Test Report

Product Name : Notebook P.C.

Model No. : S1XXX

FCC ID.: MSQS1000RF

Applicant : ASUSTeK COMPUTER INC.

Address : 4Fl., No. 150, Li-Te Rd., Peitou, Taipei, Taiwan, R.O.C.

Date of Receipt : February 08, 2002

Date of Test : February, 09, 2002

Report No. : 022L025FI

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 : February, 09, 2002
Report No. : 022L025FI

QuieTek Corporation
Accredited by NIST (NVLAP)
NVLAP Lab Code: 200533-0

Product Name	:	Notebook P.C.
Applicant	:	ASUSTeK COMPUTER INC.
Address	:	4Fl., No. 150, Li-Te Rd., Peitou, Taipei, Taiwan, R.O.C.
Manufacturer	:	ASUSTeK COMPUTER INC.
Model No.	:	S1XXX
FCC ID.	:	MSQS1000RF
Rated Voltage	:	AC Input: 100-240VAC, 1.5A, 50-60Hz DC Output: 19V, 2.64A
Trade Name	:	ASUS
Measurement Standard	:	FCC Part 15 Subpart C Paragraph 15.247
Measurement Procedure	:	ANSI C63.4:1992
Test Result	:	Complied

NVLAP
NVLAP Lab Code: 200533-0

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

Documented By : Chialin Chen (Chialin Chen)

Tested By : (Wallace Pan)

Approved By : Gene Chang (Gene Chang)

TABLE OF CONTENTS

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	:	Notebook P.C.
Trade Name	:	ASUS
FCC ID.	:	MSQS1000RF
Model No.	:	S1XXX
Frequency Range	:	2412MHz to 2462MHz
Channel Number	:	11
Type of Modulation	:	Direct Sequence Spread Spectrum
Antenna type	:	Connector
Operator Selection of Operating Frequency	:	By software

Frequency of Each Channel:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	6	2437	11	2462
2	2417	7	2442		
3	2422	8	2447		
4	2427	9	2452		
5	2432	10	2457		

Note:

1. This device is a Notebook P.C. include 2.4GHz DSSS technology wireless LAN card inside. The wireless LAN card employee 11 channels for functional requirement.
2. The model number: S1XXX, all “X” means the following:
   - ✧ The first”X” refers LCD panel size. (X=0~9/A~Z/-)
   - ✧ The second and third “X” refers CPU speed. (X=0~9/A~Z/-)
3. Regards to the frequency band operation; two rate that were included the lowest、middle and highest frequency of channel were selected to perform the test, then shown on this report.
4. 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.
5. 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 022L025F under Declaration of Conformity.
6. QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

1.2. Operational Description

This device is a Notebook P.C. include 2.4GHz DSSS technology wireless LAN card inside. The wireless LAN card employee 11 channels for functional requirement. This device provided four kind of transmitting speed 1,2,5.5 and 11Mbps. The device of RF carrier is DQPSK, DB PSK and CCK. The device adapts direct sequence spread spectrum modulation. The dual monopole antenna printed on PCB provides diversity function to improve the receiving function. Data can be transmitted by the radio signal connect to the Internet or Local network.

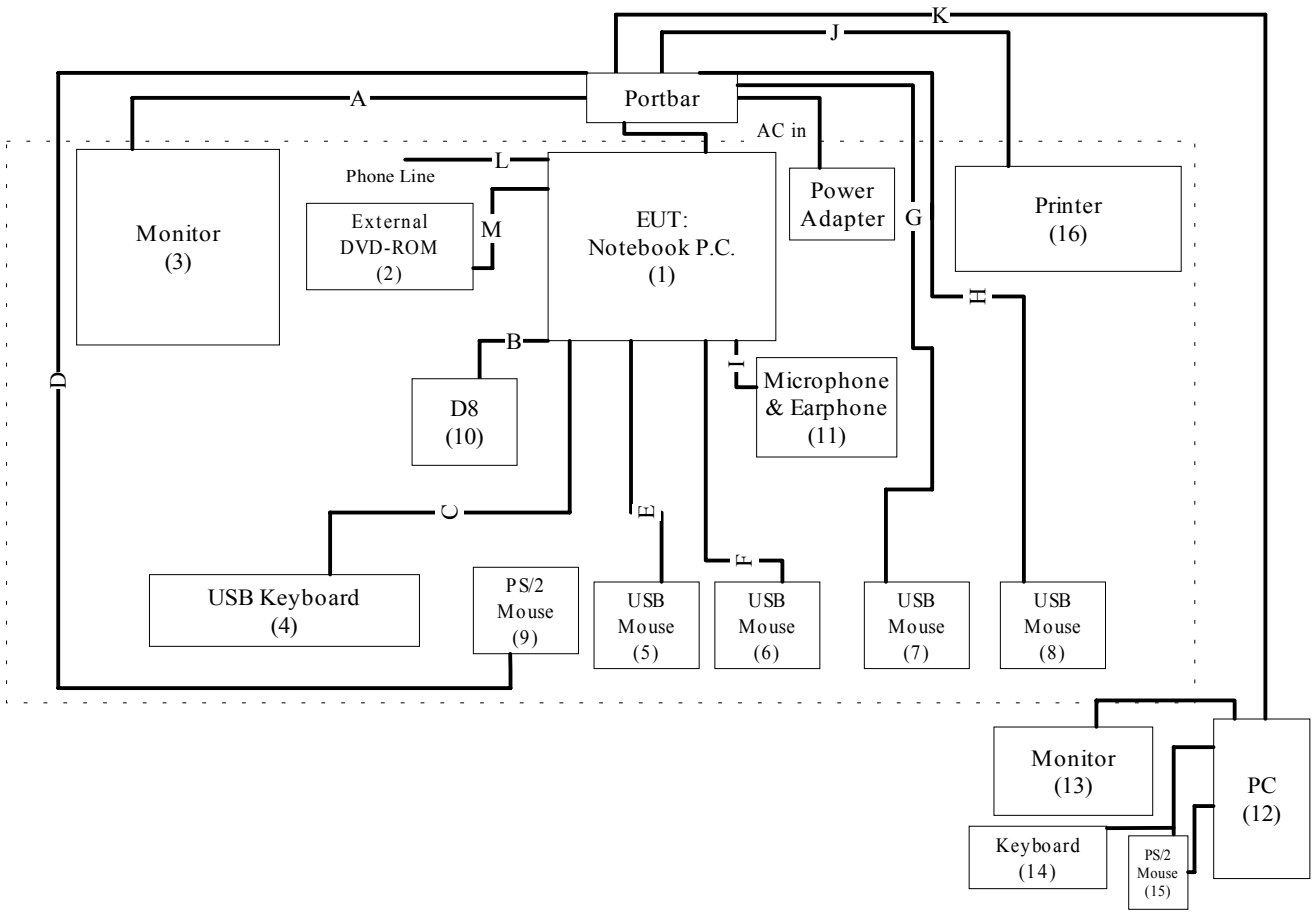
1.3. Tested System Details

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.
(1)	Notebook P.C.			
	LCD Panel	LG	LP133X8-A2M1	13” XGA
	Mother Board	Asus	08-20A000	Rev.2.1
	CPU	Intel	P3 1.13GHz	Clock: 133MHz
	Battery	Toshiba	LGP-103450C	1400mAh
	H.D.D. (30GB)	IBM	IC25N030ATDA04-0	BSMI ID:3902I002
	DVD-ROM	Toshiba	SD-C2502	BSMI ID: 3892B234
	Modem Board	Actiontec	MP560RS-2	Mini-PCI
	Keyboard	InnovACE	001162A1	
	Touch-Pad	Synaptics	TM41PDF1351	
	Inverter Board	Asus	08-20C010	Rev.1.0
	Switch Board	Asus	08-20A003	Rev.2.0
	Power Adapter	Delta	ADP-50SB	
	Portbar(II)	Asus	08-20A050	Rev.1.1
	Audio Board	Asus	08-20A002	Rev.2.1
(2)	External DVD	Toshiba	SD-C2502	BSMI ID: 3892B234
(3)	Monitor	SONY	CPD-G500	2737939
(4)	USB Keyboard	SONY	DCR-TRV520	N/A
(5)	USB Mouse	Logitech	M-BE58	LZE11405011
(6)	USB Mouse	Logitech	M-BE58	LZE10151096
(7)	USB Mouse	Logitech	M-BE58	LZE11405267
(8)	USB Mouse	Logitech	M-BE58	LZE11405342
(9)	PS/2 Mouse	IBM	M-SAU-IBM6	23-022623
(10)	D8	SONY	DCR-TRV5250	1081754
(11)	Microphone & Earphone	TOKTO	SX-MI	N/A
(12)	PC	IBM	2187-16W	BNL6772
(13)	Monitor	ADI	CM703	038054T10203875A
(14)	Keyboard	HP	SK-2506	C00083358
(15)	Mouse	HITACHI	PC-KM1300	N/A
(16)	Printer	EPSON	Color 680	015999

Note: 1. The power cord of the device 1,3,8,12,13 and 16 are non-shielded power cord.

1.4. Configuration of tested System



Signal Cable Type		Signal cable Description
A.	VGA cable	Shielded, 1.8m, with two ferrite core
B.	1394 cable	Shielded, 1.2m
C.	USB Keyboard cable	Shielded, 1.5m
D.	PS/2 Mouse cable	Shielded, 1.2m
E.	USB Mouse cable	Shielded, 1.5m
F.	USB Mouse cable	Shielded, 1.5m
G.	USB Mouse cable	Shielded, 1.5m
H.	USB Mouse cable	Shielded, 1.5m
I.	Microphone & Earphone cable	Non-Shielded, 1.2m
J.	Printer cable	Shielded, 1.5m
K.	LAN cable	Non-Shielded, 7.0m
L.	Telephone cable	Non-Shielded, 7.0m
M.	External DVD-ROM data cable	Shielded, 0.2m, with a ferrite core

1.5. EUT Exercise Software

1. Setup the EUT and simulators as shown on 1.3.
2. Turn on the power of all equipment.
3. Adjust to appropriate video resolution and run Windows.
4. Run “EMI-TEST、“Media Player” test program and play Audio.
5. EUT will sends “H” pattern to monitor, the monitor will show “H” pattern on the screen.
6. EUT sends “H” pattern to printer, the printer will print “H” pattern on paper.
7. EUT Connect another simulation PC through LAN port and carry out Read/Write work each other.
8. To enable wireless LAN card function, carry out RF simulation software to set transmission channel individually.
9. Repeat the above procedure (3) to (9).

