FCC Test Report

Product Name	Wireless Speaker System-Transmitter
Model No	CONTROL 2.4G
FCC ID.	R48CONTROL24GTXR

Applicant	Meiloon Industrial Co., Ltd.
Address	No.77, Lane 1775, Chuen-Ryh Road, Taoyuan City, Taiwan

Date of Receipt	Oct. 09, 2013
Issue Date	Nov. 07, 2013
Report No.	13A0200R-RFUSP42V01
Report Version	V1.0

Testing Laboratory
0914

Test Report Certification

Issue Date: Nov. 07, 2013
Report No.: 13A0200R-RFUSP42V01

Product Name	Wireless Speaker System-Transmitter
Applicant	Meiloon Industrial Co., Ltd.
Address	No.77, Lane 1775, Chuen-Ryh Road, Taoyuan City, Taiwan
Manufacturer	Harman International Industries, Incorporated
Model No.	CONTROL 2.4G
EUT Rated Voltage	AC 100-240V, 50/60Hz
EUT Test Voltage	AC 120V/ 60Hz
Trade Name	JBL
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.4: 2003, ANSI C63.10: 2009, KDB 558074
Test Result	Complied

The test results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.
This report must not be used to claim product endorsement by TAF or any agency of the U.S. Government

Documented By : Leven Huang

(Senior Adm. Specialist / Leven Huang)

Tested By : Nowal Kuo

(Engineer / Nowal Kuo)

Approved By :

(Director / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Speaker System-Transmitter
Trade Name	JBL
Model No.	CONTROL 2.4G
FCC ID.	R48CONTROL24GTXR
Frequency Range	2403-2478MHz
Number of Channels	26CH
Channel Separation	3MHz
Type of Modulation	GFSK
Antenna Type	Dipole
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
Audio to RCA Cable	Non-Shielded, 1.0m
Power Adapter	MFR: Ktec, M/N: KSAS0060500100D5D Input: AC 100-240V, 50/60Hz, 0.18A Output: DC 5V, 1.0A Cable Out: Non-Shielded, 1.5m
Contain Module	AlfaPlus / AM8810 Long Range

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	Ant.Star	ASD-WLAN-01	2.06 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	Frequency
Channel 01:	2403 MHz	Channel 02:	2406 MHz	Channel 03:	2409 MHz	Channel 04:	2412 MHz
Channel 05:	2415 MHz	Channel 06:	2418 MHz	Channel 07:	2421 MHz	Channel 08:	2424 MHz
Channel 09:	2427 MHz	Channel 10:	2430 MHz	Channel 11:	2433 MHz	Channel 12:	2436 MHz
Channel 13:	2439 MHz	Channel 14:	2442 MHz	Channel 15:	2445 MHz	Channel 16:	2448 MHz
Channel 17:	2451 MHz	Channel 18:	2454 MHz	Channel 19:	2457 MHz	Channel 20:	2460 MHz
Channel 21:	2463 MHz	Channel 22:	2466 MHz	Channel 23:	2469 MHz	Channel 24:	2472 MHz
Channel 25:	2475 MHz	Channel 26:	2478 MHz				

Note:

1. The EUT is a Wireless Speaker System-Transmitter with a built-in 2.4GHz transceiver.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. These tests are conducted on a sample for the purpose of demonstrating compliance of 2.4GHz transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices

Test Mode:	Mode 1: Transmit

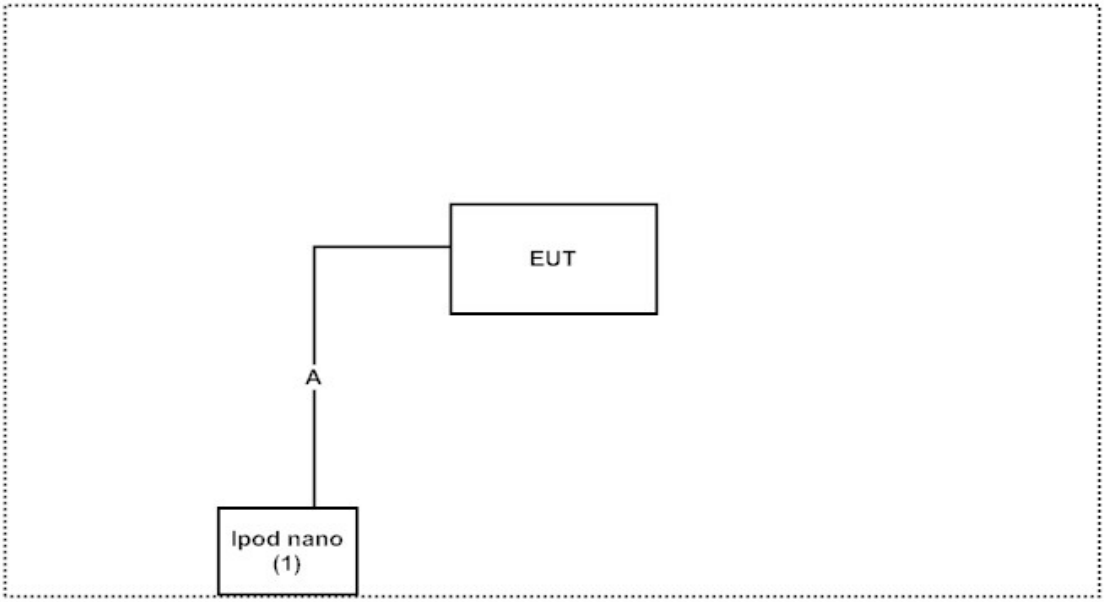
1.3. Tested System Details

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	A1199	YM708A72VQ5	N/A

Signal Cable Type		Signal cable Description
A	Audio to RCA Cable	Non-Shielded, 1.0m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

(1) Setup the EUT as shown in section 1.4.
(2) Provide the AC Power Source.
(3) Start transmits continually.
(4) 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: http://www.quietek.com/tw/ctg/cts/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

Site Name: Quietek Corporation
Site Address: No.5-22, Ruishukeng,
Linkou Dist. New Taipei City 24451,
Taiwan, R.O.C.
TEL: 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

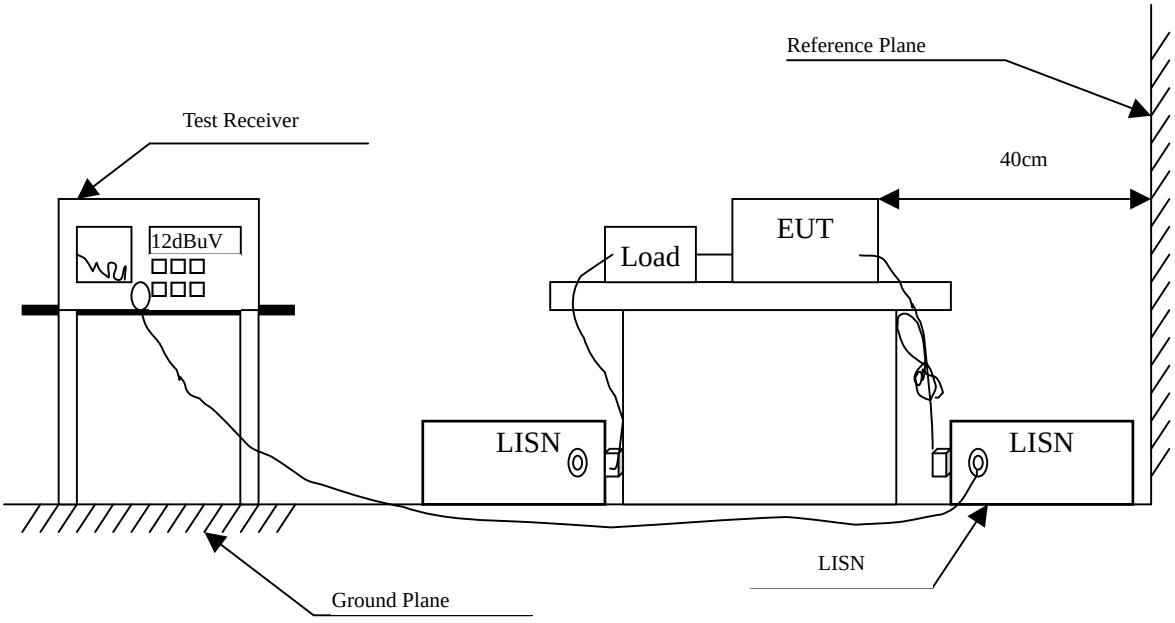
2.1. Test Equipment

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

	Equipment	Manufacturer	Model No. / Serial No.	Last Cal.	Remark
X	Test Receiver	R & S	ESCS 30 / 825442/018	Sep., 2013	
X	Artificial Mains Network	R & S	ENV4200 / 848411/10	Feb., 2013	Peripherals
X	LISN	R & S	ESH3-Z5 / 825562/002	Feb., 2013	EUT
	DC LISN	Schwarzbeck	8226 / 176	Mar, 2013	EUT
X	Pulse Limiter	R & S	ESH3-Z2 / 357.8810.52	Feb., 2013	
	No.1 Shielded Room				

