



Test Report

Product Name	IEEE802.11b/g Wireless LAN Mini-PCI Card
Model No.	EW-7358MG
FCC ID	WHD-DS-42-WG

Applicant	ORing Industrial Networking Corp.	
Address	4F., No.3, Lane 235, Baociao Rd., Sindian City, Taipei	
	County, Taiwan (R.O.C.)	

Date of Receipt	July. 07, 2008
Issued Date	July. 15, 2008
Report No.	087153R-RFUSP05V01
Version	V1.0

The test results relate only to the samples tested.

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Test Report Certification

Issued Date: July. 15, 2008 Report No.: 087153R-RFUSP05V01



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200533-0

Product Name	IEEE802.11b/g Wireless LAN Mini-PCI Card			
Applicant	ORing Industrial Networking Corp.			
Address	4F., No.3, Lane 235, Baociao Rd., Sindian City, Taipei County, Taiwan			
	(R.O.C.)			
Manufacturer	ORing Industrial Networking Corp.			
Model No.	EW-7358MG			
Rated Voltage	DC 12V			
Working Voltage	DC 12V			
Trade Name	ORing			
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2007			
	ANSI C63.4: 2003			
Test Result	Complied NVLAP Lab Code: 200533-0 U			

The test results relate only to the samples tested.

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Approved By

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lac-MRA



(Manager / Vincent Lin)



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Attachment 1: EUT Test Photographs
Attachment 2: EUT Detailed Photographs



1. GENERAL INFORMATION

1.1. EUT Description

Product Name	IEEE802.11b/g Wireless LAN Mini-PCI Card		
Trade Name	ORing		
Model No.	EW-7358MG		
FCC ID	WHD-DS-42-WG		
Frequency Range	802.11b/g: 2412-2462MHz		
Channel Number	802.11b/g: 11		
Data Speed	IEEE 802.11b – 1, 2, 5.5, 11Mbps		
	IEEE 802.11g – 6, 9, 12, 18, 24, 36 48, 54Mbps		
Type of Modulation	802.11b:DSSS		
	DBPSK, DQPSK, CCK		
	802.11g: OFDM		
	BPSK, QPSK, 16QAM, 64QAM		
Channel Control	Auto		
Antenna Type	Dipole		
Antenna Gain	Refer to the table "Antenna List"		

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	ARISTOTLE	RFA-02-C2M2-03	2.09dBi in 2.4 GHz

802.11b/g Center Frequency of Each Channel:

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		



- 1. The EUT is IEEE 802.11b/g 2.4GHz WLAN transceiver.
- 2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
- 3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps and 802.11g is 6Mbps)
- 4. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.247 for direct sequence spread spectrum devices.
- 5. The EUT is certification Limit Modular Approval and combine in host for test, the host model number is IDS-5042-WG.
- 6. The EUT will combine below Host and sell in the market.

Model Number	Description	Different
IDS-5042-WG	Industrial 4-port RS232/422/485 to 802.11 b/g WLAN and	CPU+RS-232/422/485 IO +
	2-port 100TX LAN Device Server	WLAN
IDS-5642-WG	Industrial Security 4-port RS232/422/485 to 802.11 b/g WLAN	CPU+RS-232/422/485 IO +
	and 2-port 100TX LAN Device Server	WLAN
IDS-5042-IWG	Industrial 4-port RS-422/485 with 2 KV isolation to 802.11 b/g	CPU+RS-422/485 IO+ WLAN
	WLAN and 2-port 100TX LAN Redundant Device Server	
IDS-5642-IWG	Industrial Security 4-port RS-422/485 with 2 KV isolation to	CPU+RS-422/485 IO+ WLAN
	802.11 b/g WLAN and 2-port 100TX LAN Redundant Device	
	Server	
IAP-6002-WG	Industrial 802.11 b/g Access Point with 2-port 100TX LAN	CPU+ WLAN
IAP-6002-WG+	Industrial PoE 802.11 b/g Access Point with 2-port 100TX LAN	CPU+WLAN+POE
IAR-7002-WG	Industrial 802.11 b/g Access Point Router with 2-port 100TX LAN	CPU+WLAN+USB port
	Industrial PoE 802.11 b/g Access Point Router with 2-port 100TX LAN	CPU+WLAN+ POE+USB port



1.2. Operational Description

The EUT is Mini PCI interface and certification Limited Modular Approval. The EUT is 802.11b/g wireless LAN card and powered by Host. This device provides four kinds of transmitting speed 1, 2, 5.5 and 11Mbps. The modulation of device is BPSK, QPSK and CCK (IEEE 802.11b) and eight kinds of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mbps are provided. The technology of this device used is OFDM (IEEE 802.11g).

The device adapts direct sequence spread spectrum modulation. The antenna provides diversity function to improve the receiving function.

This device, compliant with IEEE 802.11b and IEEE 802.11g, is a high-efficiency Wireless LAN adapter. It allows your computer to connect to a wireless network and to share resources, such as files or printers without being bound to the network wires.

Another information please refer to users manul.

