



## Test Report

Product Name	Notebook P.C.
Model No.	701, 700, Eee PC 2G Surf, Eee PC 4G, Eee PC 4G Surf, Eee PC 8G
FCC ID	PPD-AR5BXB63

Applicant	Atheros Communications, Inc.
Address	5480 Great America Parkway Santa Clara CA 95054

Date of Receipt	Dec. 05, 2007
Issued Date	Dec. 11, 2007
Report No.	07C113RR-RFUSP05V01

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

Issued Date: Dec. 11, 2007

Report No.: 07C113RR-RFUSP05V01



Product Name	Notebook P.C.
Applicant	Atheros Communications, Inc.
Address	5480 Great America Parkway Santa Clara CA 95054
Manufacturer	Atheros Communications, Inc.
Model No.	701, 700, Eee PC 2G Surf, Eee PC 4G, Eee PC 4G Surf, Eee PC 8G
FCC ID.	PPD-AR5BXB63
Rated Voltage	AC 120V/60Hz
Working Voltage	DC 3.3V
Trade Name	AzureWave
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2006 ANSI C63.4: 2003
Test Result	Complied



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Tested By : *Tim Sung*

( Engineer / Tim Sung )



Approved By : *Vincent Lin*

( Deputy Manager / Vincent Lin )

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## 1. GENERAL INFORMATION

### 1.1. EUT Description

Product Name	Notebook P.C.
Trade Name	AzureWave
Model No.	701, 700, Eee PC 2G Surf, Eee PC 4G, Eee PC 4G Surf, Eee PC 8G
FCC ID	PPD-AR5BXB63
Frequency Range	2412MHz - 2462MHz
Number of Channels	11 in 2.4GHz band
Channel Separation	5MHz in 2.4GHz band
Channel Control	Auto
Data Rate	802.11b – 1, 2, 5.5, 11Mbps 802.11g – 6, 9, 12, 18, 24, 36, 48, 54Mbps
Type of Modulation	DSSS/ OFDM
Antenna Type	PIFA
Antenna Gain	Refer to the table “Antenna List”
Power Adapter	ASUS, EXA0702FG Cable out: Non-Shielded, 3.5m

#### Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	YAGEO	CAN4313 626 012501B (Main) CAN4313 626 022501B (Aux)	0.79 dBi for 2.4 GHz

## Frequency of Each Channel (2.4GHz):

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

## Note:

1. This device is a Notebook P.C. with a built-in 2.4GHz transceiver.
2. The EUT is including six models for different marketing requirement.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps, 802.11g is 6Mbps)
5. 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.
6. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

## 1.2. Operational Description

The EUT is a Notebook P.C. with a built-in 2.4GHz transceiver. There are 11 channels in 2412 – 2462MHz. The channels are separated by 5MHz. This device supports the data rates of 1, 2, 5.5, 11Mbps in 802.11b mode and 6, 9, 12, 18, 24, 36, 48, 54Mbps in 802.11g mode. The signals are modulated by DSSS in 802.11b mode and OFDM in 802.11g mode. The antenna type is PIFA.

