

Product Name	Wireless Gateway
Model No	WG-110
FCC ID.	XBTWG-110

Applicant	United Integrated Services Co.,Ltd
Address	5F NO 3 LANE 7 PAOKAO ROAD HSINTIEN 23144
	TAIPEI HSIEN TAIWAN

Date of Receipt	Feb. 18, 2009
Issue Date	Jun. 17, 2009
Report No.	092207R-RFUSP05V01
Report Version	V1.0

The test results relate only to the samples tested.

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# Test Report Certification

Issue Date: Jun. 17, 2009 Report No.: 092207R-RFUSP05V01



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

Product Name	Wireless Gateway	
Applicant	United Integrated Services Co.,Ltd	
Address	5F NO 3 LANE 7 PAOKAO ROAD HSINTIEN 23144 TAIPEI HSIEN TAIWAN	
Manufacturer	United Integrated Services Co.,Ltd	
Model No.	WG-110	
Rated Voltage	AC 120V/60Hz	
Working Voltage	AC 100-240V~47-63Hz	
Trade Name	UIS	
Applicable Standard	ndard FCC CFR Title 47 Part 15 Subpart C: 2008	
Test Result	Complied	

The test results relate only to the samples tested.

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Approved By

(Manager / Vincent Lin)





Testing Laboratory 0914

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Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

# 1. GENERAL INFORMATION

# **1.1. EUT Description**

Product Name	Wireless Gateway		
Trade Name	UIS		
Model No.	WG-110		
FCC ID.	XBTWG-110		
Frequency Range	2412-2462MHz		
Number of Channels	802.11b/g: 11		
Data Speed	802.11b: 1 - 11Mbps, 802.11g: 6 - 54Mbps		
Type of Modulation	802.11b:DSSS		
	DBPSK, DQPSK, CCK		
	802.11g: OFDM		
	BPSK, QPSK, 16QAM, 64QAM		
Antenna Type	Dipole Antenna		
Antenna Gain	Refer to the table "Antenna List"		
Channel Control	Auto		
Power Adapter	MFR: ADAPTER TECH, M/N:STD-12020U		
	Input: AC 100-240V,47-63Hz,0.58A		
	Output: DC 12V,2A		
	Cable Out: Non-Shielded, 1.8m		

# Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	KINSUN	6602803081	Dipole	2.33dBi in 2.4 GHz

802.11b/g Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		

- The EUT is a Wireless Gateway, Contains functions and so on WiFi 
   Zigbee, this report for WiFi.
- 2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
- 4. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices
- 5. 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 Wireless Gateway with 11 channels. This device provided four kinds of transmitting speed 1, 2, 5.5 and 11Mbps. The device of RF carrier is DBPSK, DQPSK and CCK (IEEE 802.11b) or eight kinds of transmitting speed 6, 9, 12, 18, 24, 36, 48 and 54Mbps. The device of RF carrier is OFDM (IEEE 802.11g).

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

This Wireless Gateway, 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. Operation in 2.4GHz Direst Sequence Spread Spectrum (DSSS) radio transmission, the Wireless Gateway Wired Equivalent Protection (WEP) algorithm is used. In addition, its standard compliance ensures that it can communicate with any IEEE 802.11b and IEEE 802.11g network.

Another information please refer to users manual.

Test Mode:	Mode 1: Transmitter (802.11b 11Mbps)
	Mode 2: Transmitter (802.11g 6Mbps)

# **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)	Ipod nano	Apple	A1236	YM823SWSY0P	N/A
(2)	Notebook P.C.	DELL	PP04X	C8YYM1S	Non-Shielded, 0.8m

Signa	l Cable Type	Signal cable Description
А	USB Cable	Shielded,1.5m
В	LAN Cable	Non-Shielded,7m
С	LAN Cable	Non-Shielded,7m

# **1.4.** Configuration of Tested System



# **1.5.** EUT Exercise Software

(1)	Setup the EUT as shown in section 1.4
(2)	Turns on the power source then continually to transmit.
(3)	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

The related certificate for our laboratories about the test site and management system can be downloaded from QuieTek Corporation's Web Site : <u>http://tw.quietek.com/modules/myalbum/</u> The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site : <u>http://www.quietek.com/</u>

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





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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, 2009	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2009	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2009	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2009	
5	No.1 Shielded Roor	N/A			

Note: All instruments are calibrated every one year.

# 2.2. Test Setup



# 2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit							
Frequency	Limits						
MHz	QP	AVG					
0.15 - 0.50	66-56	56-46					
0.50-5.0	56	46					
5.0 - 30	60	50					

# 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: 2003 on conducted measurement.

Conducted emissions were invested 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

Product	: Wireless Gateway								
Test Item	: Conducted	: Conducted Emission Test							
Power Line	: Line 1								
Test Mode	: Mode 2: Tr	ansmitter (802.11g	g 6Mbps) (2437MHz)						
Frequency	Correct	Reading	Measurement	Margin	Limit				
	Factor	Level	Level						
MHz	dB	dBuV	dBuV	dB	dBuV				
Line 1									
Quasi-Peak									
0.166	9.746	43.420	53.165	-12.378	65.543				
0.216	9.696	37.040	46.736	-17.378	64.114				
0.255	9.673	35.390	45.062	-17.938	63.000				
0.295	9.652	32.010	41.662	-20.195	61.857				
0.345	9.650	25.210	34.860	-25.569	60.429				
0.650	9.630	15.180	24.810	-31.190	56.000				
Average									
0.166	9.746	27.490	37.235	-18.308	55.543				
0.216	9.696	20.800	30.496	-23.618	54.114				
0.255	9.673	20.820	30.492	-22.508	53.000				
0.295	9.652	17.440	27.092	-24.765	51.857				
0.345	9.650	8.720	18.370	-32.059	50.429				
0.650	9.630	5.950	15.580	-30.420	46.000				

