Test Report

Class II Change

Product Name : Wireless LAN Card

Model No. : WLC010-D53, WLC010

FCC ID.: H8NWLC010D53

Applicant : ASKEY COMPUTER CORP.

Address : 10FL., No.119, Chienkang Rd., Chung-Ho,
Taipei, Taiwan, R.O.C.

Date of Receipt : April 27, 2001

Date of Test : May 25, 2001

Report No. : 015H012FI

Test Report Certification

Test Date : May 25, 2001
Report No. : 015H012FI

QuieTek Corporation
Accredited by NIST (NVLAP)
NVLAP Lab Code: 200347-0

Product Name	:	Wireless LAN Card
Applicant	:	ASKEY COMPUTER CORP.
Address	:	10FL., No.119, Chienkang Rd., Chung-Ho, Taipei, Taiwan, R.O.C.
Manufacturer	:	ASKEY COMPUTER CORP.
Model No.	:	WLC010-D53, WLC010
FCC ID.	:	H8NWLC010D53
Rated Voltage	:	DC 3.3V
Trade Name	:	ASKEY
Measurement Standard	:	FCC Part 15 Subpart C Paragraph 15.247
Measurement Procedure	:	ANSI C63.4:1992
Classification	:	Class B
Test Result	:	Complied

NVLAP
NVLAP Lab Code : 200347-0

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

Documented By : Lisa chen
(Lisa Chen)

Tested By : Vincent Lin
(Vincent Lin)

Approved By : Gene Chang
(Gene Chang)

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	:	Wireless LAN Card	
Trade Name	:	ASKEY	
FCC ID.	:	H8NWLC010D53	
Model No.	:	WLC010-D53, WLC010	
Frequency Range	:	2400MHz to 2483.5MHz	
Channel Number	:	11	
Frequency of Each Channel (Working Frequency)	:	Channel 01: 2412MHz	Channel 07: 2442MHz
		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	:	By software	
Antenna type	:	Internal permanently on board.	

Note:

1. 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 class II change.
2. The different between original application and EUT in this report is the modification the emmer shielding case of VCO module. The original one metal shielding. The new version is use absorber and Gasket to improve the Grounding as photo attached.
3. The receiver part was tested in report ” 004H039F” subjected to Part 15 C paragraph 15.5.

1.2. Tested System Details

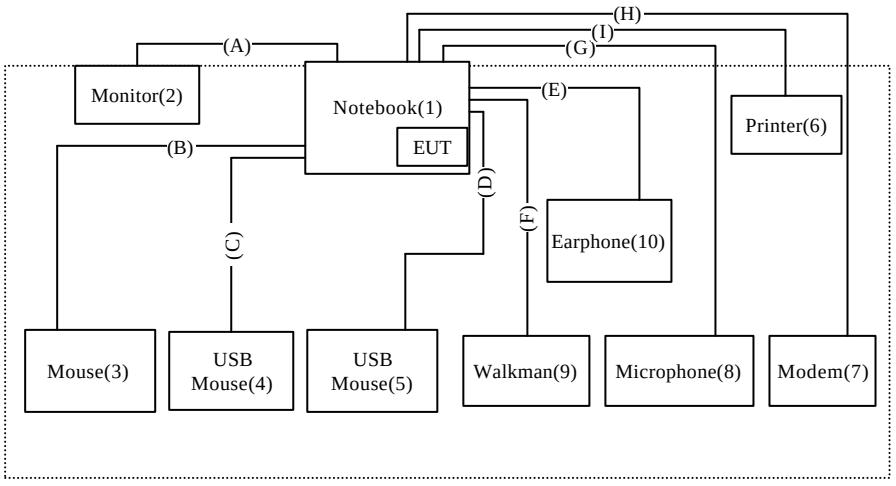
The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	FCC ID
(1)	Notebook	IBM	500	9145B0160C91000CF2M	DoC
(2)	Monitor	HITACHI	CM752ET-311	T8E004439	DoC
(3)	Mouse	Logitech	M-S35	LZA75102600	--
(4)	USB Mouse	Logitech	M-UB48	LTC74800118	--
(5)	USB Mouse	Logitech	M-UE55	DVT-324	--
(6)	Printer	HP	C2642A	MY75J1D1D0	B94C2642X
(7)	Modem	ACEEX	1414	980033041	
(8)	Microphone	AIWA	CD-8000	N/A	--
(9)	Walkman	TOBISHI	TB-21984	N/A	--
(10)	Earphone	AIWA	N/A	N/A	

Note:
1. The power cord of The device. (2) is Shielded power cord.
2. The power cord of The device. (1)、(6) are Non-shielded power cord.

Signal Cable Type		Signal cable Description
A.	VGA Cable	Shielded, 1.8m, two ferrite cores bonded.
B.	Mouse Cable	Shielded, 1.8m
C.	USB Mouse Cable	Shielded, 1.0m
D.	USB Mouse Cable	Shielded, 1.0m
E.	Earphone Cable	Non-shielded, 1.2m
F.	Walkman Cable	Non-shielded, 1.6m
G.	Microphone Cable	Non-shielded, 1.2m
H.	Modem Cable	Shielded, 1.5m
I.	Printer Cable	Shielded, 1.2m

1.3. Configuration of tested System



1.4. EUT Exercise Software

1.4.1 Setup the EUT and simulators as shown on 1.3.

1.4.2 Turn on the power of all equipment.

1.4.3 Personal Computer reads data from disk.

1.4.4 Data will be transmitted through EUT.

1.4.5 The transmission status will be shown on the monitor.

1.4.6 Repeat the above procedure 1.4.4 to 1.4.5

1.5. 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

September 30, 1998 Accreditation on NVLAP
NVLAP Lab Code: 200347-0

NVLAP Lab Code : 200347-0

Site Name: Quietek Corporation

Site Address: N0.75-1, Wang-Yeh Valley, Yung-Hsing,
Chiung-Lin, Hsin-Chu County,
Taiwa, R.O.C.

2. Conducted Emission

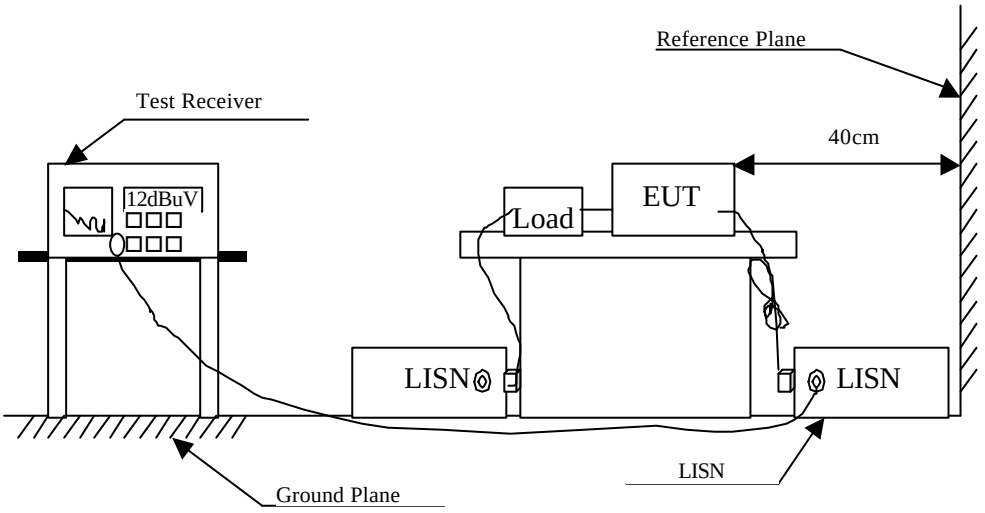
2.1. Test Equipment List

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	N0.2 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 invested 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(1Mbps)

	Frequency	Cable Loss	LISN Factor	Reading Level	Measurement Level	Limits
	MHz	dB	dB	dBuV	dBuV	dBuV
Line 1						
Quasi-Peak:						
*	0.465	0.06	0.00	26.01	26.07	48.00
	0.665	0.08	0.00	18.13	18.21	48.00
	0.795	0.09	0.00	16.25	16.34	48.00
	1.063	0.10	0.00	14.43	14.53	48.00
	9.492	0.27	0.00	20.39	20.66	48.00
	17.649	0.34	0.00	19.43	19.77	48.00
Line 2						
Quasi-Peak:						
*	0.466	0.06	0.00	24.09	24.15	48.00
	0.598	0.07	0.00	19.85	19.92	48.00
	0.796	0.09	0.00	16.63	16.72	48.00
	1.194	0.11	0.00	15.05	15.16	48.00
	8.953	0.27	0.00	21.47	21.74	48.00
	10.212	0.28	0.00	23.01	23.29	48.00

Remarks :

1. " * " means that this data is the worst emission level.
2. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Wireless LAN Card
Test Item : Conducted Emission Test
Test Mode : Normal Operation(11Mbps)

	Frequency	Cable Loss	LISN Factor	Reading Level	Measurement Level	Limits
	MHz	dB	dB	dBuV	dBuV	dBuV
Line 1						
Quasi-Peak:						
	0.466	0.06	0.10	29.04	29.20	48.00
	0.665	0.08	0.10	27.40	27.58	48.00
	1.395	0.12	0.11	29.30	29.54	48.00
*	4.383	0.19	0.16	34.69	35.05	48.00
	14.610	0.32	0.34	28.06	28.72	48.00
	24.575	0.38	0.53	29.13	30.04	48.00
Line 2						
Quasi-Peak:						
	0.466	0.06	0.10	28.27	28.43	48.00
	1.196	0.11	0.11	25.98	26.20	48.00
	1.395	0.12	0.11	27.32	27.56	48.00
	3.520	0.18	0.15	28.08	28.41	48.00
*	4.518	0.19	0.17	32.56	32.92	48.00
	15.211	0.32	0.35	27.55	28.22	48.00

Remarks :

1.“ * ” means that this data is the worst emission level.