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 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 C63.10: 2009 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 Speaker System-Transmitter
Test Item : Conducted Emission Test
Power Line : Line 1
Test Mode : Mode 1: Transmit (2439MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 1					
Quasi-Peak					
0.365	9.706	30.760	40.466	-19.391	59.857
0.431	9.709	16.140	25.849	-32.122	57.971
0.728	9.723	21.750	31.473	-24.527	56.000
1.353	9.761	17.870	27.631	-28.369	56.000
1.888	9.795	16.270	26.065	-29.935	56.000
2.970	9.810	14.330	24.140	-31.860	56.000
Average					
0.365	9.706	21.770	31.476	-18.381	49.857
0.431	9.709	6.940	16.649	-31.322	47.971
0.728	9.723	9.100	18.823	-27.177	46.000
1.353	9.761	8.630	18.391	-27.609	46.000
1.888	9.795	6.850	16.645	-29.355	46.000
2.970	9.810	5.100	14.910	-31.090	46.000

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 Speaker System-Transmitter
Test Item : Conducted Emission Test
Power Line : Line 2
Test Mode : Mode 1: Transmit (2439MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV	dB	dBuV
LINE 2					
Quasi-Peak					
0.361	9.686	28.390	38.076	-21.895	59.971
0.443	9.690	13.910	23.600	-34.029	57.629
0.857	9.719	15.640	25.359	-30.641	56.000
1.369	9.742	15.320	25.062	-30.938	56.000
1.947	9.778	14.030	23.808	-32.192	56.000
22.779	10.084	15.300	25.384	-34.616	60.000
Average					
0.361	9.686	19.360	29.046	-20.925	49.971
0.443	9.690	5.150	14.840	-32.789	47.629
0.857	9.719	6.710	16.429	-29.571	46.000
1.369	9.742	6.440	16.182	-29.818	46.000
1.947	9.778	5.180	14.958	-31.042	46.000
22.779	10.084	4.800	14.884	-35.116	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. Peak Power Output

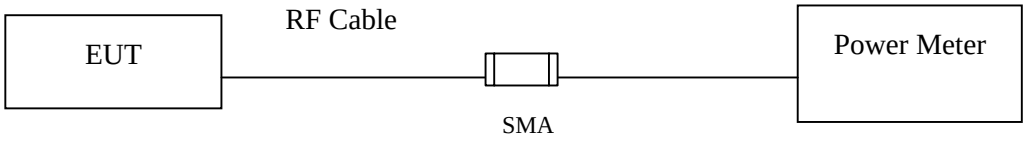
3.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2013
X	Power Sensor	Anritsu	MA2411B/0738448	Jun, 2013

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 KDB 558074 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using KDB 558074 section 9.1.3 PKPM1 Peak power meter method.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : Wireless Speaker System-Transmitter
Test Item : Peak Power Output Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
01	2403	12.90	<30dBm	Pass
13	2439	12.60	<30dBm	Pass
26	2478	11.42	<30dBm	Pass

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

4. Radiated Emission

4.1. Test Equipment

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

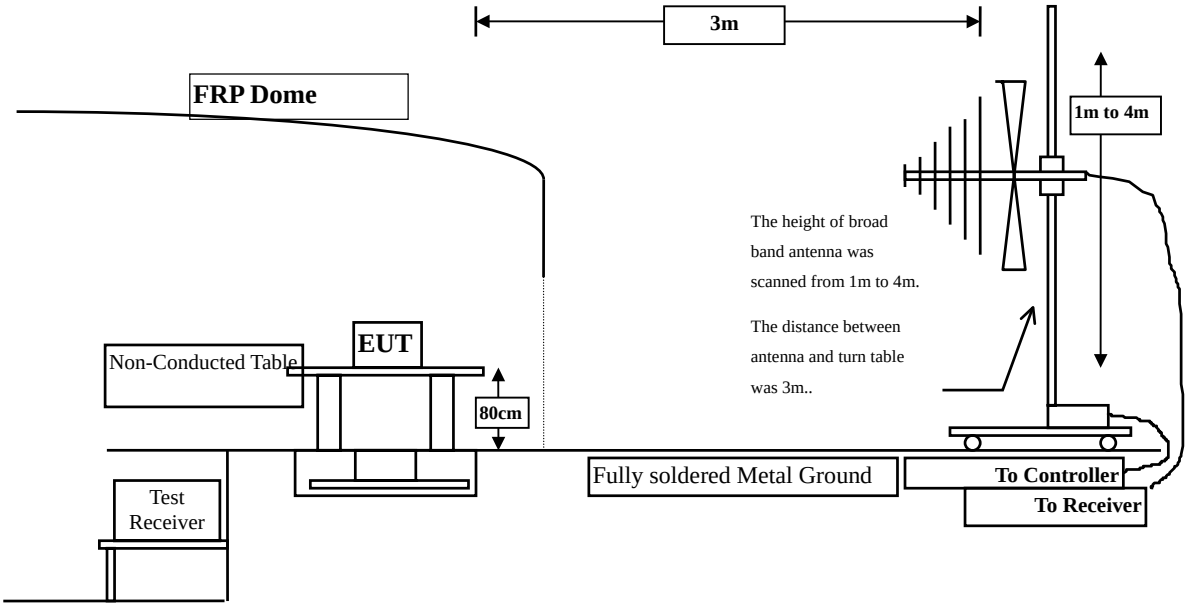
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3	X	Loop Antenna	Teseq	HLA6120 / 26739	Jul., 2013
	X	Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
	X	Pre-Amplifier	Agilent	8447D/2944A09549	Sep., 2013
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
	X	Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2013
	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.