Test Mode	Mode 1: Transmitter 802.11b
	Mode 2: Transmitter 802.11g

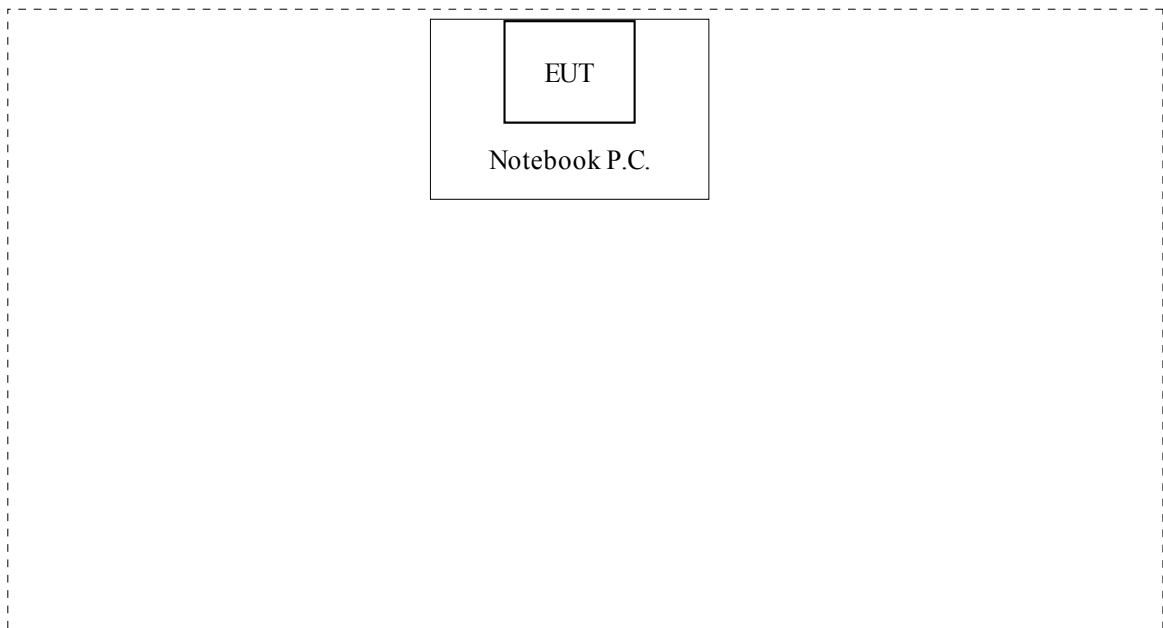
### 1.3. Tested System Details

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
(1) N/A	N/A	N/A	N/A	N/A

Signal Cable Type	Signal cable Description
A. N/A	N/A

### 1.4. Configuration of tested System



### 1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute 'ART.EXE' on the Notebook PC.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press "OK" to start the continuous transmission.
- (5) Verify that the EUT works properly.

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



Accreditation on NVLAP  
 NVLAP Lab Code: 200533-0



Site Name: Quietek Corporation  
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FCC Accreditation Number: TW1014



## 2. Peak Power Output

### 2.1. Test Equipment

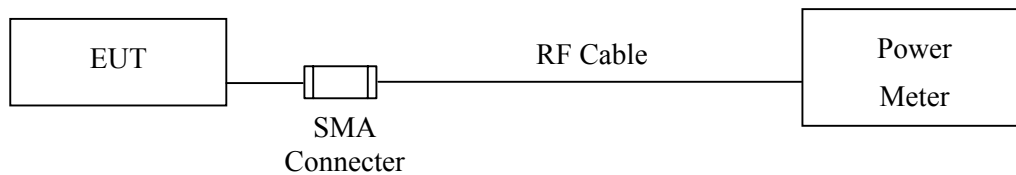
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No	Serial No.	Last Cal.	Remark
X	Power Meter	Anritsu	ML2495A	6K00003357	May., 2007	
X	Power Sensor	Anritsu	MA2491A	034457	May., 2007	

Note: 1. All equipments are calibrated every one year.  
 2. The test instruments marked by “X” are used to measure the final test results.

### 2.2. Test Setup

#### Conduction Power Measurement



### 2.3. Limits

The maximum peak power shall be less 1 Watt.

### 2.4. Test Procedure

- (1) The transmitter output was connected the Power Meter.
- (2) Select the middle channel of the operation band, and measure the peak output power value of each data rate.
- (3) Find out the worst-case data rate of previous procedure, and dependence on which data rate to measure the high and the low channel.