2. The average measurement was not performed when the peak measured data under the limit of average detection.

3. Peak Power Output

3.1. Test Equipment

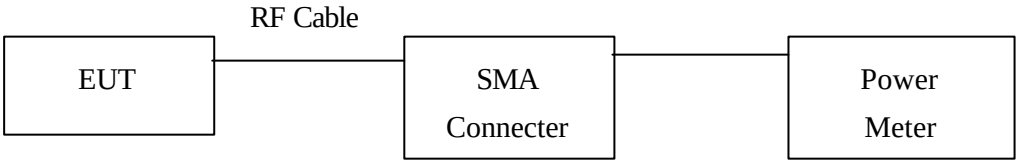
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2001
X	Power Meter	HP	EPM-441A	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: 1Mbps

Channel No.	Frequency(MHz)	Measurement	Required Limit	Result
1	2410	9.84dBm	1Watt= 30 dBm	Pass
6	2438	9.86 dBm	1Watt= 30 dBm	Pass
11	2463	9.83 dBm	1Watt= 30 dBm	Pass

Data Speed: 2Mbps

Channel No.	Frequency(MHz)	Measurement	Required Limit	Result
1	2410	9.66dBm	1Watt= 30 dBm	Pass
6	2438	9.62dBm	1Watt= 30 dBm	Pass
11	2463	9.65 dBm	1Watt= 30 dBm	Pass

Data Speed: 5.5Mbps

Channel No.	Frequency(MHz)	Measurement	Required Limit	Result
1	2410	9.83dBm	1Watt= 30 dBm	Pass
6	2438	9.77 dBm	1Watt= 30 dBm	Pass
11	2463	9.76 dBm	1Watt= 30 dBm	Pass

Data Speed: 11Mbps

Channel No.	Frequency(MHz)	Measurement	Required Limit	Result
1	2410	9.98dBm	1Watt= 30 dBm	Pass
6	2438	9.95dBm	1Watt= 30 dBm	Pass
11	2463	9.90 dBm	1Watt= 30 dBm	Pass

4. Radiated Emission

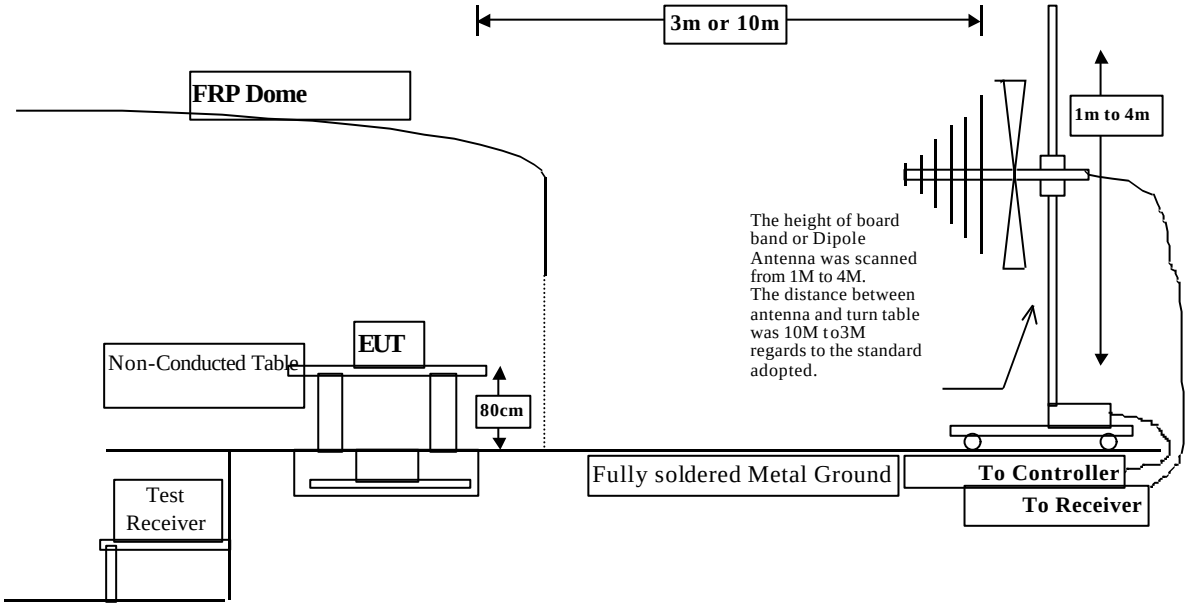
4.1. Test Equipment

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
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2001
		Pre-Amplifier	HP	8447D/3307A01812	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2000
	X	Horn Antenna	EM	EM6917 / 103325	May, 2001
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2001
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2001
		Pre-Amplifier	HP	8447D/3307A01814	May, 2001
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2000
	X	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.

4.2. Test Setup



Spurious Emissions
(Band Edge Antenna Radiated)

4.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

4.4. Limits

➢ **General Radiated Emission Limits**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

Frequency MHz	50dB below of the fundamental (dBuV/m @3m)	15.209 Limits (dBuV/m @3m)	General Radiated Limits (dBuV/m @3m)
30-88	40	40	40
88-216	43.5	43.5	43.5
216-960	44	46	46
Above 960	44	54	54

Remarks : 1. RF Line Voltage (dBuV) = 20 log RF Line 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.

4.5. 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 dtrength 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 harminics** is checked.

4.6. Test Result of Radiated Emission

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

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector **(Horizontal)**							
4824.200	6.27	33.50	34.77	53.22	58.22	15.78	74.00
7237.870	8.32	36.24	34.90	43.05	52.71	21.29	74.00
9647.860	10.18	37.43	35.10	45.80	<58.31	15.69	74.00
Average Detector **(Horizontal)**							
4826.010	6.27	33.50	34.77	42.38	47.38	6.62	54.00
9645.310	10.18	37.43	35.10	32.36	<44.87	9.13	54.00
Peak Detector **(Vertical)**							
4824.100	6.27	33.50	34.77	55.96	60.96	13.04	74.00
7236.640	8.32	36.24	34.90	43.61	53.27	20.73	74.00
9648.850	10.18	37.43	35.10	44.37	<56.88	17.12	74.00
Average Detector **(Vertical)**							
4825.980	6.27	33.50	34.77	42.98	47.98	6.02	54.00
9648.350	10.18	37.43	35.10	32.33	<44.84	9.16	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Measurement = Reading Level + Probe Factor + Cable loss-Amplifier
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(1Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector **(Horizontal)**							
4874.140	6.32	33.56	34.75	50.99	56.12	17.88	74.00
7310.060	8.38	36.31	34.90	42.71	52.49	21.51	74.00
9745.840	10.24	37.45	35.10	43.91	<56.50	17.50	74.00
Average Detector **(Horizontal)**							
4875.950	6.32	33.56	34.75	40.57	45.70	8.30	54.00
9745.840	10.24	37.45	35.10	31.48	<44.07	9.93	54.00
Peak Detector **(Vertical)**							
4873.790	6.32	33.56	34.75	48.98	54.11	19.89	74.00
7310.880	8.38	36.31	34.90	42.90	52.68	21.32	74.00
9748.680	10.24	37.45	35.10	43.46	<56.05	17.95	74.00
Average Detector **(Vertical)**							
4876.050	6.32	33.56	34.75	38.37	43.50	10.50	54.00
9748.670	10.24	37.45	35.10	31.45	<44.04	9.96	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Measurement = Reading Level + Probe Factor + Cable loss-Amplifier
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(1Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector **(Horizontal)**							
4924.140	6.37	33.62	34.73	53.16	58.42	15.58	74.00
7389.610	8.45	36.39	34.90	44.82	54.76	19.24	74.00
9852.040	10.33	37.47	35.10	47.74	<60.44	13.56	74.00
Average Detector **(Horizontal)**							
4925.980	6.37	33.62	34.73	38.99	44.25	9.75	54.00
7389.610	8.45	36.39	34.90	31.99	41.93	12.07	54.00
9852.040	10.33	37.47	35.10	36.20	<48.90	5.10	54.00
Peak Detector **(Vertical)**							
4924.250	6.37	33.62	34.73	50.32	55.58	18.42	74.00
7390.390	8.45	36.39	34.90	43.95	53.89	20.11	74.00
9853.880	10.33	37.47	35.10	48.63	<61.33	12.67	74.00
Average Detector **(Vertical)**							
4926.020	6.37	33.62	34.73	38.76	44.02	9.98	54.00
9853.870	10.33	37.47	35.10	36.67	<49.37	4.63	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Measurement = Reading Level + Probe Factor + Cable loss-Amplifier
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	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector **(Horizontal)**							
4823.950	3.06	33.50	34.77	50.94	52.73	21.27	74.00
7239.400	5.46	36.24	34.90	44.57	51.37	22.63	74.00
9652.400	7.92	37.43	35.10	45.49	<55.74	18.26	74.00
Average Detector **(Horizontal)**							
9654.450	7.92	37.43	35.10	33.29	<43.54	10.46	54.00
Peak Detector **(Vertical)**							
4824.150	3.06	33.50	34.77	50.34	52.13	21.87	74.00
7238.850	5.46	36.24	34.90	43.38	50.18	23.82	74.00
9650.750	7.92	37.43	35.10	45.16	<55.41	18.59	74.00
Average Detector **(Vertical)**							
9650.750	7.92	37.43	35.10	33.82	<44.07	9.93	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Measurement = Reading Level + Probe Factor + Cable loss-Amplifier
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	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector **(Horizontal)**							
4874.250	3.10	33.56	34.75	50.17	52.08	21.92	74.00
7313.300	5.54	36.31	34.90	43.82	50.77	23.23	74.00
9749.900	8.00	37.45	35.10	43.88	<54.22	19.78	74.00
Average Detector **(Horizontal)**							
9750.050	8.00	37.45	35.10	32.12	<42.46	11.54	54.00
Peak Detector **(Vertical)**							
4873.850	3.10	33.56	34.75	46.91	48.82	25.18	74.00
7311.350	5.54	36.31	34.90	44.99	51.94	22.06	74.00
9747.750	8.00	37.45	35.10	44.78	<55.12	18.88	74.00
Average Detector **(Vertical)**							
9750.100	8.00	37.45	35.10	32.04	<42.38	11.62	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Measurement = Reading Level + Probe Factor + Cable loss-Amplifier
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	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Peak Detector **(Horizontal)**							
4923.900	3.14	33.62	34.73	46.44	48.47	25.53	74.00
7390.550	5.64	36.39	34.90	44.69	51.82	22.18	74.00
9852.300	8.08	37.47	35.10	43.91	<54.36	19.64	74.00
Average Detector **(Horizontal)**							
9851.450	8.08	37.47	35.10	32.05	<42.50	11.50	54.00
Peak Detector **(Vertical)**							
4923.720	3.14	33.62	34.73	51.76	53.79	20.21	74.00
7376.680	5.61	36.37	34.90	43.07	50.15	23.85	74.00
9829.820	8.06	37.46	35.10	43.55	<53.98	20.02	74.00
Average Detector **(Vertical)**							
9830.080	8.06	37.46	35.10	32.81	<43.24	10.76	54.00

