



Test Report

Product Name : Wireless LAN Card

Model No. : WP222M

FCC ID.: PQP-WP222MF00001

Applicant : PRIME ELECTRONICS & SATELLITICS INC.

Address : 69, Tung-Yuan Rd., Chung-Li Industrial Park, Chung-Li
City, Taoyuan, Taiwan.

Date of Receipt : Feb. 25, 2002

Date of Test : Mar. 14, 2002

Report No. : 023H003FI

The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Test Date : Mar. 14, 2002

Report No. : 023H003FI



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200347-0

Product Name : Wireless LAN Card

Applicant : PRIME ELECTRONICS & SATELLITICS INC.

Address : 69, Tung-Yuan Rd., Chung-Li Industrial Park,
Chung-Li City, Taoyuan, Taiwan.

Manufacturer : PRIME ELECTRONICS & SATELLITICS INC.

Model No. : WP222M

FCC ID. : PQP-WP222MF00001

Rated Voltage : DC 3.3V(Power by PC)

Trade Name : PESI

Measurement Standard : FCC Part 15 Subpart C Paragraph 15.247


Measurement Procedure : ANSI C63.4:1992


Test Result : Complied

The test results relate only to the samples tested.

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Documented By : 
(Kim Hung)

Tested By : 
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Approved By : 
(Kevin Wang)

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	:	Wireless LAN Card
Trade Name	:	PESI
FCC ID.	:	PQP-WP222MF00001
Model No.	:	WP222M
Frequency Range	:	2412MHz to 2462MHz
Channel Number	:	11
Frequency of Each Channel	:	Channel 01: 2412MHz Channel 07: 2442MHz
(Working Frequency)	:	Channel 02: 2417 MHz Channel 08: 2447MHz
	:	Channel 03: 2422 MHz Channel 09: 2452MHz
	:	Channel 04: 2427MHz Channel 10: 2457MHz
	:	Channel 05: 2432MHz Channel 11: 2462MHz
	:	Channel 06: 2437MHz
Type of Modulation	:	Direct Sequence Spread Spectrum
Selection of Operating Frequency	:	Auto
Antenna type	:	Soldered on PCB

Note:

1. This device is a 2.4GHz Wireless LAN Card interface included a 2.4GHz receiving function, a 2.4GHz transmitting function.
2. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.
3. This device is a composite device in accordance with Part 15 regulations. The function receiving was measured and made a test report that the report number is 023H003F under Declaration of Conformity.

1.2. Operation Description

The EUT is Wireless LAN Card. This RF module provided three kinds of transmission speed 2,5.5 and 11Mbps. The modulations of RF carrier are DQPSK and CCK. An extender was used during the test to prove the PCMCIA card can pass all the regulation alone Self-shielding and on board power regulator were built in the EUT.

This module adopted direct sequence spread spectrum modulation. Data can be transmitted by the radio signal connect to Internet or local network.

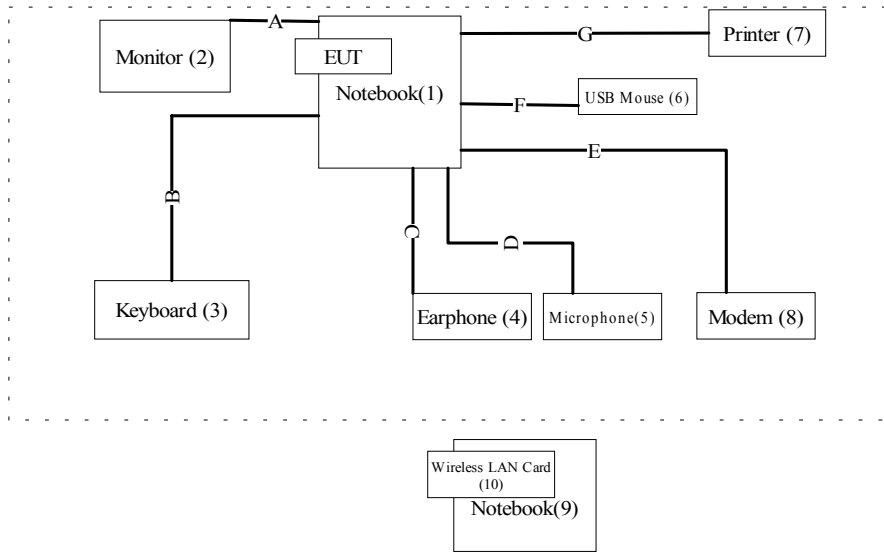
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord	FCC ID
(1)	Notebook	DELL	PP01L	2724903568	Non-shielded,1.8m	DoC
(2)	Monitor	HITACHI	CM752ET-311	T8E004439	Shielded,1.8m	DoC
(3)	Keyboard	ACER	6311-TW4C	916590704C91F25613	--	DoC
(4)	Earphone	SONY	MDR-354	--	--	DoC
(5)	Microphone	AIWA	CD-8000	--	--	DoC
(6)	USB Mouse	Logitech	M-UE55	LTC93813271	--	DoC
(7)	Printer	HP	C2642A	MY75N1D2Y1	Non-shielded,0.7m	B94C2642X
(8)	Modem	ACEEX	1414	980033036	--	IFAXDM1414
(9)	Notebook	IBM	Think Pad 570	27L8835	Non-shielded,1.5m	DoC
(10)	Wireless LAN Card	W-Link	DWL-650	--	--	KA22001060015-1

	Signal Cable Type	Signal Cable Description
A.	VGA Cable	Shielded, 1.8m, two ferrite cores bonded.
B.	Keyboard Cable	Shielded, 1.7m
C.	Earphone Cable	Non-shielded, 1.2m
D.	Microphone Cable	Non-shielded, 2.5m
E.	USB Cable	Shielded, 1.0m
F.	Modem Cable	Shielded, 1.7m
G.	Printer Cable	Shielded, 1.7m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- 1.5.1 Setup the EUT and simulators as shown on 1.4.
- 1.5.2 Turn on the power of all equipment.
- 1.5.3 Personal Computer reads data from disk.
- 1.5.4 Data will be transmitted through EUT.
- 1.5.5 The transmission status will be shown on the monitor.
- 1.5.6 Repeat the above procedure 1.5.4 to 1.5.5

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: November 3, 1998 File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Reference 31040/SIT1300F2
 August 30, 2001 Accreditation on NVLAP
 NVLAP Lab Code: 200347-0



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2. Conducted Emission

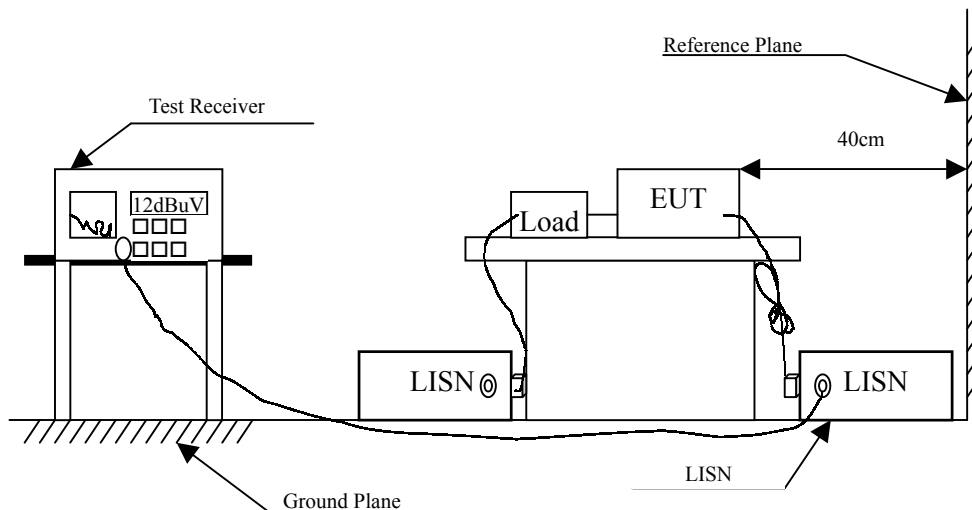
2.1. Test Equipment List

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2001	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2001	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2001	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	No.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Paragraph 15.207 (dBuV)		
Frequency MHz	Limits	
	uV	dBuV
0.45 - 30	250	48.0

2.4. Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4:1992 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.45MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Test Result of Conducted Emission

Product : Wireless LAN Card
 Test Item : Conducted Emission Test
 Test Mode : Normal Operation

Frequency	Cable Loss	LISN Factor	Reading Level	Emission Level	Limits
MHz	dB	dB	dBuV	dBuV	dBuV

Line 1

Quasi-Peak:

*0.525	0.07	0.22	30.45	30.73	48.00
0.992	0.10	0.28	22.59	22.97	48.00
2.623	0.16	0.37	20.87	21.40	48.00
3.908	0.18	0.41	27.97	28.56	48.00
5.013	0.20	0.43	17.61	18.24	48.00
15.998	0.33	0.54	22.73	23.60	48.00

Line 2

Quasi-Peak:

*0.525	0.07	0.22	26.13	26.41	48.00
0.818	0.09	0.26	24.41	24.76	48.00
2.394	0.15	0.36	24.09	24.60	48.00
3.678	0.18	0.40	25.75	26.33	48.00
5.197	0.20	0.43	20.81	21.45	48.00
7.178	0.24	0.46	18.01	18.71	48.00

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + LISN Factor + Cable loss

3. Peak Power Output

3.1. Test Equipment

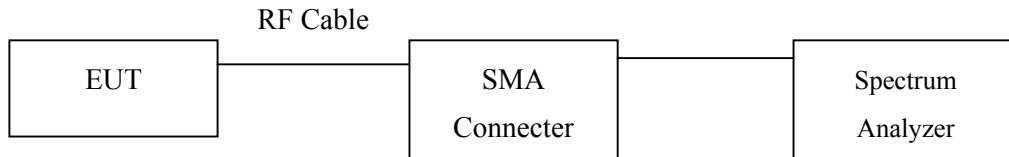
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2001

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
 2. Mark “X” test instruments are used to measure the final test results.

3.2. Test Setup

Conduction Power Measurement



3.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

3.4. Minimum Standard

The maximum peak power shall be less 1 Watt.

3.5. Test Result of Peak Power Output

Product : Wireless LAN Card
 Test Item : Peak Power Output Data
 Test Site : No.1 OATS
 Test Mode : Normal Operation

Data Speed: 2Mbps

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
1	2412	15.93	1 Watt= 30 dBm	Pass
6	2437	15.17	1 Watt= 30 dBm	Pass
11	2462	14.07	1 Watt= 30 dBm	Pass

Data Speed: 11Mbps

Channel No.	Frequency (MHz)	Measurement (dBm)	Required Limit	Result
1	2412	15.89	1 Watt= 30 dBm	Pass
6	2437	15.25	1 Watt= 30 dBm	Pass
11	2462	14.12	1 Watt= 30 dBm	Pass

4. RF Exposure Evaluation

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 (Minutes)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	F/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	F/1500	6
1500-100,000	--	--	1	30

F= Frequency in MHz

4.1. Friis Formula

$$\text{Friis transmission formula: } P_d = (P_{out} * G) / (4 * \pi * r^2)$$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

4.2. EUT Operation condition

A software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.3. Test Result of RF Exposure Evaluation

Product : Wireless LAN Card
 Test Item : RF Exposure Evaluation Data
 Test Site : No.1 OATS
 Test Mode : Transmit

4.3.1 Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 2 dBi linear scale.

4.3.2 Output Power Into Antenna & RF Exposure Evaluation Distance

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Minimum Allowable Distance ® From Skin(cm)
1 (2Mbps)	2412	15.93	2.222774
1 (11Mbps)	2412	15.89	2.212561
6 (2Mbps)	2437	15.17	2.036551
6 (11Mbps)	2437	15.25	2.055395
11 (2Mbps)	2462	14.07	1.794301
11 (11Mbps)	2462	14.12	1.804659

The distance r (4th column) calculated from the Friis transmission formula is far shorter than 20 cm separation requirement. So, RF exposure limit warning or SAR test are not required.

5. Radiated Emission

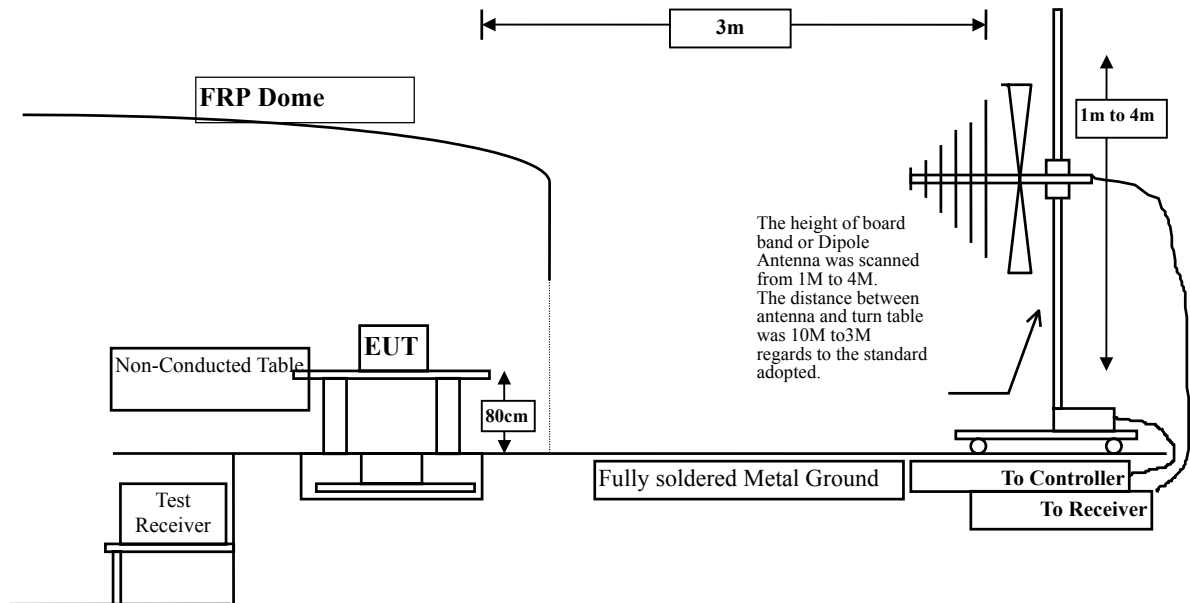
5.1. Test Equipment

The following test equipment are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X Test Receiver	R & S	ESCS 30 / 825442/14	May, 2001
	X Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2001
	X Pre-Amplifier	HP	8447D/3307A01812	May, 2001
	X Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2001
	X Horn Antenna	EM	EM6917 / 103325	May, 2001
Site # 2	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2001
	Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2001
	Pre-Amplifier	HP	8447D/3307A01814	May, 2001
	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2001
	Horn Antenna	EM	EM6917 / 103325	May, 2001

- Note:
1. All equipments that need to calibrate are with calibration period of 1 year.
 2. Mark "X" test instruments are used to measure the final test results.

5.2. Test Setup



Spurious Emissions
(Band Edge Antenna Radiated)

5.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

5.4. Limits

➤ General Radiated Emission Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Frequency MHz	15.209 Limits (dBuV/m @3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

- Remarks :
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

5.5. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:1992 on radiated measurement.

The additional latch filter below 1GHz was used to measure the level of harmonics radiated emission during field strength of harmonics measurement.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30)is 120 kHz, above 1GHz are 1 MHz.

The frequency range from 30MHz to 10th harmonics is checked.

5.6. Test Result of Radiated Emission

Product : Wireless LAN Card
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Channel 1(2Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector (Horizontal)							
4823.949	9.09	33.50	34.77	48.66	56.48	17.52	74.00
7235.749	10.60	36.24	34.90	60.68	72.62	1.38	74.00
9648.050	13.66	37.43	35.10	33.37	<49.35	24.65	74.00
12059.34	16.70	39.12	34.66	31.46	<52.62	21.38	74.00
Average Detector (Horizontal)							
4823.749	9.09	33.50	34.77	29.75	37.57	16.43	54.00
7234.947	10.60	36.24	34.90	30.50	42.44	11.56	54.00
Peak Detector (Vertical)							
4823.849	9.09	33.50	34.77	43.95	51.77	22.23	74.00
7235.849	10.60	36.24	34.90	60.72	72.66	1.34	74.00
9648.250	13.66	37.43	35.10	34.52	<50.50	23.50	74.00
12060.05	16.70	39.12	34.66	32.15	<53.31	20.69	74.00
Average Detector (Vertical)							
7236.651	10.60	36.24	34.90	28.61	40.55	13.45	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss-PreAMP
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless LAN Card
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Channel 6(2Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Peak Detector (Horizontal)

4873.749	9.18	33.56	34.75	45.54	53.53	20.47	74.00
7310.849	10.60	36.31	34.90	59.52	71.52	2.48	74.00
9748.250	13.75	37.45	35.10	34.11	<50.21	23.79	74.00
12185.15	16.76	39.17	34.55	31.47	<52.85	21.15	74.00

Average Detector (Horizontal)

7312.152	10.60	36.31	34.90	27.23	39.23	14.77	54.00
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Peak Detector (Vertical)