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. "means the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor

Product Test Item Power Line	: Wireless : Conducte : Line 2	Gateway ed Emission Test			
Test Mode	: Mode 2: 7	Fransmitter (802	.11g 6Mbps) (2437M	Hz)	
Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.150	9.766	43.340	53.106	-12.894	66.000
0.170	9.743	44.200	53.943	-11.486	65.429
0.209	9.711	38.640	48.351	-15.963	64.314
0.228	9.698	36.490	46.188	-17.583	63.771
0.263	9.677	30.720	40.397	-22.374	62.771
0.357	9.654	23.040	32.694	-27.392	60.086
Average					
0.150	9.766	17.710	27.476	-28.524	56.000
0.170	9.743	28.500	38.243	-17.186	55.429
0.209	9.711	21.810	31.521	-22.793	54.314
0.228	9.698	16.820	26.518	-27.253	53.771
0.263	9.677	11.310	20.987	-31.784	52.771
0.357	9.654	4.790	14.444	-35.642	50.086

- 1. All Reading Levels are Quasi-Peak and average value.
- 2. "means the worst emission level.
- 3. Measurement Level = Reading Level + Correct Factor

# **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.
Х	Power Meter	Anritsu	ML2495A/6K00003357	May, 2009
Х	Power Sensor	Anritsu	MA2491A/034457	May, 2009

Note: 1. All instruments are calibrated every one year.

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

# 3.2. Test Setup

Conducted Measurement



### 3.3. Limits

The maximum peak power shall be less 1 Watt.

# **3.4.** Test Procedure

The EUT was tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

# 3.5. Uncertainty

 $\pm$  1.27 dB

# **3.6.** Test Result of Peak Power Output

Product	:	Wireless Gateway
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps)

Cable	e Loss=0.5dB			Peak Power	Output	
Channel No.	b. Frequency (MHz)		De mine 11 insid			
Channel No.		1	2	5.5	11	Required Limit
1	2412.00				17.91	1Watt= 30 dBm
6	2437.00	17.91	17.79	17.83	18.05	1Watt= 30 dBm
11	2462.00				17.89	1Watt= 30 dBm

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

Product	:	Wireless Gateway
Test Item	:	Peak Power Output Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps)

Cable Loss=0.5dB		Peak Power Output								
Channel No.	Frequency (MHz)	Data Rate								
Channel No.		6	9	12	18	24	36	48	54	Required Limit
1	2412.00	20.35								1Watt= 30 dBm
6	2437.00	20.31	20.26	20.24	19.99	19.95	19.91	19.89	19.85	1Watt= 30 dBm
11	2462.00	20.64								1Watt= 30 dBm

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

# 4. Radiated Emission

# 4.1. Test Equipment

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	Х	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2008
	Х	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2008
	Х	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2008
	X Pre-Amplifier		AGILENT	8447D/2944A09549	Sep., 2008
	Х	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2008
	Х	Spectrum Analyzer	Advantest	R3162/91700283	Oct., 2008
	Х	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2009
	Х	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	Х	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

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

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@3m				
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 Mar. 2005 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 bandwidth of the antenna. The worst radiated emission is measured in the Open Area Test Site on the Final Measurement. The measurement frequency range from 30MHz - 10th Harmonic of fundamental was investigated.

# 4.5. Uncertainty

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

# 4.6. Test Result of Radiated Emission

Product	:	Wireless Gateway
Test Item	:	Harmonic Radiated Emission Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps) (2412MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4824.000	9.577	37.820	47.397	-26.603	74.000
7236.000	14.401	34.480	48.881	-25.119	74.000
Average					
<b>Detector:</b>					
Vertical					
Peak Detector:					
4824.000	8.463	37.200	45.663	-28.337	74.000
7236.000	15.412	34.870	50.282	-23.718	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.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Gateway						
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OATS						
Test Mode	: Mode 1: Transmitter (802.11b 11Mbps) (2437 MHz)						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4874.000	9.471	37.250	46.721	-27.279	74.000		
7311.000	14.540	34.050	48.590	-25.410	74.000		
Average							
<b>Detector:</b>							
Vertical							
Peak Detector:							
4874.000	8.878	36.300	45.178	-28.822	74.000		
7311.000	15.282	33.900	49.182	-24.818	74.000		
Average							
<b>Detector:</b>							

--

- 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.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Gateway						
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OATS						
Test Mode	e : Mode 1: Transmitter (802.11b 11Mbps) (2462 MHz)						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4924.000	9.483	36.450	45.933	-28.06	74.000		
7386.000	14.798	34.370	49.168	-24.832	74.000		
Average							
<b>Detector:</b>							
Vertical							
Peak Detector:							
4924.000	9.411	35.870	45.281	-28.719	74.000		
7386.000	15.270	34.110	49.380	-24.620	74.000		
Average							
<b>Detector:</b>							