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Measurement = Reading Level + Probe Factor + Cable loss-Amplifier
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(1Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
133.790	1.44	11.82	26.89	46.80	33.17	10.33	43.50
167.740	1.58	9.72	26.90	50.20	34.61	8.89	43.50
297.720	2.12	12.50	26.95	53.40	41.07	4.93	46.00
* 330.700	2.25	13.66	26.90	52.80	41.81	4.19	46.00
594.540	3.34	15.91	26.49	48.00	40.76	5.24	46.00
727.430	3.88	17.11	26.28	44.40	39.11	6.89	46.00
Vertical:							
*133.790	1.44	11.82	26.89	50.60	36.97	6.53	43.50
274.440	2.02	12.13	26.94	48.60	35.81	10.19	46.00
332.640	2.26	12.68	26.90	51.20	39.24	6.76	46.00
429.640	2.66	14.07	26.75	43.60	33.58	12.42	46.00
594.540	3.34	15.91	26.49	44.20	36.96	9.04	46.00
727.430	3.88	17.11	26.28	43.00	37.71	8.29	46.00

Note:

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

Product : Wireless LAN Card
Test Item : General Radiated Emission Data
Test Mode : Channel 6(1Mbps)

	Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:								
	198.780	1.71	9.14	26.91	51.80	35.73	7.77	43.50
	297.720	2.12	12.50	26.95	51.60	39.27	6.73	46.00
	363.680	2.39	13.12	26.85	47.20	35.85	10.15	46.00
	496.570	2.93	14.83	26.64	45.00	36.13	9.87	46.00
	529.550	3.07	15.08	26.59	45.40	36.96	9.04	46.00
	661.470	3.61	15.95	26.38	43.40	36.58	9.42	46.00
*	727.430	3.88	17.11	26.28	45.20	39.91	6.09	46.00
Vertical:								
	199.750	1.71	9.24	26.91	48.00	32.04	11.46	43.50
	232.730	1.85	10.45	26.93	52.80	38.17	7.83	46.00
*	298.690	2.12	12.50	26.95	52.60	40.28	5.72	46.00
	463.590	2.80	14.39	26.69	48.20	38.70	7.30	46.00
	595.510	3.34	15.93	26.49	45.60	38.38	7.62	46.00
	727.430	3.88	17.11	26.28	43.60	38.31	7.69	46.00
	989.330	4.96	18.49	25.87	43.00	40.58	13.42	54.00

Note:

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

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

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
199.750	1.71	9.24	26.91	53.40	37.44	6.06	43.50
*232.730	1.85	10.45	26.93	55.00	40.37	5.63	46.00
263.770	1.98	12.41	26.94	51.00	38.45	7.55	46.00
463.590	2.80	14.39	26.69	49.60	40.10	5.90	46.00
495.600	2.93	14.81	26.64	44.00	35.09	10.91	46.00
726.460	3.88	17.11	26.28	44.20	38.91	7.09	46.00
Vertical:							
132.820	1.44	11.82	26.89	48.80	35.17	8.33	43.50
231.760	1.84	10.31	26.92	54.00	39.23	6.77	46.00
* 330.700	2.25	13.66	26.90	52.20	41.21	4.79	46.00
462.620	2.79	14.37	26.69	48.60	39.07	6.93	46.00
594.540	3.34	15.91	26.49	45.60	38.36	7.64	46.00
726.460	3.88	17.11	26.28	43.00	37.71	8.29	46.00

Note:

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

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

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
167.740	1.58	9.72	26.90	50.20	34.61	8.89	43.50
198.780	1.71	9.14	26.91	51.80	35.73	7.77	43.50
*463.590	2.80	14.39	26.69	50.00	40.50	5.50	46.00
530.520	3.07	15.08	26.59	45.20	36.77	9.23	46.00
660.500	3.60	16.05	26.38	43.80	37.07	8.93	46.00
727.430	3.88	17.11	26.28	44.40	39.11	6.89	46.00
Vertical:							
133.790	1.44	11.82	26.89	50.60	36.97	6.53	43.50
231.760	1.84	10.31	26.92	53.60	38.83	7.17	46.00
* 298.690	2.12	12.50	26.95	52.00	39.68	6.32	46.00
464.560	2.80	14.39	26.69	47.80	38.30	7.70	46.00
585.810	3.30	15.83	26.50	46.40	39.03	6.97	46.00
727.430	3.88	17.11	26.28	43.00	37.71	8.29	46.00

Note:

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

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

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
132.820	1.44	11.82	26.89	44.80	31.17	12.33	43.50
*232.730	1.85	10.45	26.93	55.00	40.37	5.63	46.00
364.650	2.39	13.22	26.85	47.20	35.96	10.04	46.00
497.540	2.94	14.73	26.64	45.00	36.03	9.97	46.00
529.550	3.07	15.08	26.59	45.40	36.96	9.04	46.00
661.470	3.61	15.95	26.38	43.40	36.58	9.42	46.00
Vertical:							
132.820	1.44	11.82	26.89	48.00	34.37	9.13	43.50
199.750	1.71	9.24	26.91	48.00	32.04	11.46	43.50
277.350	2.03	12.24	26.94	49.80	37.13	8.87	46.00
*464.560	2.80	14.39	26.69	48.20	38.70	7.30	46.00
595.510	3.34	15.93	26.49	45.60	38.38	7.62	46.00
727.430	3.88	17.11	26.28	43.60	38.31	7.69	46.00

Note:

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

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

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Measurement	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
133.790	1.44	11.82	26.89	46.00	32.37	11.13	43.50
263.770	1.98	12.41	26.94	51.00	38.45	7.55	46.00
*463.590	2.80	14.39	26.69	49.60	40.10	5.90	46.00
585.810	3.30	15.83	26.50	46.40	39.03	6.97	46.00
726.460	3.88	17.11	26.28	44.20	38.91	7.09	46.00
859.350	4.42	17.79	26.07	38.80	34.94	11.06	46.00
Vertical:							
133.790	1.44	11.82	26.89	48.80	35.17	8.33	43.50
230.790	1.84	10.31	26.92	54.00	39.23	6.77	46.00
463.590	2.80	14.39	26.69	48.60	39.10	6.90	46.00
*585.810	3.30	15.83	26.50	47.80	40.43	5.57	46.00
726.460	3.88	17.11	26.28	43.00	37.71	8.29	46.00
989.330	4.96	18.49	25.87	43.20	40.78	13.22	54.00

Note:

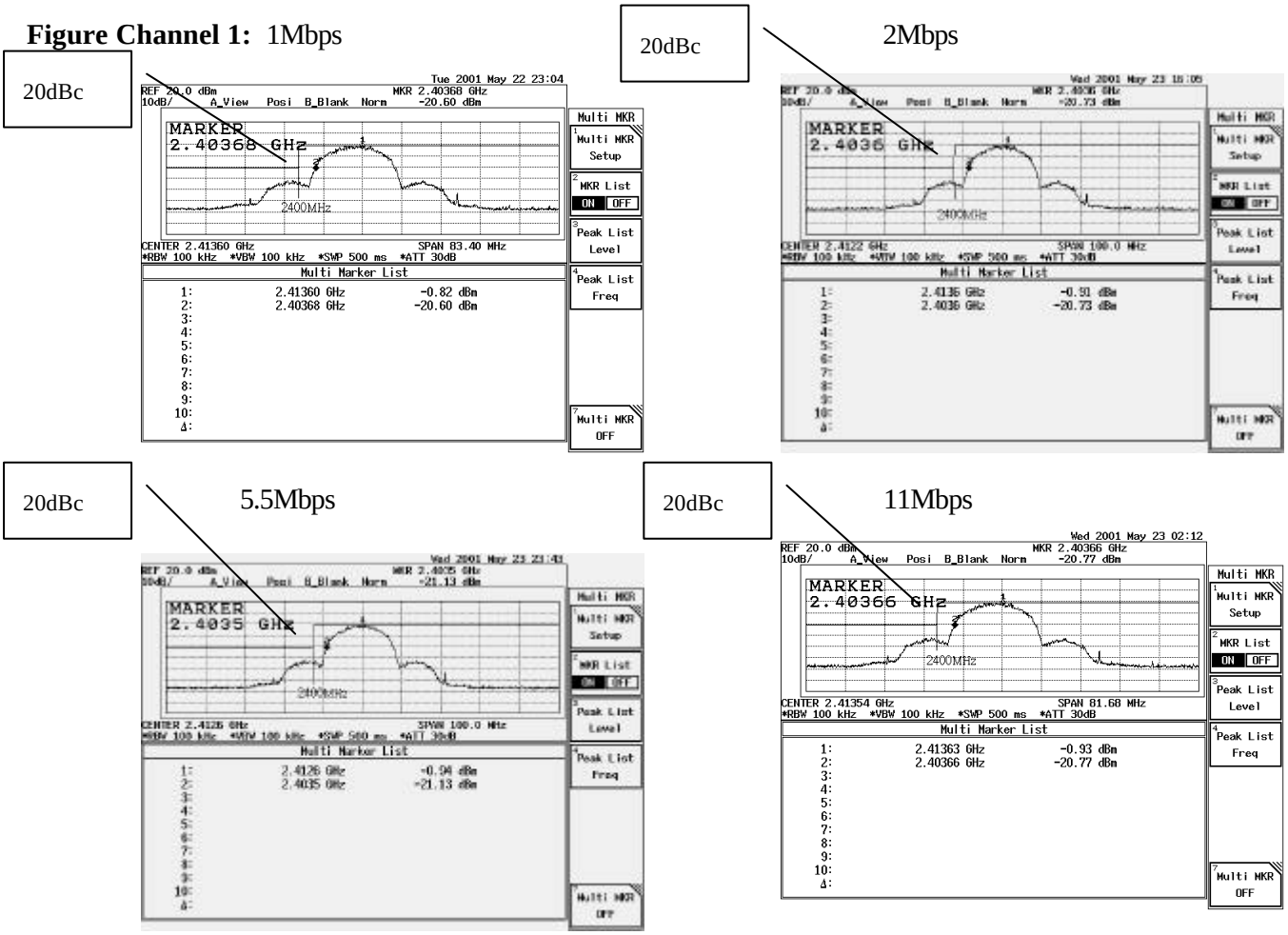
1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level-Amplifier.
3. Measurement = Reading Level + Probe Factor + Cable loss-Amplifier

4.7. Test Result of Band Edge

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

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
1 (1Mbps)	<2400	>20	Pass
1 (2Mbps)	<2400	>20	Pass
1 (5.5Mbps)	<2400	>20	Pass
1 (11Mbps)	<2400	>20	Pass

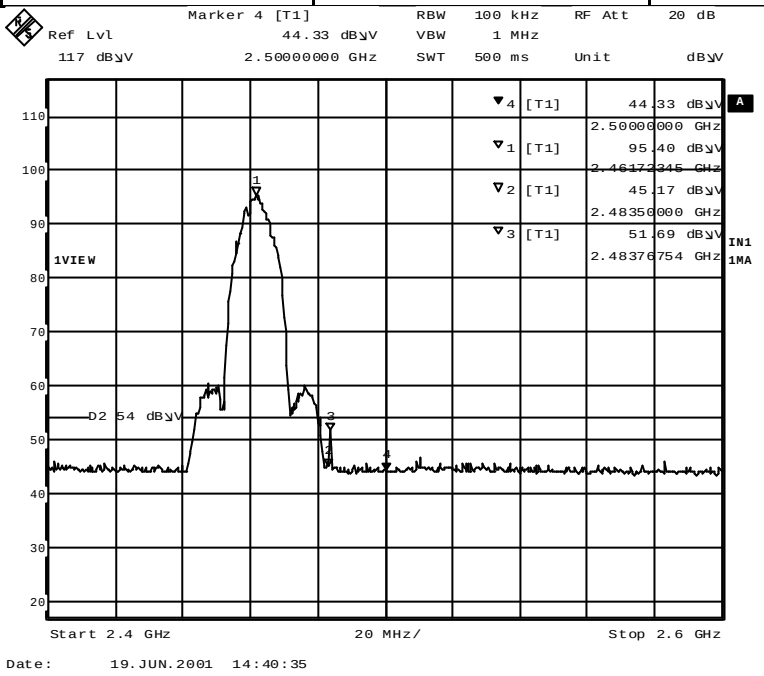
Figure Channel 1: 1Mbps



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

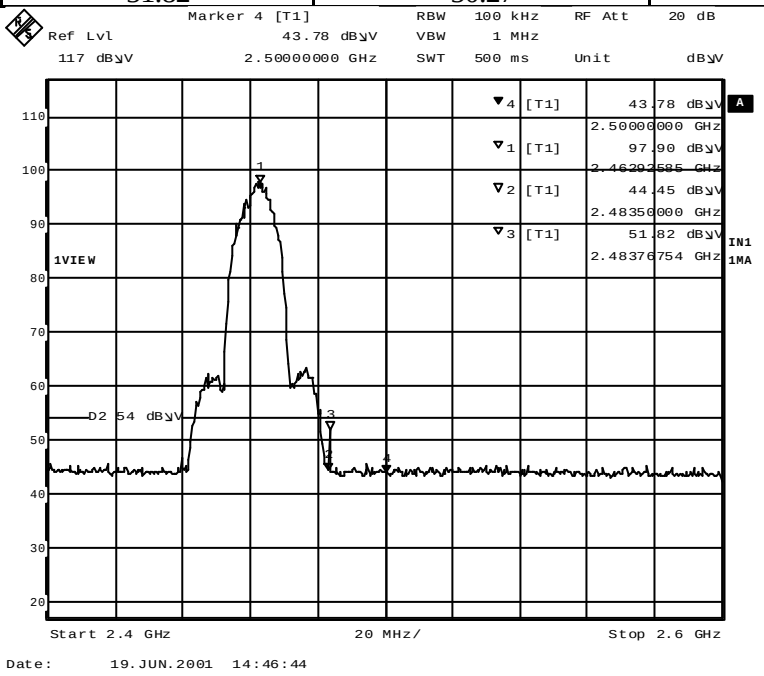
Band Edge-1 Mbps (Horizontal)

Frequency (MHz).	Reading (dBuV)	Measure (dBuV/m)	Result
2483.76	51.69	50.14	Pass



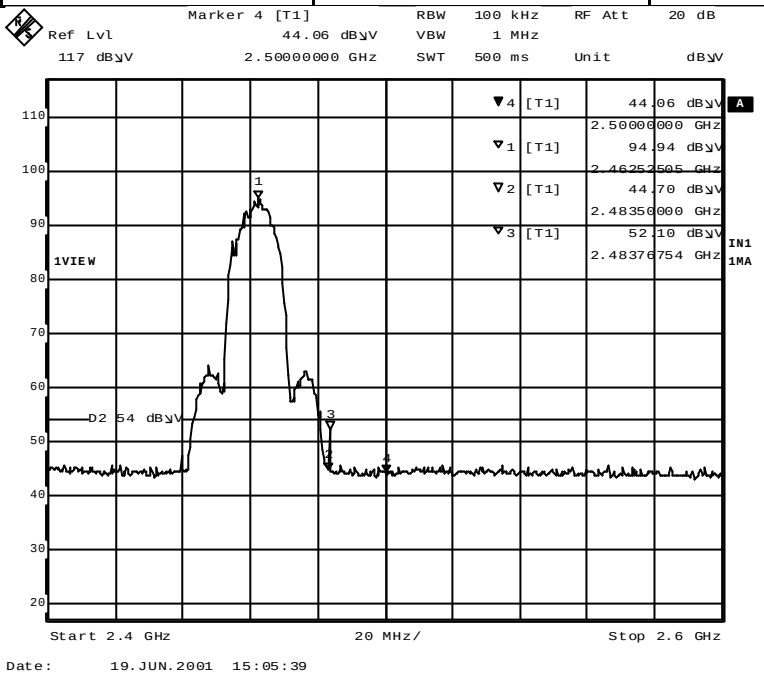
Band Edge-1 Mbps (Vertical)

Frequency (MHz).	Reading (dBuV)	Measure (dBuV/m)	Result
2483.76	51.82	50.27	Pass



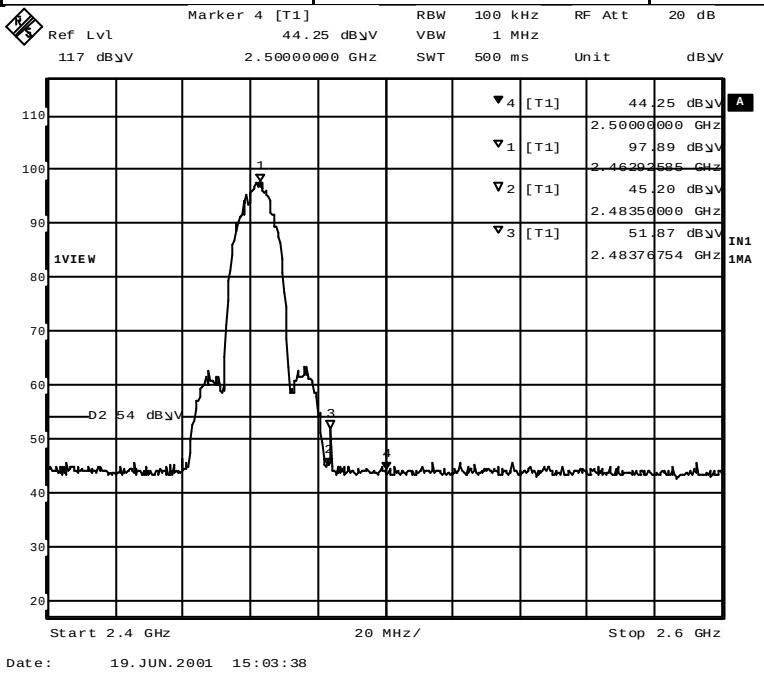
Band Edge-2 Mbps (Horizontal)