4874.150	9.18	33.56	34.75	43.84	51.83	22.17	74.00
7310.849	10.60	36.31	34.90	58.94	70.94	3.06	74.00
9748.050	13.75	37.45	35.10	33.09	<49.19	24.81	74.00
12185.15	16.76	39.17	34.55	31.71	<53.09	20.91	74.00

Average Detector (Vertical)

7312.152	10.60	36.31	34.90	26.41	38.41	15.59	54.00
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Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss -PreAMP
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless LAN Card
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Channel 11(2Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Peak Detector (Horizontal)

4923.949	9.26	33.62	34.73	41.78	49.94	24.06	74.00
7385.749	10.60	36.37	34.90	58.09	70.16	3.84	74.00
9847.949	13.87	37.47	35.10	34.72	<50.96	23.04	74.00
12310.04	16.82	39.22	34.46	31.64	<53.23	20.77	74.00

Average Detector (Horizontal)

7387.152	10.60	36.39	34.90	25.65	37.74	16.26	54.00
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Peak Detector (Vertical)

4924.250	9.26	33.62	34.73	43.49	51.65	22.35	74.00
7385.649	10.60	36.37	34.90	57.07	69.14	4.86	74.00
9847.949	13.87	37.47	35.10	34.77	<51.01	22.99	74.00
12310.35	16.82	39.22	34.46	31.15	<52.74	21.26	74.00

Average Detector (Vertical)

7387.052	10.60	36.37	34.90	26.25	38.32	15.68	54.00
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Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss-PreAMP
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless LAN Card
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Channel 1(11Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Peak Detector (Horizontal)

4824.050	6.27	33.50	34.77	40.80	45.80	28.20	74.00
7235.850	8.32	36.24	34.90	56.83	66.49	7.51	74.00
9648.350	10.18	37.43	35.10	36.60	<49.11	24.89	74.00
12060.95	11.90	39.12	34.66	34.78	<51.14	22.86	74.00

Average Detector (Horizontal)

7236.950	8.32	36.24	34.90	25.51	35.17	18.83	54.00
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Peak Detector (Vertical)

4824.250	6.27	33.50	34.77	41.90	46.90	27.10	74.00
7235.850	8.32	36.24	34.90	52.73	62.39	11.61	74.00
9647.950	10.18	37.43	35.10	36.12	<48.63	25.37	74.00
12059.55	11.90	39.12	34.66	35.36	<51.72	22.28	74.00

Average Detector (Vertical)

7235.250	8.32	36.24	34.90	23.57	33.23	20.77	54.00
----------	------	-------	-------	-------	-------	-------	-------

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss-PreAMP
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless LAN Card
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Channel 6(11Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Peak Detector (Horizontal)

4874.030	6.32	33.56	34.75	37.96	43.09	30.91	74.00
7310.930	8.38	36.31	34.90	55.87	65.65	8.35	74.00
9747.930	10.24	37.45	35.10	40.03	<52.62	21.38	74.00
12186.03	11.99	39.17	34.55	35.02	<51.64	22.36	74.00

Average Detector (Horizontal)

7311.630	8.38	36.31	34.90	24.45	34.23	19.77	54.00
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Peak Detector (Vertical)

4873.630	6.32	33.56	34.75	38.96	44.09	29.91	74.00
7311.130	8.38	36.31	34.90	50.29	60.07	13.93	74.00
9747.920	10.24	37.45	35.10	36.40	<48.99	25.01	74.00
12185.50	11.99	39.17	34.55	34.01	<50.63	23.37	74.00

Average Detector (Vertical)

7313.130	8.38	36.31	34.90	23.62	33.40	20.60	54.00
----------	------	-------	-------	-------	-------	-------	-------

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss-PreAMP
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless LAN Card
 Test Item : Harmonic Radiated Emission Data
 Test Mode : Channel 11(11Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Peak Detector (Horizontal)

4924.130	6.37	33.62	34.73	39.84	45.10	28.90	74.00
7385.930	8.43	36.37	34.90	55.22	65.13	8.87	74.00
9848.130	10.33	37.47	35.10	39.04	<51.74	22.26	74.00
12310.50	12.07	39.22	34.46	34.64	<51.48	22.52	74.00

Average Detector (Horizontal)

7388.040	8.45	36.39	34.90	23.65	33.59	20.41	54.00
----------	------	-------	-------	-------	-------	-------	-------

Peak Detector (Vertical)

4923.900	6.37	33.62	34.73	41.07	46.33	27.67	74.00
7385.730	8.43	36.37	34.90	51.07	60.98	13.02	74.00
9848.530	10.33	37.47	35.10	36.26	<48.96	25.04	74.00
12310.40	12.07	39.22	34.46	33.78	<50.62	23.38	74.00

Average Detector (Vertical)

7388.030	8.45	36.39	34.90	22.70	32.64	21.36	54.00
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Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Emission Level = Reading Level + Probe Factor + Cable loss-PreAMP
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless LAN Card
 Test Item : General Radiated Emission Data
 Test Mode : Channel 1(2Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

248.250	1.91	18.44	26.93	40.00	33.42	12.58	46.00
298.690	2.12	18.90	26.95	38.00	32.07	13.93	46.00
456.800	2.77	22.30	26.70	39.00	37.37	8.63	46.00
*471.350	2.83	22.64	26.68	39.80	38.58	7.42	46.00
541.190	3.12	23.91	26.57	33.20	33.66	12.34	46.00
583.870	3.29	24.56	26.50	34.00	35.35	10.65	46.00

Vertical:

193.930	1.69	18.28	26.91	40.00	33.06	10.44	43.50
332.640	2.26	19.60	26.90	38.40	33.36	12.64	46.00
455.830	2.76	22.28	26.70	37.00	35.34	10.66	46.00
471.350	2.83	22.64	26.68	35.40	34.18	11.82	46.00
542.160	3.12	23.93	26.57	34.80	35.28	10.72	46.00
*586.780	3.30	24.60	26.50	35.40	36.81	9.19	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level
3. Emission Level = Reading Level + Probe Factor + Cable loss. - PreAMP.

Product : Wireless LAN Card
 Test Item : General Radiated Emission Data
 Test Mode : Channel 6(2Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

149.310	1.51	20.20	26.89	36.60	31.41	12.09	43.50
248.250	1.91	18.44	26.93	40.80	34.22	11.78	46.00
299.660	2.12	18.90	26.95	37.20	31.27	14.73	46.00
455.830	2.76	22.28	26.70	38.40	36.74	9.26	46.00
*471.350	2.83	22.64	26.68	39.20	37.98	8.02	46.00
542.160	3.12	23.93	26.57	34.00	34.48	11.52	46.00

Vertical:

*195.870	1.70	18.19	26.91	42.00	34.98	8.52	43.50
331.670	2.26	19.58	26.90	36.60	31.53	14.47	46.00
454.860	2.76	22.26	26.71	36.20	34.51	11.49	46.00
469.410	2.82	22.59	26.68	36.60	35.33	10.67	46.00
541.190	3.12	23.91	26.57	35.00	35.46	10.54	46.00
587.750	3.31	24.62	26.50	34.00	35.43	10.57	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss. - PreAMP.

Product : Wireless LAN Card
 Test Item : General Radiated Emission Data
 Test Mode : Channel 11(2Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

298.690	2.12	18.90	26.95	37.60	31.67	14.33	46.00
351.070	2.34	19.96	26.87	35.80	31.23	14.77	46.00
432.550	2.67	21.74	26.74	34.20	31.87	14.13	46.00
454.860	2.76	22.26	26.71	39.60	37.91	8.09	46.00
*469.410	2.82	22.59	26.68	41.80	40.53	5.47	46.00
583.870	3.29	24.56	26.50	34.20	35.55	10.45	46.00

Vertical:

149.310	1.51	20.20	26.89	38.20	33.01	10.49	43.50
193.930	1.69	18.28	26.91	40.80	33.86	9.64	43.50
331.670	2.26	19.58	26.90	37.40	32.33	13.67	46.00
456.800	2.77	22.30	26.70	37.80	36.17	9.83	46.00
*470.380	2.82	22.61	26.68	39.20	37.96	8.04	46.00
543.130	3.12	23.94	26.57	36.20	36.70	9.30	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level
3. Emission Level = Reading Level + Probe Factor + Cable loss. - PreAMP.

Product : Wireless LAN Card
 Test Item : General Radiated Emission Data
 Test Mode : Channel 1(11Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

298.690	2.12	18.90	26.95	39.00	33.07	12.93	46.00
*453.890	2.76	22.23	26.71	39.20	37.48	8.52	46.00
469.410	2.82	22.59	26.68	37.40	36.13	9.87	46.00
515.000	3.01	23.53	26.61	34.80	34.73	11.27	46.00
542.160	3.12	23.93	26.57	34.60	35.08	10.92	46.00
583.870	3.29	24.56	26.50	34.40	35.75	10.25	46.00

Vertical:

*193.930	1.69	18.28	26.91	41.80	34.86	8.64	43.50
331.670	2.26	19.58	26.90	36.60	31.53	14.47	46.00
454.860	2.76	22.26	26.71	36.60	34.91	11.09	46.00
515.000	3.01	23.53	26.61	34.80	34.73	11.27	46.00
543.130	3.12	23.94	26.57	36.60	37.10	8.90	46.00
586.780	3.30	24.60	26.50	34.60	36.01	9.99	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss. - PreAMP.

