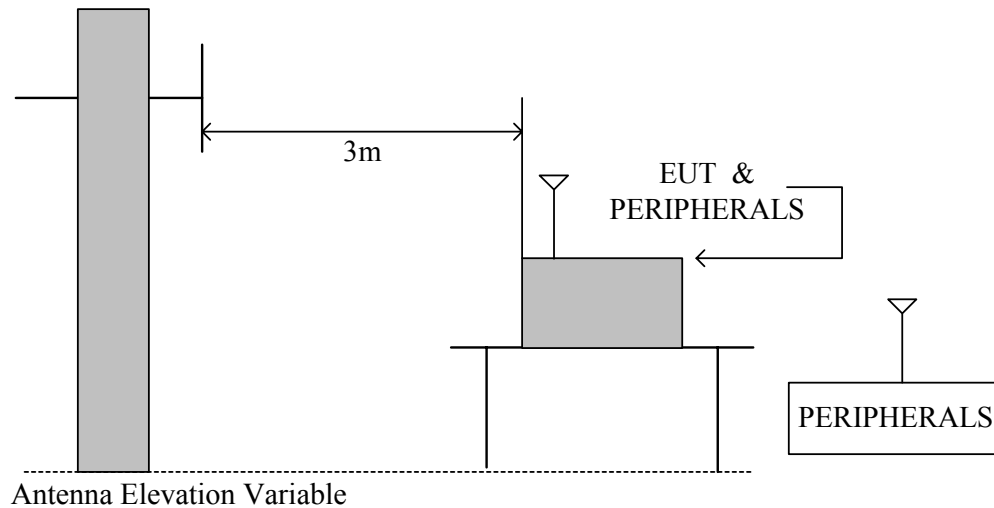
TEST EQUIPMENTS

The following test equipments are utilized in making the measurements contained in this report.

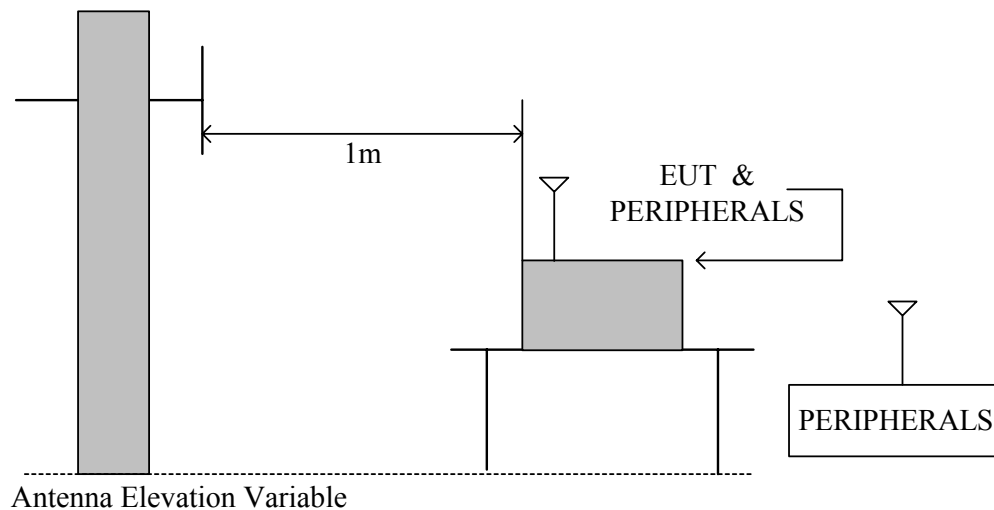
Manufacturer or Type	Model No.	Serial No.	Date of Calibration	Calibration Period	Remark
CHASE BI-LOG ANTENNA	CBL6112B	2421	June 15, 2004	1 Year	FINAL
R/S SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004	1 Year	FINAL
OPEN SITE	-----	No.2	May 07, 2004	1 Year	FINAL
N TYPE COAXIAL CABLE	CHA9525	12	June 08, 2004	1 Year	FINAL
Horn Antenna	96001	2698	April 09, 2005	1 Year	FINAL
HP Pre-amplifier	8449B	3008A01471	November 24, 2004	1 Year	FINAL
HP High pass filter	84300/80038	002	CAL. ON USE	1 Year	FINAL

TEST SETUP

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.





TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. While measuring the radiated emission below 1GHz, the EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. While measuring the radiated emission above 1GHz, the EUT was set 1 meters away from the interference-receiving antenna
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarization of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Note :

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

TEST RESULTS

No non-compliance noted

**6.8.2 WORST-CASE RADIATED EMISSION BELOW 1 GHz**

Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	CH Low transmitting mode	TEMP&Humidity	19°C, 85%

Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading at 3m(dBμV)		Limits (dBμV/m)	Emission Level at 3m(dBμV/m)	
			Horizontal	Vertical		Horizontal	Vertical
135.73	12.41	2.36	17.10	9.20	43.50	31.87	23.97
168.00	10.98	2.74	27.00	22.60	43.50	40.72	36.32
249.99	12.72	4.01	19.30	13.60	46.00	36.03	30.33
300.65	13.54	4.30	16.50	12.60	46.00	34.35	30.45
391.01	17.97	4.80	3.50	5.30	46.00	26.27	28.07
527.99	18.07	5.32	3.00	10.00	46.00	26.38	33.38

- REMARKS:
1. * Undetectable
 2. Emission level (dBμV/M) = Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dBμV).
 3. According to technical experiences, all spurious emission at channel Low, Middle, High are almost the same below 1GHz, so that the channel Low was chosen as representative in final test.
 4. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results

**6.8.3 TRANSMITTER RADIATED EMISSION ABOVE 1 GHz**

Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11b mode at 11Mbps	TEMP&Humidity	19°C, 85%

CH Low TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2389.85	25.80	31.81	3.57	0.00	9.50	0.00	51.68	74.00	-22.32	P	1.00
* 2389.85	12.60	31.81	3.57	0.00	9.50	0.00	38.48	54.00	-15.52	A	1.00
* 2390.00	25.70	31.81	3.57	0.00	9.50	0.00	51.58	74.00	-22.42	P	1.00
* 2390.00	12.50	31.81	3.57	0.00	9.50	0.00	38.38	54.00	-15.62	A	1.00
* 4823.98	55.12	34.44	5.08	35.16	9.50	2.00	51.99	74.00	-22.01	P	1.11
* 4823.98	49.01	34.44	5.08	35.16	9.50	2.00	45.88	54.00	-8.12	A	1.11

Note :

1. The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level=Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
7. The other emission levels were 20dB below the limit
8. The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11b mode at 11Mbps	TEMP&Humidity	19°C, 85%

CH Low TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2389.85	40.80	31.81	3.57	0.00	9.50	0.00	66.68	74.00	-7.32	P	1.00
* 2389.85	25.50	31.81	3.57	0.00	9.50	0.00	51.38	54.00	-2.62	A	1.00
* 2390.00	41.20	31.81	3.57	0.00	9.50	0.00	67.08	74.00	-6.92	P	1.00
* 2390.00	25.70	31.81	3.57	0.00	9.50	0.00	51.58	54.00	-2.42	A	1.00
* 4824.02	61.60	34.44	5.08	35.16	9.50	2.00	58.47	74.00	-15.53	P	1.09
* 4824.02	54.62	34.44	5.08	35.16	9.50	2.00	51.49	54.00	-2.51	A	1.09

Note :

1. The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter - Dist, Margin = Level - Limit
7. The other emission levels were 20dB below the limit
8. The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11b mode at 11Mbps	TEMP&Humidity	19°C, 85%

CH Mid TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 4874.08	55.00	34.77	5.10	35.20	9.50	1.80	51.97	74.00	-22.03	P	1.07
* 4874.08	50.37	34.77	5.10	35.20	9.50	1.80	47.34	54.00	-6.66	A	1.07
* 7314.30	53.04	39.77	6.79	35.64	9.50	2.00	56.47	74.00	-17.53	P	1.16
* 7314.30	45.52	39.77	6.79	35.64	9.50	2.00	48.95	54.00	-5.05	A	1.16

Note :

1. The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter - Dist, Margin = Level - Limit
7. The other emission levels were 20dB below the limit
8. The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11b mode at 11Mbps	TEMP&Humidity	19°C, 85%

CH Mid TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 4874.07	60.07	34.77	5.10	35.20	9.50	1.80	57.04	74.00	-16.96	P	1.16
* 4874.07	54.30	34.77	5.10	35.20	9.50	1.80	51.27	54.00	-2.73	A	1.16
* 7314.65	60.35	39.77	6.79	35.64	9.50	2.00	63.78	74.00	-10.22	P	1.00
* 7314.65	46.80	39.77	6.79	35.64	9.50	2.00	50.23	54.00	-3.77	A	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter - Dist, Margin = Level - Limit
7. The other emission levels were 20dB below the limit
8. The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11b mode at 11Mbps	TEMP&Humidity	19°C, 85%