Frequency (MHz).	Reading (dBuV)	Measure (dBuV/m)	Result
2483.76	52.1	50.55	Pass



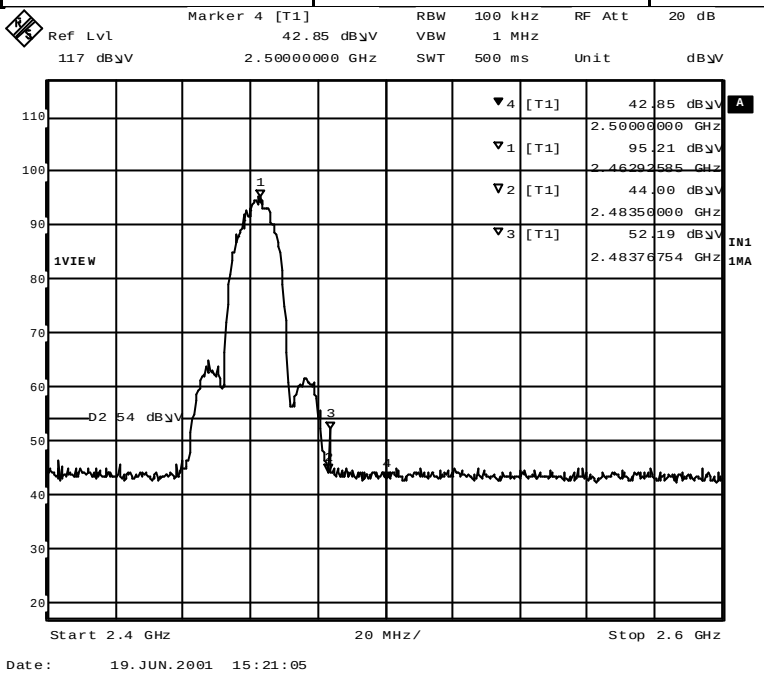
Band Edge-2 Mbps (Vertical)

Frequency (MHz).	Reading (dBuV)	Measure (dBuV/m)	Result
2483.76	51.87	50.32	Pass



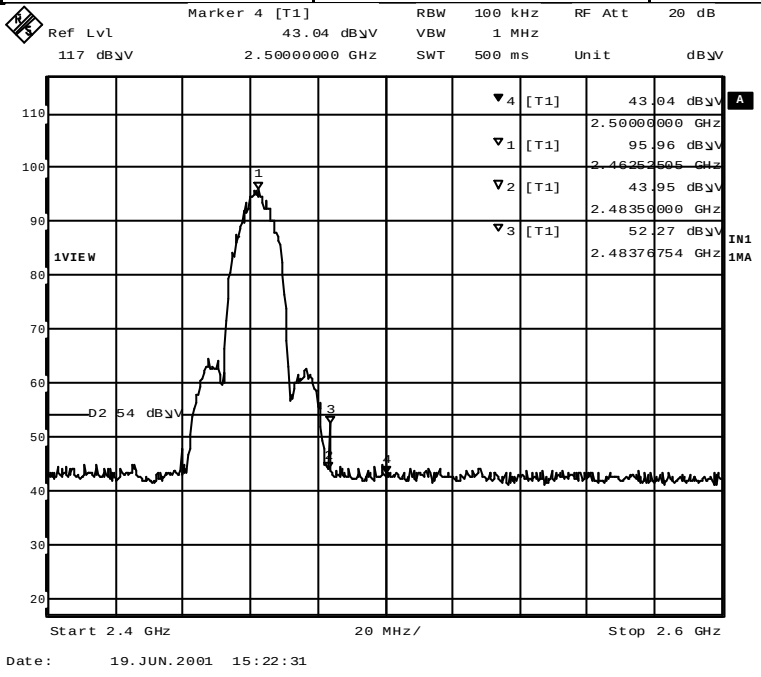
Band Edge-5.5 Mbps (Horizontal)

Frequency (MHz).	Reading (dBuV)	Measure (dBuV/m)	Result
2483.76	52.19	50.64	Pass



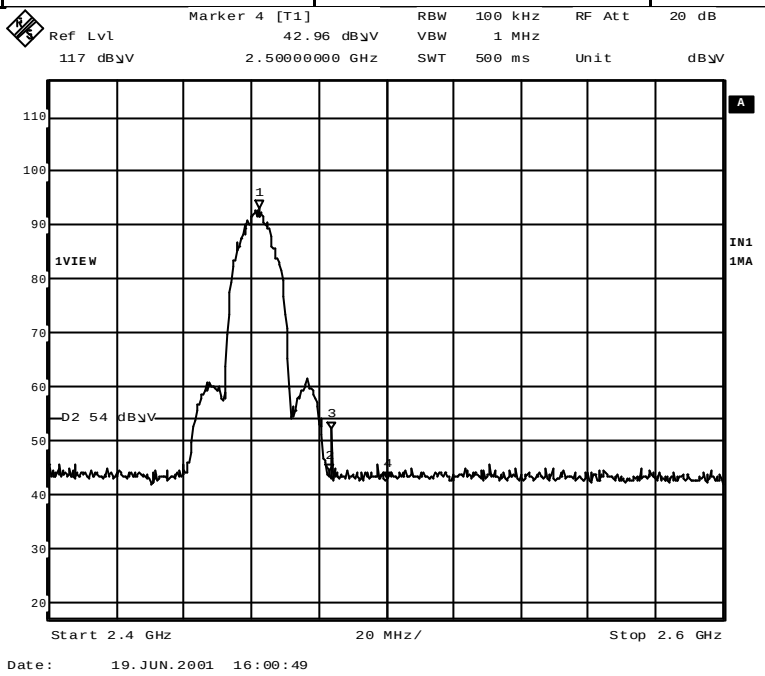
Band Edge-5.5 Mbps (Vertical)

Frequency (MHz).	Reading (dBuV)	Measure (dBuV/m)	Result
2483.76	52.27	50.72	Pass



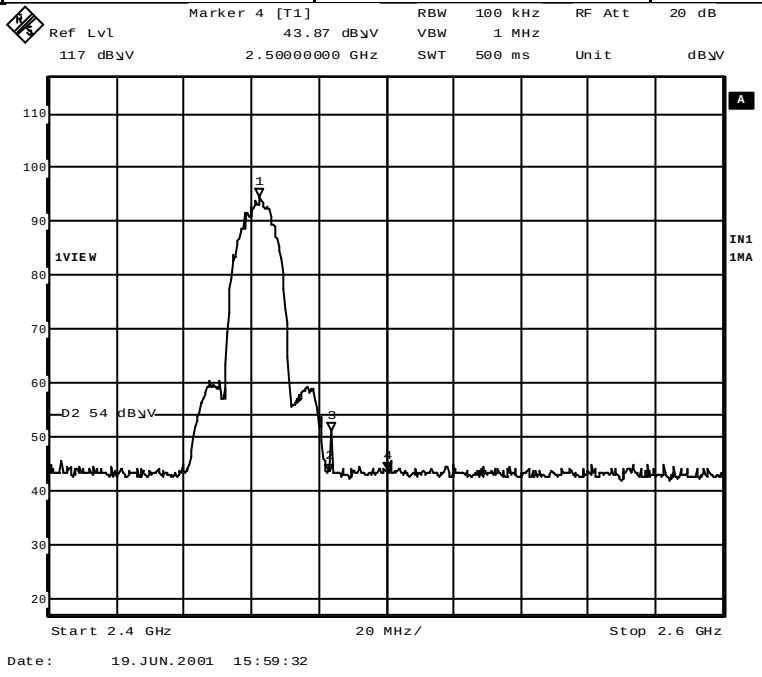
Band Edge-11 Mbps (Horizontal)

Frequency (MHz).	Reading (dBuV)	Measure (dBuV/m)	Result
2483.76	53.97	52.42	Pass



Band Edge-11 Mbps (Vertical)

Frequency (MHz).	Reading (dBuV)	Measure (dBuV/m)	Result
2483.76	55.29	53.74	Pass



5. Occupied Bandwidth

5.1. Test Equipment

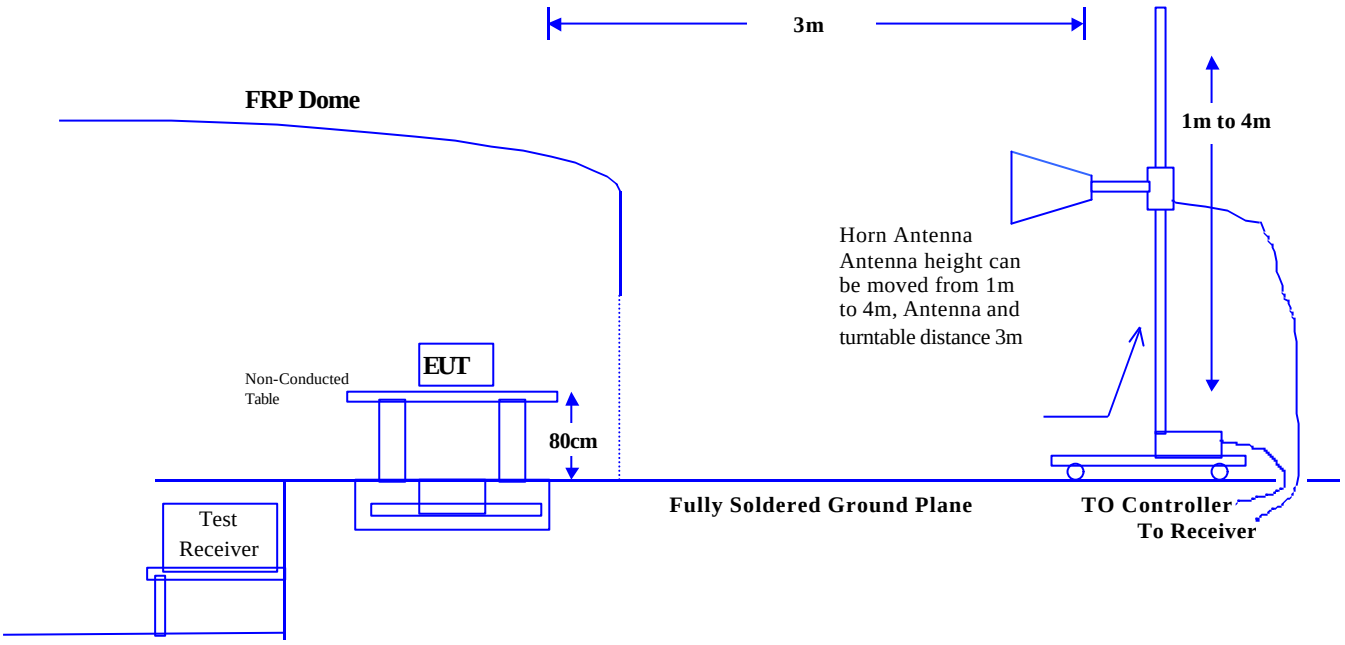
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2001
X	Horn Antenna	EM	EM6917 / 103325	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.

