



Test Report

Product Name	2.4GHz wireless transmitter
Model No	AWD210T
FCC ID.	DoC

Applicant	TATUNG CO.
Address	22, Chungshan N. Rd., 3rd Sec. Taipei, Taiwan, 104, R.O.C.

Date of Receipt	Mar. 22, 2010
Issue Date	May. 05, 2010
Report No.	103339R-RFUSP37V02
Report Version	V1.0

The test results relate only to the samples tested.

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Test Report Certification

Issue Date: May. 05, 2010

Report No.: 103339R-RFUSP37V02



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

Product Name	2.4GHz wireless transmitter
Applicant	TATUNG CO.
Address	22, Chungshan N. Rd., 3rd Sec. Taipei, Taiwan, 104, R.O.C.
Manufacturer	TATUNG CO.
Model No.	AWD210T
FCC ID.	DoC
EUT Rated Voltage	DC 5V (Power by USB)
EUT Test Voltage	AC 120V/60Hz
Trade Name	Acoustic Research
Applicable Standard	FCC CFR Title 47 Part 15 Subpart B: 2009 ANSI C63.4: 2003
Test Result	Complied



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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	2.4GHz wireless transmitter
Trade Name	Acoustic Research
Model No.	AWD210T
FCC ID.	DoC
Frequency Range	2405-2477MHz
Number of Channels	37CH
Type of Modulation	$\pi/4$ DQPSK (Differential Quadrature Phase Shift Keying)
Antenna Type	Printed on PCB
Antenna Gain	Refer to the table "Antenna List"
Channel Control	Auto
Power Adapter	MFR: KINGS, M/N: KSS05-050-1000U Input: AC 100-240V, 50-60Hz, 150mA Output: DC 5V, 1000mA Cable Out: Non-Shielded, 1.8m

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	TATUNG	N/A	2.0 dBi for 2.4 GHz

Note: The antenna of EUT is conform to FCC 15.203

Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 2:	2405 MHz	Channel 3:	2407 MHz	Channel 4:	2409 MHz
Channel 5:	2411 MHz	Channel 6:	2413 MHz	Channel 7:	2415 MHz
Channel 8:	2417 MHz	Channel 9:	2419 MHz	Channel 10:	2421 MHz
Channel 11:	2423 MHz	Channel 12:	2425 MHz	Channel 13:	2427 MHz
Channel 14:	2429 MHz	Channel 15:	2431 MHz	Channel 16:	2433 MHz
Channel 17:	2435 MHz	Channel 18:	2437 MHz	Channel 19:	2439 MHz
Channel 20:	2441 MHz	Channel 21:	2443 MHz	Channel 22:	2445 MHz
Channel 23:	2447 MHz	Channel 24:	2449 MHz	Channel 25:	2451 MHz
Channel 26:	2453 MHz	Channel 27:	2455 MHz	Channel 28:	2457 MHz
Channel 29:	2459 MHz	Channel 30:	2461 MHz	Channel 31:	2463 MHz
Channel 32:	2465 MHz	Channel 33:	2467 MHz	Channel 34:	2469 MHz
Channel 35:	2471 MHz	Channel 36:	2473 MHz	Channel 37:	2475 MHz
Channel 38:	2477 MHz				

Note:

1. The EUT is a 2.4GHz wireless transmitter with a built-in 2.4GHz transceiver.
1. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
2. These tests are conducted on a sample for demonstrating the compliance of 2.4GHz receiver with Part 15 Subpart B.
3. Part 15 Subpart C compliance for spread spectrum devices is shown on the report no. 103339R-RFUSP44V01-A and certified under FCC ID: BJM-AWD210T.