CH High TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2483.50	30.00	31.72	3.61	0.00	9.50	0.00	55.83	74.00	-18.17	P	1.01
* 2483.50	16.50	31.72	3.61	0.00	9.50	0.00	42.33	54.00	-11.67	A	1.01
* 2484.34	31.90	31.72	3.61	0.00	9.50	0.00	57.73	74.00	-16.27	P	1.01
* 2484.34	15.60	31.72	3.61	0.00	9.50	0.00	41.43	54.00	-12.57	A	1.01
* 4924.20	57.11	35.10	5.12	35.24	9.50	1.60	54.19	74.00	-19.81	P	1.01
* 4924.20	52.54	35.10	5.12	35.24	9.50	1.60	49.62	54.00	-4.38	A	1.01
* 7389.80	55.69	39.74	6.85	35.62	9.50	2.00	59.16	74.00	-14.84	P	1.00
* 7389.80	47.32	39.74	6.85	35.62	9.50	2.00	50.79	54.00	-3.21	A	1.00

Note :

- The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark "*" means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were 20dB below the limit
- The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11b mode at 11Mbps	TEMP&Humidity	19°C, 85%

CH High TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2483.50	40.20	31.72	3.61	0.00	9.50	0.00	66.03	74.00	-7.97	P	1.00
* 2483.50	26.00	31.72	3.61	0.00	9.50	0.00	51.83	54.00	-2.17	A	1.00
* 2484.34	42.10	31.72	3.61	0.00	9.50	0.00	67.93	74.00	-6.07	P	1.00
* 2484.34	25.00	31.72	3.61	0.00	9.50	0.00	50.83	54.00	-3.17	A	1.00
* 4923.87	62.08	35.10	5.12	35.24	9.50	1.60	59.16	74.00	-14.84	P	1.04
* 4923.87	54.12	35.10	5.12	35.24	9.50	1.60	51.20	54.00	-2.80	A	1.04
* 7389.31	59.80	39.74	6.84	35.62	9.50	2.00	63.27	74.00	-10.73	P	1.00
* 7389.31	46.06	39.74	6.84	35.62	9.50	2.00	49.53	54.00	-4.47	A	1.00

Note :

- The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark "*" means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were 20dB below the limit
- The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/14
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11g mode at 6Mbps	TEMP&Humidity	24°C, 72%

CH Low TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2389.90	32.60	31.81	3.57	0.00	9.50	0.00	58.48	74.00	-15.52	P	1.00
* 2389.90	13.00	31.81	3.57	0.00	9.50	0.00	38.88	54.00	-15.12	A	1.00
* 2390.00	31.90	31.81	3.57	0.00	9.50	0.00	57.78	74.00	-16.22	P	1.00
* 2390.00	13.50	31.81	3.57	0.00	9.50	0.00	39.38	54.00	-14.62	A	1.00
* 4823.29	52.66	34.43	5.08	35.16	9.50	2.01	49.53	74.00	-24.47	P	1.03
* 4823.29	39.12	34.43	5.08	35.16	9.50	2.01	35.99	54.00	-18.01	A	1.03

Note :

- The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark "*" means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
Level=Reading + AF + Cable – Preamp + Filter – Dist, Margin = Level-Limit
- The other emission levels were 20dB below the limit
- The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/14
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11g mode at 6Mbps	TEMP&Humidity	24°C, 72%

CH Low TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2389.90	45.80	31.81	3.57	0.00	9.50	0.00	71.68	74.00	-2.32	P	1.00
* 2389.90	24.30	31.81	3.57	0.00	9.50	0.00	50.18	54.00	-3.82	A	1.00
* 2390.00	46.10	31.81	3.57	0.00	9.50	0.00	71.98	74.00	-2.02	P	1.00
* 2390.00	24.50	31.81	3.57	0.00	9.50	0.00	50.38	54.00	-3.62	A	1.00
* 4822.04	57.41	34.43	5.08	35.16	9.50	2.01	54.27	74.00	-19.73	P	1.00
* 4822.04	41.13	34.43	5.08	35.16	9.50	2.01	37.99	54.00	-16.01	A	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter - Dist, Margin = Level - Limit
7. The other emission levels were 20dB below the limit
8. The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/14
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11g mode at 6Mbps	TEMP&Humidity	24°C, 72%

CH Mid TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 4874.05	48.44	34.77	5.10	35.20	9.50	1.80	45.41	74.00	-28.59	P	1.06
* 4874.05	36.11	34.77	5.10	35.20	9.50	1.80	33.08	54.00	-20.92	A	1.06
* 7314.56	52.01	39.77	6.79	35.64	9.50	2.00	55.44	74.00	-18.56	P	1.00
* 7314.56	36.85	39.77	6.79	35.64	9.50	2.00	40.28	54.00	-13.72	A	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter - Dist, Margin = Level - Limit
7. The other emission levels were 20dB below the limit
8. The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/14
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11g mode at 6Mbps	TEMP&Humidity	24°C, 72%