Product : Wireless LAN Card
 Test Item : General Radiated Emission Data
 Test Mode : Channel 6(11Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

114.390	1.36	16.15	26.88	43.40	34.03	9.47	43.50
247.280	1.91	18.43	26.93	41.40	34.81	11.19	46.00
456.800	2.77	22.30	26.70	39.00	37.37	8.63	46.00
*469.410	2.82	22.59	26.68	40.40	39.13	6.87	46.00
542.160	3.12	23.93	26.57	35.20	35.68	10.32	46.00
586.780	3.30	24.60	26.50	34.60	36.01	9.99	46.00

Vertical:

*118.270	1.38	16.19	26.88	46.60	37.28	6.22	43.50
195.870	1.70	18.19	26.91	41.40	34.38	9.12	43.50
454.860	2.76	22.26	26.71	36.60	34.91	11.09	46.00
471.350	2.83	22.64	26.68	36.60	35.38	10.62	46.00
541.190	3.12	23.91	26.57	36.80	37.26	8.74	46.00
587.750	3.31	24.62	26.50	34.40	35.83	10.17	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

Product : Wireless LAN Card
 Test Item : General Radiated Emission Data
 Test Mode : Channel 11(11Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m

Horizontal:

248.250	1.91	18.44	26.93	39.80	33.22	12.78	46.00
*454.860	2.76	22.26	26.71	39.60	37.91	8.09	46.00
468.440	2.82	22.57	26.68	38.80	37.50	8.50	46.00
515.000	3.01	23.53	26.61	34.20	34.13	11.87	46.00
542.160	3.12	23.93	26.57	34.40	34.88	11.12	46.00
585.810	3.30	24.59	26.50	34.00	35.39	10.61	46.00

Vertical:

*146.400	1.50	19.93	26.89	40.80	35.33	8.17	43.50
204.600	1.73	18.04	26.91	40.60	33.46	10.04	43.50
235.640	1.86	18.32	26.93	39.40	32.66	13.34	46.00
455.830	2.76	22.28	26.70	37.20	35.54	10.46	46.00
514.030	3.00	23.52	26.61	34.80	34.71	11.29	46.00
541.190	3.12	23.91	26.57	37.00	37.46	8.54	46.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. “ * ”, means this data is the worst emission level.
3. Emission Level = Reading Level + Probe Factor + Cable loss - PreAMP.

5.7. Test Result of Band Edge

Product : Wireless LAN Card
 Test Item : Band Edge Data
 Test Site : No.1 OATS
 Test Mode : Channel 1 (2Mbps)

RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (Horizontal)	<2400	>20	Pass
1 (Vertical)	<2400	>20	Pass

Figure Channel 1: (Horizontal)

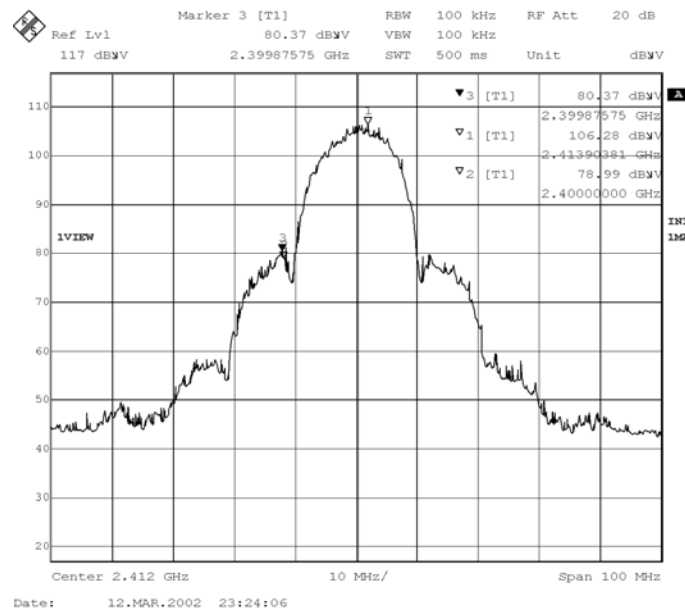
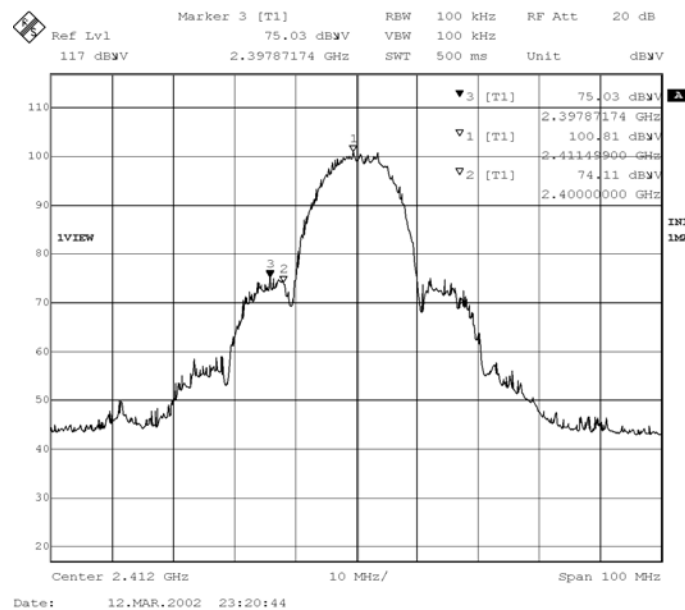


Figure Channel 1: (Vertical)



Product : Wireless LAN Card
 Test Item : Band Edge Data
 Test Site : No.1 OATS
 Test Mode : Channel 1 (11Mbps)

RF Radiated Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (Horizontal)	<2400	>20	Pass
1 (Vertical)	<2400	>20	Pass

Figure Channel 1: (Horizontal)

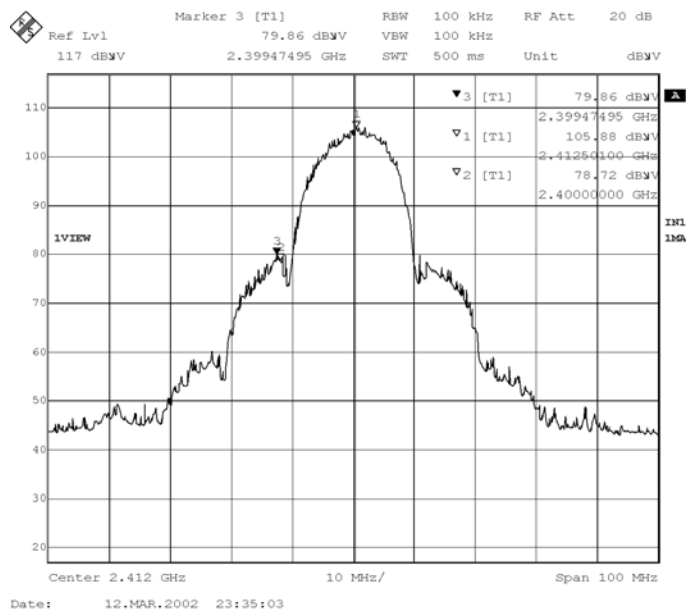
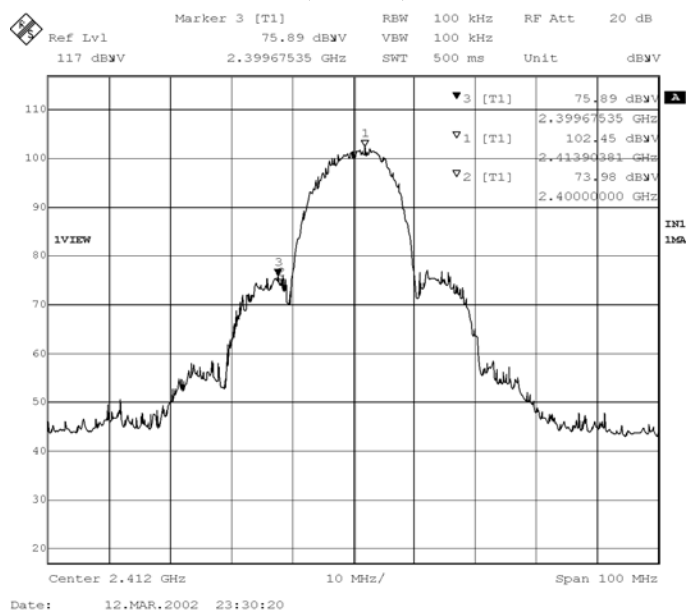