Test Mode:	Mode 1: Receive
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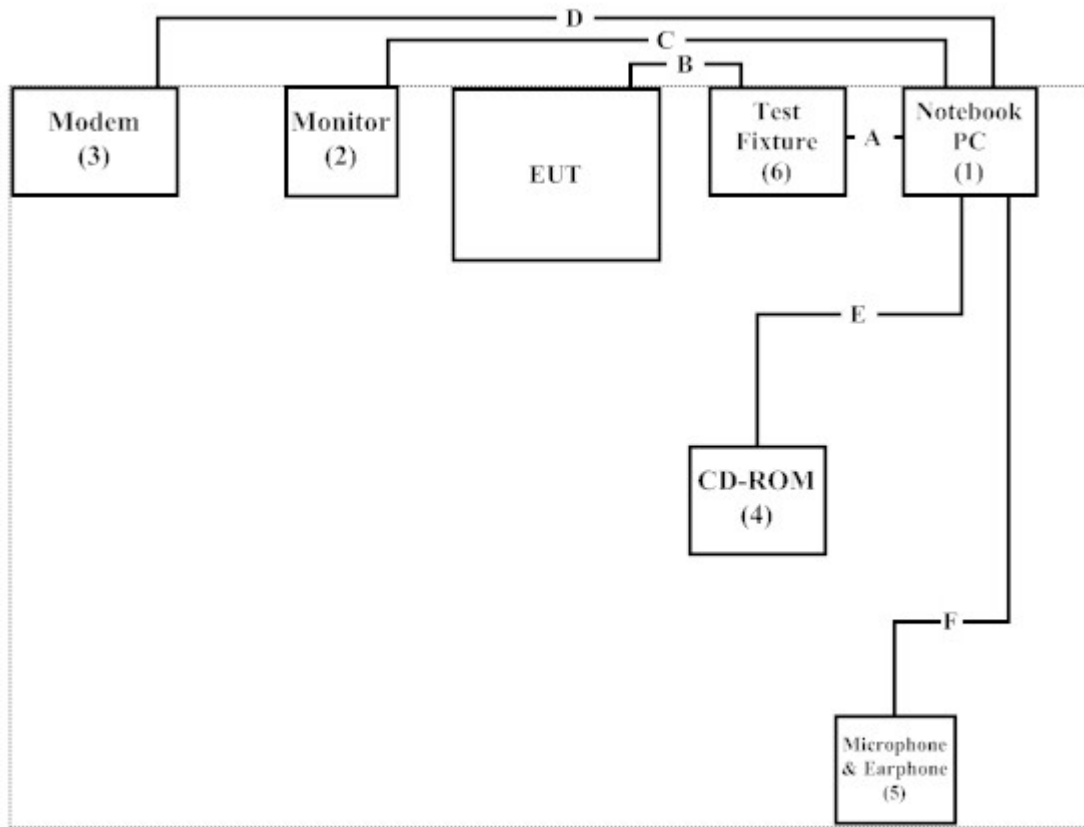
1.2. Tested System Details

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

Product	Manufacturer	Model No.	Serial No.	Power Cord
1 Notebook PC	DELL	PPT	N/A	Non-shielded, 0.8m
2 Monitor	Dell	2407WFPb	CN-0YY528-46633-796-12RS	Non-shielded, 1.8m
3 Modem	ACEEX	DM-1414	0102027550	Non-shielded, 1.8m
4 CD-ROM	Dell	N/A	N/A	N/A
5 Microphone & Earphone	PCHOME	N/A	N/A	N/A
6 Test Fixture	N/A	N/A	N/A	N/A

Signal Cable Type	Signal cable Description
A USB Cable	Non-shielded, 1.5m
B Signal Cable	Non-shielded, 0.1m
C VGA Cable	Shielded, 1.8m, with one ferrite core bonded.
D RS-232 Cable	Non-shielded, 1.5m
E CD-ROM USB Cable	Non-shielded, 0.5m
F Microphone & Earphone Cable	Non-shielded, 1.6m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

- (1) Setup the EUT as shown in section 1.4
- (2) Execute the “AMD2 Debug Ver 1.37.001” program (the continuous transmission program) on the EUT.
- (3) Setup the test mode, the test channel, and the data rate.
- (4) Press OK to start the transmission.
- (5) Verify that the EUT works correctly.