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: April 22, 2001 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2

June 29, 2001 Accreditation on NVLAP
NVLAP Lab Code: 200533-0

NVLAP Lab Code: 200533-0

Site Name: Quietek Corporation

Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,
Lin-Kou Shiang, Taipei,
Taiwa, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

2. Conducted Emission

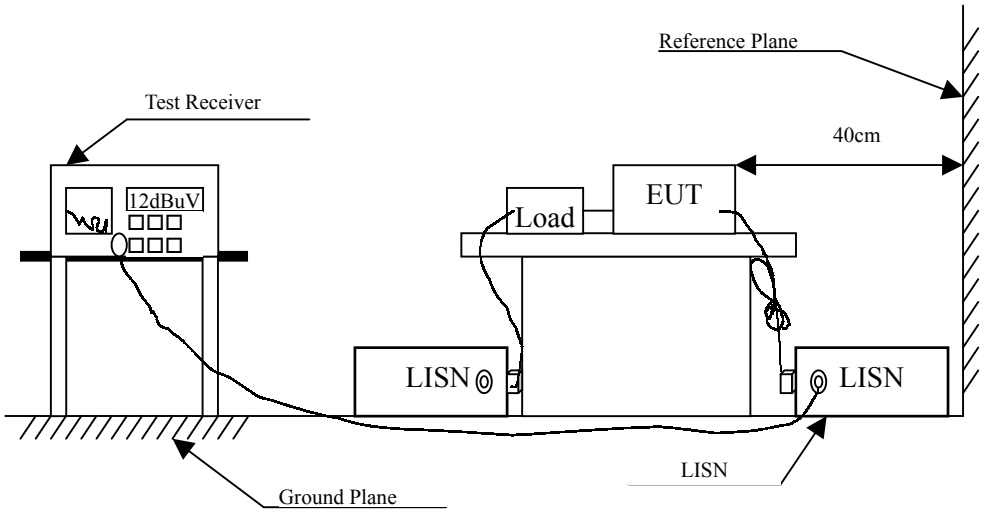
2.1. Test Equipment List

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 30/838251/0001	May, 2001	
2	L.I.S.N.	R & S	ESH3-Z5/836679/0023	May, 2001	EUT
3	L.I.S.N.	R & S	ENV 4200/833209/0023	May, 2001	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2001	
5	N0.4 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.

During conducted emission testing, wireless LAN card enable its function and communicate data between access point (AP) and EUT.

2.5. Test Result of Conducted Emission

Date of Test	February, 09, 2002	Product	Notebook P.C.
Test Condition	Normal Operation	Test Range	0.45MHz – 30MHz

Frequency	Measurement Level (dBuV)		Limits (dBuV)
MHz	Line1 QP	Line2 QP	QP
0.474	--	41.16	48
0.541	40.28	--	48
0.677	40.37	--	48
0.677	--	39.78	48
0.877	40.37	--	48
0.877	--	40.57	48
1.080	40.31	--	48

Note:

1. All Reading Levels are Quasi-Peak.
2. Measurement Level = Reading Level + LISN Factor + Cable loss.

3. Peak Power Output

3.1. Test Equipment

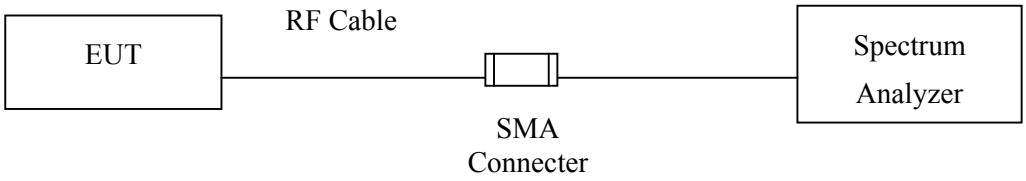
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Spectrum	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

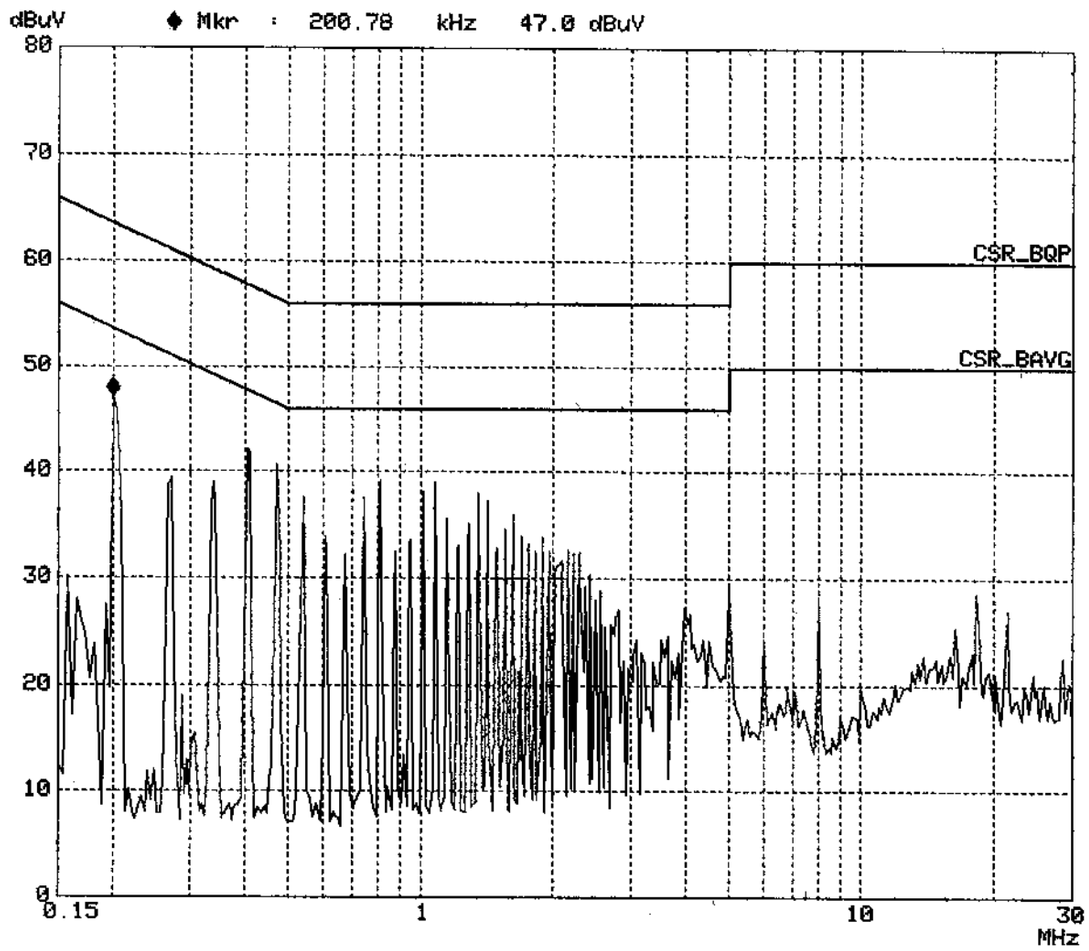
Standard Temperature and Humidity, Standard Test Voltage

3.4. Limit

The maximum peak power shall be less 1 Watt.

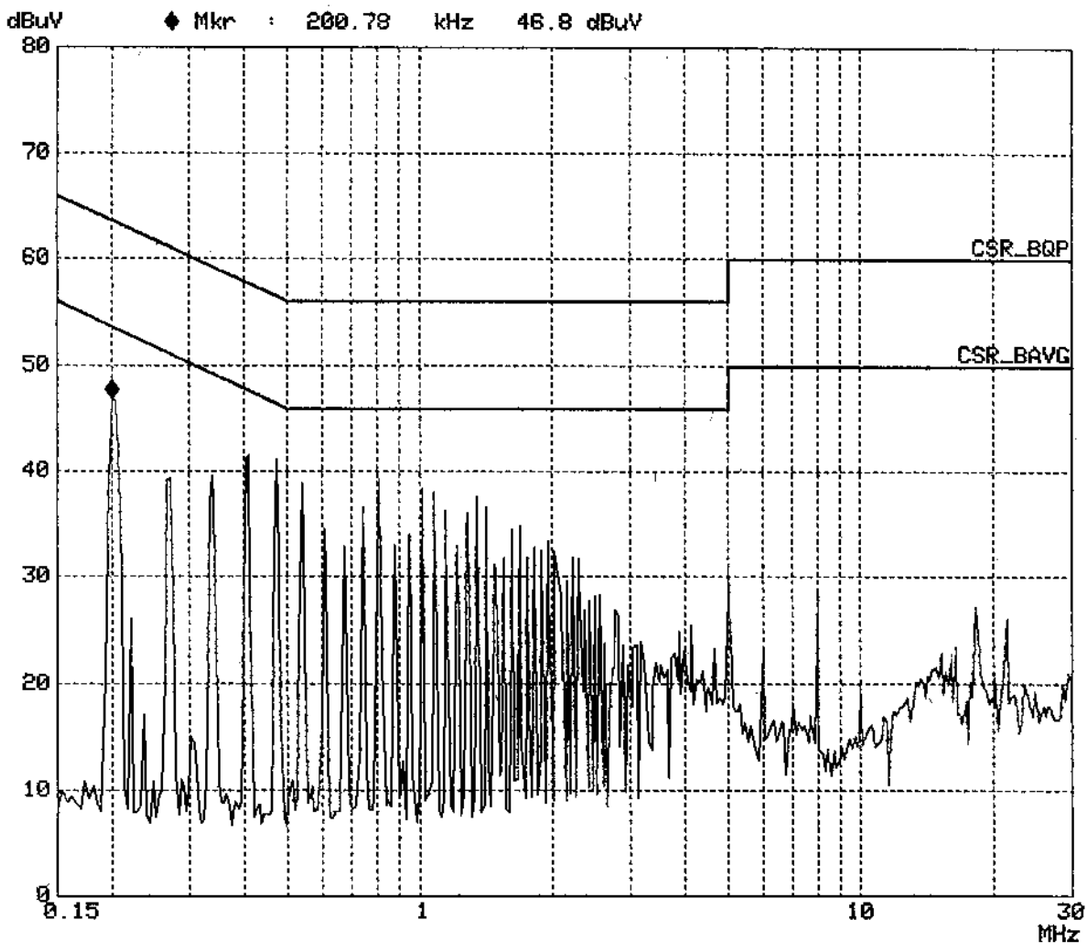
QUIETEK CORPORATION
MEI TEST RECEIVER ESCS30

EUT:	NOTEBOOK PC
Manuf:	ASUS
Op Cond:	FULL SYSTEM
Operator:	MILLER
Test Spec:	AC 110V/60HZ
Comment:	LINE 1
	M/N:S1300 (A) MODE:2 (TX)
Date:	30. Nov 01 09:58



QUIETEK CORPORATION
MEI TEST RECEIVER ESCS30

EUT:	NOTEBOOK PC
Manuf:	ASUS
Op Cond:	FULL SYSTEM
Operator:	MILLER
Test Spec:	AC 110V/60HZ
Comment:	LINE 2
	M/N:S1300 (A) MODE:2 (TX)
Date:	30. Nov 01 10:02