### 2.5. Uncertainty

± 1.27 dB

## 2.6. Test Result of Peak Power Output

Product : Notebook P.C.  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter 802.11b

Peak Power Output						
Channel No.	Frequency (MHz)	Data Rate				Required Limit
		1	2	5.5	11	
1	2412.00	23.51	23.47	23.35	23.41	1Watt= 30 dBm
6	2437.00	23.52	--	--	--	1Watt= 30 dBm
11	2462.00	23.61	--	--	--	1Watt= 30 dBm

Product : Notebook P.C.  
 Test Item : Peak Power Output Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmitter 802.11g

Peak Power Output										
Channel No.	Frequency (MHz)	Data Rate								Required Limit
		6	9	12	18	24	36	48	54	
1	2412.00	23.81	23.78	23.69	23.57	23.52	23.51	23.48	23.47	1Watt= 30 dBm
6	2437.00	26.58	--	--	--	--	--	--	--	1Watt= 30 dBm
11	2462.00	23.88	--	--	--	--	--	--	--	1Watt= 30 dBm

### 3. Radiated Emission

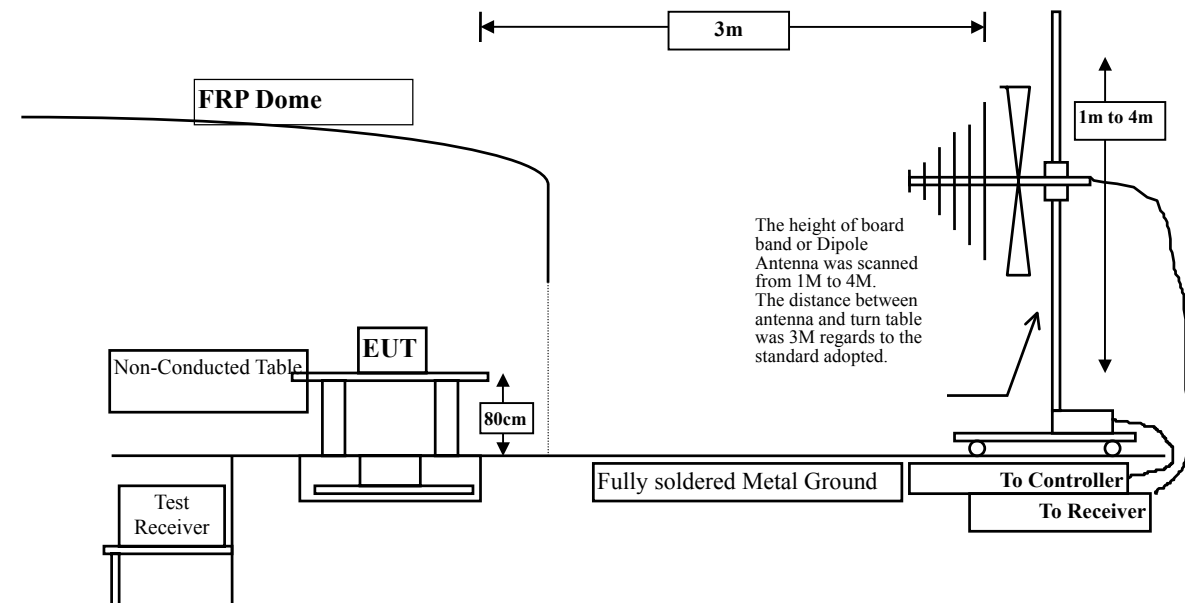
#### 3.1. Test Equipment

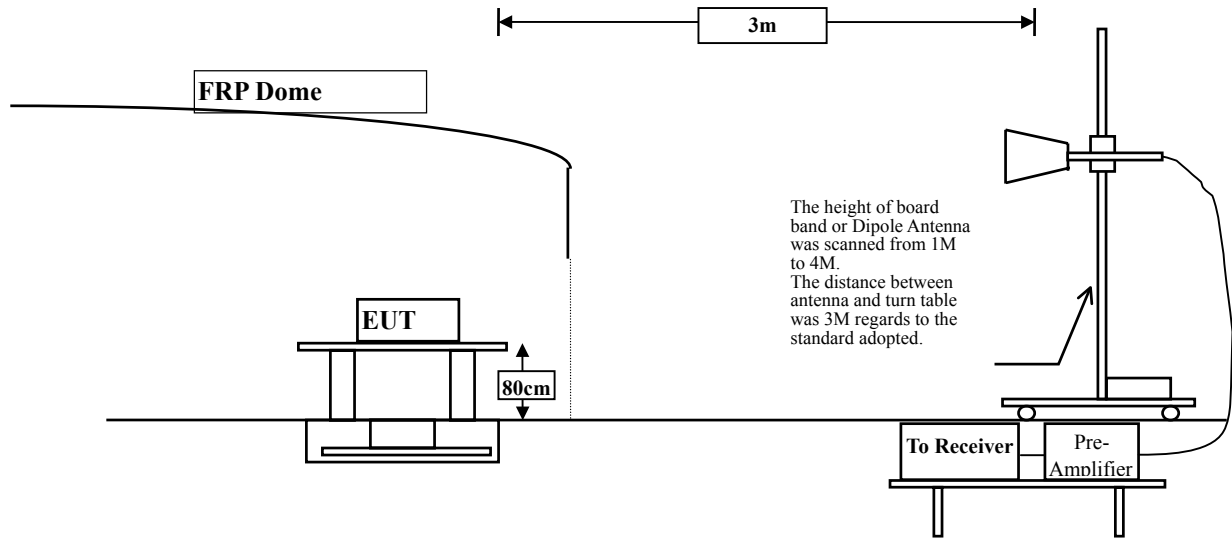
The following test equipment are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	Test Receiver	R & S	ESCS 30 / 825442/14	May, 2007
	Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2007
	Pre-Amplifier	HP	8447D/3307A01812	May, 2007
	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2007
	Horn Antenna	EM	EM6917 / 103325	May, 2007
Site # 2	Test Receiver	R & S	ESCS 30 / 825442/17	May, 2007
	Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2007
	Pre-Amplifier	HP	8447D/3307A01814	May, 2007
	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2007
	Horn Antenna	EM	EM6917 / 103325	May, 2007
Site # 3	X Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2007
	X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2007
	X Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2007
	X Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2007
	X Horn Antenna	ETS	3115 / 0005-6160	July, 2007