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- 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.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Gateway						
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OATS						
Test Mode	: Mode 2: Transmitter (802.11g 6Mbps) (2412MHz)						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4824.000	9.577	37.170	46.747	-27.253	74.000		
7236.000	14.401	35.200	49.601	-24.399	74.000		
Average							
<b>Detector:</b>							
Vertical							
<b>Peak Detector:</b>							
4824.000	8.463	37.730	46.193	-27.807	74.000		
7236.000	15.412	35.100	50.512	-23.488	74.000		
Average							
Detector:							

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- 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.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Gateway						
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OATS						
Test Mode	: Mode 2: Transmitter (802.11g 6Mbps) (2437 MHz)						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
<b>Peak Detector:</b>							
4874.000	9.471	36.720	46.191	-27.809	74.000		
7311.000	14.540	34.090	48.630	-25.370	74.000		
Average							
<b>Detector:</b>							
Vertical							
<b>Peak Detector:</b>							
4874.000	8.878	36.150	45.028	-28.972	74.000		
7311.000	15.282	34.130	49.412	-24.588	74.000		
Average							
<b>Detector:</b>							

# Note:

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- 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.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Gateway						
Test Item	: Harmonic Radiated Emission Data						
Test Site	: No.3 OATS						
Test Mode	st Mode : Mode 2: Transmitter (802.11g 6Mbps) (2462 MHz)						
Frequency	Correct	Reading	Measurement	Margin	Limit		
	Factor	Level	Level				
MHz	dB	dBuV	dBuV/m	dB	dBuV/m		
Horizontal							
Peak Detector:							
4924.000	9.483	37.120	46.603	-27.397	74.000		
7386.000	14.798	34.500	49.298	-24.702	74.000		
Average							
<b>Detector:</b>							
Vertical							
Peak Detector:							
4924.000	9.411	37.080	46.491	-27.509	74.000		
7386.000	15.270	34.460	49.730	-24.270	74.000		
Average							
<b>Detector:</b>							

--

- 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.
- 7. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product	: Wireless Gateway					
Test Item	: General Radiated Emission Data					
Test Site	: No.3 OATS					
Test Mode	: Mode 1	: Transmitter (802	.11b 11Mbps)(2437 M	MHz)		
Frequency	Correct	Reading	Measurement	Margin	Limit	
	Factor	Level	Level			
MHz	dB	dBuV	dBuV/m	dB	dBuV/m	
Horizontal						
288.020	-5.106	48.156	43.050	-2.950	46.000	
431.580	-2.561	45.977	43.416	-2.584	46.000	
480.080	-0.784	44.185	43.401	-2.599	46.000	
577.080	2.641	34.480	37.121	-8.879	46.000	
666.320	1.563	33.682	35.245	-10.755	46.000	
934.040	6.116	27.137	33.253	-12.747	46.000	
Vertical						
288.020	-8.716	46.953	38.237	-7.763	46.000	
383.080	-2.819	46.622	43.803	-2.197	46.000	
480.080	-4.814	48.678	43.864	-2.136	46.000	
666.320	-2.277	37.611	35.334	-10.666	46.000	
722.580	-0.608	34.523	33.915	-12.085	46.000	
934.040	5.296	32.366	37.662	-8.338	46.000	

Note:

- 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.

Product	:	Wireless Gateway
Test Item	:	General Radiated Emission Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps)(2437 MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
	Factor	Level	Level		
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
288.020	-5.106	43.251	38.145	-7.855	46.000
431.580	-2.561	38.699	36.138	-9.862	46.000
480.080	-0.784	38.708	37.924	-8.076	46.000
577.080	2.641	32.827	35.468	-10.532	46.000
800.180	4.773	24.186	28.959	-17.041	46.000
934.040	6.116	25.991	32.107	-13.893	46.000
Vertical					
288.020	-8.716	43.836	35.120	-10.880	46.000
383.080	-2.819	46.746	43.927	-2.073	46.000
480.080	-4.814	49.088	44.274	-1.726	46.000
577.080	-6.189	32.850	26.661	-19.339	46.000
724.520	-0.634	31.382	30.749	-15.251	46.000
800.180	2.433	25.434	27.867	-18.133	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	R&S	FSP40 / 100170	Nov, 2008
	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2009

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 Mar. 2005 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  $\pm 1.27$ dB

# 5.6. Test Result of RF antenna conducted test

Product	:	Wireless Gateway
Test Item	:	RF antenna conducted test
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps)

#### Channel 01 (2412MHz) 30-25GHz

🕦 Agilent Spectrum Analyzer - Swept SA				
ΣοΩ Display Line -17.14 dBm	AC SENSE:INT	ALIGN OFF	12:15:31 PM May 12, 2009 TRACE 1 2 3 4 5 6	Display
Input: RF PN( IFGa Ref Offset 1 dB 10 dB/div Ref 11.00 dBm	in:Low #Atten: 20 dB	М	kr1 2.402 GHz 2.857 dBm	Annotation►
1.00				Title►
-9.00			-17.14 dBm	Graticule On Off
-29.0				Display Line -17.14 dBm On Off
-49.0		orten filters of star being all an set of	derbergerte aller and the serviced	
-69.0	n Blughur an			System Display▶ Settings
Start 30 MHz #Res BW 100 kHz	#VBW 1.0 MHz	Sweep	Stop 25.00 GHz 2.30 s (1001 pts)	