CH Mid TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 4876.90	53.53	34.79	5.10	35.20	9.50	1.79	50.51	74.00	-23.49	P	1.08
* 4876.90	43.20	34.79	5.10	35.20	9.50	1.79	40.18	54.00	-13.82	A	1.08
* 7313.80	58.92	39.77	6.79	35.64	9.50	2.00	62.35	74.00	-11.65	P	1.00
* 7313.80	45.75	39.77	6.79	35.64	9.50	2.00	49.18	54.00	-4.82	A	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter - Dist, Margin = Level - Limit
7. The other emission levels were 20dB below the limit
8. The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/14
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11g mode at 6Mbps	TEMP&Humidity	24°C, 72%

CH High TX				Measurement Distance at 1m Horizontal polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2483.50	35.50	31.72	3.61	0.00	9.50	0.00	61.33	74.00	-12.67	P	1.02
* 2483.50	13.10	31.72	3.61	0.00	9.50	0.00	38.93	54.00	-15.07	A	1.02
* 2483.60	34.10	31.72	3.61	0.00	9.50	0.00	59.93	74.00	-14.07	P	1.02
* 2483.60	12.80	31.72	3.61	0.00	9.50	0.00	38.63	54.00	-15.37	A	1.02
* 4923.54	50.02	35.10	5.12	35.24	9.50	1.61	47.10	74.00	-26.90	P	1.00
* 4923.54	40.52	35.10	5.12	35.24	9.50	1.61	37.60	54.00	-16.40	A	1.00
* 7389.30	50.97	39.74	6.84	35.62	9.50	2.00	54.44	74.00	-19.56	P	1.00
* 7389.30	36.83	39.74	6.84	35.62	9.50	2.00	40.30	54.00	-13.70	A	1.00

Note :

1. The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter - Dist, Margin = Level - Limit
7. The other emission levels were 20dB below the limit
8. The test limit distance is 3M limit.



Product Name	Wireless mini pci card	Test Date	2005/04/14
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11g mode at 6Mbps	TEMP&Humidity	24°C, 72%

CH High TX				Measurement Distance at 1m Vertical polarity							
Freq. (MHz)	Reading (dBμV)	AF (dBμV)	Cable (dB)	Pre-amp (dB)	Dist (dB)	Filter (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Mark (P/Q/A)	Height (Meter)
* 2483.50	45.50	31.72	3.61	0.00	9.50	0.00	71.33	74.00	-2.67	P	1.12
* 2483.50	22.90	31.72	3.61	0.00	9.50	0.00	48.73	54.00	-5.27	A	1.12
* 2483.60	45.80	31.72	3.61	0.00	9.50	0.00	71.63	74.00	-2.37	P	1.12
* 2483.60	22.10	31.72	3.61	0.00	9.50	0.00	47.93	54.00	-6.07	A	1.12
* 4923.34	56.80	35.09	5.12	35.24	9.50	1.61	53.88	74.00	-20.12	P	1.06
* 4923.34	48.12	35.09	5.12	35.24	9.50	1.61	45.20	54.00	-8.80	A	1.06
* 7389.64	54.81	39.74	6.84	35.62	9.50	2.00	58.28	74.00	-15.72	P	1.00
* 7389.64	39.46	39.74	6.84	35.62	9.50	2.00	42.93	54.00	-11.07	A	1.00

Note :

- The measurement was searched to 10th harmonic, Remark "-----" means that the emissions level is too low to be measured.
- AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter: High Pass Filter Insertion Loss (3.5GHz)
- Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
- Remark "*" means that Restricted band.
- Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
- The result basic equation calculation is as follow:
Level = Reading + AF + Cable – Preamp + Filter - Dist, Margin = Level - Limit
- The other emission levels were 20dB below the limit
- The test limit distance is 3M limit.



6.8.4 BAND EDGE

LIMITS

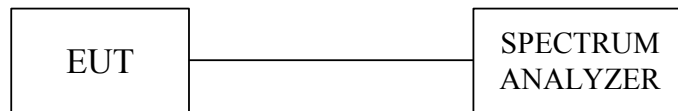
The emission not fallen in restricted bands should be 20dB below the highest emission level of operating band (in 100KHz Resolution Bandwidth).

For the emissions fallen in the restricted bands listed in section 15.205, the maximum permitted average field strength should meet the requirement listed in section 15.209.