	X Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2007

- Note:
1. All equipments are calibrated every one year.
  2. The test instruments marked by “X” are used to measure the final test results.

#### 3.2. Test Setup





### 3.3. 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.

### 3.4. 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: 2003 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 is 120 kHz, above 1GHz are 1 MHz. The frequency range from 30MHz to 10th harmonics is checked.

### 3.5. Uncertainty

± 3.8 dB below 1GHz

± 3.9 dB above 1GHz

### 3.6. Test Result of Radiated Emission

Product : Notebook P.C.  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter 802.11b (2412MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
4824.000	3.723	47.130	50.853	-23.147	74.000
7236.000	9.439	38.670	48.109	-25.891	74.000
9648.000	11.829	39.900	51.729	-22.271	74.000
<b>Average Detector</b>					
--					
<b>Vertical</b>					
<b>Peak Detector</b>					
4824.000	3.723	41.830	45.553	-28.447	74.000
7236.000	9.439	39.090	48.529	-25.471	74.000
9648.000	11.829	42.990	54.819	-19.181	74.000
<b>Average Detector</b>					
9648.000	11.829	39.890	51.719	-2.281	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Notebook P.C.  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter 802.11b (2437MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
4874.000	3.893	47.830	51.722	-22.278	74.000
7311.000	9.624	43.080	52.704	-21.296	74.000
9748.000	11.805	40.780	52.586	-21.414	74.000
<b>Average Detector</b>					
--					
<b>Vertical</b>					
<b>Peak Detector</b>					
4874.000	3.893	43.320	47.212	-26.788	74.000
7311.000	9.624	42.650	52.274	-21.726	74.000
9748.000	11.805	41.580	53.386	-20.614	74.000
<b>Average Detector</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.