### Channel 06 (2437MHz) 30-25GHz



💴 Agilent	Spectrum	Analyzer - S	iwept SA		- 15							
Dicplay	50 S	16 55	dBm	1	AC SEI	NSE:INT			12:22:08 P	M May 12, 2009		Display
Display	Ref	Offset 1 c	UBIII Dut: RF PN IFG	IO: Fast 😱 ain:Low	Trig: Free #Atten: 20	eRun )dB	OLA INC	M	kr1 2.4	52 GHz		Annotation►
10 dB/div	v Ref	11.00 c	IBM						3.3			Title►
-9.00										-16.55 dBm	<u>On</u>	Graticule Off
-29.0											<u>On</u>	Display Line -16.55 dBm Off
-49.0		NAL JN	tor the strategy and	4	9 1 WIL	A MARKING	Weshighton	america, of particular	<sub>pert</sub> April 2004 Market Market	hat a start and a start		
-69.0 -79.0	4 <sub>4</sub> 4 <sup>4</sup> 441	- Sector		new with	a Liki Huli da ana							System Display≯ Settings
Start 30 #Res B	) MHz W 100	kHz		#VBW	1.0 MHz			Sweep	Stop 2 2.30 s (	5.00 GHz 1001 pts)		
MSG								STATUS				

Product	:	Wireless Gateway
Test Item	:	RF Antenna Conducted Spurious
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps)

# Channel 01 (2412MHz) 30-25GHz

🗾 Agilent Spectrum Analyzer - Swept SA					
Display Line -24.08 dBm	SENSE:INT Avg Type:	ALIGN OFF	12:26:12 PM TRACI	May 12, 2009	Display
Input: RF PN0: Fast C If Gain:Low #Atten IFGain:Low #Atten 10 dB/div Ref 11.00 dBm	: 20 dB	М	kr1 2.4 -4.07	02 GHz 77 dBm	Annotation
1.00 <b>1</b>					Title
-19.00				-24.08 dBm	Graticule On Of
-29.0					Display Line -24.08 dBn On Of
-49.0	ու տիկսանակ <sup>ի</sup> կեղություն	MP + Healmark	a julio water a	h <sup>ri</sup> hm <sup>des</sup> leadtingt	
-69.0					System Display Settings
Start 30 MHz #Res BW 100 kHz #VBW 1.0 MI	l l	Sweep	Stop 2: 2.30 s (1	5.00 GHz 1001 pts)	



### Channel 06 (2437MHz) 30-25GHz



D Agile	ent Spectrum	Analyzer - Sw	rept SA									
w Displ	50 lav Line	ີ -24.76 d	IBm	A	.c sei	NSE:INT	Avg Type	ALIGN OFF	12:41:20 P	M May 12, 2009		Display
10 dB	Ref /div <b>R</b> e	Inpu Offset 1 dE f 11.00 dE	t: RF PN IFG 3 <b>3</b> m	IO: Fast 😱 ain:Low	┘ Trig: Free #Atten: 20	e Run ) dB		M	lkr1 2.4 -4.	77 GHz 76 dBm		Annotation►
1.00 -	•	1		2								Title►
-9.00 -										-24.76 dBm	<u>On</u>	Graticule Off
-29.0 -											<u>On</u>	Display Line -24.76 dBm Off
-49.0 -	<b>P</b>	A 10) And W	የም ትም	k 1.			[Periodication of the states o	ungrafila <sub>ter</sub> ations.	Uall Lation Lossed An	et alanting		
-69.0	unitad there	of the second		man albert	et wy duy wy ta	Nigdro <b>n</b> Haven						System Display▶ Settings
Start #Res	30 MHz BW 100	kHz		#VBW	1.0 MHz			Sweep	Stop 2 2.30 s (	5.00 GHz 1001 pts)		
MSG								STATUS				

# 6. Band Edge

# 6.1. Test Equipment

Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
Site # 3	Х	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2008
	Х	Pre-Amplifier	AGILENT	8447D/2944A09549	Sep., 2008
	Х	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2008
	Х	Spectrum Analyzer	Advantest	R3162/91700283	Oct., 2008
	Х	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2009
	Х	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	Χ	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

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

Note: 1. All instruments are calibrated every one year.

2. The test instruments marked by "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 Mar. 2005 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

- $\pm$  3.9 dB above 1GHz
- ± 3.8 dB below 1GHz

### 6.6. Test Result of Band Edge

Product	:	Wireless Gateway
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps)

#### **RF Radiated Measurement (Horizontal):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2390.000	36.566	24.874	61.440	74.00	54.00	Pass
01 (Average)	2390.000	36.566	13.170	49.736	74.00	54.00	Pass

#### Figure Channel 01:

#### 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.

Product	:	Wireless Gateway
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps)

#### **RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2385.300	35.566	26.901	62.467	74.00	54.00	Pass
01 (Average)	2385.300	35.566	15.642	51.208	74.00	54.00	Pass

#### Figure Channel 01:

#### Vertical (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.

Product	:	Wireless Gateway
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps)

#### **RF Radiated Measurement (Horizontal):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2486.200	36.704	25.086	61.790	74.00	54.00	Pass
11(Average)	2486.200	36.704	13.150	49.854	74.00	54.00	Pass

#### Figure Channel 11:

#### Horizontal (Peak)





# Horizontal (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.

Product	:	Wireless Gateway
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps)

#### **RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2489.600	36.219	27.136	63.355	74.00	54.00	Pass
11(Average)	2489.600	36.219	14.883	51.102	74.00	54.00	Pass

### Figure Channel 11:

Vertical (Peak)





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.