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



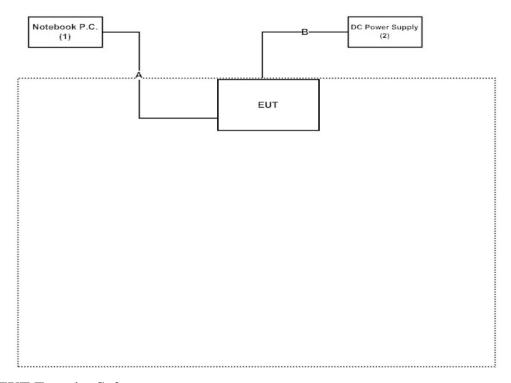
1.3. Tested System Datails

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)	Notebook P.C.	DELL	PP04X	2D2ZM1S	Non-Shielded, 0.8m
(2)	DC Power Supply	Agilent	E3646A	MY40008217	Non-Shielded, 0.8m

Signal Cable Type		Signal cable Description
A	LAN Cable	Non-Shielded,8m
В	DC power line	Non-Shielded,2m

1.4. Configuration of Test System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4
- (2) Execute <u>Http://192.168.10.2</u> Web site on the EUT.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press "OK" to start the continuous Transmit.
- (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

Registration Number: 92195

Accreditation on NVLAP NVLAP Lab Code: 200533-0

Site Name: Quietek Corporation

Site Address: No. 5-22, Ruei-Shu Valley, Ruei-Ping Tsuen,

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E-Mail: service@quietek.com

FCC Accreditation Number: TW1014







2. Conducted Emission

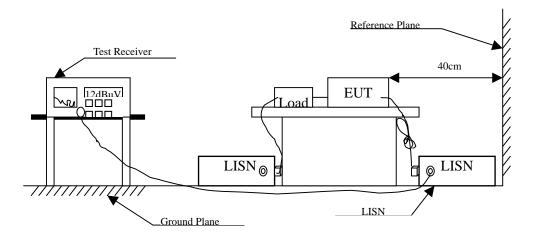
2.1. Test Equipment

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, 2008	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2008	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2008	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2008	
5	No.1 Shielded Room	N/A			

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit							
Frequency	Limits						
MHz	uV	dBuV					
0.15 - 0.50	66-56 _(i±)	56-46 _(註)					
0.50-5.0	56	46					
5.0 - 30	60	50					

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2.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 dB



2.6. Test Result of Conducted Emission

Owing to the DC operation of EUT, this test item is not performed.



3. Peak Power Output

3.1. Test Equipment

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

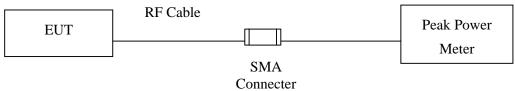
Equipment		Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2008
X	Power Sensor	Anritsu	MA2491A/034457	May, 2008

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

3.2. Test Setup

Conducted Measurement



3.3. Test procedures

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

3.4. Limits

The maximum peak power shall be less 1 Watt.

3.5. Uncertainty

± 1.27 dB



3.6. Test Result of Peak Power Output

Product : IEEE802.11b/g Wireless LAN Mini-PCI Card

Test Item : Peak Power Output Data

Test Site : No.3 OATS

Test Mode : Mode 1: Transmitter 802.11b

Cabl	e loss=0.5dB	Peak Power Output Value (dBm)				
CI 1N	Frequency (MHz)					
Channel No.		1 Mbps	2Mbps	5.5Mbps	11Mbps	Required Limit
1	2412.00				18.05	1Watt= 30 dBm
6	2437.00	17.85	17.92	17.93	18.07	1Watt= 30 dBm
11	2462.00				18.12	1Watt= 30 dBm

Note: Peak Power Output Value =Reading value on peak power meter + cable loss



Test Item : Peak Power Output Data

Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g

Cable loss=0.5dB Peak Power Output Value			ıt Value (d	lBm)						
Channel	Frequency		Data Rate (Mbps)							D : 17: :
No.	(MHz)	6 Mbps	9 Mbps	12 Mbps	18 Mbps	24 Mbps	36 Mbps	48 Mbps	54 Mbps	Required Limit
1	2412.00	-	-	-	-	-		1	17.58	1Watt= 30 dBm
6	2437.00	17.01	17.15	1708	17.1	17.23	17.22	17.25	17.47	1Watt= 30 dBm
11	2462.00								17.71	1Watt= 30 dBm

Note: Peak Power Output Value = Reading value on peak power meter + cable loss



4. Radiated Emission

4.1. Test Equipment

The following test equipments 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, 2008
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 2008
		Pre-Amplifier	HP	8447D/3307A01812	May, 2008
		Bilog Antenna	Chase	CBL6112B / 12452	Sep., 2007
		Horn Antenna	EM	EM6917 / 103325	May, 2008
Site # 2		Test Receiver	R & S	ESCS 30 / 825442/17	May, 2008
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 2008
		Pre-Amplifier	HP	8447D/3307A01814	May, 2008
		Bilog Antenna	Chase	CBL6112B / 2455	Sep., 2007
		Horn Antenna	EM	EM6917 / 103325	May, 2008
Site #3	X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
	X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2008
	X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2008
	X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2008
	X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2008
	X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2008
	X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2008

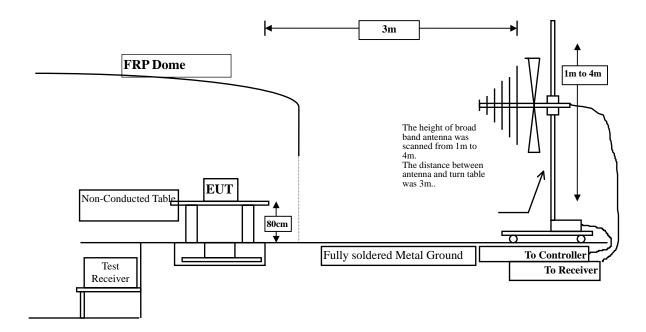
Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

^{2.} The test instruments marked with "X" are used to measure the final test results.

