Test Report

Product Name	Wireless Subwoofer (SW1-40W)
Model No.	SW1-GDT
FCC ID.	DoC

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

Date of Receipt	Mar. 31, 2009
Issued Date	Apr. 09, 2009
Report No.	094065R-RFUSP01V02
Report Version	V1.0

Test Report Certification

Issued Date: Apr. 09, 2009
Report No.: 094065R-RFUSP01V02

Product Name	Wireless Subwoofer (SW1-40W)
Applicant	TATUNG CO.
Address	22, Chungshan N. Rd., 3rd Sec. Taipei, Taiwan, 104, R.O.C.
Manufacturer	TATUNG CO.
Model No.	SW1-GDT
FCC ID.	DoC
Rated Voltage	AC 120V/60Hz
Working Voltage	AC 100-240V, 50-60Hz
Trade Name	GE
Applicable Standard	FCC CFR Title 47 Part 15 Subpart B: 2007 ANSI C63.4: 2003
Test Result	Complied

NVLAP Lab Code: 200533-0

The Test Results relate only to the samples tested.
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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

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Approved By :
(Manager / Vincent Lin)

Testing Laboratory
0914

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Subwoofer (SW1-40W)
Trade Name	GE
FCC ID.	DoC
Model No.	SW1-GDT
Frequency Range	2405 – 2477MHz
Number of Channels	37
Channel Separation	2 MHz
Channel Control	Auto
Type of Modulation	π/4 DQPSK (Differential Quadrature Phase Shift Keying)
Antenna Type	Chip Antenna
Antenna Gain	Refer to the table "Antenna List"
Build In Power	MFR: FSP, M/N: FSP060-1P07A

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Johanson Technology	2450AT18A100	Chip Antenna	0.5 dBi for 2.4 GHz

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 Wireless Subwoofer (SW1-40W) with a built-in 2.4GHz transceiver.
2. These tests are conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart B.
3. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
4. The function for the 2.4GHz transmitting is measured and produces a test report that the report number is 094065R-RFUSP07V01, certified under FCC ID: BJM-SW1GDT

EMI Test Mode	Mode 1: Receiver

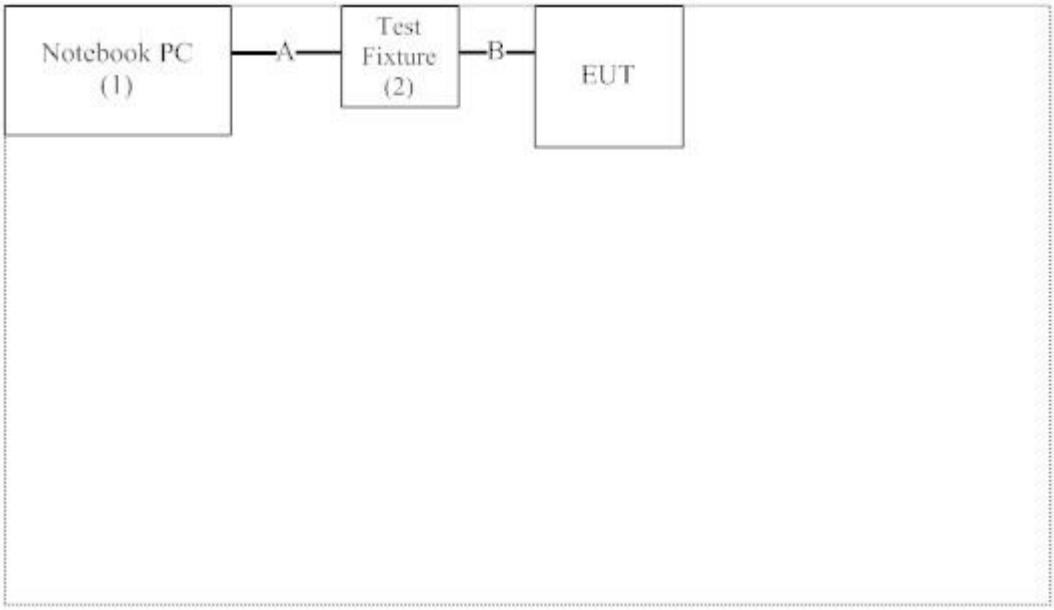
1.2. Tested System Details

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.	Test Fixture	TATUNG	N/A	N/A	N/A