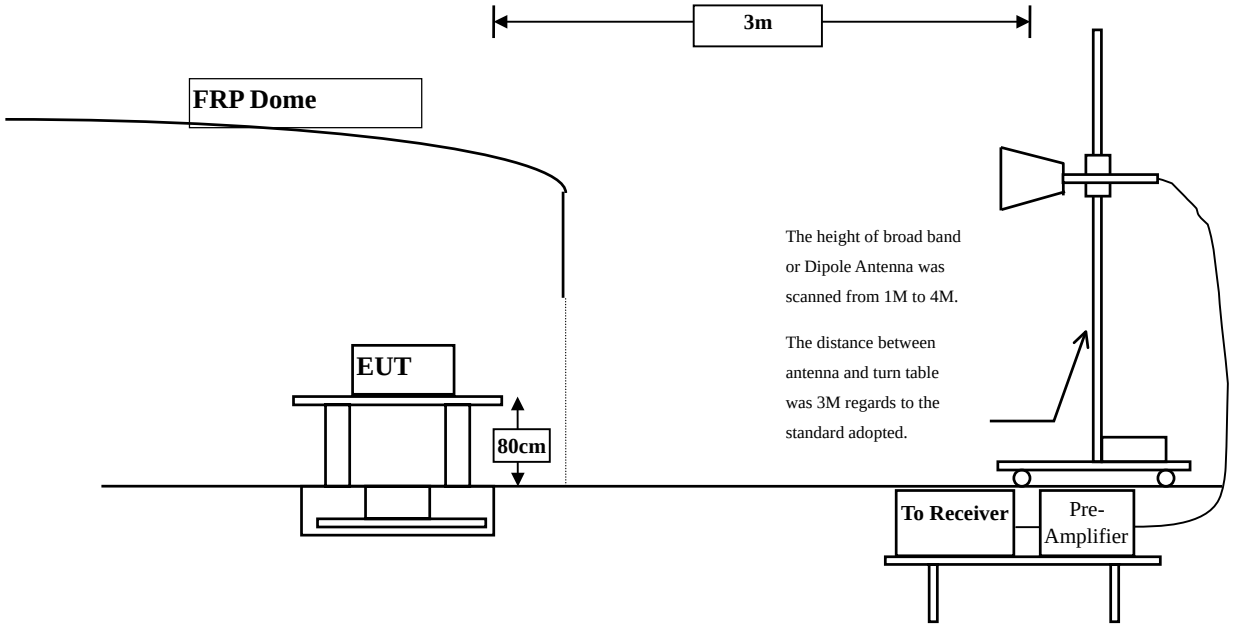
2. The test instruments marked with “X” are used to measure the final test results.

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 C63.10, 2009 and tested according to DTS test procedure of Jan. 2012 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 C63.10: 2009on 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 form 9kHz - 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 Speaker System-Transmitter
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2403MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4806.000	3.328	56.440	59.769	-14.231	74.000
7209.000	10.188	48.180	58.367	-15.633	74.000
9612.000	13.669	42.930	56.599	-17.401	74.000
Average Detector:					
4806.000	3.328	45.580	48.909	-5.091	54.000
7209.000	10.188	35.200	45.387	-8.613	54.000
9612.000	13.669	30.000	43.669	-10.331	54.000
Vertical					
Peak Detector:					
4806.000	6.626	56.140	62.766	-11.234	74.000
7209.000	11.054	48.900	59.954	-14.046	74.000
9612.000	14.074	48.720	62.794	-11.206	74.000
Average Detector:					
4806.000	6.626	45.160	51.786	-2.214	54.000
7209.000	11.054	35.190	46.244	-7.756	54.000
9612.000	14.074	35.200	49.274	-4.726	54.000