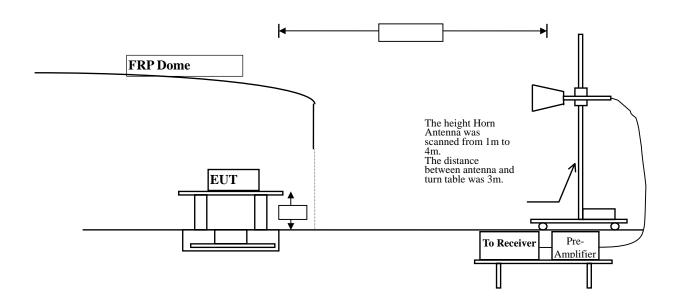


4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz





4.3. 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@					
30-88	100	40				
88-216	150	43.5				
216-960	200	46				
Above 960	500	54				

Remarks: E field strength $(dBuV/m) = 20 \log E$ field strength (uV/m)



4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 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 is scanned between 1 meter and 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB beamwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

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

4.5. Uncertainty

- + 3.9 dB above 1GHz
- ± 3.8 dB below 1GHz



4.6. Test Result of Radiated Emission

Product : IEEE802.11b/g Wireless LAN Mini-PCI Card

Test Item : Harmonic Radiated Emission Data

Test Site : No.3 OATS

Test Mode : Mode 1: Transmitter 802.11b (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	-0.229	41.020	40.791	-33.209	74.000
7236.000	3.182	44.340	47.522	-26.478	74.000
9648.000	5.798	41.510	47.309	-26.691	74.000
Average					
Detector:					
Vertical					
Peak Detector:					
4824.000	-0.229	43.750	43.521	-30.479	74.000
7236.000	3.182	41.900	45.082	-28.918	74.000
9648.000	5.798	42.190	47.989	-26.011	74.000
Average					
Detector:					

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Harmonic Radiated Emission Data

Test Site : No.3 OATS

Test Mode : Mode 1: Transmitter 802.11b (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	-0.268	43.110	42.842	-31.158	74.000
7311.000	3.285	41.690	44.976	-29.024	74.000
9748.000	6.190	41.280	47.470	-26.530	74.000
Average					
Detector:					
Vertical					
Peak Detector:					
4874.000	-0.268	42.990	42.722	-31.278	74.000
7311.000	3.285	41.960	45.246	-28.754	74.000
9748.000	6.190	41.000	47.190	-26.810	74.000
Average					
Detector:					

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Harmonic Radiated Emission Data

Test Site : No.3 OATS

Test Mode : Mode 1: Transmitter 802.11b (2462 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4924.000	0.105	42.340	42.445	-31.555	74.000
7386.000	3.644	42.960	46.605	-27.395	74.000
9848.000	6.582	40.300	46.882	-27.118	74.000
Average					
Detector:					
Vertical					
Peak Detector:					
4924.000	-0.058	42.510	42.451	-31.549	74.000
7386.000	3.644	42.240	45.885	-28.115	74.000
9848.000	6.582	40.030	46.612	-27.388	74.000
Average					
Detector:					

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Harmonic Radiated Emission Data

Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	-0.229	42.410	42.181	-31.819	74.000
7236.000	3.182	41.740	44.922	-29.078	74.000
9648.000	5.798	42.050	47.849	-26.151	74.000
Average					
Detector:					
Vertical					
Peak Detector:					
4824.000	-0.229	41.470	41.241	-32.759	74.000
7236.000	3.182	41.470	44.652	-29.348	74.000
9648.000	5.798	42.510	48.309	-25.691	74.000
Average					
Detector:					

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Harmonic Radiated Emission Data

Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4874.000	-0.268	41.970	41.702	-32.298	74.000
7311.000	3.285	40.950	44.236	-29.764	74.000
9748.000	6.190	40.800	46.990	-27.010	74.000
Average					
Detector:					
Vertical					
Peak Detector:					
4874.000	-0.268	41.190	40.922	-33.078	74.000
7311.000	3.285	41.270	44.556	-29.444	74.000
9748.000	6.190	42.510	48.700	-25.300	74.000
Average					
Detector:					

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Harmonic Radiated Emission Data

Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g (2462 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4924.000	0.105	42.620	42.725	-31.275	74.000
7386.000	3.644	40.840	44.485	-29.515	74.000
9848.000	6.582	40.420	47.002	-26.998	74.000
Average					
Detector:					
Vertical					
Peak Detector:					
4924.000	0.105	42.300	42.405	-31.595	74.000
7386.000	3.644	41.010	44.655	-29.345	74.000
9848.000	6.582	40.160	46.742	-27.258	74.000
Average					
Detector:					

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : General Radiated Emission Data

Test Site : No.3 OATS

Test Mode : Mode 1: Transmitter 802.11b (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
198.780	8.253	23.364	31.617	-11.883	43.500
439.340	15.587	18.733	34.320	-11.680	46.000
600.360	17.746	17.904	35.650	-10.350	46.000
660.500	18.611	17.043	35.654	-10.346	46.000
716.760	18.197	16.294	34.491	-11.509	46.000
846.740	19.579	18.839	38.418	-7.582	46.000
Vertical					
202.660	8.528	29.167	37.695	-5.805	43.500
472.320	16.503	19.428	35.931	-10.069	46.000
528.580	16.927	19.476	36.403	-9.597	46.000
623.640	18.888	15.886	34.774	-11.226	46.000
802.120	19.160	17.748	36.908	-9.092	46.000
930.160	21.320	15.930	37.250	-8.750	46.000

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : General Radiated Emission Data

Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g (2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
198.780	8.253	28.432	36.685	-6.815	43.500
600.360	17.746	20.217	37.963	-8.037	46.000
623.640	18.488	19.877	38.365	-7.635	46.000
664.640	18.335	21.598	39.933	-6.067	46.000
782.720	18.962	18.839	37.801	-8.199	46.000
846.740	19.579	16.558	36.137	-9.863	46.000
Vertical					
200.720	8.300	29.098	37.398	-6.102	43.500
472.320	16.503	19.711	36.214	-9.786	46.000
528.580	16.927	19.626	36.553	-9.447	46.000
674.080	17.688	22.522	40.210	-5.790	46.000
800.180	19.247	18.599	37.846	-8.154	46.000
926.280	21.306	15.866	37.172	-8.828	46.000

- 1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



5. RF antenna conducted test

5.1. **Test Equipment**

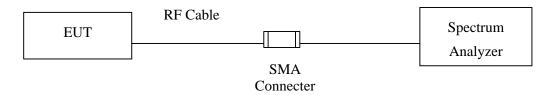
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.	
	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008	_
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008	
	Spectrum Analyzer	Agilent	N9010A / MY48030495	April, 2008	

- Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 - 2. The test instruments marked with "X" are used to measure the final test results.

5.2. Test Setup

RF antenna Conducted Measurement:



5.3. Limits

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)).

5.4. **Test Procedure**

The EUT was tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

5.5. Uncertainty

The measurement uncertainty

Conducted is defined as \pm 1.27dB



5.6. Test Result of RF antenna conducted test

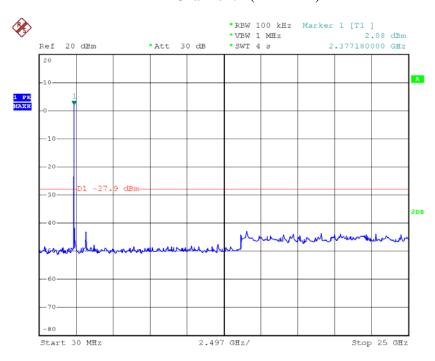
Product : IEEE802.11b/g Wireless LAN Mini-PCI Card

Test Item : RF antenna conducted test

Test Site : No.3 OATS

Test Mode : Mode 1: Transmitter 802.11b

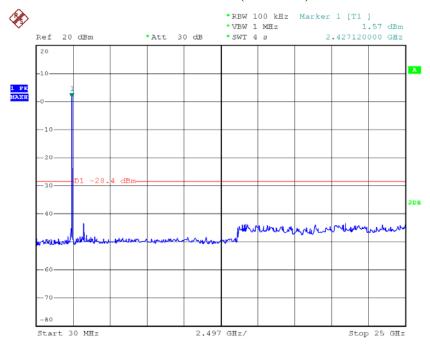
Channel 01 (2412MHz)



Date: 9.JUL.2008 11:05:35

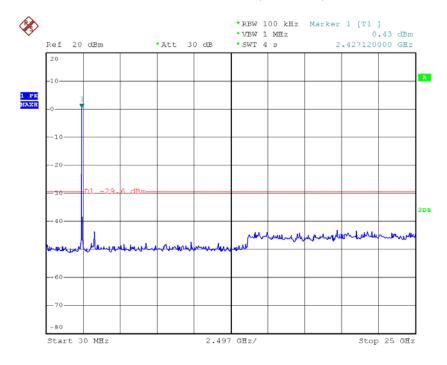


Channel 06 (2437MHz)



Date: 9.JUL.2008 11:06:23

Channel 11 (2462MHz)



Date: 9.JUL.2008 11:07:01

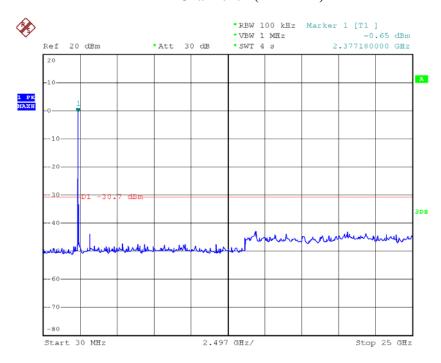


Test Item : RF Antenna Conducted Spurious

Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g

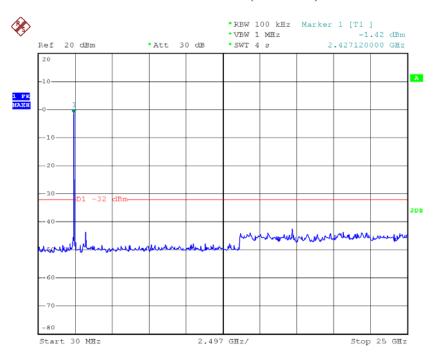
Channel 01 (2412MHz)



Date: 9.JUL.2008 11:07:44

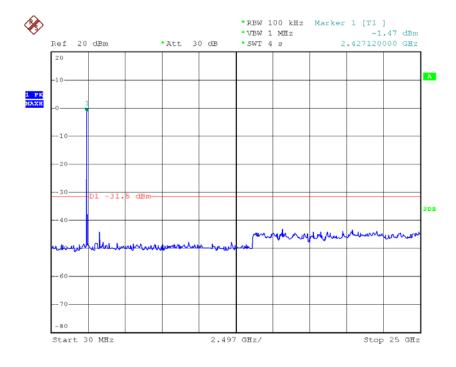


Channel 06 (2437MHz)



Date: 9.JUL.2008 11:08:39

Channel 11 (2462MHz)