Signal Cable Type		Signal Cable Description
A.	USB Cable	Shielded, 1.8m with one ferrite core bonded
B.	Controller Cable	Non-Shielded, 0.1m

1.3. Configuration of Tested System



1.4. EUT Exercise Software

(1) Setup the EUT as shown in section 1.3.
(2) Connect the EUT to a notebook via a USB.
(3) Execute “AMD2 Debug.exe (V1.37.001)” on the notebook.
(4) Setup the test channel.
(5) Press “Apply” to start the continuous receiver.
(6) 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/modules/myalbum/
The address and introduction of QuieTek Corporation's laboratories can be founded in our Web site: http://www.quietek.com/

Site Description: File on
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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,
Lin-Kou Shiang, Taipei,
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TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

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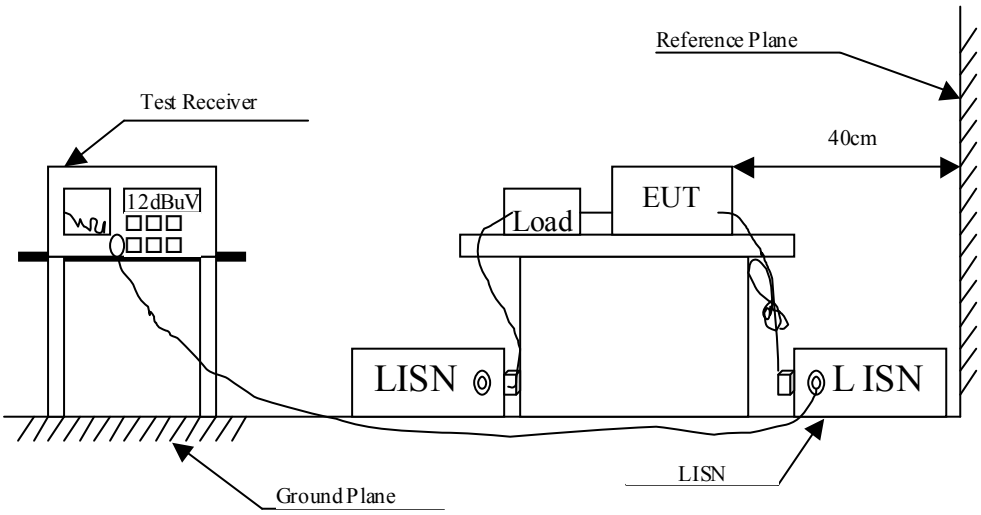
2. Conducted Emission

2.1. Test Equipment

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: All equipments 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	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

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 refer 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 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 Subwoofer (SW1-40W)
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 1: Receiver (2441MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 1					
Quasi-Peak					
0.384	9.820	21.230	31.050	-28.264	59.314
0.564	9.820	10.160	19.980	-36.020	56.000
3.630	9.860	16.410	26.270	-29.730	56.000
4.189	9.860	10.040	19.900	-36.100	56.000
18.431	10.200	18.960	29.160	-30.840	60.000
24.576	10.230	26.570	36.800	-23.200	60.000
Average					
0.384	9.820	21.030	30.850	-18.464	49.314
0.564	9.820	7.480	17.300	-28.700	46.000
3.630	9.860	1.590	11.450	-34.550	46.000
4.189	9.860	-0.470	9.390	-36.610	46.000
18.431	10.200	14.850	25.050	-24.950	50.000
24.576	10.230	23.770	34.000	-16.000	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 : Wireless Subwoofer (SW1-40W)
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Receiver (2441MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 2					
Quasi-Peak					
0.384	9.840	21.840	31.680	-27.634	59.314
1.150	9.830	11.090	20.920	-35.080	56.000
3.580	9.860	17.250	27.110	-28.890	56.000
4.041	9.860	13.350	23.210	-32.790	56.000
19.966	10.230	18.330	28.560	-31.440	60.000
24.576	10.251	26.970	37.221	-22.779	60.000
Average					
0.384	9.840	21.570	31.410	-17.904	49.314
1.150	9.830	10.080	19.910	-26.090	46.000
3.580	9.860	1.500	11.360	-34.640	46.000
4.041	9.860	2.780	12.640	-33.360	46.000
19.966	10.230	17.940	28.170	-21.830	50.000
24.576	10.251	24.170	34.421	-15.579	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:

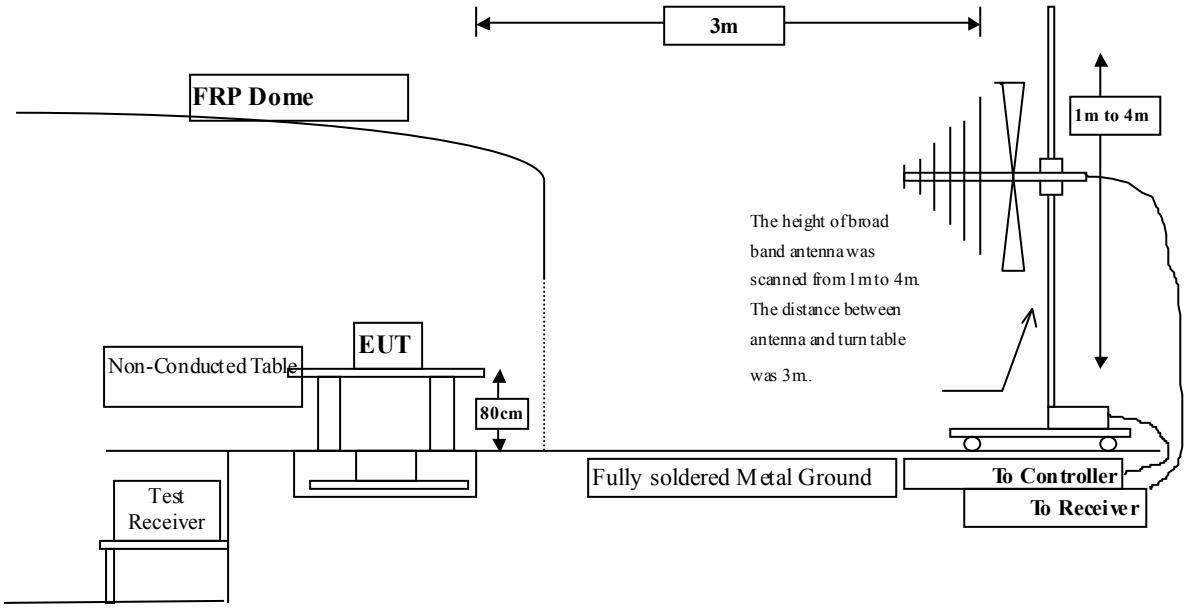
Test Site	Equipment		Manufacturer	Model No./Serial No.	Last Cal.
☒ Site # 3	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2008
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2008
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2008
	X	Pre-Amplifier	AGILENT	8447D/2944A09549	Sep., 2008
	X	Test Receiver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

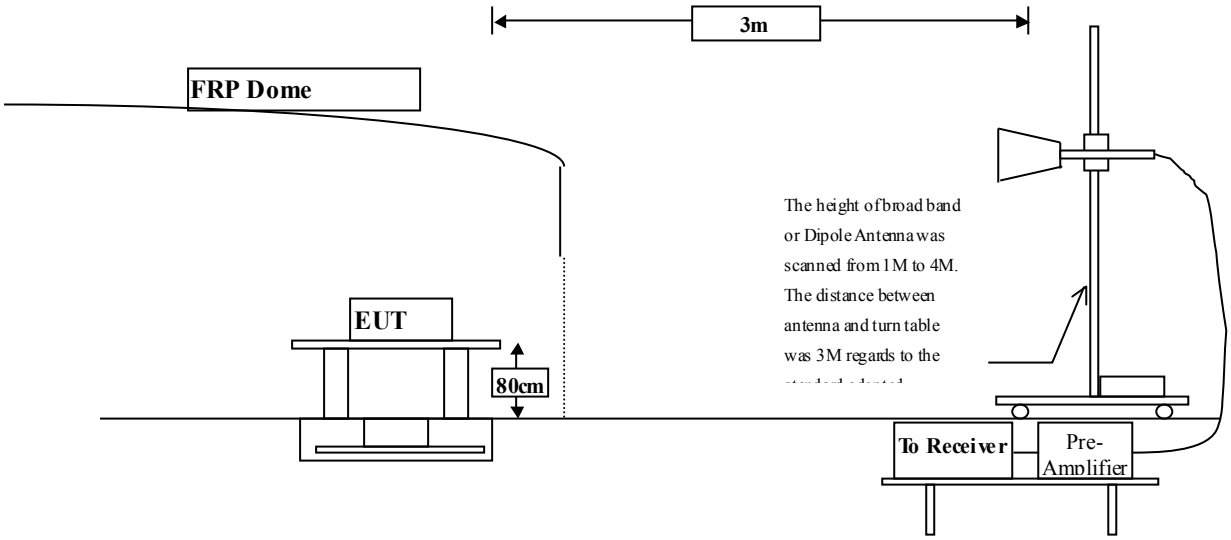
2. The test instruments marked with "X" are used to measure the final test results.