Product	:	Wireless Gateway
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps)

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### **RF Radiated Measurement (Horizontal):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2390.000	36.566	25.590	62.156	74.00	54.00	Pass
01 (Average)	2390.000	36.566	14.066	50.632	74.00	54.00	Pass

### Figure Channel 01:

### Horizontal (Peak)





#### Horizontal (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.

Product	:	Wireless Gateway
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps)
Test Mode	:	Mode 2: Transmitter (802.11g 6Mb

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#### **RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
01 (Peak)	2390.000	35.558	35.816	71.374	74.00	54.00	Pass
01 (Average)	2390.000	35.558	15.732	51.290	74.00	54.00	Pass

#### Figure Channel 01:

#### Vertical (Peak)





#### 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.

Product	:	Wireless Gateway
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps)

#### **RF Radiated Measurement (Horizontal):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2484.100	36.705	26.641	63.346	74.00	54.00	Pass
11 (Average)	2484.100	36.705	13.478	50.183	74.00	54.00	Pass

#### Figure Channel 11:

### Horizontal (Peak)





#### Horizontal (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.

Product	•	Wireless Gateway
Test Item	:	Band Edge Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps)

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#### **RF Radiated Measurement (Vertical):**

Channel No.	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
11 (Peak)	2483.700	36.184	33.067	69.251	74.00	54.00	Pass
11(Average)	2483.700	36.184	15.274	51.458	74.00	54.00	Pass

#### Figure Channel 11:

#### Vertical (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.

# 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.
	Spectrum Analyzer	R&S	FSP40 / 100170	Nov, 2008
	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2009

Note: 1. All instruments are calibrated every one year.

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

# 7.2. Test Setup

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#### 7.3. Limits

The minimum bandwidth shall be at least 500 kHz.

# 7.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003; tested according to DTS test procedure of Mar. 2005 KDB558074 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 100 kHz, Span greater than RBW.

# 7.5. Uncertainty

 $\pm$  150Hz

# 7.6. Test Result of Occupied Bandwidth

Product	:	Wireless Gateway
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412.00	11220	>500	Pass

# Figure Channel 1:

D Agi	ent Spectrum	Analyzer -	Swept SA		02		29					
N. d.	50 S	2		β.	AC SEI	VSE:INT	Ava Tro		12:12:41 P	M May 12, 2009	Sa	ve As
	5 -0.00 u	D In	put: RF PI IFC	NO: Fast 😱 Gain:Low	Trig: Free #Atten: 20	Run IdB			TY D			Sava
10 dE	Ref 3/div <b>Ref</b>	Offset 1 ( f 11.00 (	dB dBm					Mkr	1 2.411 4.6	35 GHz 50 dBm		Save
Log					المعاملة والمعادية	1 ለጎሳላታዊ የአዲስ አ						File/Folder
1.00				- All	har and a second se		v <del>i, -6.00 (</del> ₩,1.22	18 MHz				List
-9.00				Jan K		-	+					
-19.0				/			<u> </u>					File name:
-29.0				/				1				
20.0		lun	whenhave I					) 				Save As type:
-35.0		Jon Hundred	¥					h. word	Mart North			
-49.0	144 Holder Michael	<i>o<sup>n</sup></i>							- A A	al Manakin and	Ì	Up One Level
-39.0												1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
-69.0											1 1 C	reate New Folder
-79.0												
Cen	ter 2.4120	0 GHz							Span 5	0.00 MHz		Cancel
#Res	s BW 100	kHz		#VBW	100 kHz			#Sweep	500 ms (	1001 pts)		
MSG								STATUS	5			

Product	:	Wireless Gateway
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	11910	>500	Pass

# Figure Channel 6:

D Agilent Spo	ectrum Analyzer - S	wept SA				X				_	
vx/ NdB -6.	50 Ω 00 dB		4	AC SEI	NSE:INT	Avg Type	ALIGN OFF	12:16:16 P	M May 12, 2009	Me	as Setup
	Inp	ut: RF PN IFGa	0: Fast 🖵 ain:Low	Trig: Free #Atten: 20	Run dB	Avg Hold:	25/100	TYF		Av	erage/Hold
10 dB/div	Ref Offset 1 d Ref 11.00 d	B IBm		C			Mkr	1 2.436 4.5	90 GHz 96 dBm		Number 100
1.00				plicetornucles	1 Monthally	م6.00	dB	3		Ave	erage Type LogPower► Man
-9.00			Jan Martin			ີ່ "ຳ11.9"	MHz				
-19.0			ſ			h h					
-29.0		بر ار ار								N	dB Points -6.00 dB
-39.0	ي يوني من الم	Whenhall !		o			Janney	Mhu	0	<u>On</u>	Off
-49.0	at have	r					3.0	- Way	W Ymstrad	Př F <u>Auto</u>	Noise Opt ast Tuning ▶ Man
-69.0										4	ADC Dither On ▶
-79.0										<u>Auto</u>	Man
											More
Center 2. #Res BW	43700 GHz 100 kHz		#VBW	100 kHz			#Sweep	Span 5 500 ms (	0.00 MHz 1001 pts)		1 of 2
MSG	n na managan - Andrew Sardt						STATU	5			