TEST EQUIPMENTS

Description & Manufacturer	Model No.	Serial No.	Date of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	September 06, 2004

TEST SETUP



TEST PROCEDURE

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW and VBM to 1MHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength.

**TEST RESULTS**

No non-compliance noted

802.11b MODE

Refer to the section 6.8.3, the measured radiated band edge emissions are listed below :

Band edge Frequency (MHz)		Measured radiated band edge field strength (dBuV/m)		Radiated band edge field strength limit (dBuV/m)		Test result
		Horizontal	Vertical	Horizontal	Vertical	
2390.00	PK	51.58	67.08	74.00	74.00	PASS
	AV	38.38	51.58	54.00	54.00	
2483.50	PK	55.83	66.03	74.00	74.00	PASS
	AV	42.33	51.83	54.00	54.00	

802.11g MODE

Refer to the section 6.8.3, the measured radiated band edge emissions are listed below :

Band edge Frequency (MHz)		Measured radiated band edge field strength (dBuV/m)		Radiated band edge field strength limit (dBuV/m)		Test result
		Horizontal	Vertical	Horizontal	Vertical	
2390.00	PK	57.78	71.98	74.00	74.00	PASS
	AV	39.38	50.38	54.00	54.00	
2483.50	PK	61.33	71.33	74.00	74.00	PASS
	AV	38.93	48.73	54.00	54.00	

Note : 1. Radiated band edge field strength is measured with measurement procedure ANSI C63.4-2003.



6.9 POWERLINE CONDUCTED EMISSIONS

LIMITS

§ 15.207 (a) Except as shown in paragraph (b) and (c) this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

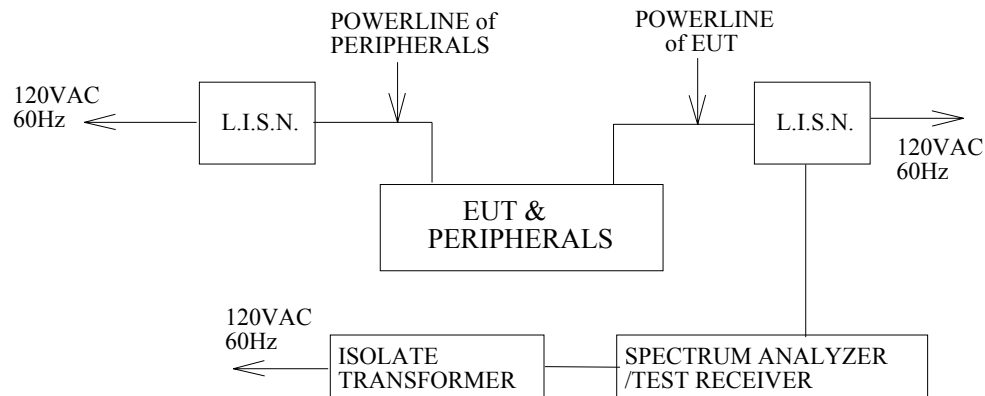
The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted limit (dB μ v)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56	56 to 46
0.5 - 5	56	46
5 - 30	60	50

TEST EQUIPMENTS

The following test equipments are used during the conducted powerline tests :

Manufacturer or Type	Model No.	Serial No.	Date of Calibration	Calibration Period	Remark
HP SPECTRUM ANALYZER	8594E	3801A05627	April 26, 2004	1 Year	PRETEST
SOLAR ISOLATION TRANSFORMER	7032-1	N/A	N/A	N/A	FINAL
EMCO L.I.S.N.	3850/2	9311-1025 9401-1028	January 10, 2005 For Characteristic impedance	1 Year	FINAL
			May 18, 2004 For Insertion loss		
R & S TEST RECEIVER	ESHS30	838550/003	February 21, 2005	1 Year	FINAL
KEENE SHIELDED ROOM	5983	No.1	N/A	N/A	FINAL
R & S PULSE LIMIT	EHS3Z2	357.8810.52	July 10, 2004	1 Year	FINAL
N TYPE COAXIAL CABLE	-----	-----	July 10, 2004	1 Year	FINAL
50 Ω TERMINATOR	-----	-----	July 10, 2004	1 Year	FINAL

**TEST SETUP****TEST PROCEDURE**

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80cm above the horizontal ground plane. The EUT IS CONFIGURED IN ACCORDANCE WITH ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both quasi-peak detection and average detection measurements.

Line conducted data is recorded for both NEUTRAL and LINE.