Figure Channel 1: (Vertical)



Product : Wireless LAN Card
 Test Item : Band Edge Data
 Test Site : No.1 OATS
 Test Mode : Channel 11 (2Mbps)

RF Radiated Measurement: (Peak)

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Result
11(Horizontal)	2484.54	68.81	67.50	74	Pass
11 (Vertical)	2483.54	70.37	69.06	74	Pass

Figure Channel 11:

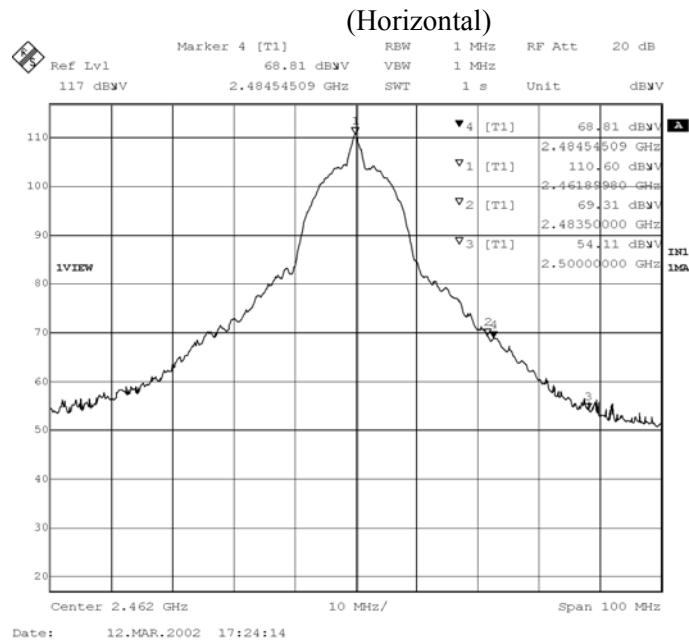
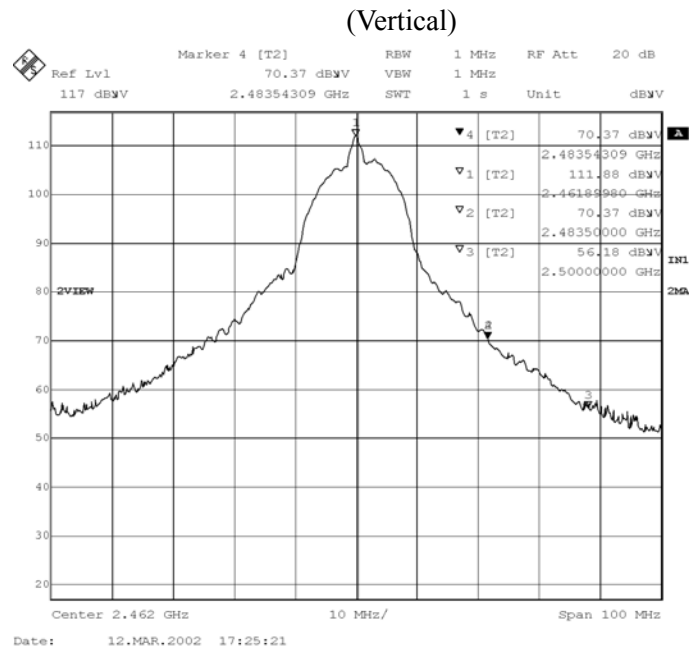


Figure Channel 11:



Product : Wireless LAN Card
 Test Item : Band Edge Data
 Test Site : No.1 OATS
 Test Mode : Channel 11 (2Mbps)

RF Radiated Measurement: (Average)

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Result
11(Horizontal)	2484.34	48.60	47.29	54	Pass
11(Vertical)	2484.14	52.00	50.45	54	Pass

Figure Channel 11:

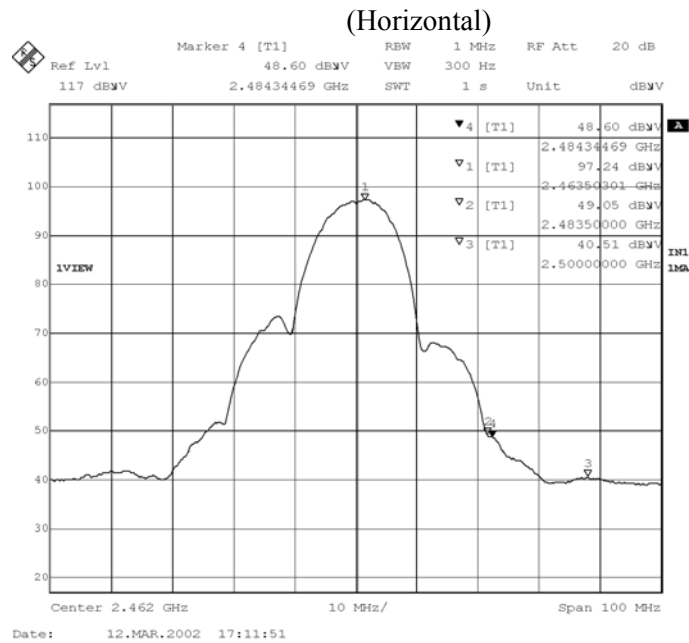
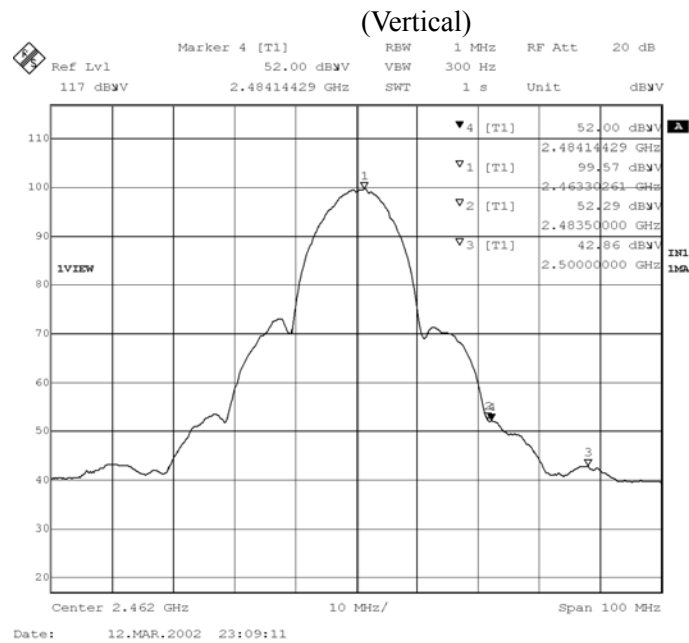


Figure Channel 11:



Product : Wireless LAN Card
 Test Item : Band Edge Data
 Test Site : No.1 OATS
 Test Mode : Channel 11 (11Mbps)

RF Radiated Measurement: (Peak)

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Result
11(Horizontal)	2484.74	67.89	66.58	74	Pass
11(Vertical)	2484.74	69.62	68.31	74	Pass

Figure Channel 11:

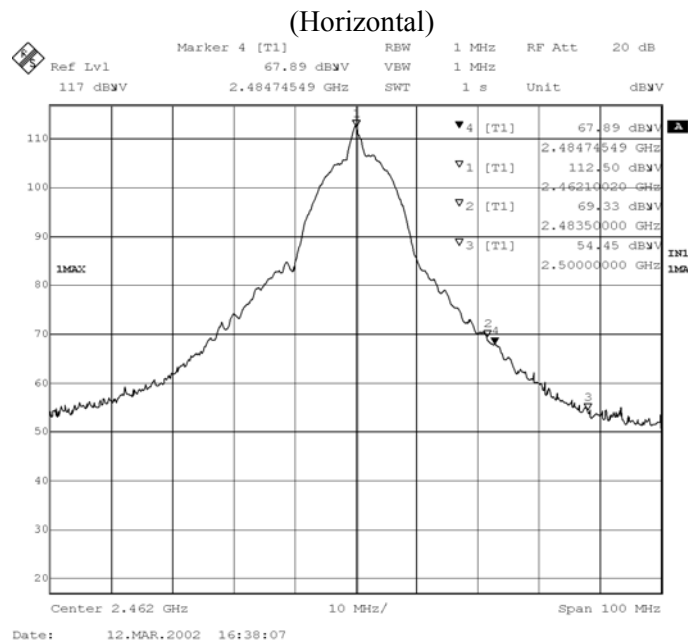
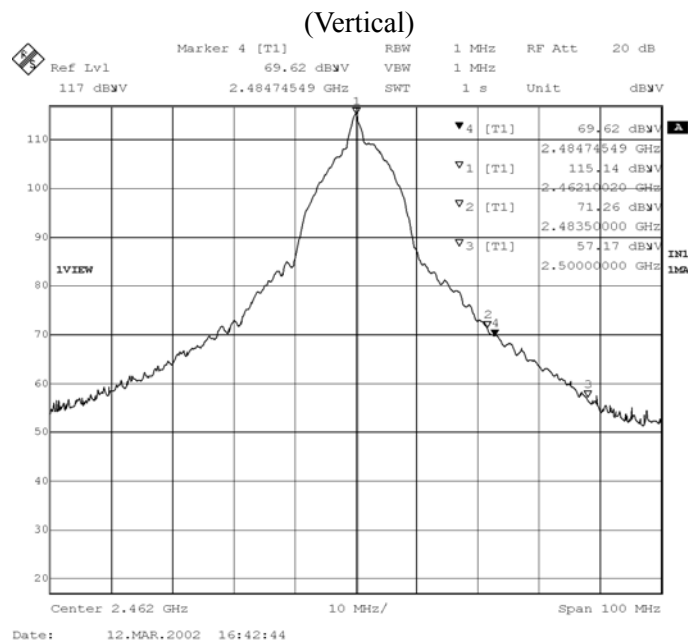