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. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
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 Speaker System-Transmitter
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2439MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4878.000	3.019	54.400	57.419	-16.581	74.000
7317.000	11.820	45.880	57.700	-16.300	74.000
9756.000	12.599	40.670	53.269	-20.731	74.000
Average Detector:					
4878.000	3.019	43.700	46.719	-7.281	54.000
7317.000	11.820	34.310	46.130	-7.870	54.000
Vertical					
Peak Detector:					
4878.000	5.762	51.090	56.853	-17.147	74.000
7317.000	12.678	47.460	60.139	-13.861	74.000
9756.000	13.077	46.130	59.207	-14.793	74.000
Average Detector:					
4878.000	5.762	40.400	46.163	-7.837	54.000
7317.000	12.678	34.130	46.809	-7.191	54.000
9756.000	13.077	33.010	46.087	-7.913	54.000

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. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
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 Speaker System-Transmitter
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2478MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4956.000	2.771	52.420	55.191	-18.809	74.000
7434.000	12.509	44.100	56.610	-17.390	74.000
9912.000	13.411	38.080	51.491	-22.509	74.000
Average Detector:					
4956.000	2.771	41.970	44.741	-9.259	54.000
7434.000	12.509	30.990	43.500	-10.500	54.000
Vertical					
Peak Detector:					
4956.000	5.553	48.370	53.924	-20.076	74.000
7434.000	13.416	44.900	58.317	-15.683	74.000
9912.000	13.964	41.640	55.605	-18.395	74.000
Average Detector:					
7434.000	13.416	31.580	44.997	-9.003	54.000
9912.000	13.964	27.870	41.835	-12.165	54.000

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. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
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 Speaker System-Transmitter
Test Item : General Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2439MHz)

Frequency	Correct Factor	Reading Level	Measurement Level	Margin	Limit
MHz	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
311.300	-4.026	39.744	35.718	-10.282	46.000
385.020	-1.350	35.000	33.650	-12.350	46.000
431.580	-2.099	42.788	40.689	-5.311	46.000
577.080	3.169	31.104	34.273	-11.727	46.000
672.140	2.291	28.601	30.892	-15.108	46.000
827.340	6.302	26.733	33.035	-12.965	46.000
Vertical					
336.520	-4.630	34.533	29.903	-16.097	46.000
431.580	-9.509	38.943	29.434	-16.566	46.000
528.580	-0.462	28.026	27.564	-18.436	46.000
691.540	2.421	26.074	28.495	-17.505	46.000
844.800	3.181	26.315	29.496	-16.504	46.000
967.020	8.071	24.857	32.928	-21.072	54.000

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. Measurement Level = Reading Level + Correct Factor.
5. Correct Factor = Antenna factor + Cable loss –Amplifier gain.
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.
8. No emission found between lowest internal used/generated frequency to 30MHz.

5. RF antenna conducted test

5.1. Test Equipment

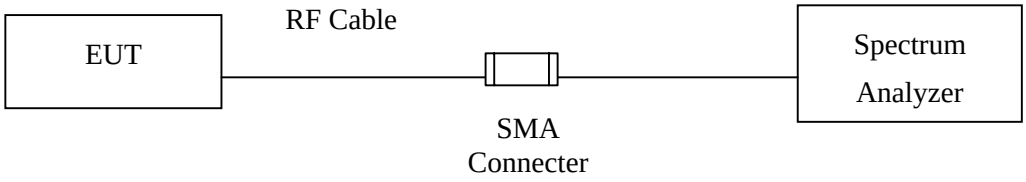
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr., 2013

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 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