Date: 9.JUL.2008 11:09:16



6. Radiated Emission Band Edge

6.1. Test Equipment

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

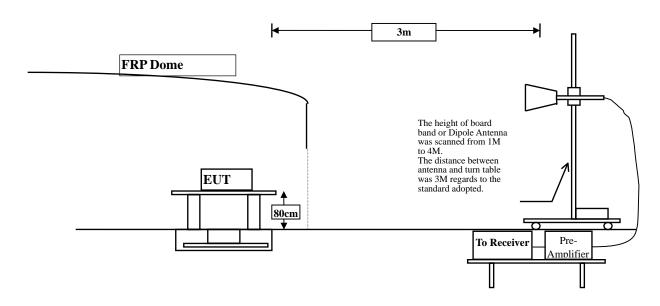
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2008
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2008
X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2008
X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2008
X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2008
X	Pre-Amplifier	HP	8449B / 3008A01123	July, 2008

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

6.2. Test Setup

RF Radiated Measurement:



6.3. 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.



6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 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 is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

6.5. Uncertainty

± 3.9 dB above 1GHz



6.6. Test Result of Band Edge

Product : IEEE802.11b/g Wireless LAN Mini-PCI Card

Test Item : Band Edge Data
Test Site : No.3 OATS

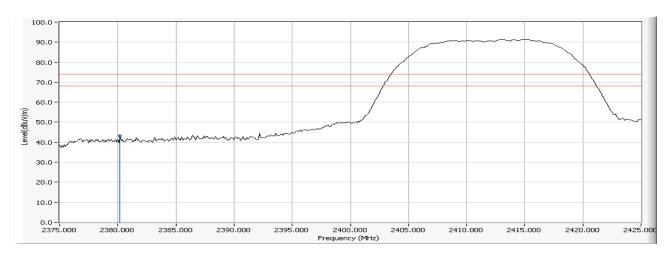
Test Mode : Mode 1: Transmitter 802.11b

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
1 (Peak)	2380.200	-6.799	50.026	43.227	74.00	54.00	Pass
1 (Average)					74.00	54.00	Pass

Figure Channel 1:

Horizontal (Peak)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Band Edge Data Test Site : No.3 OATS

Test Mode : Mode 1: Transmitter 802.11b

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Fcator (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
1 (Peak)	2385.100	-6.783	68.333	61.550	74.00	54.00	Pass
1 (Average)	2385.100	-6.783	48.894	42.111	74.00	54.00	Pass

Figure Channel 1:

Vertical (Peak)

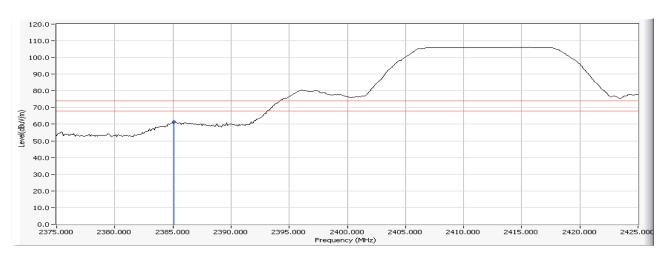
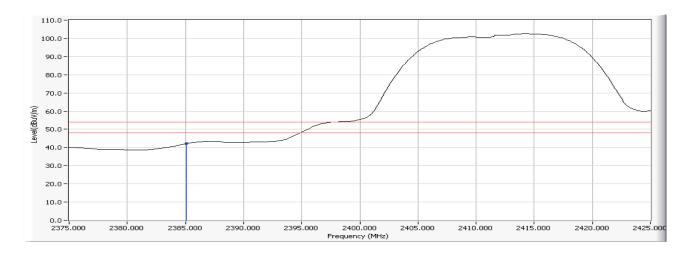


Figure Channel 1:

Vertical (Average)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Band Edge Data
Test Site : No.3 OATS

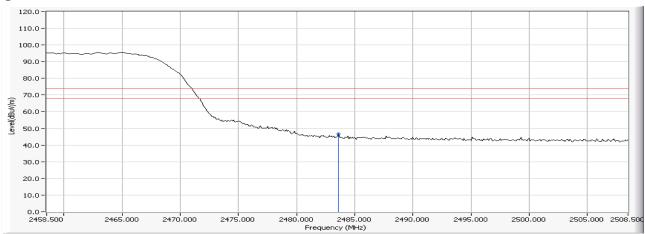
Test Mode : Mode 1: Transmitter 802.11b

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11(Peak)	2483.600	-6.468	53.061	46.593	74.00	54.00	Pass
11(Average)					74.00	54.00	Pass

Figure Channel 11:

Horizontal (Peak)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Band Edge Data
Test Site : No.3 OATS

Test Mode : Mode 1: Transmitter 802.11b

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11(Peak)	2489.000	-6.461	65.214	58.753	74.00	54.00	Pass
11(Average)	2489.000	-6.461	49.809	43.348	74.00	54.00	Pass

Figure Channel 11:

Vertical (Peak)

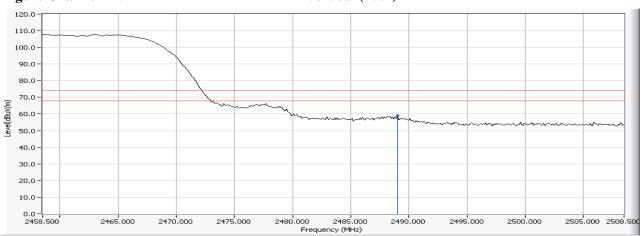
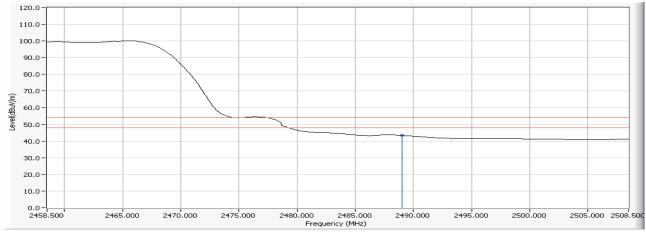


Figure Channel 11:

Vertical (Average)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.