Product : Notebook P.C.  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter 802.11b (2462MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
4924.000	4.075	38.110	42.185	-31.815	74.000
7386.000	9.812	35.550	45.362	-28.638	74.000
9848.000	11.819	35.140	46.959	-27.041	74.000
<b>Average Detector</b>					
--					
<b>Vertical</b>					
<b>Peak Detector</b>					
4924.000	4.075	37.720	41.795	-32.205	74.000
7386.000	9.812	33.600	43.412	-30.588	74.000
9848.000	11.819	35.280	47.099	-26.901	74.000
<b>Average Detector</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Notebook P.C.  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3OATS  
 Test Mode : Mode 2: Transmitter 802.11g (2412 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
4824.000	3.723	36.110	39.833	-34.167	74.000
7236.000	9.439	34.540	43.979	-30.021	74.000
9648.000	11.829	35.090	46.919	-27.081	74.000
<b>Average Detector</b>					
--					
<b>Vertical</b>					
<b>Peak Detector</b>					
4824.000	3.723	36.190	39.913	-34.087	74.000
7236.000	9.439	34.160	43.599	-30.401	74.000
9648.000	11.829	34.330	46.159	-27.841	74.000
<b>Average Detector</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Notebook P.C.  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmitter 802.11g (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
4874.000	3.893	35.440	39.332	-34.668	74.000
7311.000	9.624	33.550	43.174	-30.826	74.000
9748.000	11.805	34.690	46.496	-27.504	74.000
<b>Average Detector</b>					
--					
<b>Vertical</b>					
<b>Peak Detector</b>					
4874.000	3.893	35.520	39.412	-34.588	74.000
7311.000	9.624	33.280	42.904	-31.096	74.000
9748.000	11.805	35.090	46.896	-27.104	74.000
<b>Average Detector</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Notebook P.C.  
 Test Item : Harmonic Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmitter 802.11g (2462 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
4924.000	4.075	36.120	40.195	-33.805	74.000
7386.000	9.812	32.990	42.802	-31.198	74.000
9848.000	11.819	34.150	45.969	-28.031	74.000
<b>Average Detector</b>					
--					
<b>Vertical</b>					
<b>Peak Detector</b>					
4924.000	4.075	36.670	40.745	-33.255	74.000
7386.000	9.812	33.030	42.842	-31.158	74.000
9848.000	11.819	34.690	46.509	-27.491	74.000
<b>Average Detector</b>					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz; Span:100MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:30Hz; Span:20MHz.
4. Measurement Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.

Product : Notebook P.C.  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 1: Transmitter 802.11b (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
128.700	11.934	20.100	32.034	-11.466	43.500
167.998	9.357	20.150	29.507	-13.993	43.500
229.990	9.909	23.300	33.209	-12.791	46.000
239.990	10.968	24.800	35.767	-10.233	46.000
500.000	16.975	16.300	33.275	-12.725	46.000
623.990	19.380	18.600	37.980	-8.020	46.000

### Vertical

#### Peak Detector

70.860	6.837	27.100	33.937	-6.063	40.000
120.000	10.679	21.300	31.979	-11.521	43.500
167.990	8.860	21.330	30.190	-13.310	43.500
230.400	10.278	18.360	28.637	-17.363	46.000
400.000	16.969	14.500	31.469	-14.531	46.000
500.000	17.070	13.800	30.869	-15.131	46.000

#### Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. "█" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

Product : Notebook P.C.  
 Test Item : General Radiated Emission Data  
 Test Site : No.3 OATS  
 Test Mode : Mode 2: Transmitter 802.11g (2437 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
<b>Horizontal</b>					
<b>Peak Detector</b>					
167.998	9.357	21.300	30.657	-12.843	43.500
229.900	9.895	23.100	32.995	-13.005	46.000
239.990	10.968	21.220	32.187	-13.813	46.000
500.000	16.975	13.400	30.375	-15.625	46.000
623.990	19.380	19.600	38.980	-7.020	46.000
720.000	19.282	15.100	34.382	-11.618	46.000
<b>Vertical</b>					
<b>Peak Detector</b>					
120.000	10.679	21.100	31.779	-11.721	43.500
167.990	8.860	23.100	31.960	-11.540	43.500
230.400	10.278	16.400	26.677	-19.323	46.000
400.000	16.969	15.100	32.069	-13.931	46.000
500.000	17.070	14.300	31.369	-14.631	46.000
720.000	20.516	11.500	32.016	-13.984	46.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. "█" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

#### 4. EMI Reduction Method During Compliance Testing

No modification was made during testing.