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

5.5. Uncertainty

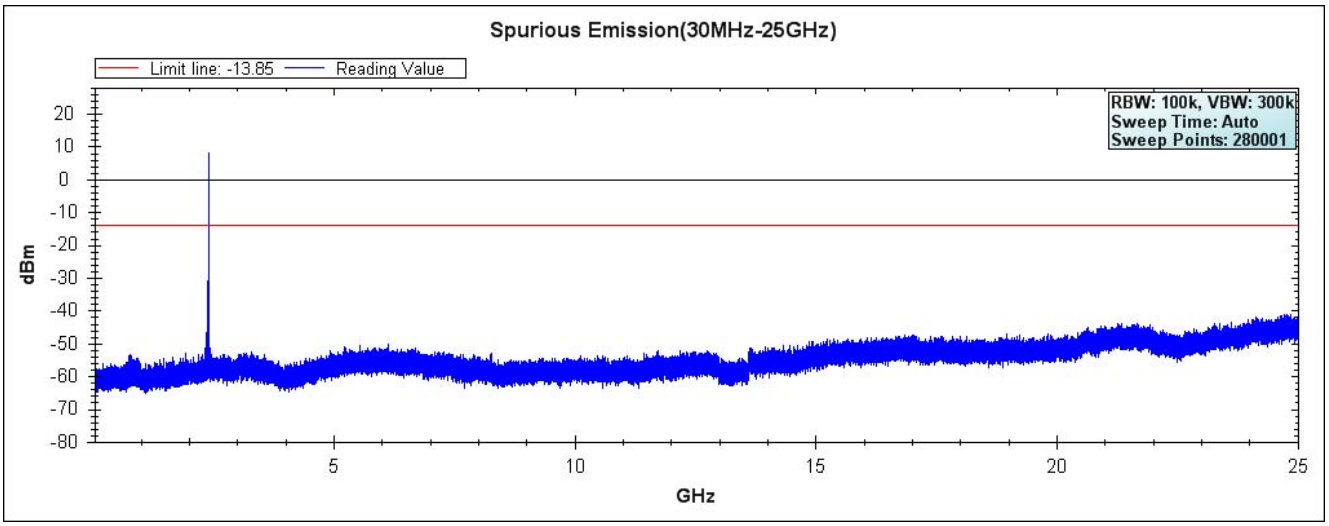
The measurement uncertainty

Conducted is defined as ± 1.27dB

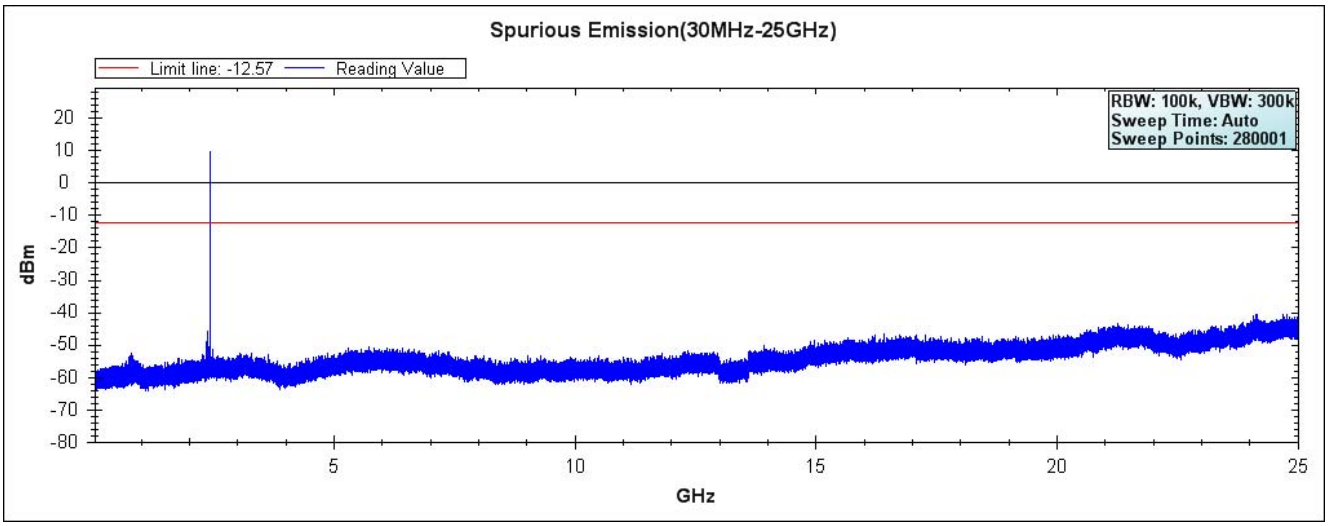
5.6. Test Result of RF antenna conducted test

Product : Wireless Speaker System-Transmitter
Test Item : RF antenna conducted test
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