3.5. Test Result of Peak Power Output

Product : Notebook P.C.
Test Item : Peak Power Output Data
Test Site : No.1 OATS
Test Mode : Normal Operation

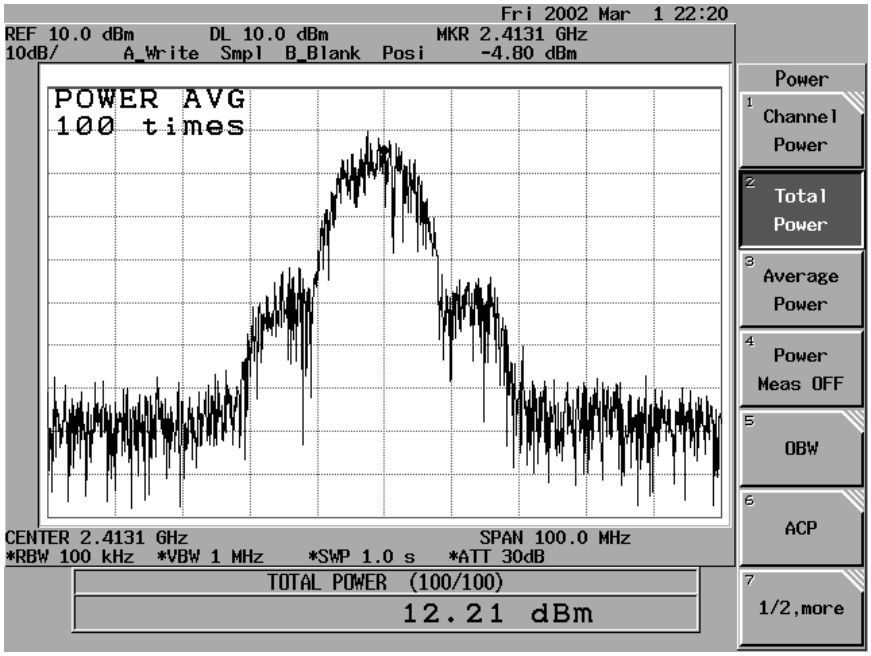
Data Speed: 1Mbps

Channel No.	Frequency(MHz)	Measurement	Required Limit	Result
1	2412	12.21 dBm	1Watt= 30 dBm	Pass
6	2437	10.91 dBm	1Watt= 30 dBm	Pass
11	2462	10.21 dBm	1Watt= 30 dBm	Pass

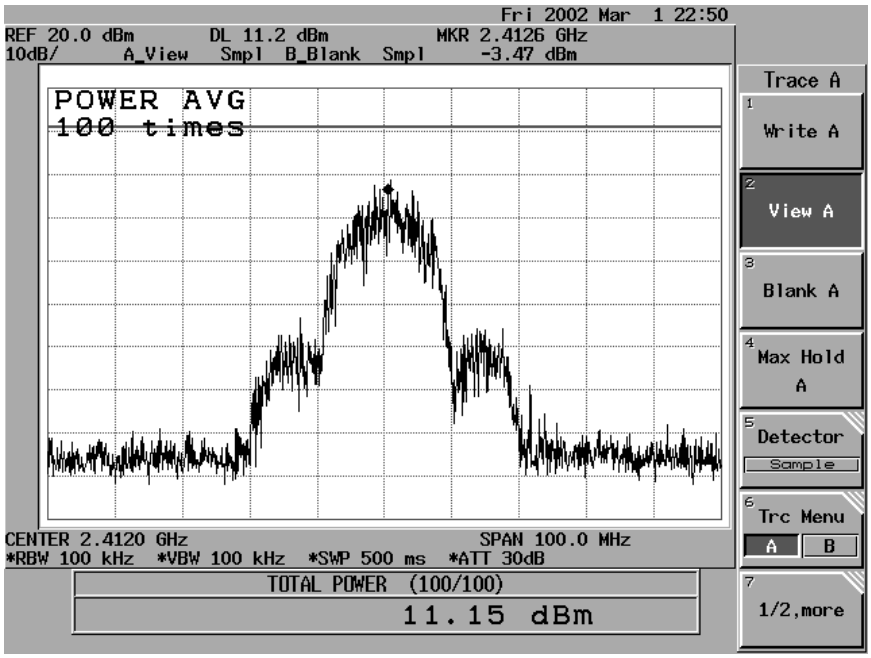
Data Speed: 11Mbps

Channel No.	Frequency(MHz)	Measurement	Required Limit	Result
1	2412	11.15 dBm	1Watt= 30 dBm	Pass
6	2437	10.91 dBm	1Watt= 30 dBm	Pass
11	2462	10.21 dBm	1Watt= 30 dBm	Pass