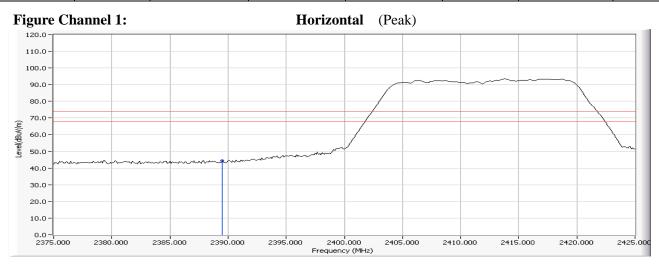


Test Item : Band Edge Data Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
1 (Peak)	2389.500	-6.769	51.045	44.275	74.00	54.00	Pass
1 (Average)					74.00	54.00	Pass



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Band Edge Data Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Fcator (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
1 (Peak)	2390.000	-6.769	62.741	55.973	74.00	54.00	Pass
1 (Average)	2390.000	-6.769	46.322	39.554	74.00	54.00	Pass

Figure Channel 1:

Vertical (Peak)

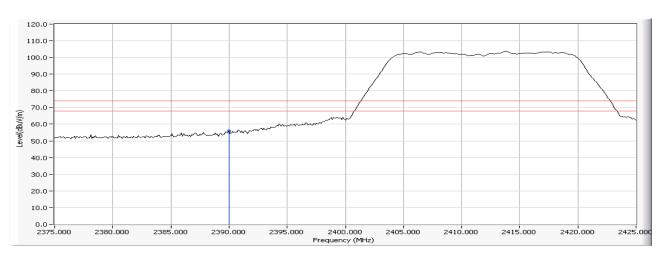
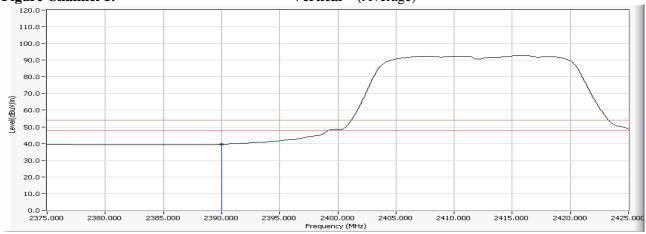


Figure Channel 1:

Vertical (Average)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Band Edge Data
Test Site : No.3 OATS

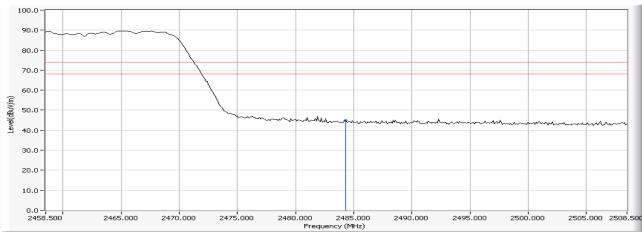
Test Mode : Mode 2: Transmitter 802.11g

RF Radiated Measurement (Horizontal):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11(Peak)	2484.300	-6.467	51.350	44.883	74.00	54.00	Pass
11(Average)					74.00	54.00	Pass

Figure Channel 11:





- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



Test Item : Band Edge Data
Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g

RF Radiated Measurement (Vertical):

Channel	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11(Peak)	2490.600	-6.459	61.845	55.386	74.00	54.00	Pass
11(Peak)	2490.900	-6.458	48.851	42.392	74.00	54.00	Pass

Figure Channel 11:

Vertical (Peak)

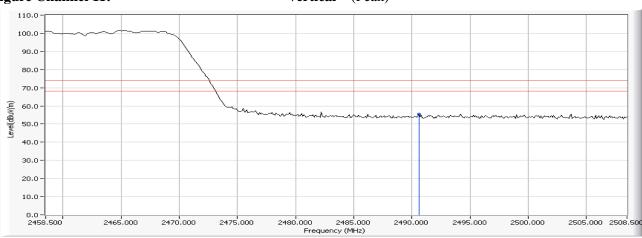
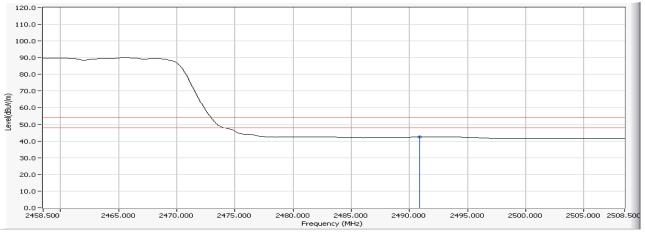


Figure Channel 11:

Vertical (Average)



- 1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
- 2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- 3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- 4. "*", means this data is the worst emission level.
- 5. Measurement Level = Reading Level + Correct Factor.
- 6. The average measurement was not performed when the peak measured data under the limit of average detection.



7. Occupied Bandwidth

7.1. Test Equipment

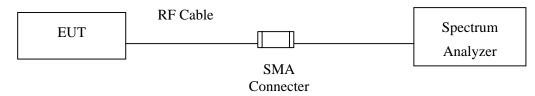
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
	Spectrum Analyzer	Agilent	N9010A / MY48030495	April, 2008

Note:

- 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
- 2. The test instruments marked with "X" are used to measure the final test results.