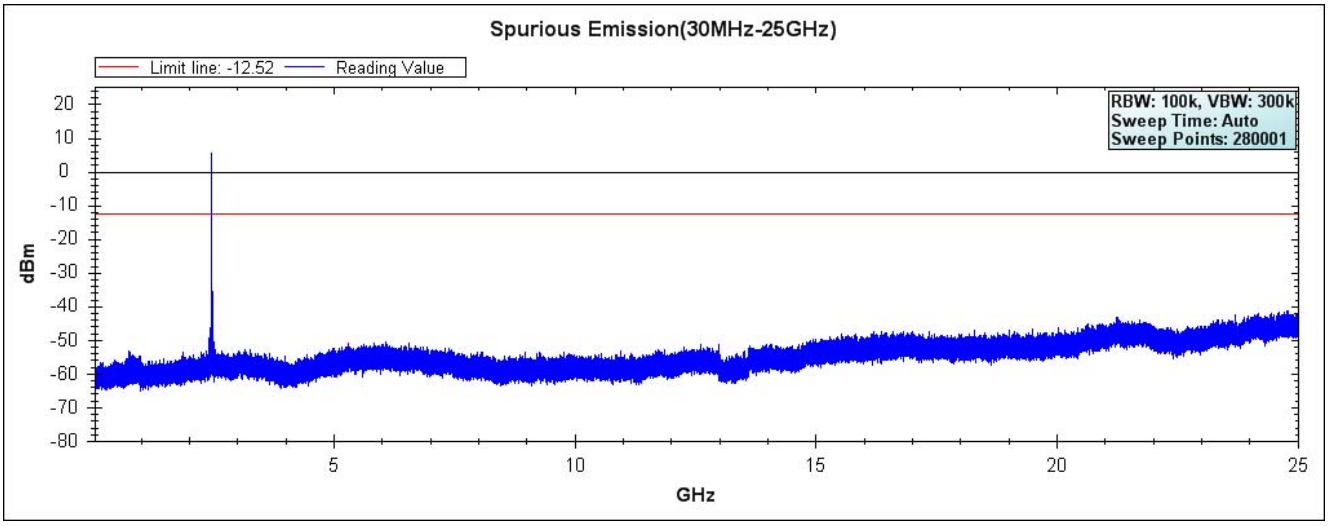
Channel 01 (2403MHz) 30M-25GHz



Channel 13 (2439MHz) 30M-25GHz



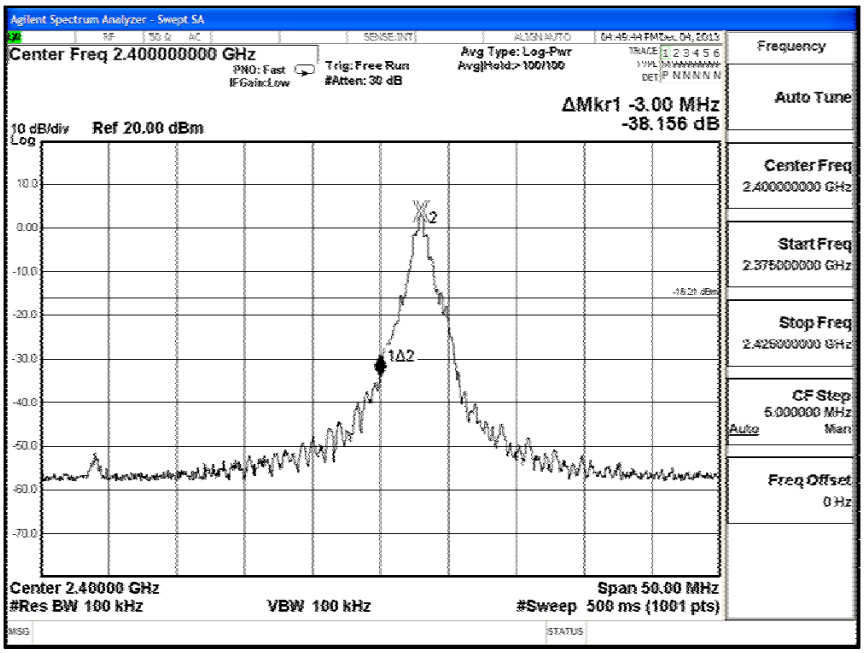
Channel 26 (2478MHz) 30M-25GHz



Conducted Band Edge

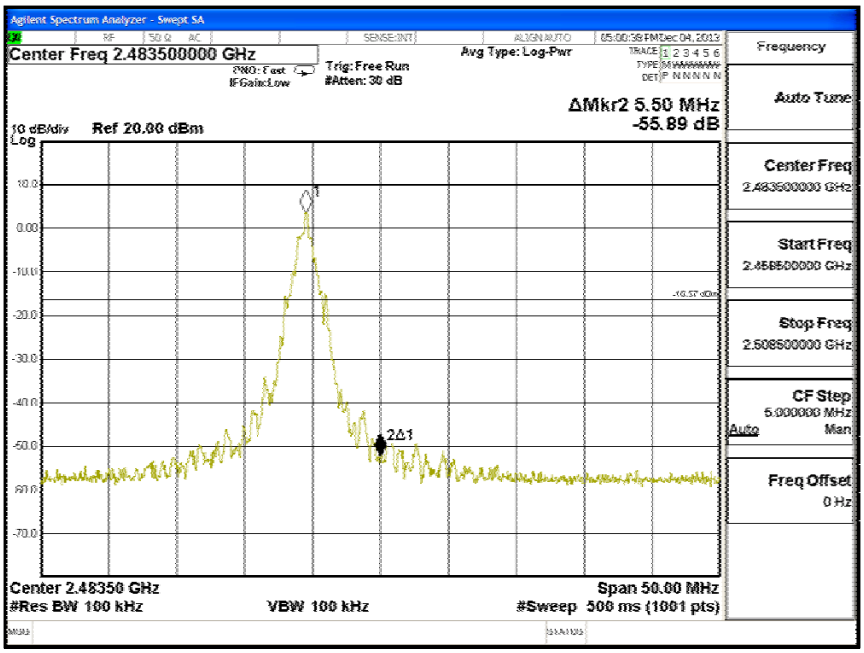
Test Frequency (MHz)	Measurement Level (dBc)	Limit (dBc)	Result
< 2400	38.156	>20	PASS

Channel_2403MHz



Test Frequency (MHz)	Measurement Level (dBc)	Limit (dBc)	Result
>2483.5	55.89	>20	PASS

Channel_2478MHz



6. Band Edge

6.1. Test Equipment

RF Radiated Measurement:

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