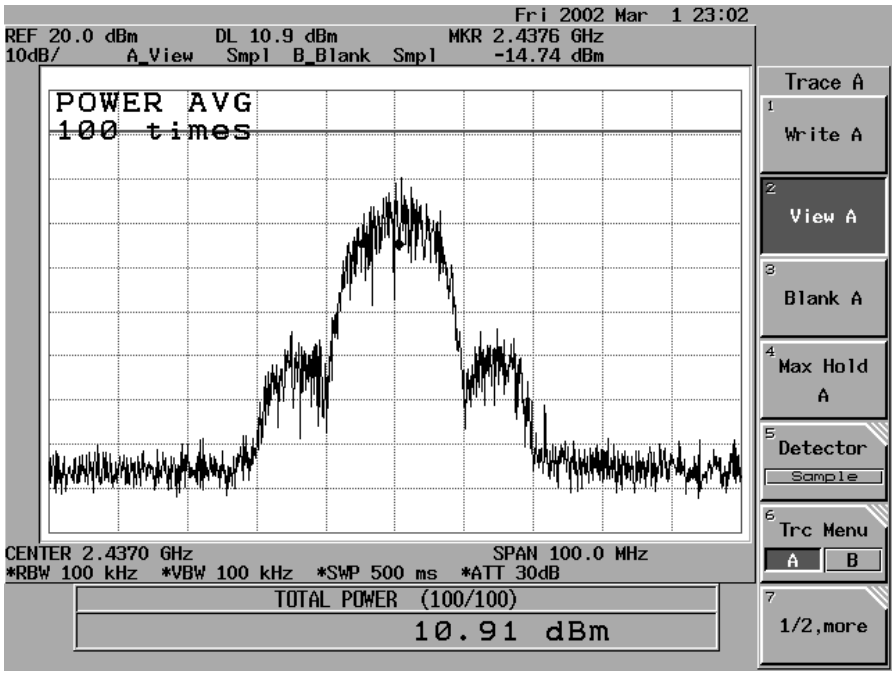
Channel 1_1MHz



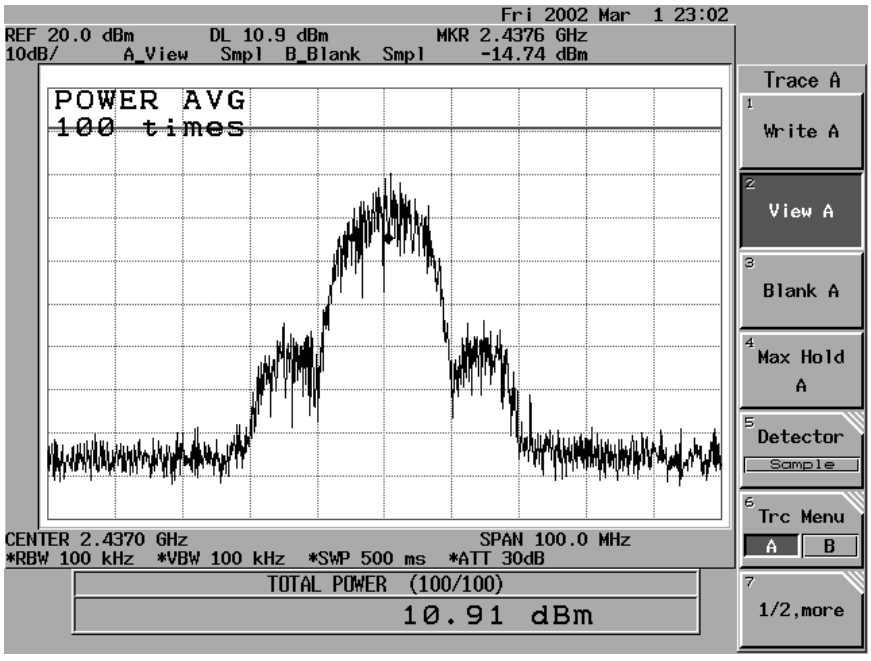
Channel 1_11MHz



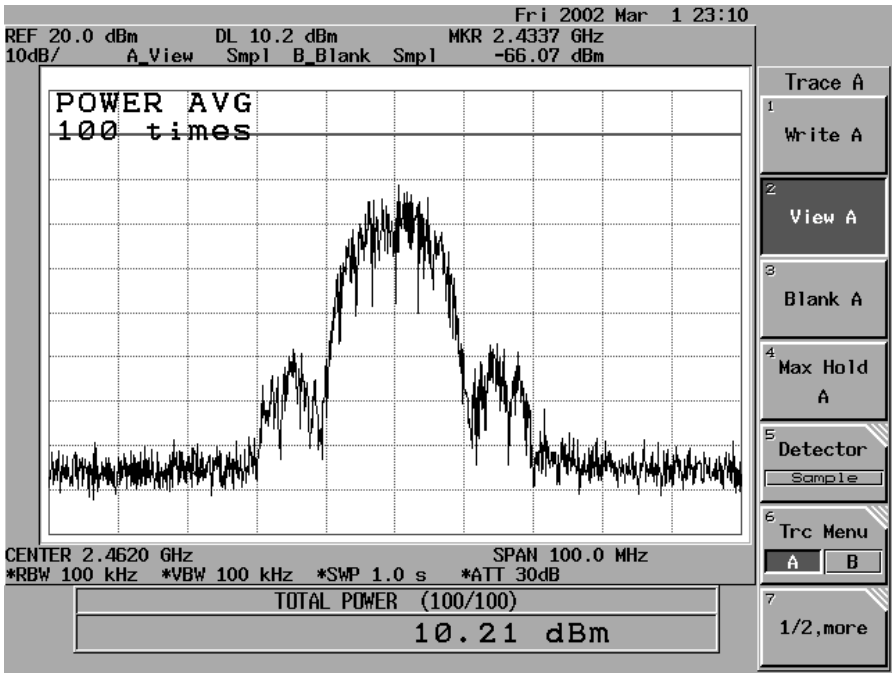
Channel 6_1 MHz



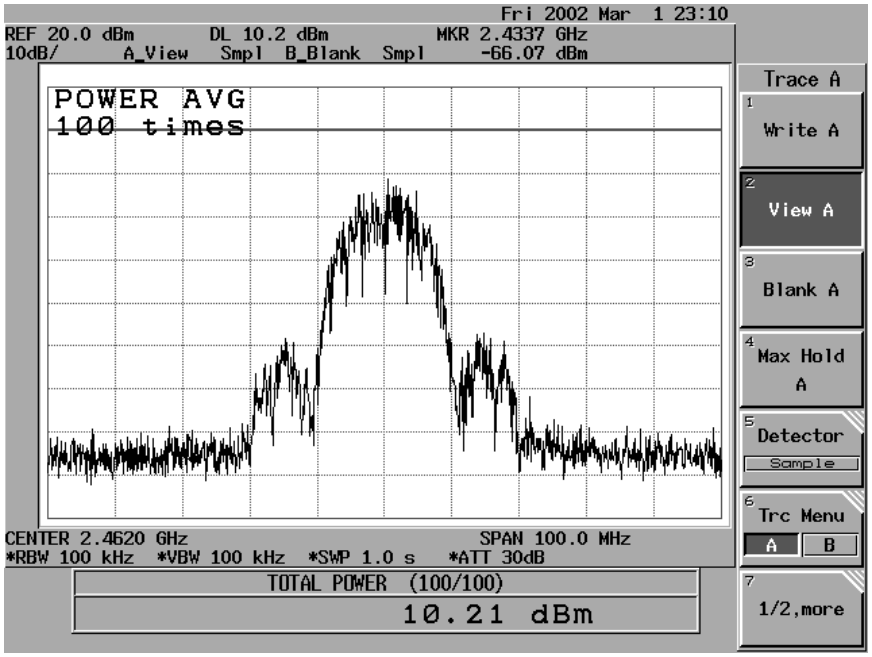
Channel 6_11 MHz



Channel 11_1 MHz



Channel 11_11 MHz



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

Friis transmission formula: $Pd = (Pout*G)/(4*pi*r^2)$

Where
Pd = power density in mW/cm^2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 3.1416
R = distance between observation point and center of the radiator in cm

Pd id the limit of MPE, 1 mW/cm^2 . 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 : Notebook P.C.
Test Item : RF Exposure Evaluation Data
Test Site : No.1 OATS
Test Mode : Normal Operation

4.3.1 Antenna Gain

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 0dBi 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 (1Mbps)	2412	12.21	1.15
1 (11Mbps)	2412	11.15	1.02
6 (1Mbps)	2437	10.91	0.99
6 (11Mbps)	2437	10.91	0.99
11 (1Mbps)	2462	10.21	0.91
11 (11Mbps)	2462	10.21	0.91

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

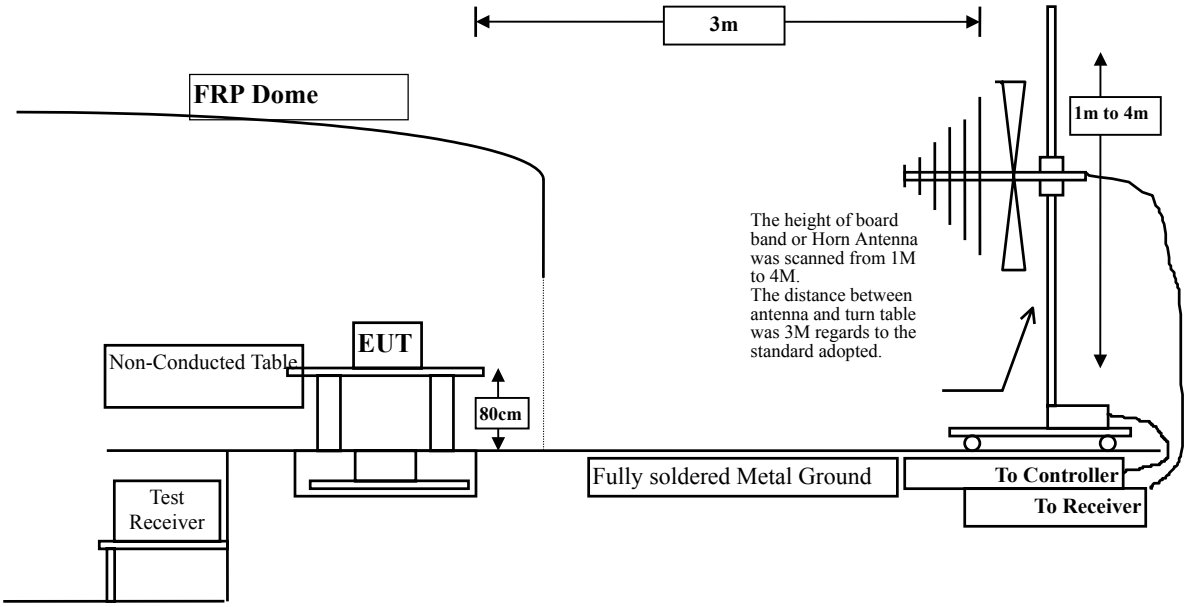
5.1. Test Equipment

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	ESVS 10 / 834468/003	July, 2001
	X	Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2001
	X	Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2001
	X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Nov., 2001
	X	Test Receiver	R & S	ESCS 30 / 836858/022	Nov., 2001
☒Site # 2	X	Spectrum Analyzer	Advantest	3162 / 100803466	May, 2001
	X	Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2001
	X	Bilog Antenna	SCHAFFNER	CBL6112B / 2705	Oct., 2001
	X	Horn Antenna	ETS	3115 / 0005-6160	July, 2001
	X	Pre-Amplifier	QTK	QTK-AMP-01/ 0001	July, 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



5.3. 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.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	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.

5.4. 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.

5.5. Test Result of Radiated Emission

Product : Notebook P.C.
Test Item : Harmonic Radiated Emission Data
Test Site : No.2 OATS
Test Mode : Channel 1(1Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal							
Peak Detector							
4824.000	6.19	33.70	0.00	18.50	<58.39	15.61	74.00
7236.000	7.35	36.72	0.00	20.29	<64.36	9.64	74.00
Average Detector							
4824.000	6.19	33.70	0.00	1.99	<41.88	12.12	54.00
7236.000	7.35	36.72	0.00	5.13	<49.20	4.80	54.00
Vertical							
Peak Detector							
4824.000	6.19	33.70	0.00	18.50	<58.39	15.61	74.00
7236.000	7.35	36.72	0.00	21.40	<65.47	8.53	74.00
Average Detector							
4824.000	6.19	33.70	0.00	6.19	<46.08	7.92	54.00
7236.000	7.35	36.72	0.00	6.68	<50.75	3.25	54.00

Note:

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

Product : Notebook P.C.
Test Item : Harmonic Radiated Emission Data
Test Site : No.2 OATS
Test Mode : Channel 6(1Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal							
Peak Detector							
4874.000	6.21	33.85	0.00	13.12	<53.18	20.82	74.00
7311.000	7.39	36.87	0.00	16.43	<60.69	13.31	74.00
Average Detector							
4874.000	6.21	33.85	0.00	2.18	<42.24	11.76	54.00
7311.000	7.39	36.87	0.00	4.54	<48.80	5.20	54.00
Vertical							
Peak Detector							
4874.000	6.21	33.85	0.00	13.12	<53.18	20.82	74.00
7311.000	7.39	36.87	0.00	16.42	<60.68	13.32	74.00
Average Detector							
4874.000	6.21	33.85	0.00	2.18	<42.24	11.76	54.00
7311.000	7.39	36.87	0.00	4.54	<48.80	5.20	54.00

Note:

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

Product : Notebook P.C.
Test Item : Harmonic Radiated Emission Data
Test Site : No.2 OATS
Test Mode : Channel 11(1Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal							
Peak Detector							
4924.000	6.25	33.99	0.00	15.02	<55.26	18.74	74.00
7386.000	7.42	37.06	0.00	15.75	<60.23	13.77	74.00
Average Detector							
4924.000	6.25	33.99	0.00	2.67	<42.91	11.09	54.00
7386.000	7.42	37.06	0.00	4.54	<49.02	4.98	54.00
Vertical							
Peak Detector							
4924.000	6.25	33.99	0.00	14.53	<54.77	19.23	74.00
7386.000	7.42	37.06	0.00	15.96	<60.44	13.56	74.00
Average Detector							
4924.000	6.25	33.99	0.00	2.46	<42.70	11.30	54.00
7386.000	7.42	37.06	0.00	5.04	<49.52	4.48	54.00

Note:

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

Product : Notebook P.C.
Test Item : Harmonic Radiated Emission Data
Test Site : No.2 OATS
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							
Peak Detector							
4824.000	6.19	33.70	19.50	38.00	<58.39	15.61	74.00
7236.000	7.35	36.72	18.32	38.61	<64.36	9.64	74.00
Average Detector							
4824.000	6.19	33.70	19.50	21.49	<41.88	12.12	54.00
7236.000	7.35	36.72	18.32	23.45	<49.20	4.80	54.00
Vertical							
Peak Detector							
4824.000	6.19	33.70	19.50	38.00	<58.39	15.61	74.00
7236.000	7.35	36.72	18.32	39.72	<65.47	8.53	74.00
Average Detector							
4824.000	6.19	33.70	19.50	25.69	<46.08	7.92	54.00
7236.000	7.35	36.72	18.32	25.00	<50.75	3.25	54.00

Note:

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

Product : Notebook P.C.
Test Item : Harmonic Radiated Emission Data
Test Site : No.2 OATS
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							
Peak Detector							
4874.000	6.21	33.85	19.49	32.61	<53.18	20.82	74.00
7311.000	7.39	36.87	18.26	34.69	<60.69	13.31	74.00
Average Detector							
4874.000	6.21	33.85	19.49	21.67	<42.24	11.76	54.00
7311.000	7.39	36.87	18.26	22.80	<48.80	5.20	54.00
Vertical							
Peak Detector							
4874.000	6.21	33.85	19.49	32.61	<53.18	20.82	74.00
7311.000	7.39	36.87	18.26	34.68	<60.68	13.32	74.00
Average Detector							
4874.000	6.21	33.85	19.49	21.67	<42.24	11.76	54.00
7311.000	7.39	36.87	18.26	22.80	<48.80	5.20	54.00

Note:

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

Product : Notebook P.C.
Test Item : Harmonic Radiated Emission Data
Test Site : No.2 OATS
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							
Peak Detector							
4924.000	6.25	33.99	19.49	34.51	<55.26	18.74	74.00
7386.000	7.42	37.06	18.22	35.16	<61.43	12.57	74.00
Average Detector							
4924.000	6.25	33.99	19.49	22.16	<42.91	11.09	54.00
7386.000	7.42	37.06	18.22	22.75	<49.02	4.98	54.00
Vertical							
Peak Detector							
4924.000	6.25	33.99	19.49	34.02	<54.77	19.23	74.00
7386.000	7.42	37.06	18.22	34.17	<60.44	13.56	74.00
Average Detector							
4924.000	6.25	33.99	19.49	21.95	<42.70	11.30	54.00
7386.000	7.42	37.06	18.22	23.25	<49.52	4.48	54.00

Note:

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

Product : Notebook P.C.
Test Item : General Radiated Emission Data
Test Site : No.1 OATS
Test Mode : Channel 1(1Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
*60.333	1.03	5.42	0.00	28.50	34.95	5.05	40.00
66.364	1.06	5.66	0.00	25.54	32.26	7.74	40.00
72.399	1.08	6.64	0.00	25.75	33.48	6.52	40.00
132.730	1.40	11.49	0.00	16.86	29.75	13.75	43.50
150.256	1.49	10.32	0.00	23.45	35.27	8.23	43.50
195.034	1.72	8.05	0.00	18.31	28.08	15.42	43.50
325.050	2.39	12.26	0.00	18.30	32.96	13.04	46.00
356.935	2.55	13.52	0.00	14.26	30.34	15.66	46.00
455.403	3.07	16.66	0.00	11.20	30.93	15.07	46.00
Vertical:							
60.336	1.03	5.15	0.00	25.54	31.71	8.29	40.00
66.370	1.06	5.86	0.00	25.15	32.06	7.94	40.00
*79.216	1.12	7.12	0.00	25.13	33.38	6.62	40.00
132.728	1.40	10.55	0.00	15.72	27.67	15.83	43.50
150.249	1.49	9.13	0.00	18.04	28.67	14.83	43.50
351.997	2.53	13.52	0.00	16.33	32.38	13.62	46.00
396.002	2.77	15.89	0.00	14.19	32.84	13.16	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- Pre Amp.