Figure Channel 11:



Product : Wireless LAN Card
 Test Item : Band Edge Data
 Test Site : No.1 OATS
 Test Mode : Channel 11 (11Mbps)

RF Radiated Measurement: (Average)

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Result
11(Horizontal)	2484.74	48.98	47.67	54	Pass
11(Vertical)	2484.34	50.22	48.91	54	Pass

Figure Channel 11:

(Horizontal)

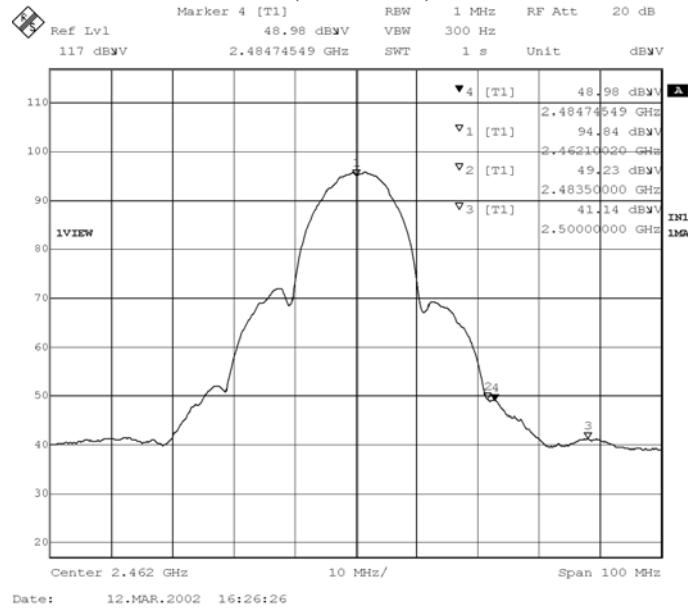
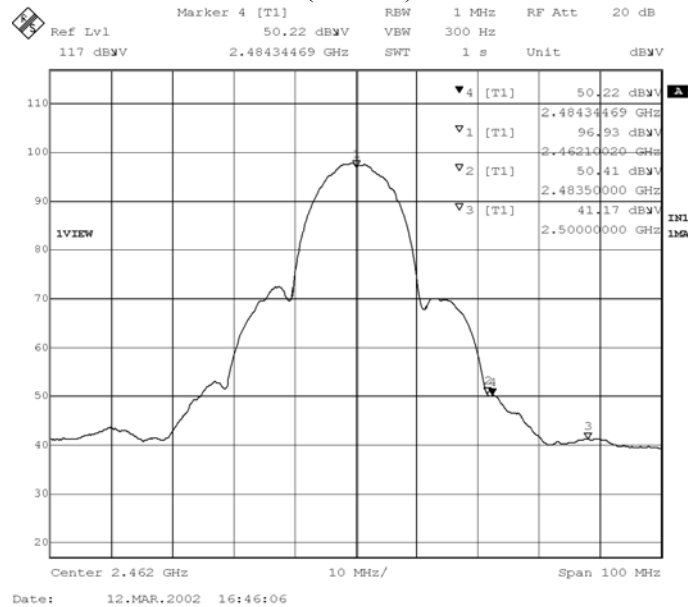


Figure Channel 11:

(Vertical)



6. Occupied Bandwidth

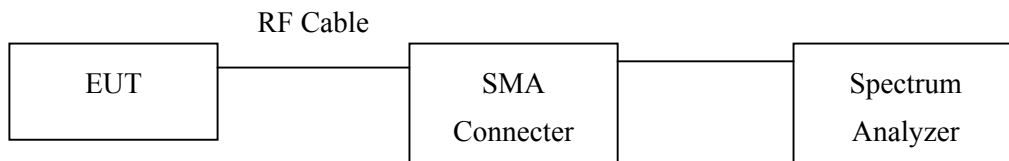
6.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum	Advantest	R3261C / 71720140	May, 2001

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
 2. Mark “X” test instruments are used to measure the final test results.

6.2. Test Setup



6.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

6.4. Standard Requirement

The minimum bandwidth shall be at least 500kHz.

6.5. Test Result of Occupied Bandwidth

Product : Wireless LAN Card
 Test Item : Occupied Bandwidth Data
 Test Site : No.1 OATS
 Test Mode : Channel 1

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1 (2Mbps)	2412	10300	>500	Pass
1 (11Mbps)	2412	11200	>500	Pass

Figure Channel 1: 2Mbps

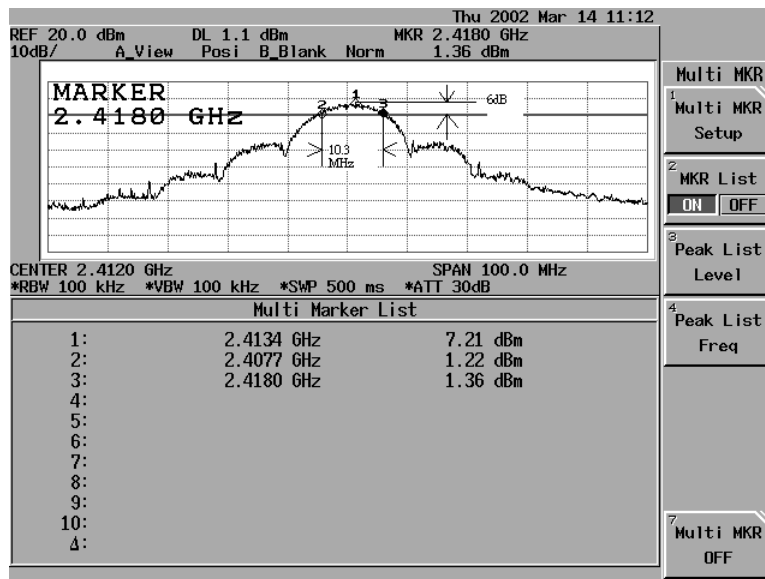
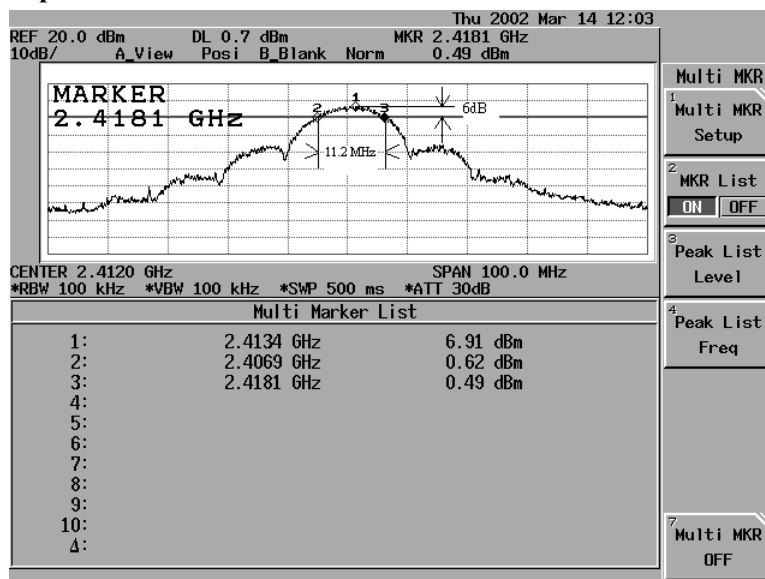