7.2. Test Setup



7.3. Test Procedures

The EUT was setup according to ANSI C63.4, 2003; tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Span greater than RBW.

7.4. Limits

The 6 dB bandwidth must be greater than 500 kHz.

7.5. Uncertainty

± 150Hz



7.6. Test Result of Occupied Bandwidth

Product : IEEE802.11b/g Wireless LAN Mini-PCI Card

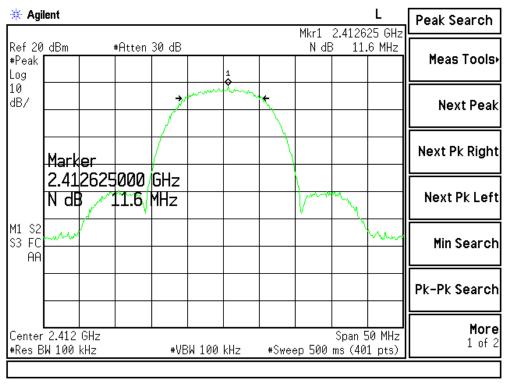
Test Item : Occupied Bandwidth Data

Test Site : No.3 OATS

Test Mode : Mode 1: Transmitter 802.11b

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1 (11Mbps)	2412.00	11600	>500	Pass
6 (11Mbps)	2437.00	11600	>500	Pass
11 (11Mbps)	2462.00	11600	>500	Pass

Figure Channel 1:







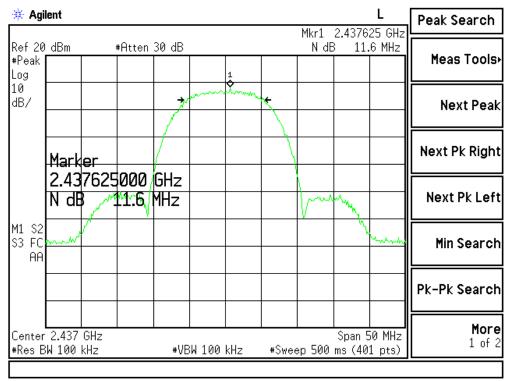
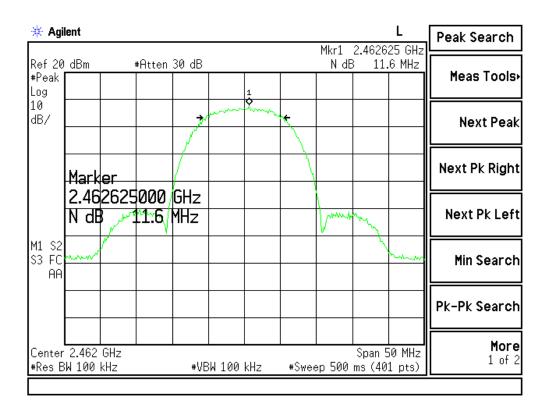


Figure Channel 11:





Test Item : Occupied Bandwidth Data

Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1 (54Mbps)	2412.00	16750	>500	Pass
6 (54Mbps)	2437.00	16750	>500	Pass
11 (54Mbps)	2462.00	16710	>500	Pass

Figure Channel 1:

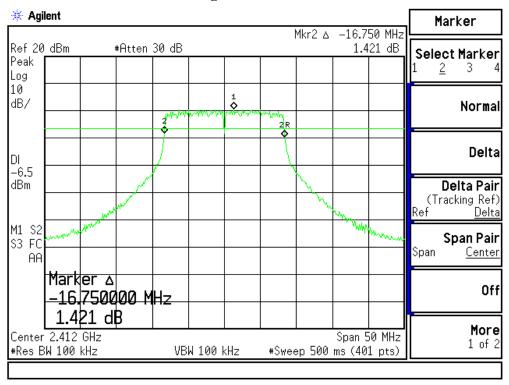




Figure Channel 6:

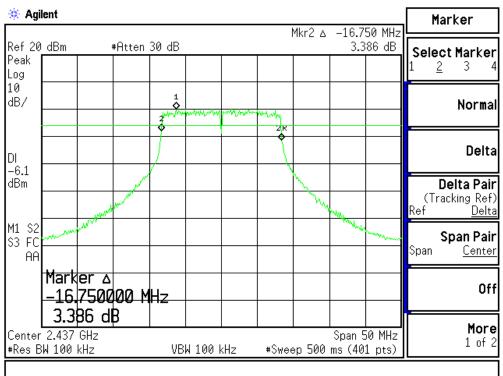
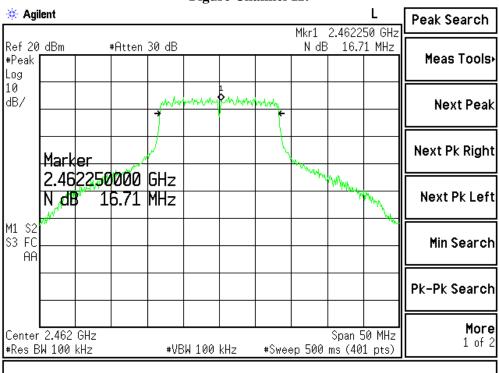


Figure Channel 11:





8. Power Density

8.1. Test Equipment

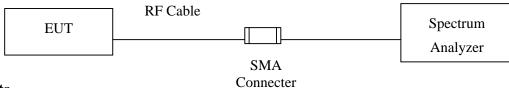
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
	Spectrum Analyzer	Agilent	N9010A / MY48030495	April, 2008

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2. The test instruments marked with "X" are used to measure the final test results.