5.2. Test Setup



5.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

5.4. Standard Reqirement

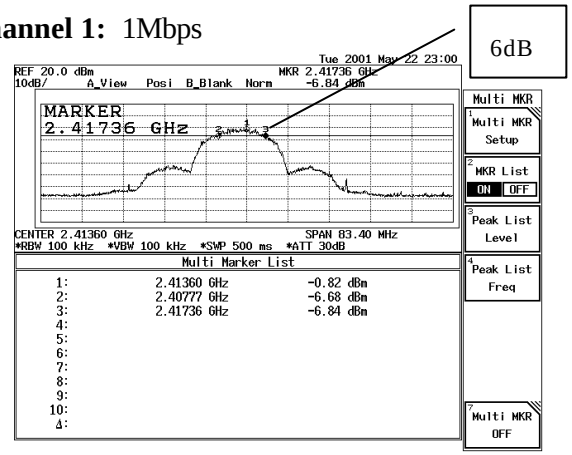
The minimum bandwidth shall be at least 500kHz.

5.5. Test Result of Occupied Bandwidth

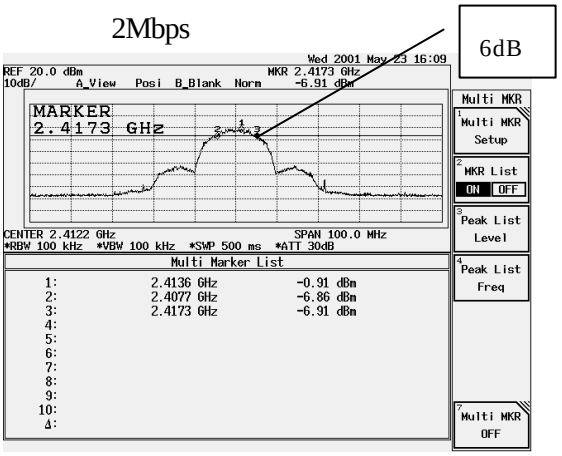
Product : Wireless LAN Card
Test Item : Occupied Bandwidth Data
Test Site : No.1 OATS
Test Mode : Channel 1

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1 (1Mbps)	2413	9590	>500	Pass
1 (2Mbps)	2414	9600	>500	Pass
1 (5.5Mbps)	2413	10400	>500	Pass
1 (11Mbps)	2413	10000	>500	Pass

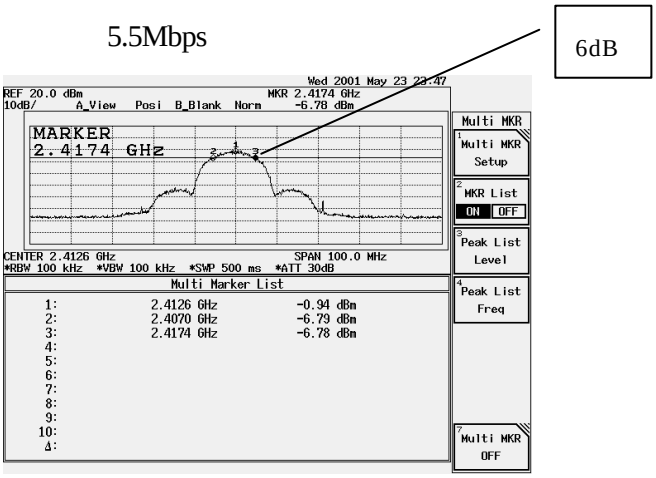
Figure Channel 1: 1Mbps



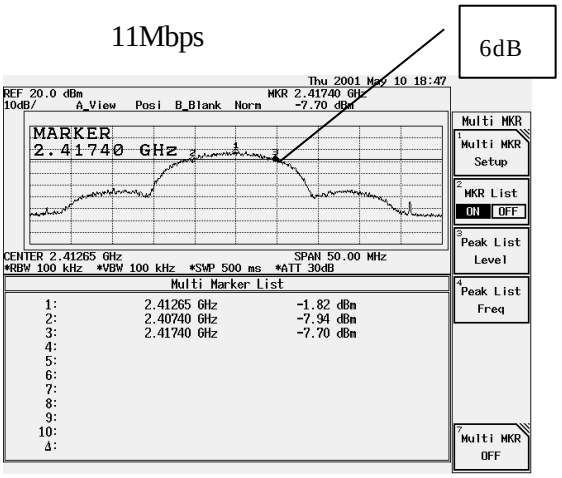
2Mbps



5.5Mbps



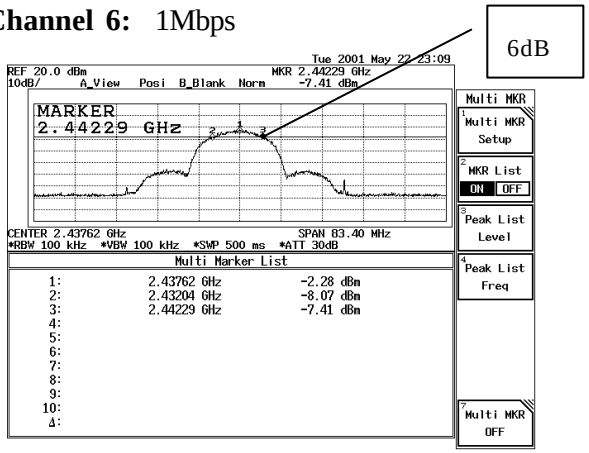
11Mbps



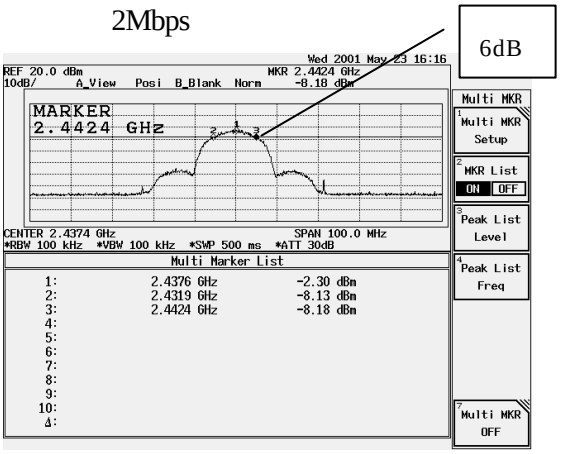
Product : Wireless LAN Card
Test Item : Occupied Bandwidth Data
Test Site : No.1 OATS
Test Mode : Channel 6

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6 (1Mbps)	2438	10250	>500	Pass
6 (2Mbps)	2438	10500	>500	Pass
6(5.5Mbps)	2438	10700	>500	Pass
6 (11Mbps)	2438	9750	>500	Pass