Figure Channel 1: 11Mbps



Product : Wireless LAN Card
 Test Item : Occupied Bandwidth Data
 Test Site : No.1 OATS
 Test Mode : Channel 6

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6 (2Mbps)	2437	11400	>500	Pass
6 (11Mbps)	2437	11700	>500	Pass

Figure Channel 6: 2Mbps

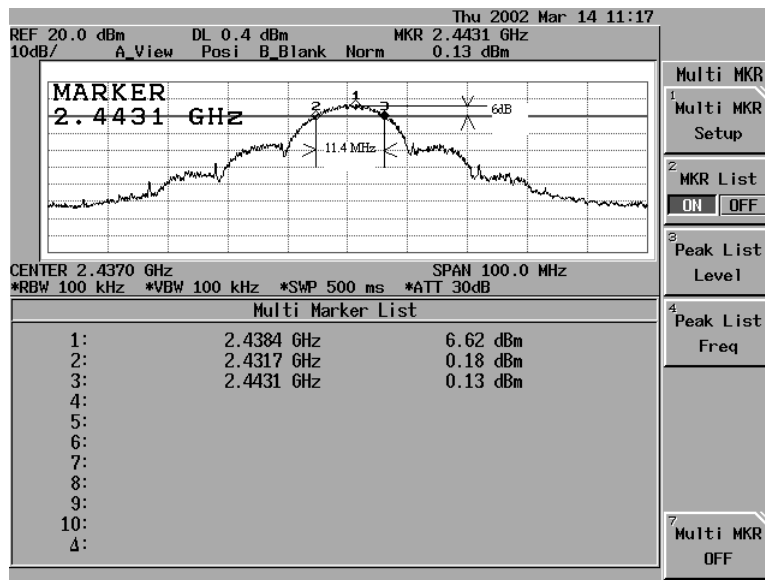
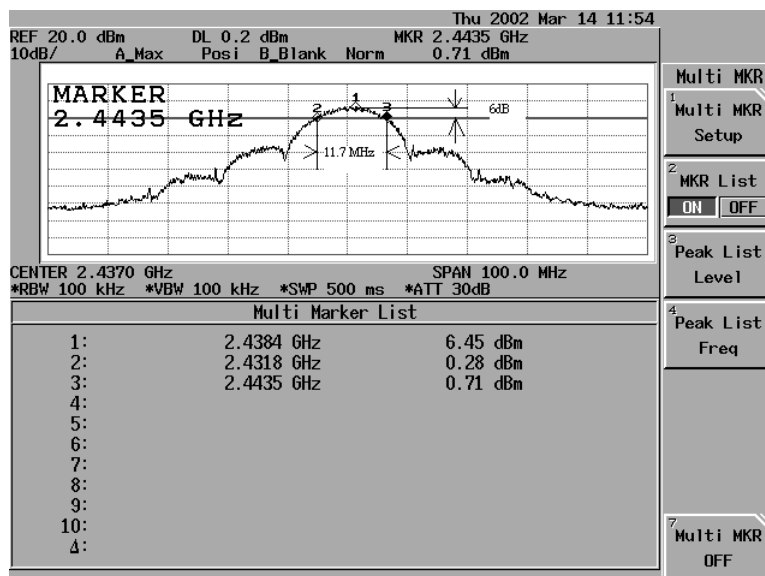


Figure Channel 6: 11Mbps



Product : Wireless LAN Card
 Test Item : Occupied Bandwidth Data
 Test Site : No.1 OATS
 Test Mode : Channel 11

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11 (2Mbps)	2462	11000	>500	Pass
11 (11Mbps)	2462	11300	>500	Pass

Figure Channel 11: 2Mbps

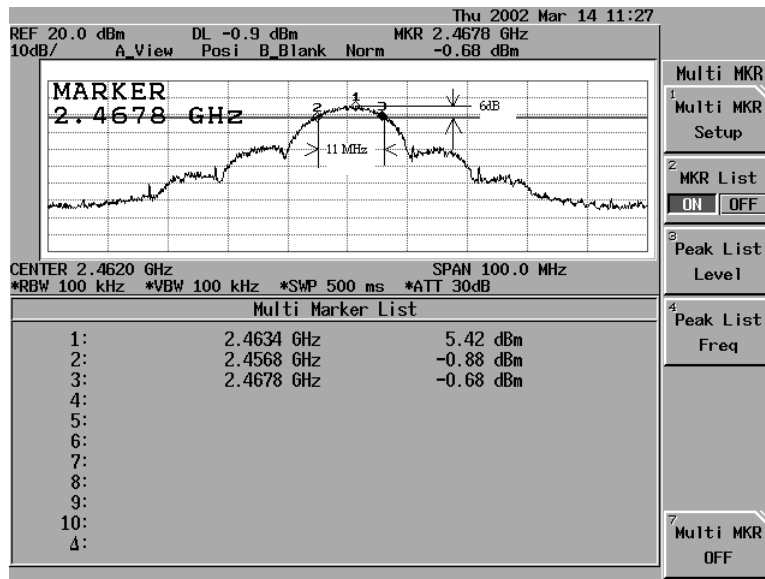
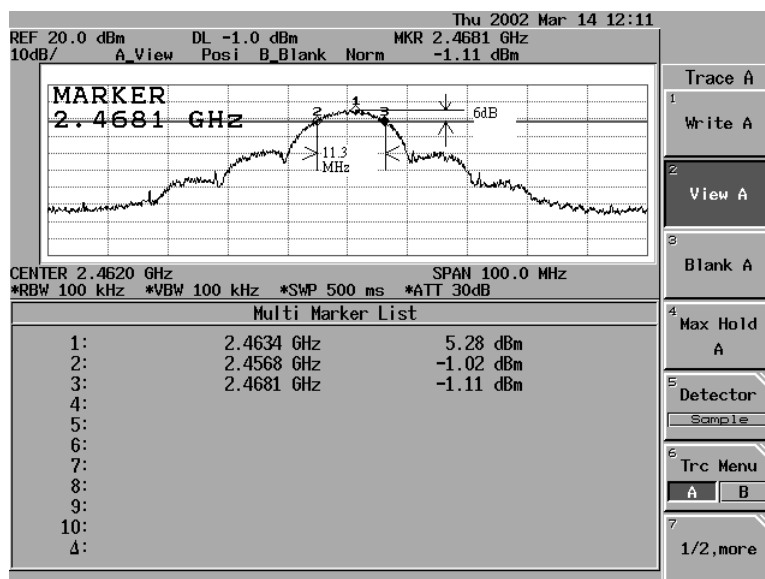


Figure Channel 11: 11Mbps



7. Transmitter Power Density

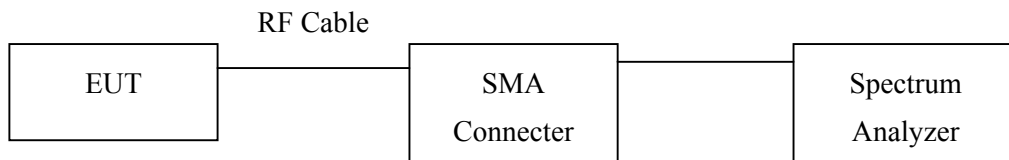
7.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum	Advantest	R3272 / 72421194	May, 2001

Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
 2. Mark “X” test instruments are used to measure the final test results.

7.2. Test Setup



7.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

7.4. Standard Requirement

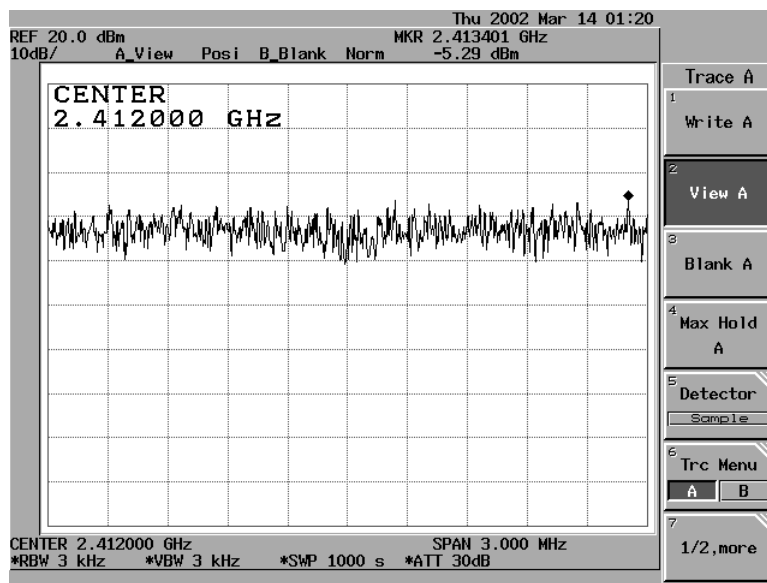
The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