1.5. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

The related certificate for our laboratories about the test site and management system can be downloaded from

Quietek Corporation's Web Site : <http://tw.quietek.com/tw/emc/accreditations/accreditations.htm>

The address and introduction of Quietek Corporation's laboratories can be founded in our Web site :

<http://www.quietek.com/>

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

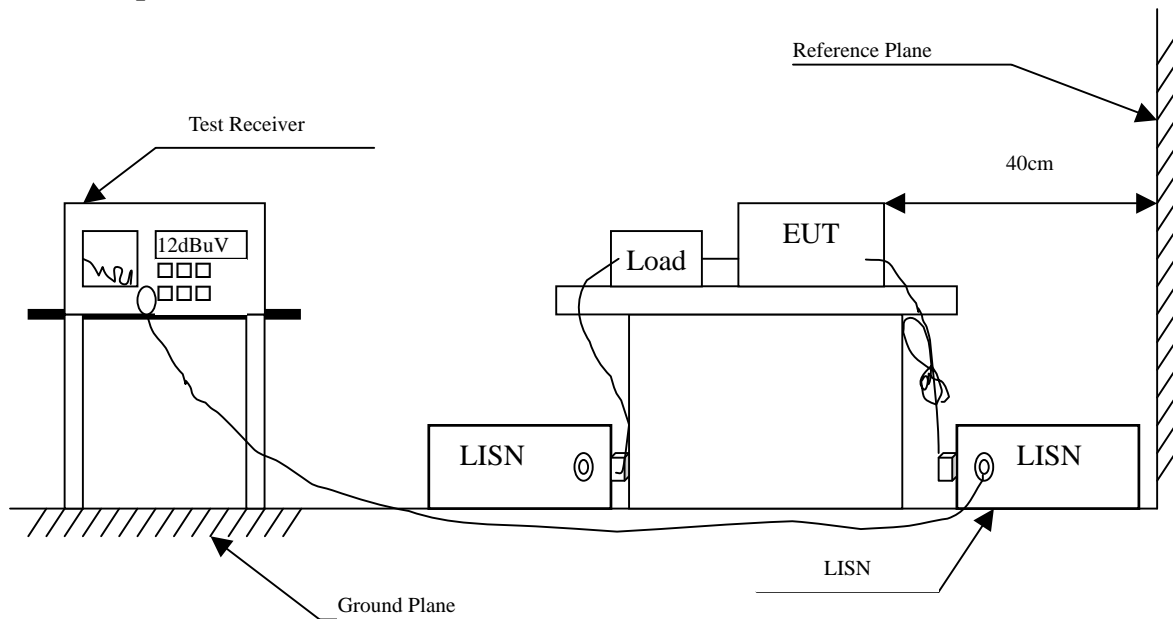
2.1. Test Equipment

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, 2010	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2010	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2010	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2010	
5	No.1 Shielded Room			N/A	

Note: All instruments are calibrated every one year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart B Paragraph 15.107 (dBuV) Limit		
Frequency MHz	Limits	
	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 : 2.4GHz wireless transmitter
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Receive(2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 1					
Quasi-Peak					
0.201	9.706	32.810	42.516	-22.027	64.543
0.267	9.665	27.240	36.905	-25.752	62.657
0.673	9.630	27.250	36.880	-19.120	56.000
0.966	9.670	28.680	38.350	-17.650	56.000
2.642	9.690	28.420	38.110	-17.890	56.000
5.716	9.720	34.480	44.200	-15.800	60.000
Average					
0.201	9.706	23.980	33.686	-20.857	54.543
0.267	9.665	18.230	27.895	-24.762	52.657
0.673	9.630	14.160	23.790	-22.210	46.000
0.966	9.670	17.270	26.940	-19.060	46.000
2.642	9.690	18.140	27.830	-18.170	46.000
5.716	9.720	25.720	35.440	-14.560	50.000

Note:

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

Product : 2.4GHz wireless transmitter
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Receive (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 2					
Quasi-Peak					
0.170	9.743	34.860	44.603	-20.826	65.429
0.298	9.660	31.140	40.800	-20.971	61.771
0.630	9.650	30.030	39.680	-16.320	56.000
1.408	9.670	26.620	36.290	-19.710	56.000
2.685	9.690	27.280	36.970	-19.030	56.000
5.103	9.700	31.940	41.640	-18.360	60.000
Average					
0.170	9.743	27.560	37.303	-18.126	55.429
0.298	9.660	22.830	32.490	-19.281	51.771
0.630	9.650	20.260	29.910	-16.090	46.000
1.408	9.670	18.000	27.670	-18.330	46.000
2.685	9.690	18.660	28.350	-17.650	46.000
5.103	9.700	23.570	33.270	-16.730	50.000