Product	:	Wireless Gateway
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462.00	10960	>500	Pass

# Figure Channel 11:

								Swept SA	trum Analyzer	Agilent Spec
Peak Search	ACE 1 2 3 4 5 6	12:19:53 F	ALIGN OFF	Avg Type	SENSE:INT	AC S	GHz	000000	50 Ω 2.462650	arker 1
	DET P N N N N N	TY	22/100	Avg Hold:	Free Run n: 20 dB	Trig: Fre #Atten: :	PNO: Fast 🖵 Gain:Low	nput: RF	1	
NextPea	2 65 GHz 061 dBm	1 2.462 5.0	Mkr					dB dBm	Ref Offset 1 Ref 11.00	dB/div
Next Rig			B	بر -6.00 d	1	World WWW. Wards				
			MHz	10.96			Marth			
Next Le										.0
Marker Del								when		.0
Mkr→C	w of by husistion to	Wardin Hawlowing	1/Maria					¥	A	1.0
Mkr→RefL										.0
<b>Mo</b> 1 of	50.00 MHz	Span 5	#Sween		H7	( 100 kH	#\/B\A(		6200 GHz	enter 2.4

Product	:	Wireless Gateway
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
1	2412.00	16300	>500	Pass

# Figure Channel 1:

	gilent	Spect	trum	Analyzer - S	Swept SA	23		62								
LXI			50 \$	204500	00000		AC	SEN	SE:INT	A	ALIGN		12:23:48 PI	M May 12, 2009	-	Marker
Ma	rker	3	2.4	201500 Ing	put: RF	GHZ PNO: Fast FGain:Lov		rig: Free Atten: 20	Run dB	Avgi	pe. Log	-r wr	TYP	E MWWWWW T P N N N N N		Marker Table
10	Ref Offset 1 dB Mkr3 2.420 15 GHz dB/div Ref 11.00 dBm -5.14 dBm												<u>On</u>	Off		
<b>Log</b> 1.0			-								3			- 7.05 JBa	м	arker Count
-9.0 -19						CALL CALL	4.104.4017.02	Aller Haller Ardra L	and decompleted					-7.25 UDM		[Off]
-29.						AND MALL	-				Wenner Wardens	44.1				Couple
-39. -49			المري	mplatentit	war-for -							- NAMA	haller of the last in	1914	On	Markers Off
-59.	° nh≁n 0	(HUV SIL														
-69. .79																
-70. Co		24	120								17		Enon 5	0.00 MHz		
#R	es B	W 1	00	kHz		#V	'BW 10	0 kHz			#Sw	еер	500 ms (	1001 pts)		
<u>мк</u>	MODE N	TRO 1	SCL f		× 2.414	50 GHz		Y -1.25 dB	FU m	NCTION	FUNCTION	WIDTH	FUNCTIO	IN VALUE		
2	N N	1	f f		2.403 2.420	85 GHz 15 GHz		-5.37 dB -5.14 dB	m m							
56															A	i Markers Off
7																Mara
10 11																2 of 2
12 MSG												STATUS				

Product	:	Wireless Gateway
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
6	2437.00	16250	>500	Pass

# Figure Channel 6:

D Agilent	Spectrum	Analyzer -	Swept SA								
₩ Marker	50 3 2.4	∝  451000	00000 G	iHz	AC SE	NSE:INT	Avg T	ALIGN OFF	12:27:06 F	M May 12, 2009 CE 1 2 3 4 5 6	Marker
		In	put: RF PI IF(	NO: Fast ( Gain:Low	#Atten: 2	dB			D	ET P N N N N N	Marker Table
10 dB/div	Re / Re	f Offset 1 o f 11.00 o	dB d <b>B</b> m					Mk	r3 2.445 -6.	10 GHz 00 dBm	<u>On</u> Off
1.00				2	hand wird over the works	กลงของสโคงร	1	3		-8.13 dBm	Marker Count
-9.00 -19.0				1				ι			[Off]
-29.0			. When your distant	w <sup>r</sup>				What have a			Couple
-49.0	hund	nishilter Ashiet	Peter.						- Herren fritte - Hig	Hor Marcally Start - Marce	On <u>Off</u>
-59.0											
-79.0											
Center #Res Bi	2.4370 W 100	00 GHz	1	#VP	W 100 kHz	1		#Sween	Span 5	0.00 MHz	
MKR MODE	TRC SC		×		Y		FUNCTION	FUNCTION WIDT	H FUNCTI	ON VALUE	
1 N 2 N	1 f 1 f 1 f		2.442 0	0 GHZ 5 GHZ 0 GHZ	-2.13 d -6.04 d -6.00 d	Bm Bm Bm					
4 5			2.440 1	0 0112	0.00 4						All Markers Off
6 7 8		0									
9 10											More 2 of 2
11 12											2012
MSG								STATU	JS		

Product	:	Wireless Gateway
Test Item	:	Occupied Bandwidth Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
11	2462.00	16300	>500	Pass