7.5. Test Result of Transmitter Power Density

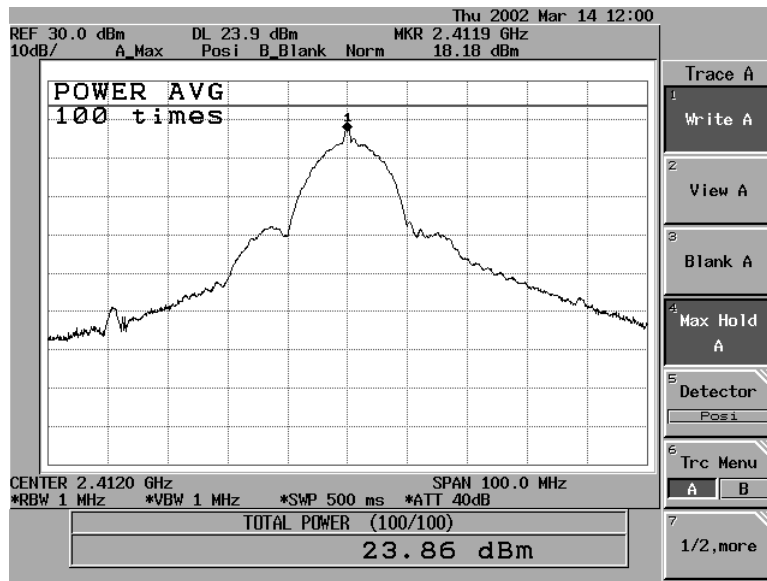
Product : Wireless LAN Card
 Test Item : Transmitter Power Density Data
 Test Site : No.1 OATS
 Test Mode : Channel 1

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
1 (2Mbps)	2413.401	-5.29	< 8dBm	Pass
1 (11Mbps)	2413.404	-5.60	< 8dBm	Pass

2Mbps



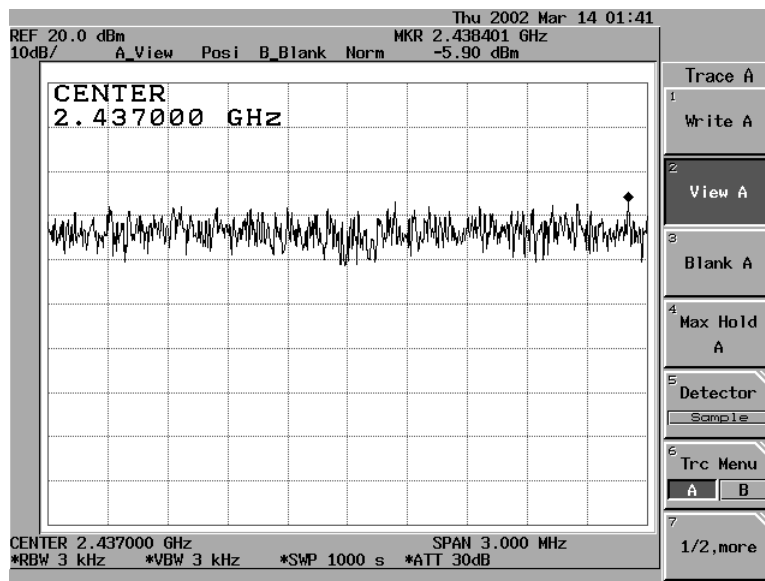
11Mbps



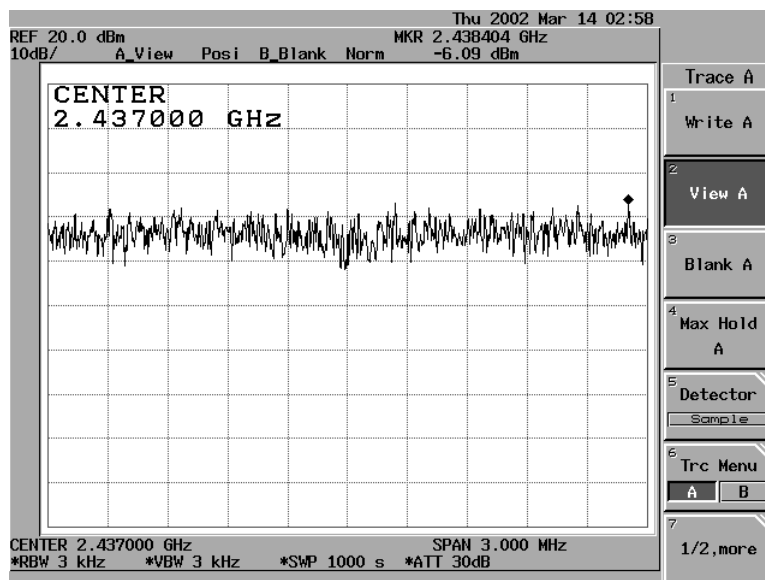
Product : Wireless LAN Card
 Test Item : Transmitter Power Density Data
 Test Site : No.1 OATS
 Test Mode : Channel 6

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6 (2Mbps)	2438.401	-5.90	< 8dBm	Pass
6 (11Mbps)	2438.404	-6.09	< 8dBm	Pass

2Mbps



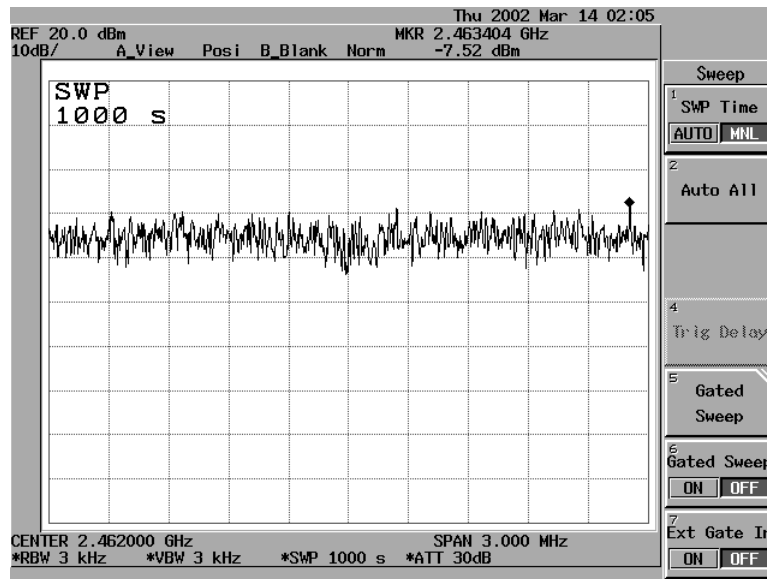
11Mbps



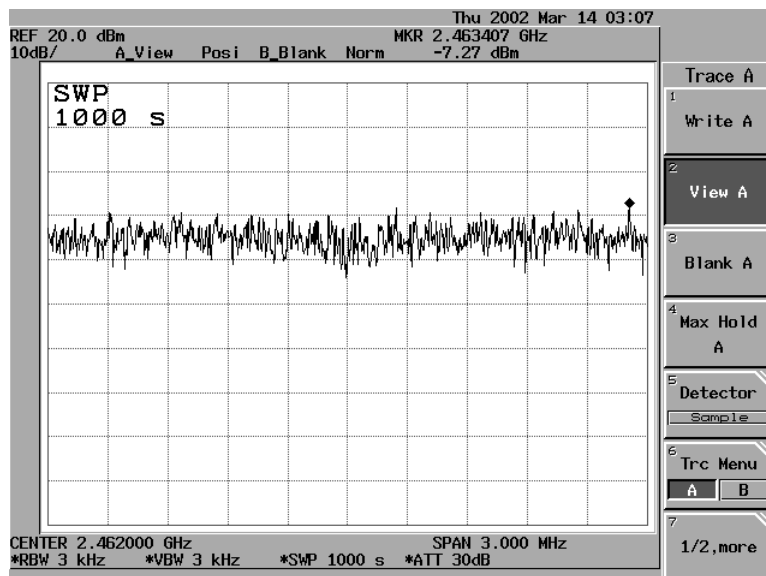
Product : Wireless LAN Card
 Test Item : Transmitter Power Density Data
 Test Site : No.1 OATS
 Test Mode : Channel 11

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11 (2Mbps)	2463.404	-7.52	< 8dBm	Pass
11 (11Mbps)	2463.407	-7.27	< 8dBm	Pass

2Mbps



11Mbps



8. Processing Gain

8.1. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

8.2. Minimum Standard

According to FCC Part 15 Subpart C Paragraph 15.247(e), The processing gain shall be at least 10 dB.

8.3. Test Procedure & Result

As EUT power is less than 20dBm, processing gain is omitted.

9. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1 : EUT Test Photographs

Attachment 2 : EUT Detailed Photographs