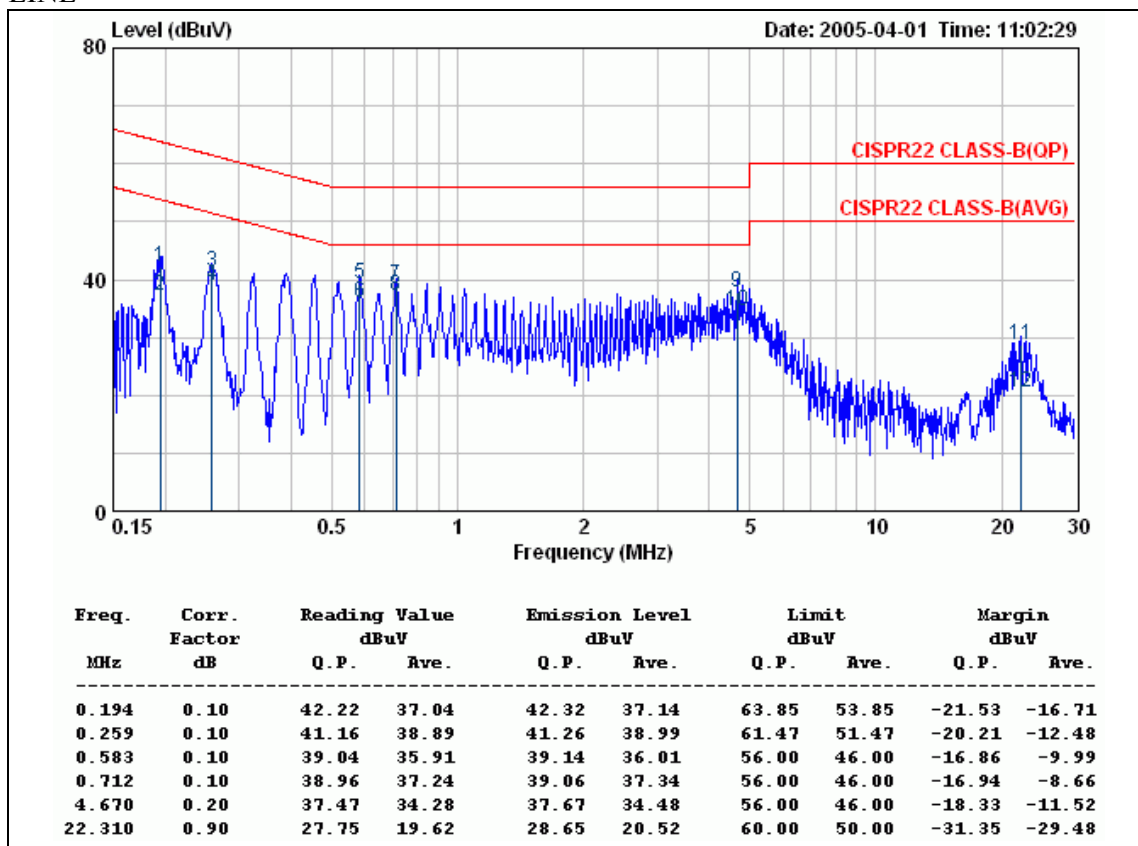
TEST RESULTS

No non-compliance noted

**CONDUCTED RF VOLTAGE MEASUREMENT**

Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11b mode	TEMP&Humidity	18°C, 78%