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 can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4: 2003 on radiated measurement.
The 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.

3.5. Uncertainty

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

3.6. Test Result of Radiated Emission

Product : Wireless Subwoofer (SW1-40W)
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Receiver (2405MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Peak Limit dBuV/m
Horizontal Peak Detector:					
2405.000	-1.561	42.360	40.799	-33.201	74.000
4810.000	3.510	43.290	46.800	-27.200	74.000
7215.000	7.945	41.090	49.035	-24.965	74.000
Average Detector					
--					
Vertical Peak Detector:					
2405.000	-2.335	41.630	39.295	-34.705	74.000
4810.000	3.495	42.150	45.645	-28.355	74.000
7215.000	8.927	41.690	50.617	-23.383	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:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz。
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.

Product : Wireless Subwoofer (SW1-40W)
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Receiver (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Peak Limit dBuV/m
Horizontal Peak Detector:					
2441.000	-1.362	41.080	39.718	-34.282	74.000
4882.000	3.430	42.340	45.770	-28.230	74.000
7323.000	7.273	40.940	48.213	-25.787	74.000
Average Detector					
--					
Vertical Peak Detector:					
2441.000	-1.928	41.040	39.112	-34.888	74.000
4882.000	3.966	42.150	46.116	-27.884	74.000
7323.000	8.062	40.720	48.783	-25.217	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:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz。
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.

Product : Wireless Subwoofer (SW1-40W)
Test Item : Harmonic Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Receiver (2477MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Average Limit dBuV/m
Horizontal					
Peak Detector:					
2477.000	-1.061	41.830	40.769	-33.231	74.000
4954.000	3.409	43.210	46.618	-27.382	74.000
7431.000	7.079	40.240	47.319	-26.681	74.000
Average Detector					
--					
Vertical					
Peak Detector:					
2477.000	-1.394	42.170	40.776	-33.224	74.000
4954.000	4.494	42.140	46.634	-27.366	74.000
7431.000	7.635	40.150	47.785	-26.215	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:1MHz; Span:100MHz。
3. Receiver setting (AVG Detector) : RBW:1MHz; VBW:10Hz; Span:20MHz。
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.

Product : Wireless Subwoofer (SW1-40W)
Test Item : General Radiated Emission
Test Site : No.3 OATS
Test Mode : Mode 1: Receiver (2441MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
309.360	-4.602	34.800	30.198	-15.802	46.000
398.600	0.699	30.995	31.694	-14.306	46.000
567.380	1.729	33.337	35.066	-10.934	46.000
637.220	1.420	30.691	32.110	-13.890	46.000
769.140	4.967	30.591	35.557	-10.443	46.000
875.840	5.621	28.510	34.131	-11.869	46.000
Vertical					
396.660	-2.237	33.102	30.864	-15.136	46.000
497.540	-0.890	30.536	29.646	-16.354	46.000
544.100	1.281	28.629	29.910	-16.090	46.000
749.740	1.841	28.912	30.753	-15.247	46.000
817.640	2.876	24.437	27.313	-18.687	46.000
930.160	3.590	22.808	26.398	-19.602	46.000

Note:

1. The reading levels below 1GHz are quasi-peak values.
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.