Product : Notebook P.C.
Test Item : General Radiated Emission Data
Test Site : No.1 OATS
Test Mode : Channel 6(1Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
*60.333	1.03	5.42	0.00	28.27	34.72	5.28	40.0
66.364	1.06	5.66	0.00	25.29	32.01	7.99	40.0
72.399	1.08	6.64	0.00	25.48	33.2	6.8	40.0
132.73	1.4	11.49	0.00	16.57	29.46	10.54	40.0
150.256	1.49	10.32	0.00	23.14	34.95	5.05	40.0
195.034	1.72	8.05	0.00	17.98	27.75	12.25	40.0
Vertical:							
60.336	1.03	5.15	0.00	25.39	31.57	8.43	40.0
66.370	1.06	5.86	0.00	24.99	31.91	8.09	40.0
*79.216	1.12	7.12	0.00	24.96	33.2	6.8	40.0
132.728	1.4	10.55	0.00	15.54	27.49	16.01	43.5
150.249	1.49	9.13	0.00	17.85	28.47	15.03	43.5
351.997	2.53	13.52	0.00	16.13	32.18	13.82	46.0

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- Pre Amp.

Product : Notebook P.C.
Test Item : General Radiated Emission Data
Test Site : No.1 OATS
Test Mode : Channel 11(1Mbps)

Freq.	Cable Loss	Probe Factor	PreAMP	Reading Level	Emission Level	Margin	Limit
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal:							
*60.333	1.03	5.42	0.00	28.35	34.80	5.20	40.0
66.364	1.06	5.66	0.00	25.38	32.10	7.90	40.0
72.399	1.08	6.64	0.00	25.58	33.30	6.70	40.0
132.73	1.40	11.49	0.00	16.68	29.57	10.43	40.0
150.256	1.49	10.32	0.00	23.26	35.07	4.93	40.0
195.034	1.72	8.05	0.00	18.11	27.88	12.12	40.0
Vertical:							
60.336	1.03	5.15	0.00	25.43	31.61	8.39	40.0
66.370	1.06	5.86	0.00	25.02	31.94	8.06	40.0
*79.216	1.12	7.12	0.00	24.98	33.22	6.78	40.0
132.728	1.40	10.55	0.00	15.55	27.5	16.00	43.5
150.249	1.49	9.13	0.00	17.85	28.47	15.03	43.5
351.997	2.53	13.52	0.00	16.12	32.17	13.83	46.0

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- Pre Amp.

Product : Notebook P.C.
Test Item : General Radiated Emission Data
Test Site : No.1 OATS
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:							
*66.364	1.06	5.66	0.00	25.32	32.04	7.96	40.00
72.399	1.08	6.64	0.00	25.43	33.15	6.85	40.00
132.73	1.40	11.49	0.00	16.44	29.33	10.67	40.00
150.256	1.49	10.32	0.00	22.93	34.74	5.26	40.00
195.034	1.72	8.05	0.00	17.69	27.46	12.54	40.00
356.935	2.55	13.52	0.00	13.54	29.61	10.39	40.00
455.403	3.07	16.66	0.00	10.38	30.11	9.89	40.00
Vertical:							
60.336	1.03	5.15	0.00	25.32	31.5	8.5	40.00
*66.370	1.06	5.86	0.00	24.92	31.84	8.16	40.00
79.216	1.12	7.12	0.00	24.89	33.13	6.87	40.00
132.728	1.40	10.55	0.00	15.47	27.42	16.08	43.50
150.249	1.49	9.13	0.00	17.78	28.4	15.1	43.50
351.997	2.53	13.52	0.00	16.06	32.11	13.89	46.00
396.002	2.77	15.89	0.00	13.91	32.57	13.43	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- Pre Amp.

Product : Notebook P.C.
Test Item : General Radiated Emission Data
Test Site : No.1 OATS
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:							
*66.364	1.06	5.66	0.00	25.31	32.03	7.97	40.00
72.399	1.08	6.64	0.00	25.5	33.22	6.78	40.00
132.73	1.40	11.49	0.00	16.59	29.48	10.52	40.00
150.256	1.49	10.32	0.00	23.16	34.97	5.03	40.00
195.034	1.72	8.05	0.00	18	27.77	12.23	40.00
356.935	2.55	13.52	0.00	13.93	30	10	40.00
455.403	3.07	16.66	0.00	10.85	30.58	9.42	40.00
Vertical:							
60.336	1.03	5.15	0.00	25.4	31.58	8.42	40.00
66.37	1.06	5.86	0.00	24.99	31.91	8.09	40.00
*79.216	1.12	7.12	0.00	24.95	33.19	6.81	40.00
132.728	1.4	10.55	0.00	15.52	27.47	16.03	43.50
150.249	1.49	9.13	0.00	17.82	28.44	15.06	43.50
351.997	2.53	13.52	0.00	16.09	32.14	13.86	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- Pre Amp.

Product : Notebook P.C.
Test Item : General Radiated Emission Data
Test Site : No.1 OATS
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:							
*60.333	1.03	5.42	0.00	28.34	34.79	5.21	40.00
66.364	1.06	5.66	0.00	25.35	32.07	7.93	40.00
72.399	1.08	6.64	0.00	25.53	33.25	6.75	40.00
132.73	1.4	11.49	0.00	16.61	29.5	10.5	40.00
150.256	1.49	10.32	0.00	23.17	34.98	5.02	40.00
195.034	1.72	8.05	0.00	18	27.77	12.23	40.00
Vertical:							
60.336	1.03	5.15	0.00	25.38	31.56	8.44	40.00
66.37	1.06	5.86	0.00	24.97	31.89	8.11	40.00
*79.216	1.12	7.12	0.00	24.93	33.17	6.83	40.00
132.728	1.4	10.55	0.00	15.5	27.45	16.05	43.50
150.249	1.49	9.13	0.00	17.8	28.42	15.08	43.50
351.997	2.53	13.52	0.00	16.07	32.12	13.88	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- Pre Amp.

6. Band Edge

6.1. Test Equipment

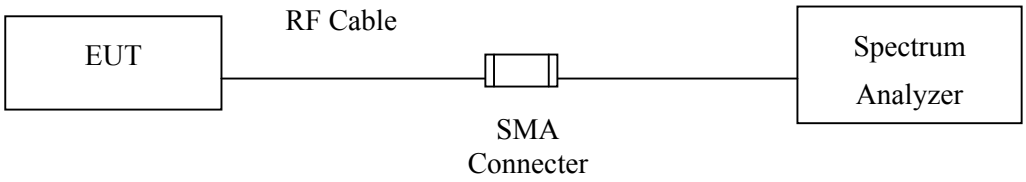
The following test equipments are used during the band edge tests:

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

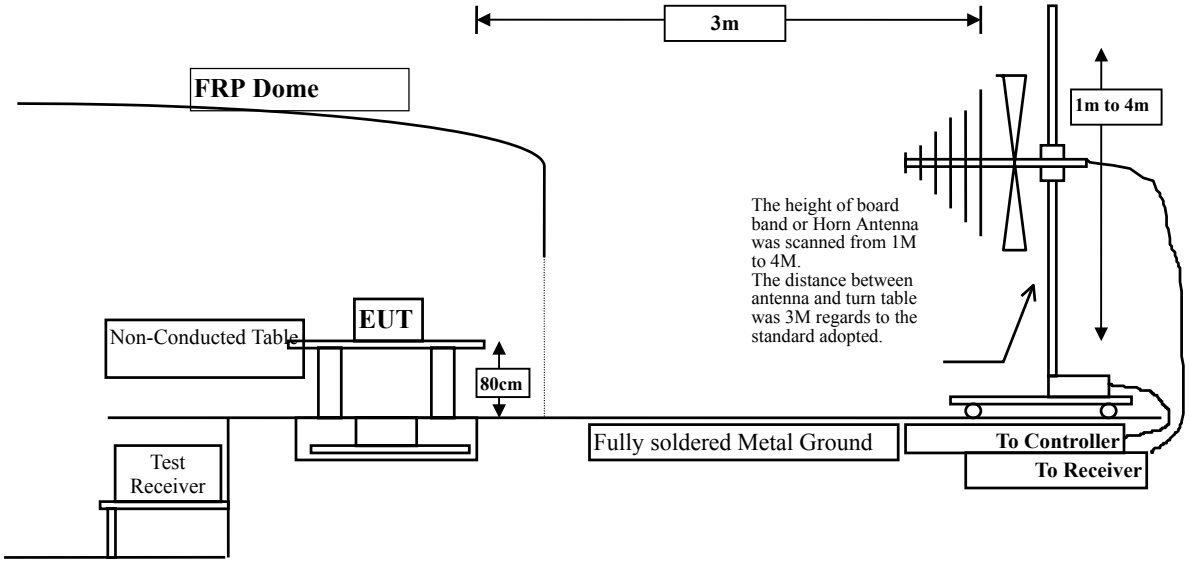
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.
2. Mark "X" test instruments are used to measure the final test results.

6.2. Test Setup

RF Conducted Measurement:



RF Radiated Measurement:



6.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

6.4. Limit

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 Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.5. 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 is 120 kHz, above 1GHz are 1 MHz.