LINE

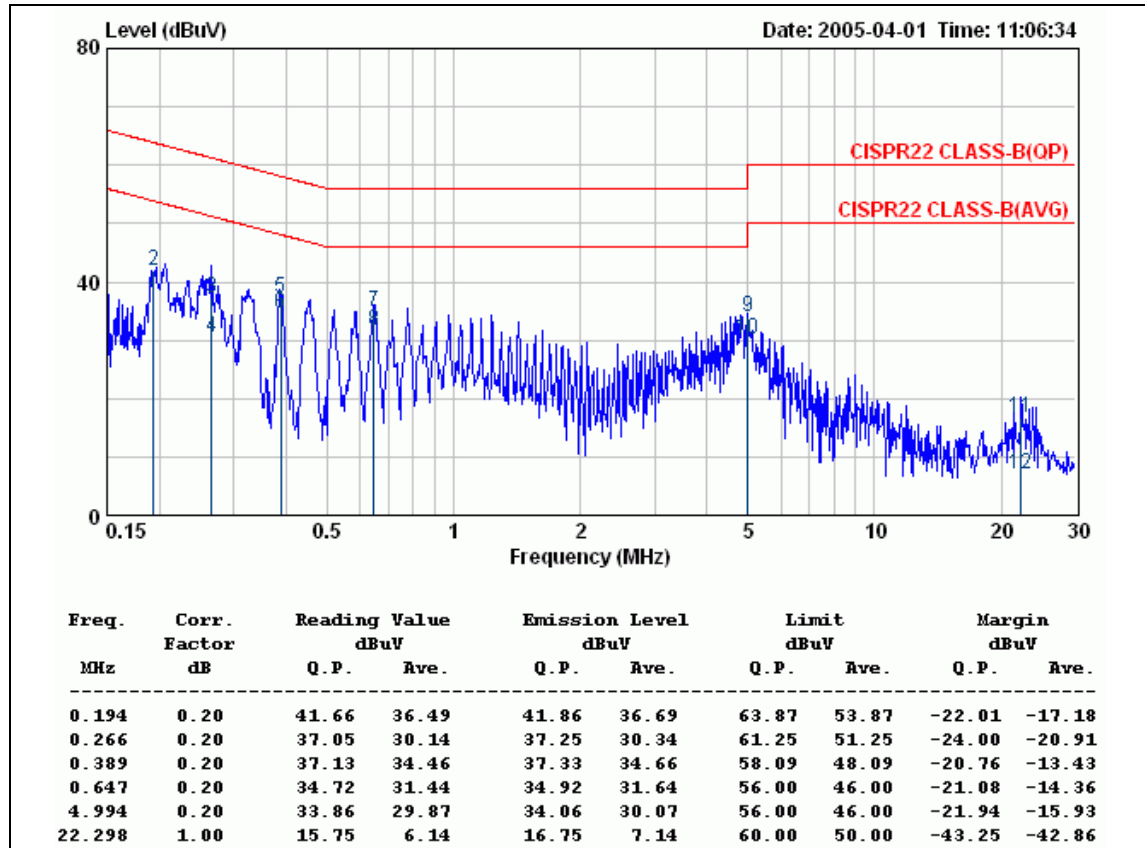


REMARKS: 1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.



Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11b mode	TEMP&Humidity	18°C, 78%

NEUTRAL

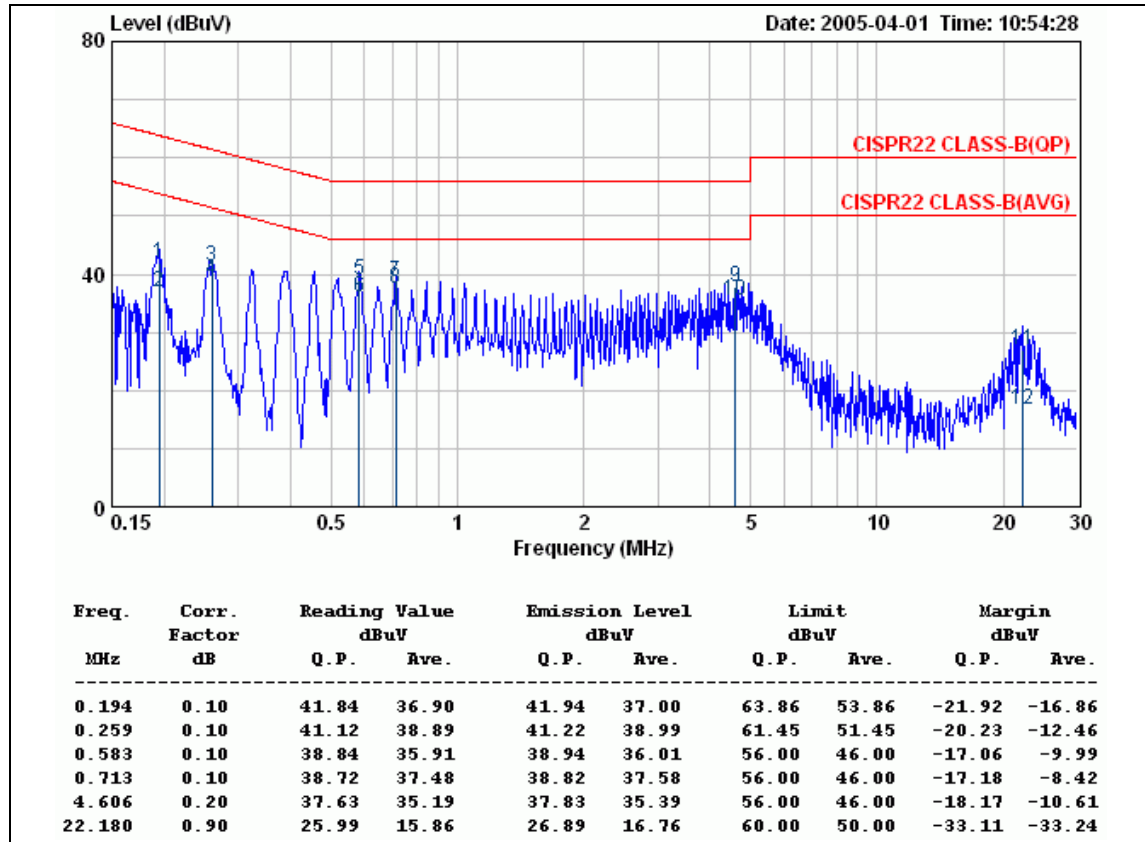


REMARKS: 1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.



Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11g mode	TEMP&Humidity	18°C, 78%

LINE

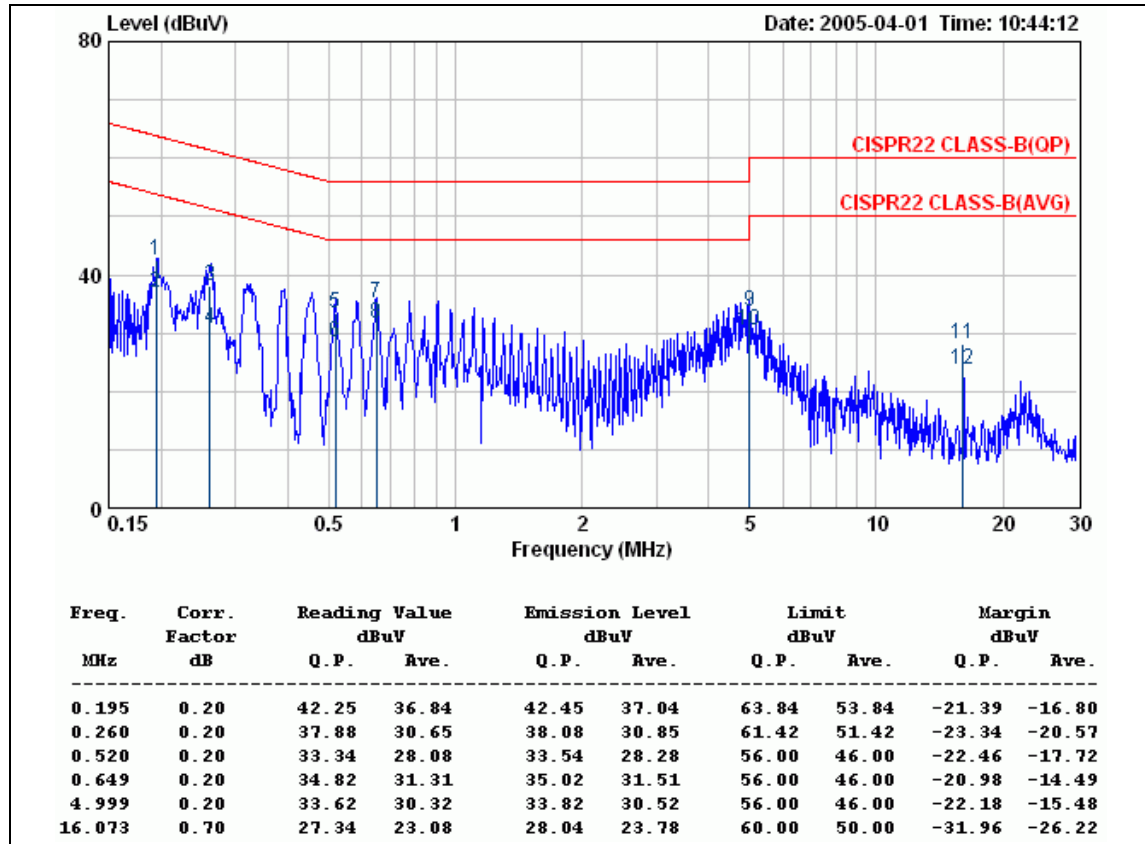


REMARKS: 1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.



Product Name	Wireless mini pci card	Test Date	2005/04/01
Model Name	MP-G-BR-05	Test By	Alan Fan
Mode	802.11g mode	TEMP&Humidity	18°C, 78%

NEUTRAL



REMARKS: 1. Correction Factor = Insertion loss + cable loss
2. Margin value = Emission level – Limit value
3. The EUT can be operated in transmitting, stand-by and receiving mode. After preliminary scan, EUT in transmitting mode has highest emission. The EUT was set in transmitting mode at final test to get the worst case test results.



7. SETUP PHOTOS

RADIATED RF MEASUREMENT SETUP







POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP





8. ANTENNA REQUIREMENT

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.

8.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used for this product is $1/2\lambda$ Dipole antenna . The temporary antenna connector is MHF connector and the peak Gain of this antenna is only 5 dBi.