# Figure Channel 11:

D Agilen	t Spect	trum /	Analyzer	- Swept S	A														
<mark>x</mark> Marke	er 3	50 Ω 2.4	70150	00000	)0 G	Hz	AC	SE	NSE:IN	T	Avg 1	ype:	ALIGN OFF	12:30	:52 PI TRAC TYP	M May 12, 2 E 1 2 3 4 E M <del>WMM</del>	2009 56		Marker
			8	nput: RF	IFG	io: Fast ain:Low	С,	#Atten: 2	0 dB						DE	PNNN	NN		Marker Tab
10 dB/c	liv	Ref Ref	Offset 1 11.00	dB dBm									Mkı	3 2.4	70 -5.1	15 GI 11 dB	Hz Sm	<u>On</u>	C
1.00						2			(	1		3_							arkar Count
-9.00 =						Jul	strankow	total preserver		Joseban	malanda					-7.80	dBm	w	
-19.0						1						4							[en]
-29.0 —					1 August	and the second						24.	why wat				_		Cour
-39.0				In Maria	γ <b>4</b>								Hallower and the				_		Marke
-49.0	دار.	, where	phalmanthan											"" How we want	Mm	Withour I		On	<u>C</u>
-59.0	whether															. A ANNUM	VIALA		
-69.0																	_		
-79.0																			
L																			
Cente #Res I	r 2.40 BW 1	620) 00	) GHz (Hz			#V	BW 1	00 kHz				ŧ	#Sweep	Spa 500 m	ın 5 1s (	0.00 M 1001 p	Hz ts)		
MKR MOL	DE TRO	SCL		×		CH-		Y 1.90 d	Bm	FUNC	TION	FUN	ICTION WIDTH	FU	NCTIC	IN VALUE			
2 N	1	f		2.	453 8	5 GHz		-6.09 d	Bm			2						-	
6 N	1	f		2.	470 1	5 GHz		-5.11 d	Bm			-					_		Markers O
5												-						^	
7																			
8									_								_		Mo
10									_			-		-					2 of
12																			2.01
MSG													STATU	5					

# 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.	
	Spectrum Analyzer	R&S	FSP40 / 100170	Nov, 2008	
	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2009	
Х	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2009	

Note: 1. All equipments are calibrated every one year.

2. The test instruments marked by "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 Procedure

The EUT was setup according to ANSI C63.4, 2003; tested according to DTS test procedure of Mar. 2005 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

 $\pm$  1.27 dB

# 8.6. Test Result of Power Density

Product	:	Wireless Gateway
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2412.00	-8.049	< 8dBm	Pass

# Figure Channel 1:

🎾 Agilent Spe	ctrum Analyzer - S	wept SA								
Marker 1	<sup>50 Ω</sup>	00000 GI	Hz	C SEI	NSE:INT	Avg Type	ALIGN OFF	12:14:44 P TRAC	May 12, 2009 E 1 2 3 4 5 6	Peak Search
10 dB/div	Inp Ref Offset 1 d <b>Ref 11.00 d</b>	iut: RF PN IFG IB IBM	0: >30k 😱 ain:Low	<sup>4</sup> Trig: Free #Atten: 20	e Run ) dB	Avg Hold:	<sup>1/100</sup> Mkr1 2.4	411 460 -8.04	6 1 GHz 49 dBm	Next Peak
1.00									1	Next Right
-9.00 •••••••••••••••••••••••••••••••••••	<sup>สโ</sup> นฟูฟฟูษสถามาสำหรุญปุ	๛๛๛ๅ	plynewyddw	~ <sub>v/l</sub> lllu <sub>k/l</sub> r	℩℩ <sub>ՠՠ</sub> ՠֈՠ	hand the main the second se	Luthan Maraka		vvr <sup>s/th</sup> home	Next Left
-29.0										Marker Delta
-49.0										Mkr→CF
-69.0										Mkr→RefLvl
Center 2. #Res BW	4113500 GHz 3.0 kHz	:	#VBW	10 kHz			#Sweep	Span 3 100 s (	800.0 kHz 1001 pts)	More 1 of 2

Product	:	Wireless Gateway
Test Item	:	Power Density Data
Test Site	:	No.3OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6	2437.000	-8.642	< 8dBm	Pass

# Figure Channel 6:

								Swept SA	ım Analyzer -	ilent Spec
Peak Search	M May 12, 2009	12:18:20 PI			NSE:INT	C SE	iHz	000000 G	<sup>50 Ω</sup>	rker 1
NextPea	I 0 GHz 42 dBm	137 761 -8.64	Mkr1 2.	Avginoia.	) dB	#Atten: 2	10: >30k 🖵 Gain:Low	dB dBm	In Ref Offset 1 Ref 11.00	IB/div
Next Rig		<u> </u>				р 	7			
Next Le	WILHY ANN	~~	hymrunuth	WMNJY	huny willight	m Marry	wyNur <sub>lyw</sub> yly	fr.M.W.N.Willinge	ኯዀኯጚኯ፟፟፟ዾኯ	) bt-/h <sub>hit</sub>
Marker De										j
Mkr→0										]
Mkr→RefL										]
<b>Mo</b> 1 o	800.0 kHz	Span (						z	76500 GH	nter 2.4
0	iouripts)	100 S (	#Sweep			TUKHZ	#VBW		UKMZ	SBW

Product	:	Wireless Gateway
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 1: Transmitter (802.11b 11Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11	2462.00	-8.438	< 8dBm	Pass