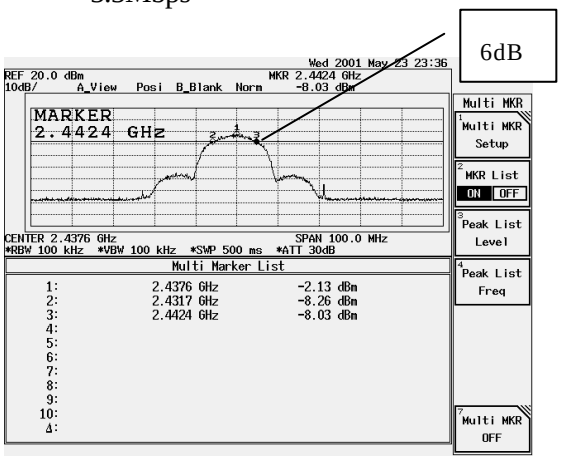
Figure Channel 6: 1Mbps



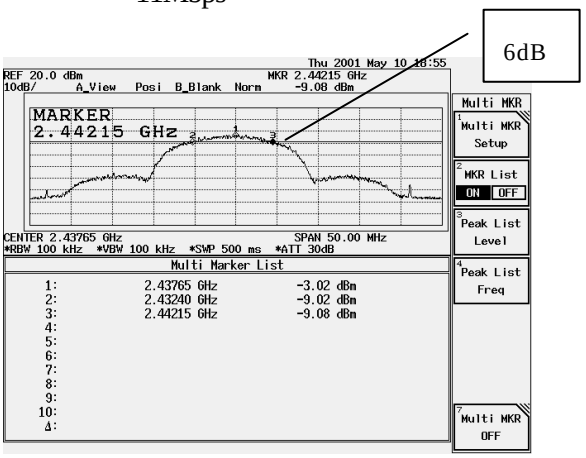
2Mbps



5.5Mbps



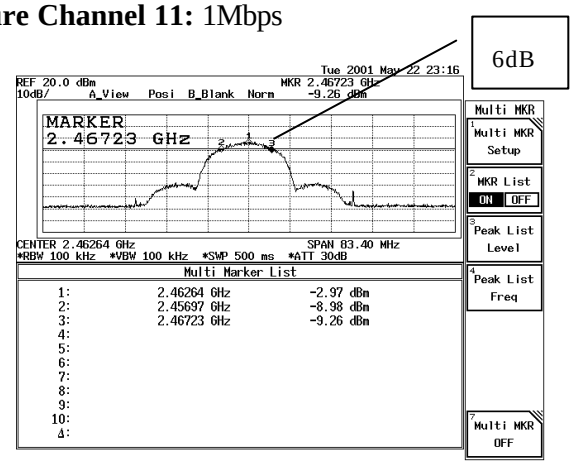
11Mbps



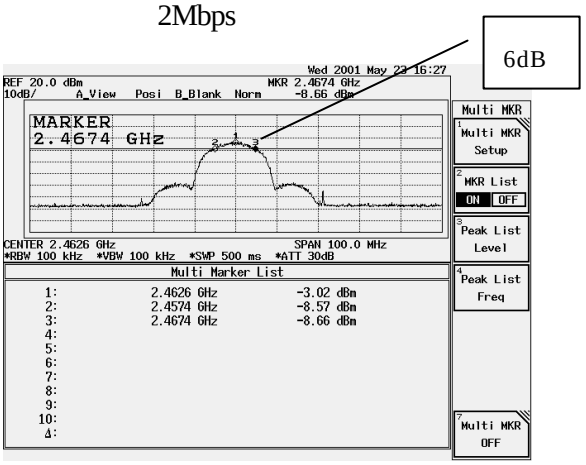
Product : Wireless LAN Card
Test Item : Occupied Bandwidth Data
Test Site : No.1 OATS
Test Mode : Channel 11

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11 (1Mbps)	2463	10260	>500	Pass
11 (2Mbps)	2463	10000	>500	Pass
11 (5.5Mbps)	2463	10000	>500	Pass
11 (11Mbps)	2463	9450	>500	Pass

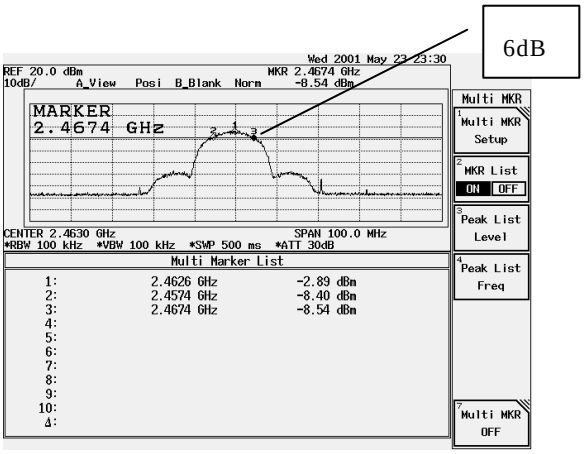
Figure Channel 11: 1Mbps



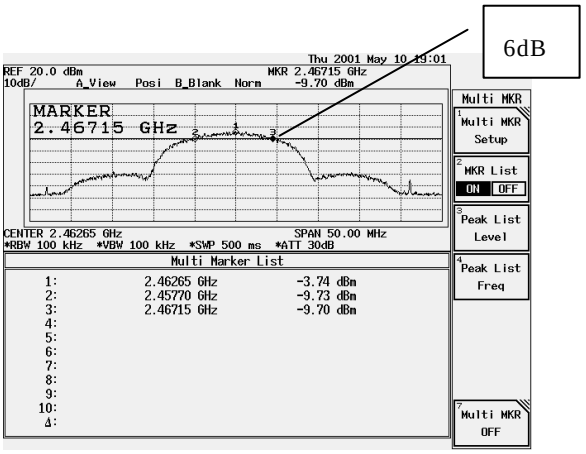
2Mbps



5.5Mbps



11Mbps



6. Transmitter Power Density

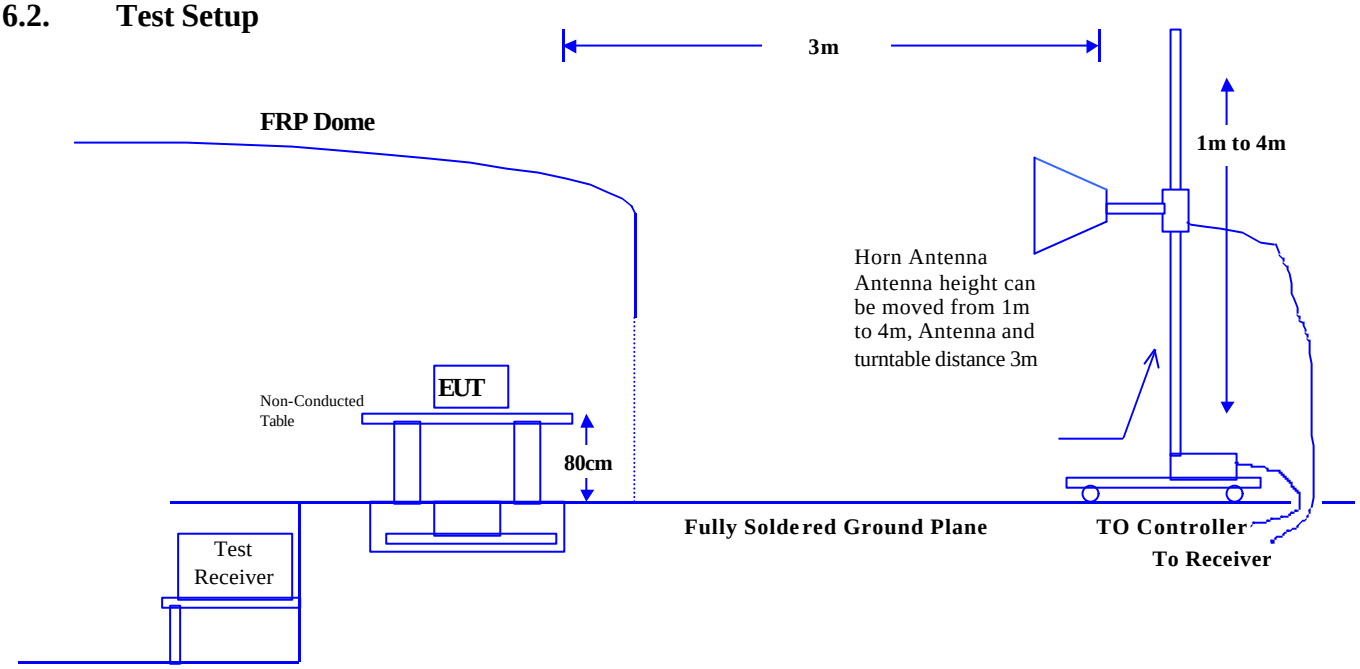
6.1. Test Equipment

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

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum Analyzer	Advantest	R3272 / 72421194	May, 2001
X	Attenuator	HP		May, 2001
X	Horn Antenna	EM	EM6917 / 103325	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 Reqirement

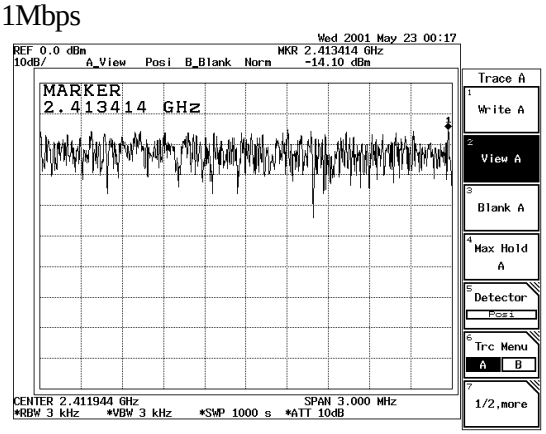
The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

6.5. Test Result of Transmitter Power Density

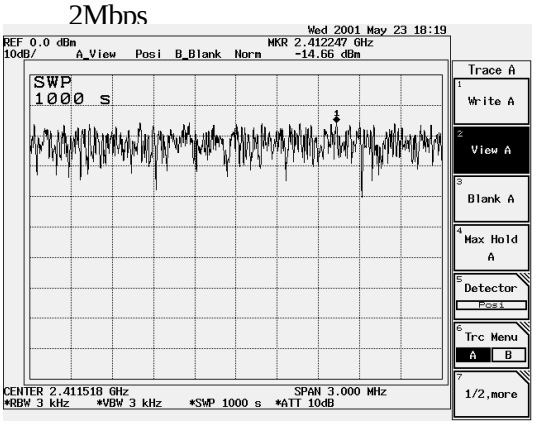
Product : Wireless LAN Card
Test Item : Transmitter Power Density Data
Test Site : No.1 OATS
Test Mode : Normal Operation

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
1 (1Mbps)	2413.414	-14.10dBm	< 8dBm	Pass
1 (2Mbps)	2412.247	-14.66dBm	< 8dBm	Pass
1 (5.5Mbps)	2411.749	-13.59dBm	< 8dBm	Pass
1 (11Mbps)	2411.750	-14.80dBm	< 8dBm	Pass