8.2. Test Setup



8.3. Limits

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

8.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2003; tested according to DTS test procedure of Oct 2002 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW= 3 kHz, VBW=10KHz, Sweep time=(SPAN/3KHz), detector=Peak detector

8.5. Uncertainty

± 1.27 dB



8.6. Test Result of Power Density

IEEE802.11b/g Wireless LAN Mini-PCI Card Product

Test Item Power Density Data

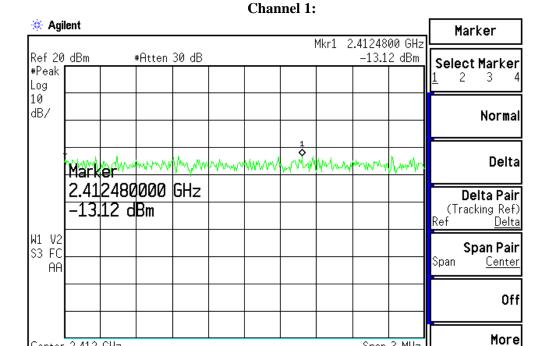
Test Site No.3 OATS

Center 2.412 GHz

#Res BW 3 kHz

Test Mode Mode 1: Transmitter 802.11b

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
1 (11Mbps)	2412.00	-13.12	< 10dBm	Pass
6 (11Mbps)	2437.00	-13.23	< 10dBm	Pass
11 (11Mbps)	2462.00	-12.24	< 10dBm	Pass



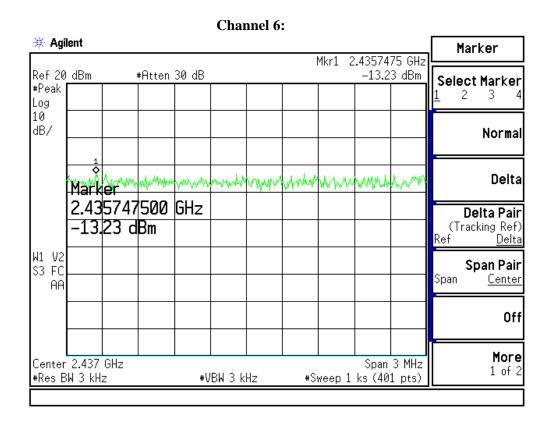
#VBW 3 kHz

Span 3 MHz

#Sweep 1 ks (401 pts)

1 of 2





Channel 11: # Agilent Marker 2.4607475 GHz Mkr1 Ref 20 dBm #Atten 30 dB -12.24 dBm Select Marker #Peak 2 3 Log 10 dB/ Normal andphilipper/M Delta Marker 2.460747500 GHz Delta Pair -12,24 dBm (Tracking Ref) Delta W1 V2 S3 FC Span Pair Span <u>Center</u> AΑ Off More Center 2.462 GHz Span 3 MHz 1 of 2 #Res BW 3 kHz #VBW 3 kHz #Sweep 1 ks (401 pts)

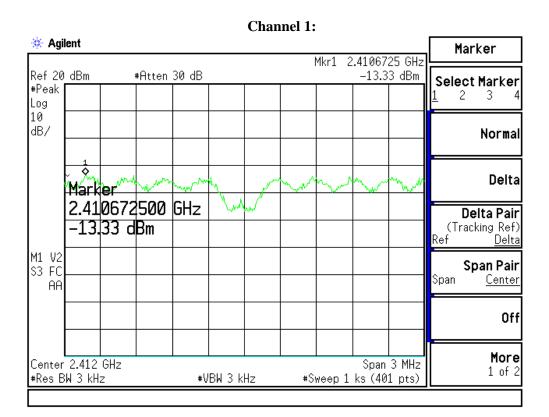


Test Item : Power Density Data

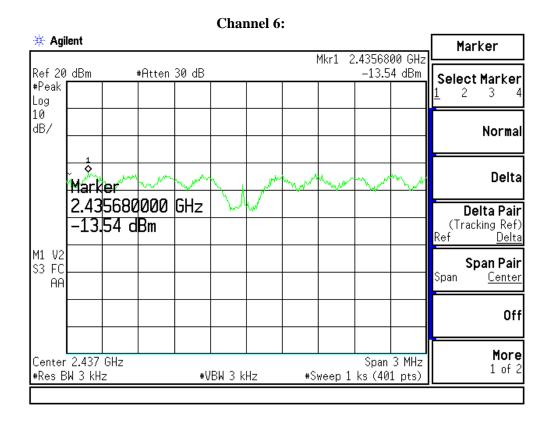
Test Site : No.3 OATS

Test Mode : Mode 2: Transmitter 802.11g

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
1 (54Mbps)	2412.00	-13.33	< 10dBm	Pass
6 (54Mbps)	2437.00	-13.54	< 10dBm	Pass
11 (54Mbps)	2462.00	-13.58	< 10dBm	Pass







Channel 11: # Agilent Marker Mkr1 2.4607400 GHz Ref 20 dBm #Atten 30 dB -13.58 dBm Select Marker #Peak 2 3 Log 10 dB/ Normal Delta Marker 2.460740000 GHz Delta Pair -13.58 dBm (Tracking Ref) Ref Delta M1 V2 Span Pair S3 FC Span <u>Center</u> AΑ Off More Center 2.462 GHz #Res BW 3 kHz Span 3 MHz 1 of 2 #VBW 3 kHz #Sweep 1 ks (401 pts)



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.