# Figure Channel 11:

DAgilent Spe	ctrum Analyzer	- Swept SA								
Marker 1	50 Ω 2.462760	700000 G	م ا Hz	AC SE	NSE:INT	Avg Type	ALIGN OFF	12:21:45 F	M May 12, 2009	Peak Search
10 dB/div	Ref Offset 1 Ref 11.00	nput: RF PI IFI dB dBm	NO: >30k 😱 Gain:Low	Trig: Free #Atten: 20	≥Run )dB	Avg Hold	Mkr1 2.	462 76 -8.4	0 7 GHz 38 dBm	NextPeak
1.00								▲1		Next Right
-9.00 -19.0	וייעאידיעאידיאאיזיא	∿up <sup>≁₩</sup> *Iŋ≁ <sup>ſ</sup> ∖l <sub>a</sub> ,	ֆրթեսրվ	╱┅╢ <sup>ϻ</sup> ┈╇ <sup>╸</sup> ୄ୷	haar the flow of the	L.MARKANK	hand the second s	printip hr	War for the work	Next Left
-29.0										Marker Delta
-49.0										Mkr→CF
-69.0										Mkr→RefLv
Center 2.4 #Res BW	4626500 GH 3.0 kHz	łz	#VBW	10 kHz			#Sweep	Span : 5 100 s (	300.0 kHz 1001 pts)	More 1 of 2
MSG							STATUS			

Product	:	Wireless Gateway
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2412.00	-13.749	< 8dBm	Pass

# Figure Channel 1:

Agilent Sp	ectrum Analyzer	- Swept SA								
× Center F	<sup>50 Ω</sup>	500000 G	Hz	C SE		Avg Type Avg Hold	ALIGN OFF	12:25:49 P	M May 12, 2009	Frequency
10 dB/div	Ref Offset 1 Ref 11.00	Input: RF PI IF( I dB I dBm	NO: >30k ( ) Gain:Low	#Atten: 20	dB	Arginola.	Mkr1 2.4	114 486 -13.74	6 8 GHz 49 dBm	Auto Tun
1.00										Center Fre 2.414500000 GH
-9.00 -19.0 <b>- ເປັນເປັນ</b>	Anna High Planam	March March	mengul	1- ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	etwys/7%	Mar Carlo	where and the	<del>ለማ<sup>በ</sup>አሳት አ</del> ዋት	<sup>م</sup> ەلكىتىرىمەنىرىم	Start Fre 2.414350000 GH
-29.0										<b>Stop Fre</b> 2.414650000 GH
-49.0										CF Ste 30.000 kł <u>Auto</u> Ma
-69.0										Freq Offs 0 H
-79.0 Center 2. #Res BW	4145000 GI 3.0 kHz	Hz	#VBW	10 kHz			#Sweep	Span 3 100 s (	300.0 kHz 1001 pts)	

Product	:	Wireless Gateway
Test Item	:	Power Density Data
Test Site	:	No.3OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps) (2437MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
6	2437.000	-15.684	< 8dBm	Pass

# Figure Channel 6:

	12:20:00 DM May 12, 2000	ALIGN OFF		SENSEINT	AC			50.0	0
Peak Search	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N	: Log-Pwr : 1/100	Avg Type Avg Hold	Free Run	Trig: I	GHz PNO: >30k ⊂	800000 nput: RF	2.442022	arker 1
Next Pea	442 022 8 GHz -15.684 dBm	Mkr1 2.		en. 20 ab	#Atter	lFGain:Low	dB dBm	Ref Offset 1 Ref 11.00	dB/div
Next Rigl									
Next Le	www.www.www.	m y mar	   	un yung	Marth May Mal	Nacimu	J. M. M. LA	Warn	0
Marker Del									.0
Mkr→C									.0
Mkr→RefL									.0
<b>Moi</b> 1 of	Span 300.0 kHz	#Sween		Hz	W 10 kH	#VBV	łz	420000 GI	nter 2.4

Product	:	Wireless Gateway
Test Item	:	Power Density Data
Test Site	:	No.3 OATS
Test Mode	:	Mode 2: Transmitter (802.11g 6Mbps) (2462MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
11	2462.00	-13.296	< 8dBm	Pass

# Figure Channel 11:

🗈 Agilent Spectrum Analyzer - Swept SA									
Marker	50 Ω 1 2.4644880	00000 GH	Z	SENSE:INT	Avg Type	ALIGN OFF	12:40:58 P TRAC	M May 12, 2009 E 1 2 3 4 5 6	Peak Search
Input: RF         PNO: >30k         Trig: Free Run         Avg Hold: 5/100         Tree Maxwawe           Ref Offset 1 dB         #Atten: 20 dB         Mkr1 2.464 488 0 GHz           10 dB/div         Ref 11.00 dBm         -13.296 dBr								B 0 GHz 96 dBm	Next Peak
1.00									Next Right
-9.00 -19.0	on on the second	mahunn	nor Alexandre and a second	1 Marianter	Vwwww	M-trayerysteeply	᠕᠕᠕᠕	-r#-vorter	Next Left
-29.0									Marker Delta
-49.0									Mkr→CF
-69.0									Mkr→RefLv
Center 2 #Res BV	2.4645000 GHz V 3.0 kHz	2	#VBW 10 F	Hz		#Sweep	Ŝpan ( 100 s (	300.0 kHz 1001 pts)	More 1 of 2
MSG						STATUS			

# 9. EMI Reduction Method During Compliance Testing

No modification was made during testing.