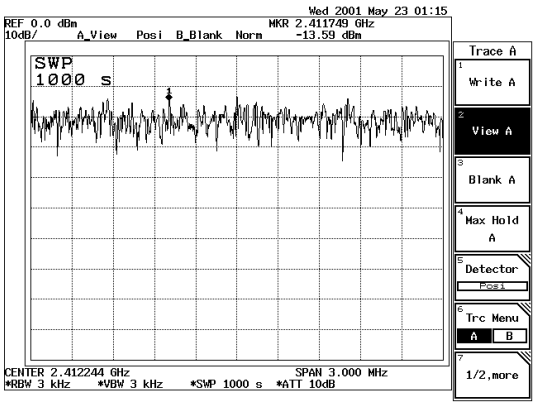
1Mbps



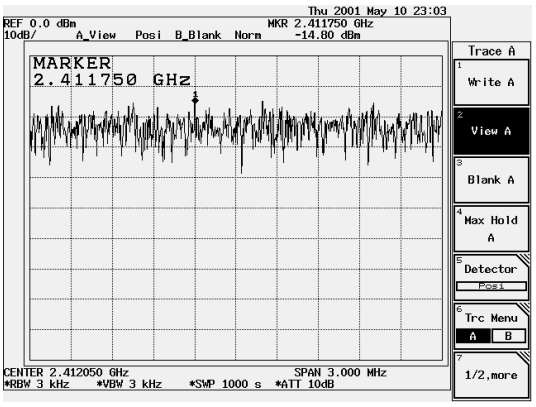
2Mbps



5.5Mbps



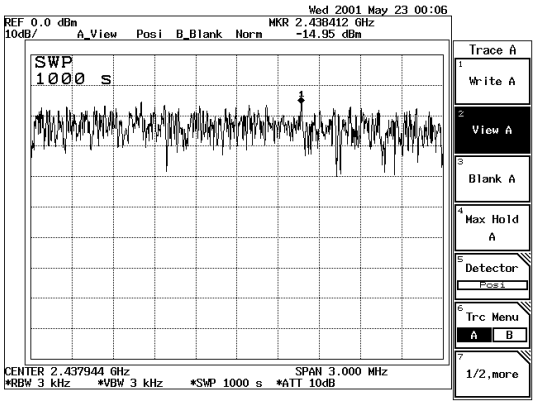
11Mbps



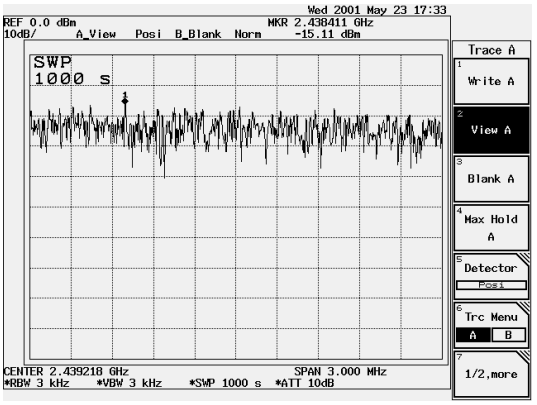
Product : Wireless LAN Card
Test Item : Transmitter Power Density Data
Test Site : No.1 OATS
Test Mode : Normal Operation

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6 (1Mbps)	2438.412	-14.95dBm	< 8dBm	Pass
6 (2Mbps)	2438.411	-15.11dBm	< 8dBm	Pass
6(5.5Mbps)	2438.410	-15.02dBm	< 8dBm	Pass
6 (11Mbps)	2438.410	-16.25dBm	< 8dBm	Pass

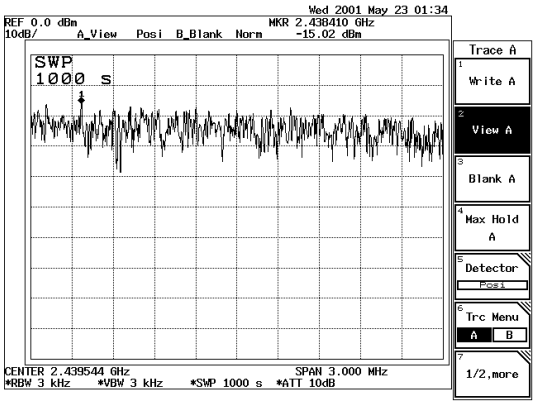
1Mbps



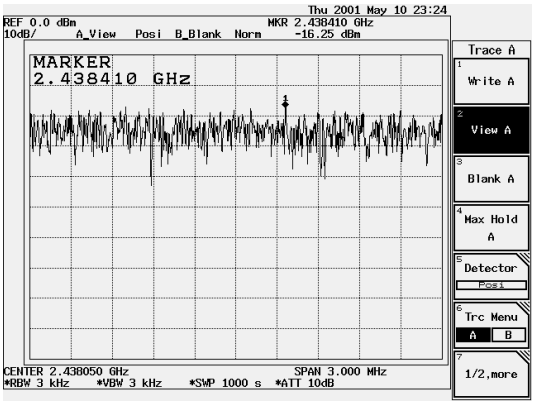
2Mbps



5.5Mbps



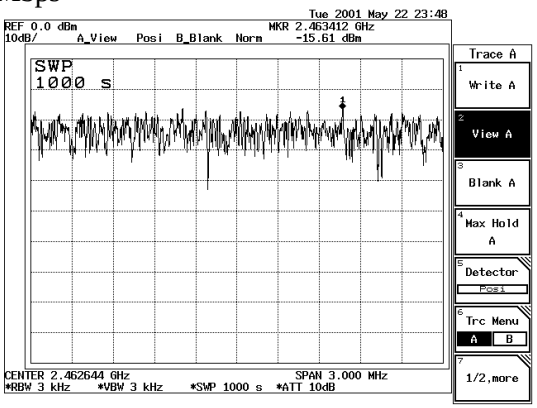
11Mbps



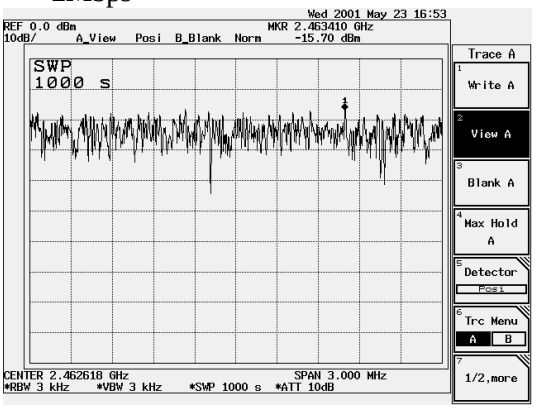
Product : Wireless LAN Card
Test Item : Transmitter Power Density Data
Test Site : No.1 OATS
Test Mode : Normal Operation

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11 (1Mbps)	2463.412	-15.61dBm	< 8dBm	Pass
11 (2Mbps)	2463.410	-15.70dBm	< 8dBm	Pass
11 (5.5Mbps)	2462.246	-16.30dBm	< 8dBm	Pass
11 (11Mbps)	2463.412	-16.88dBm	< 8dBm	Pass

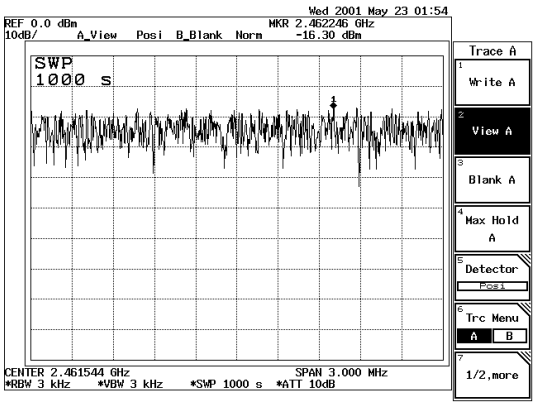
1Mbps



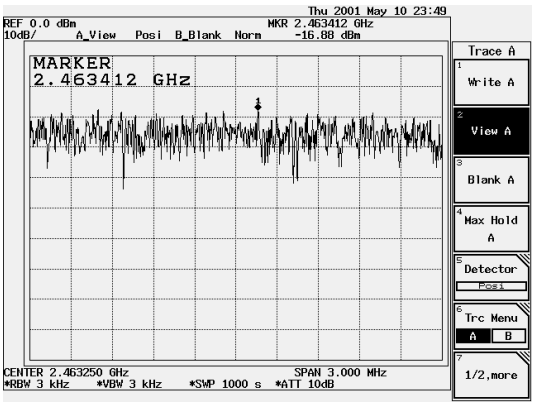
2Mbps



5.5Mbps



11Mbps



7. Processing Gain

7.1. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

7.2. Minimum Standard

The processing gain shall be at least 10 dB.

7.3. Method of Measurement

The processing gain of this spread spectrum was measured the CW jamming method. The Section9.1 illustrates the measurement setup. The output power of the spread spectrum transmitter is fixed and the output power of jammed is adjustable. The frequency of iammer was stopped through the pass band of nominal channel in 50kHz steps. In each frequency step of the jammed, the output power of rammed is adjusted to cause the Bit Error Rate (BER) to be 1.0*10e-6. The power levels are recorded to calculate the J/S as shown in Table 1.

7.4. Calculation of Processing Gain:

The processing gain was determined by measuring the jamming margin of the EUT and using the following formula:

Gp = (S/N)o + Mj + Lsys

Where (S/N)o is the required signal to noise ratio at the receiver output
Mj is the jammer to signal ratio (J/S)
Lsys is the system loss

The (S/N)o is calculated from:

Pe = 1/2exp(-1/2(S/N)o) ; Pe = probability of error (BER)

For the Pe(BER) = 1.0*10e-6, the required (S/N)o is 14.2dB

From Measurement, the minimum J/S(Mj) is –3.4dB
We assume the system loss is 1dB.
Therefore the processing gain is calculated below:

Gp = (S/N)o + Mj + Lsys = 14.2 + (-3.4) + 1 = 11.8 (dB)