6.6. Test Result of Band Edge

Product : Notebook P.C.
Test Item : Band Edge Data
Test Site : No.1 OATS
Test Mode : Channel 1 (1Mbps)

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)

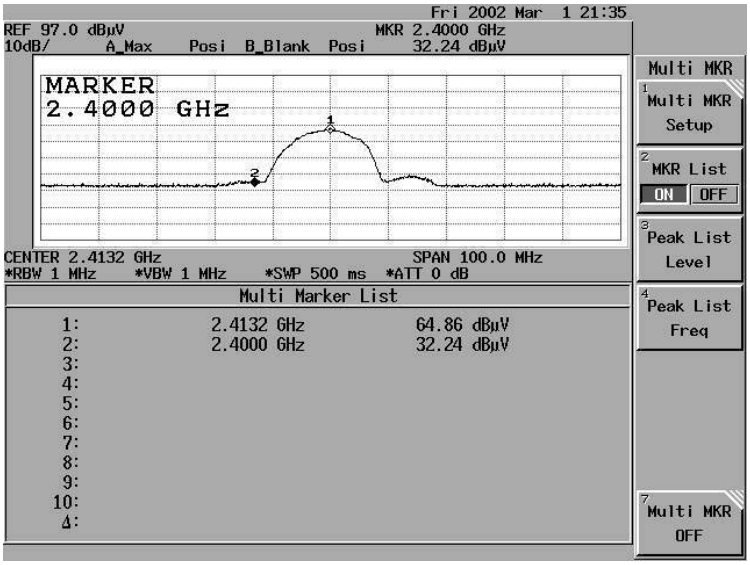
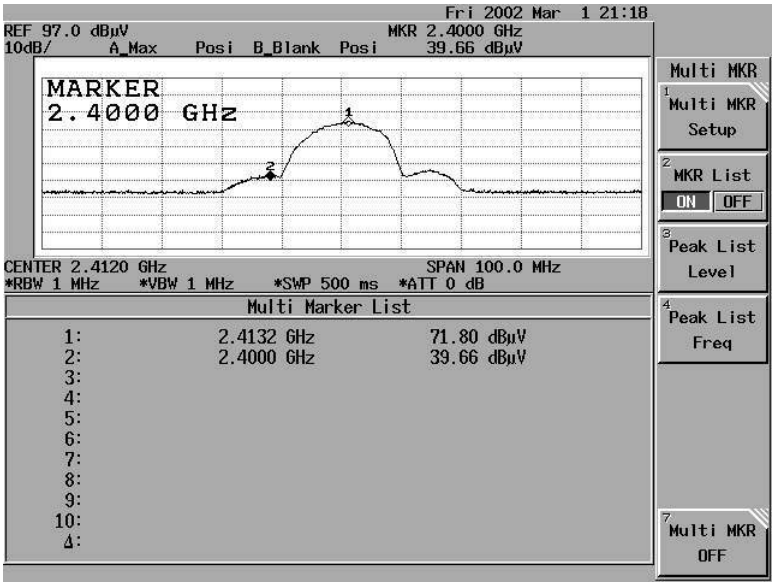


Figure Channel 1: (Vertical)



Product : Notebook P.C.
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)

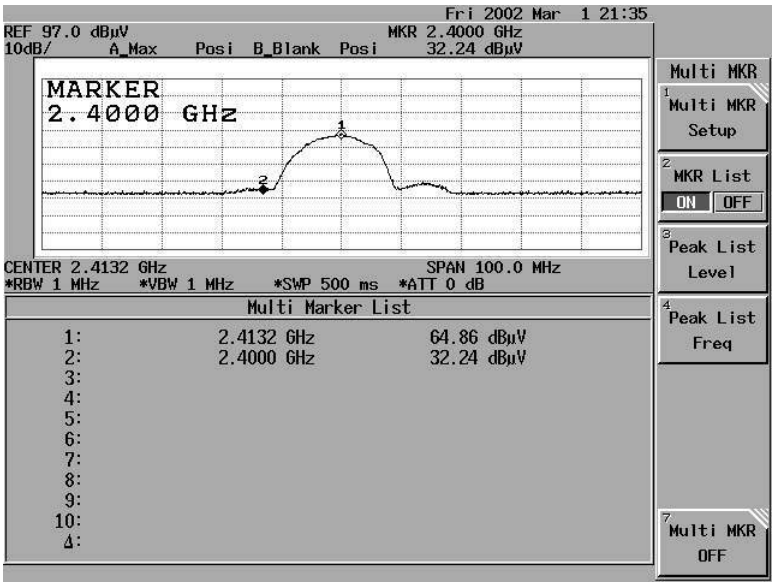
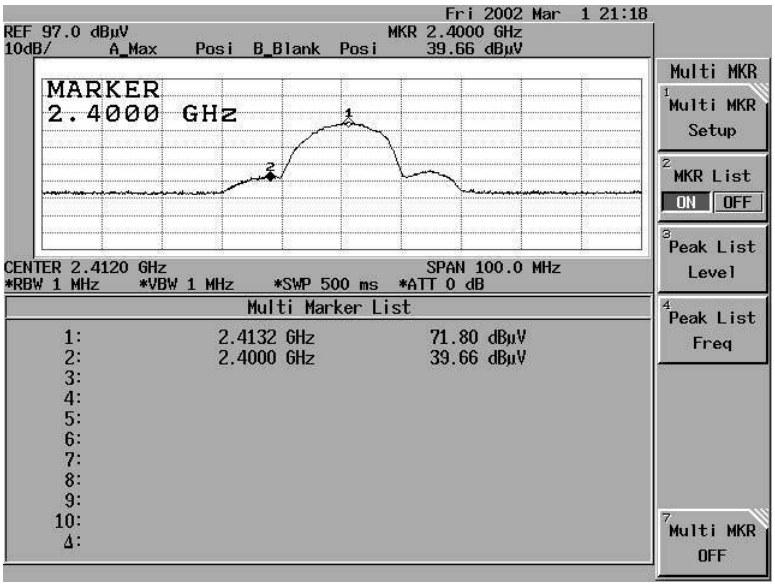


Figure Channel 1: (Vertical)



Product : Notebook P.C.
Test Item : Band Edge Data
Test Site : No.1 OATS
Test Mode : Channel 11 (1Mbps)

RF Radiated Measurement:

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Result
11(Horizontal)	2483.96	30.80	43.12	54	Pass
11 (Vertical)	2483.96	30.45	42.77	54	Pass

Figure Channel 11: (Horizontal)

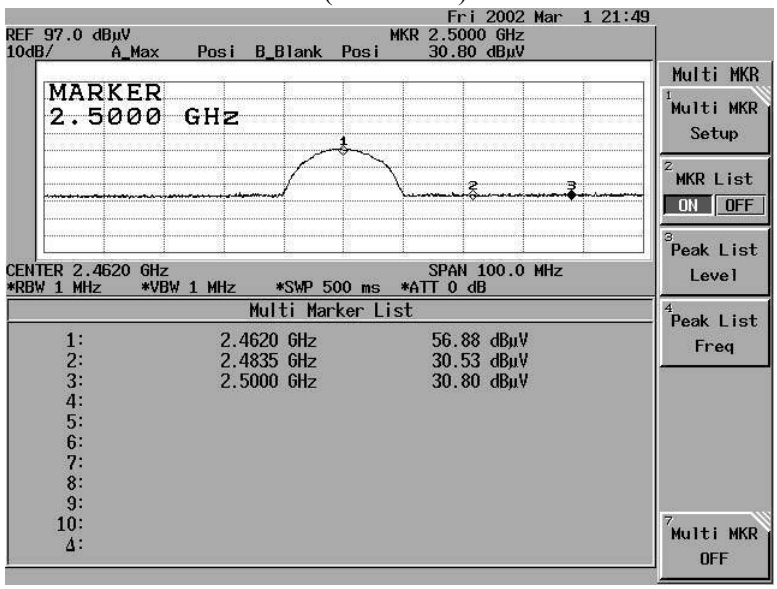
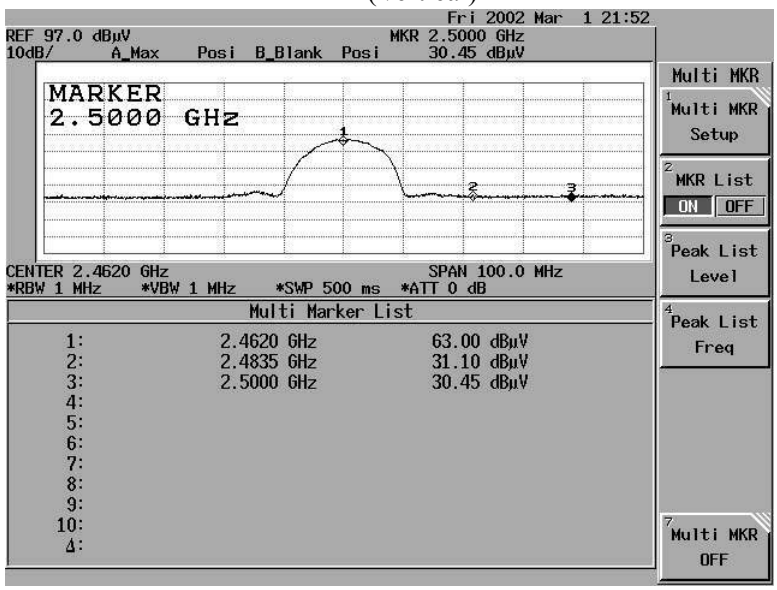


Figure Channel 11: (Vertical)



Product : Notebook P.C.
Test Item : Band Edge Data
Test Site : No.1 OATS
Test Mode : Channel 11 (11Mbps)

RF Radiated Measurement:

Channel No.	Frequency (MHz)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Result
11(Horizontal)	2483.96	30.80	43.12	54	Pass
11(Vertical)	2483.96	30.45	42.77	54	Pass

Figure Channel 11: (Horizontal)