Note:

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

3. Radiated Emission

3.1. Test Equipment

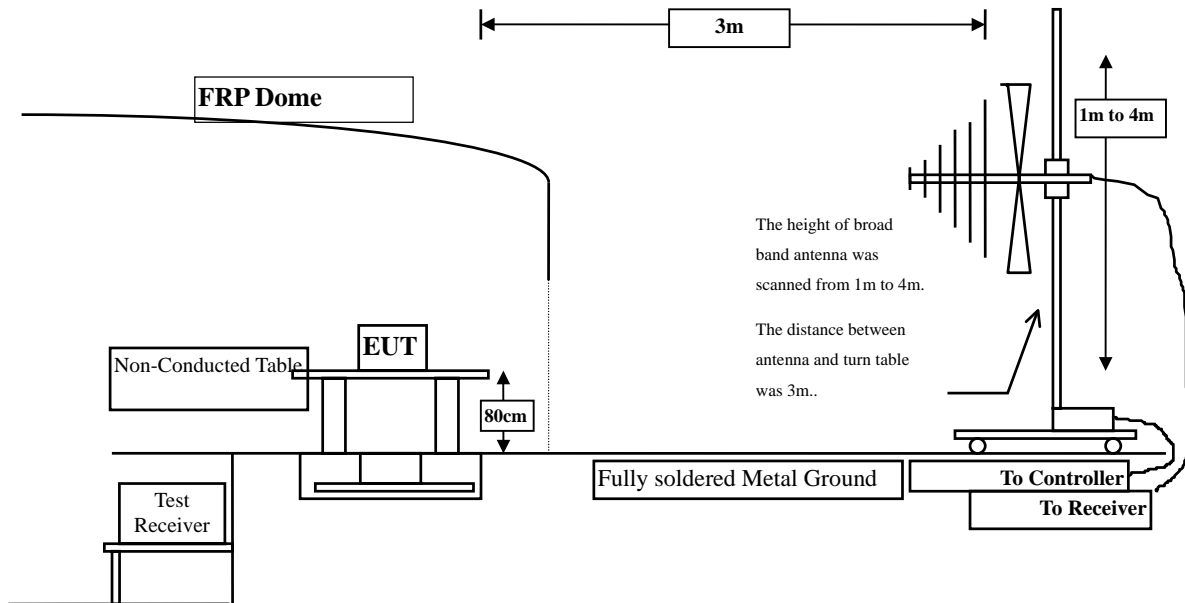
The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2009
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2009
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2009
	X	Pre-Amplifier	AGILENT	8447D/2944A09549	Sep., 2009
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2009
	X	Spectrum Analyzer	Advantest	R3162/91700283	Oct., 2009
	X	Coaxial Cable	Quietek	QTK-CABLE/ CAB5	Feb., 2010
	X	Controller	Quietek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