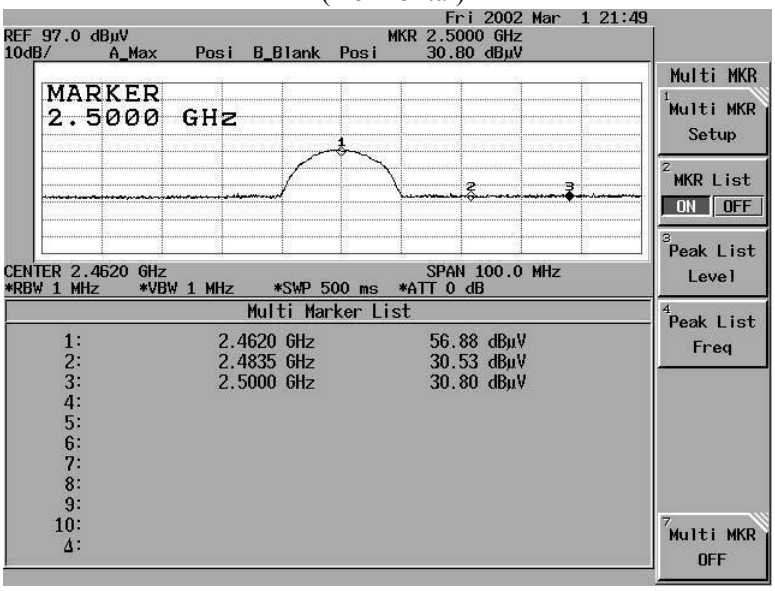
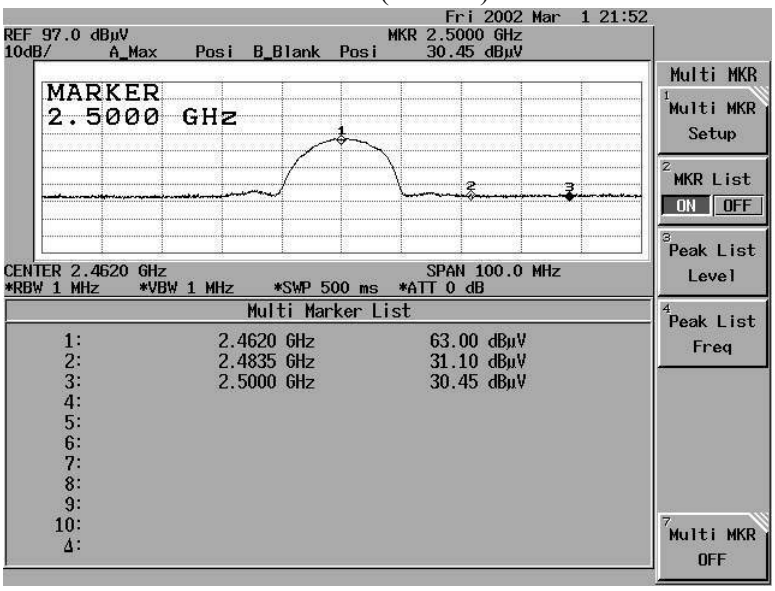


Figure Channel 11: (Vertical)



7. Occupied Bandwidth

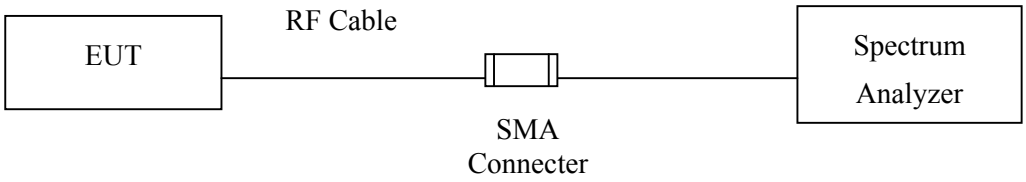
7.1. Test Equipment

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. Limit

The minimum bandwidth shall be at least 500kHz.

7.5. Test Result of Occupied Bandwidth

Product : Notebook P.C.
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)	2413.2	11000	>500	Pass
1 (11Mbps)	2413.2	11000	>500	Pass

Figure Channel 1: 1Mbps

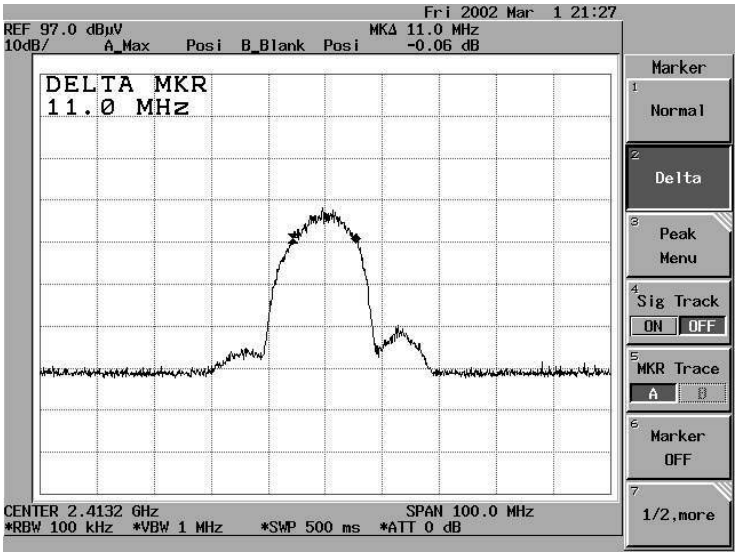
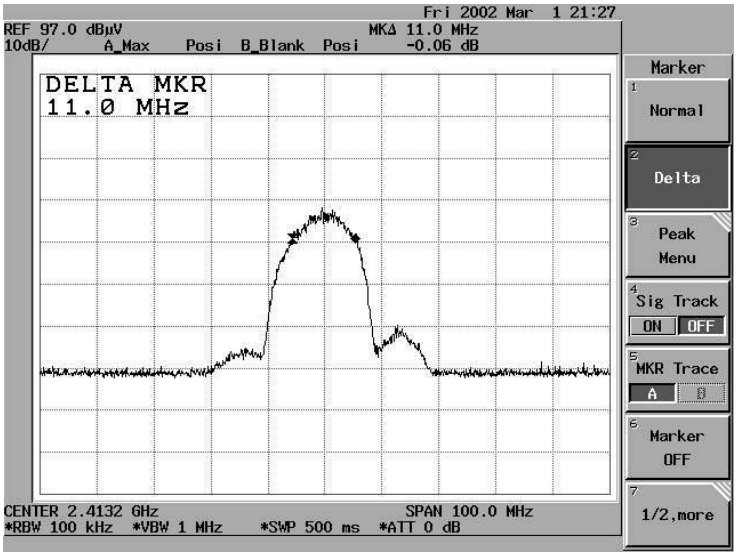


Figure Channel 1: 11Mbps



Product : Notebook P.C.
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)	2437	11200	>500	Pass
6 (11Mbps)	2437	11200	>500	Pass

Figure Channel 6: 1Mbps

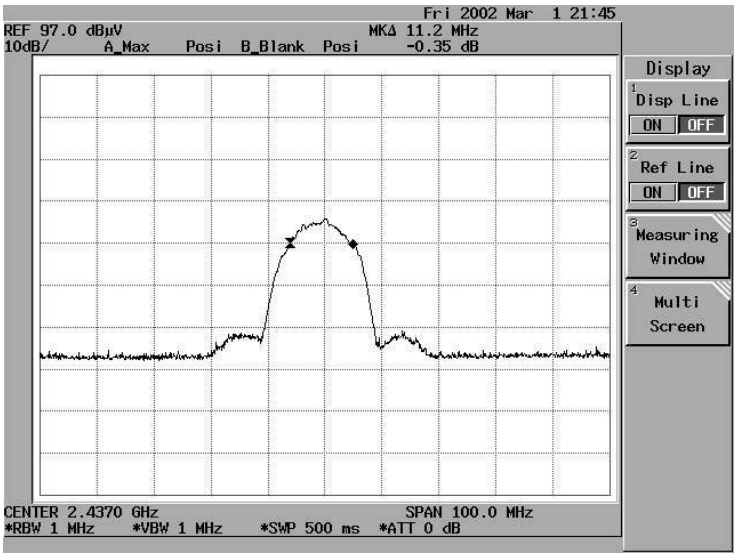
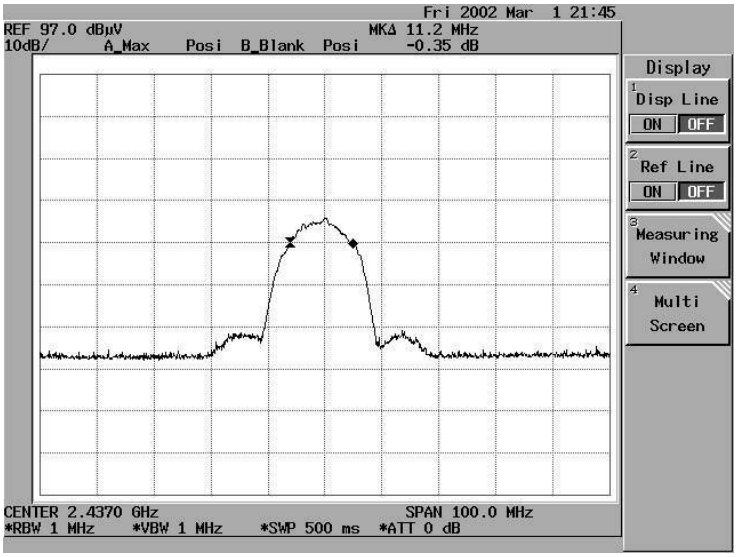


Figure Channel 6: 11Mbps



Product : Notebook P.C.
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)	2462	10000	>500	Pass
11 (11Mbps)	2462	10000	>500	Pass

Figure Channel 11: 1Mbps

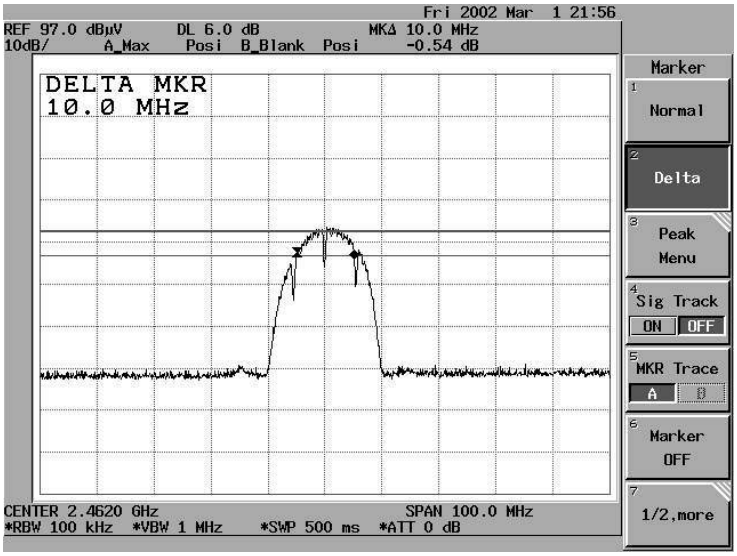
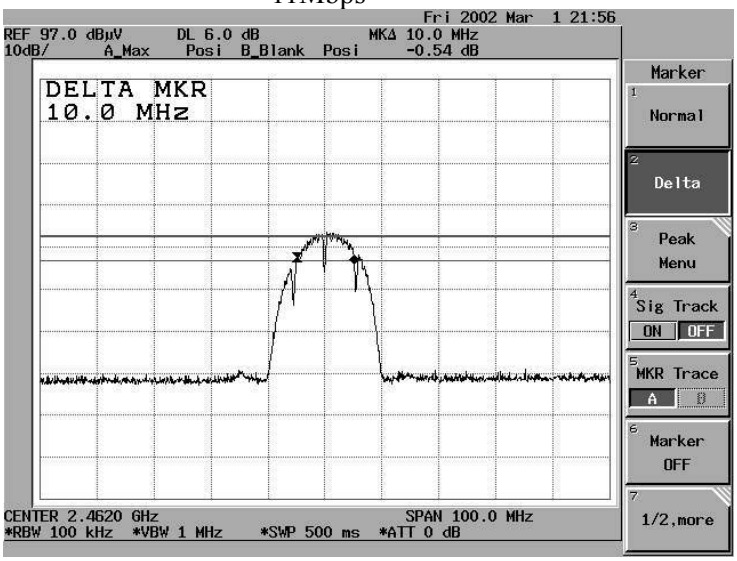


Figure Channel 11: 11Mbps



8. Transmitter Power Density

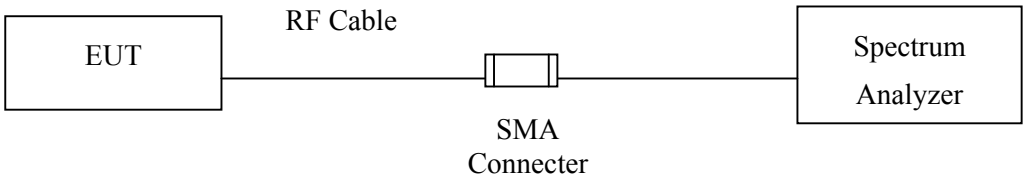
8.1. Test Equipment

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.

8.2. Test Setup



8.3. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

8.4. Limit

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

8.5. Test Result of Transmitter Power Density

Product : Notebook P.C.
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 (1Mbps)	2413.005	-17.45	< 8dBm	Pass
1 (11Mbps)	2412.471	-11.01	< 8dBm	Pass

Figure Channel 1: 1Mbps

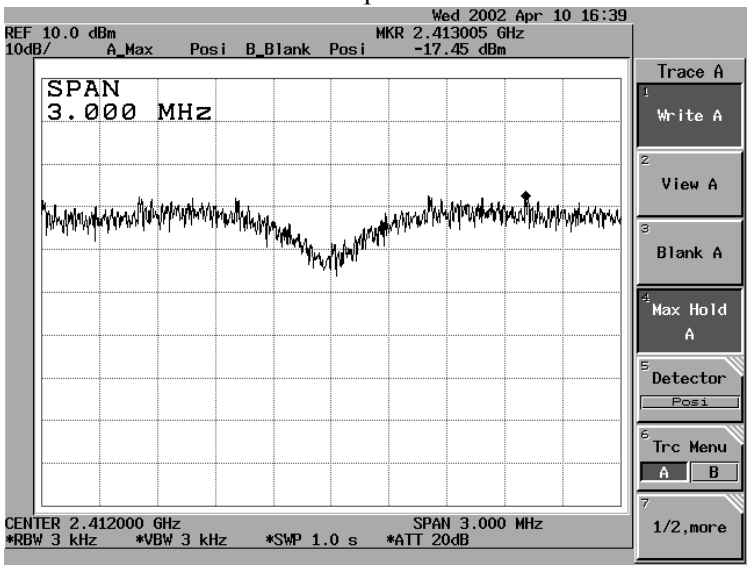
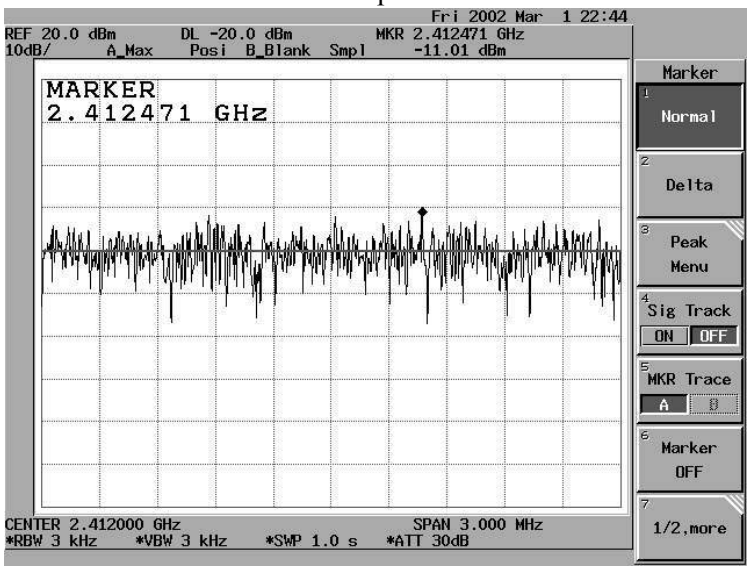


Figure Channel 1: 11Mbps



Product : Notebook P.C.
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 (1Mbps)	2436.151	-14.81	< 8dBm	Pass
6 (11Mbps)	2425.151	-12.83	< 8dBm	Pass

Figure Channel 6: 1Mbps

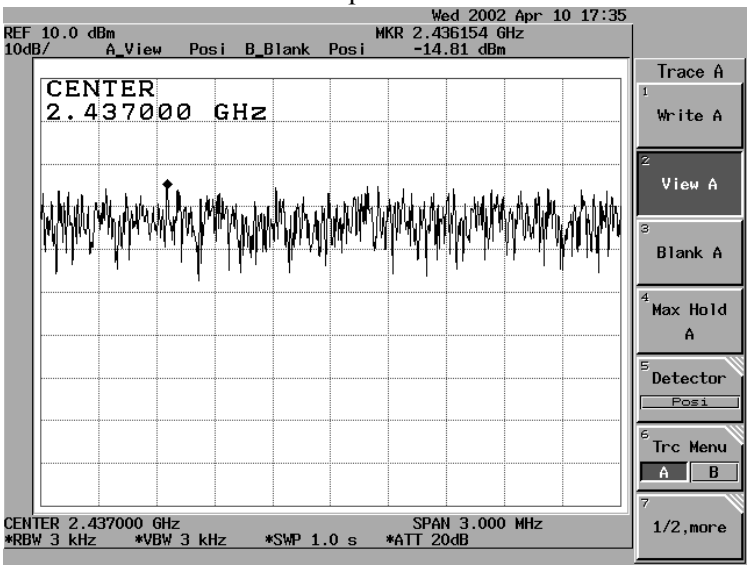
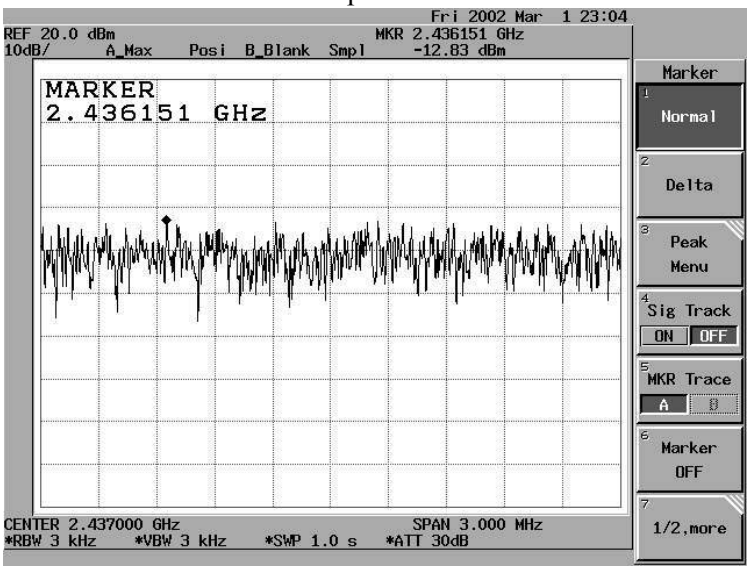


Figure Channel 6: 11Mbps



Product : Notebook P.C.
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 (1Mbps)	2462.495	-13.80	< 8dBm	Pass
11 (11Mbps)	2461.151	-14.36	< 8dBm	Pass

Figure Channel 11: 1Mbps

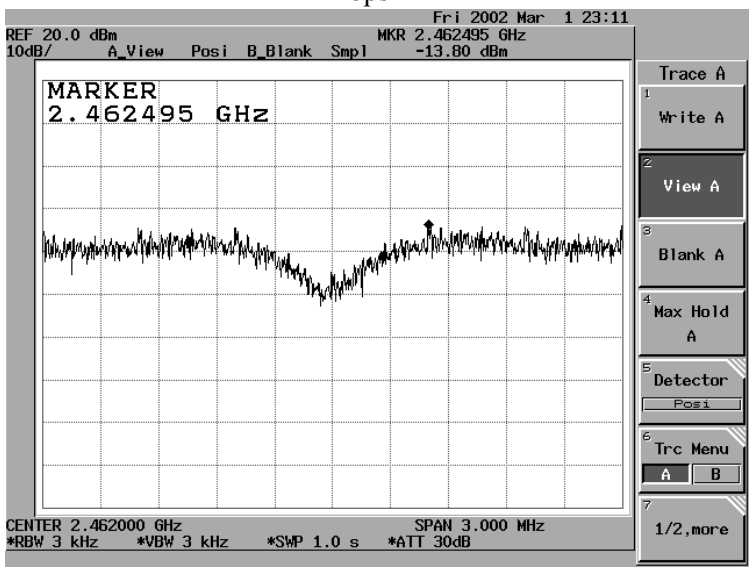
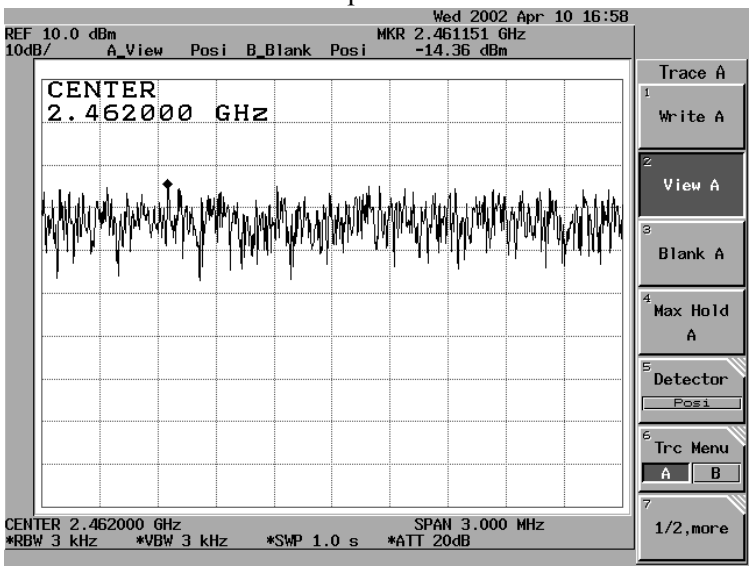


Figure Channel 11: 11Mbps



9. Processing Gain

9.1. Test Condition

Standard Temperature and Humidity, Standard Test Voltage

9.2. Limit

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

9.3. Test Procedure & Result

As EUT power is less than 20dBm, processing gain is not applicable.

10. EMI Reduction Method During Compliance Testing

No modification was made during testing.