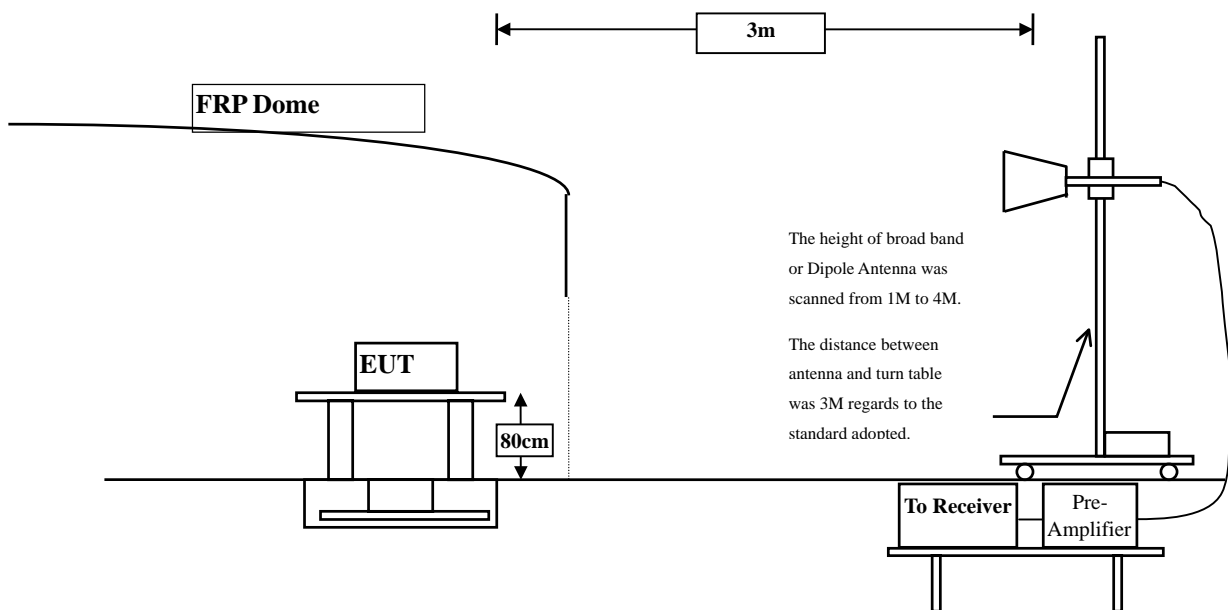
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

3.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



3.3. Limits

FCC Part 15 Subpart B Paragraph 15.109 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

- Remarks :
1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
 2. In the Above Table, the tighter limit applies at the band edges.
 3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna 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.

3.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

3.6. Test Result of Radiated Emission

Product : 2.4GHz wireless transmitter
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Receive(2405MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
2405.000	-1.055	45.590	44.534	-29.466	74.000
4810.000	3.142	37.560	40.702	-33.298	74.000
7215.000	10.194	35.980	46.175	-27.825	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
2405.000	-1.722	40.200	38.477	-35.523	74.000
4810.000	6.410	38.110	44.520	-29.480	74.000
7215.000	11.056	36.590	47.647	-26.353	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:3MHz; Span:10MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:10MHz.
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 2.4GHz wireless transmitter
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Receive(2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
2441.000	-0.829	37.630	36.801	-37.199	74.000
4882.000	2.889	41.120	44.009	-29.991	74.000
7323.000	11.783	35.010	46.793	-27.207	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
2441.000	-1.543	40.860	39.317	-34.683	74.000
4882.000	5.601	39.590	45.192	-28.808	74.000
7323.000	12.664	35.930	48.595	-25.405	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:3MHz; Span:10MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:10MHz.
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 2.4GHz wireless transmitter
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Receive(2477MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
2477.000	-0.600	42.470	41.870	-32.130	74.000
4954.000	2.734	41.190	43.924	-30.076	74.000
7431.000	12.382	35.320	47.702	-26.298	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
2477.000	-1.341	45.290	43.949	-30.051	74.000
4954.000	5.509	40.650	46.158	-27.842	74.000
7431.000	13.313	35.160	48.474	-25.526	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:3MHz; Span:10MHz.
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:10MHz.
4. Emission Level = Reading Level + Correct Factor.
5. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
6. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : 2.4GHz wireless transmitter
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Receive(2441 MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
51.340	-12.165	38.068	25.903	-14.097	40.000
627.520	1.660	29.618	31.278	-14.722	46.000
774.960	4.187	26.919	31.106	-14.894	46.000
848.680	5.776	26.392	32.167	-13.833	46.000
947.620	6.619	29.120	35.739	-10.261	46.000
984.480	7.679	31.087	38.766	-15.234	54.000
Vertical					
344.280	-3.171	26.473	23.303	-22.697	46.000
458.740	-3.887	27.007	23.120	-22.880	46.000
755.560	3.281	24.589	27.870	-18.130	46.000
959.260	6.964	28.433	35.397	-10.603	46.000
970.900	7.302	28.002	35.304	-18.696	54.000
984.480	3.049	30.547	33.596	-20.404	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.
4. The radiated emissions below 1GHz of the lowest, middle, highest frequency are pretested. Only the worst case is shown on the report.

4. EMI Reduction Method During Compliance Testing

No modification was made during testing.