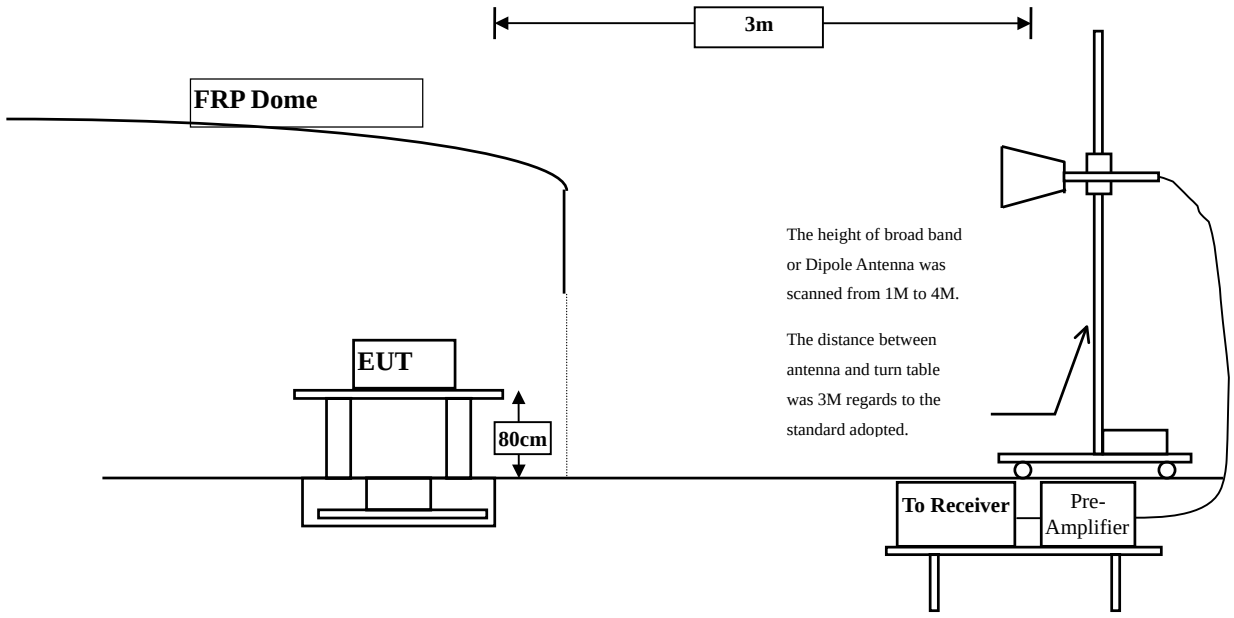
Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☒Site # 3		Bilog Antenna	Schaffner Chase	CBL6112B/2673	Sep., 2013
	X	Horn Antenna	Schwarzbeck	BBHA9120D/D305	Sep., 2013
		Horn Antenna	Schwarzbeck	BBHA9170/208	Jul., 2013
		Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2013
	X	Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2013
		Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 2013
	X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2013
		Test Receiver	R & S	ESCS 30/ 825442/018	Sep., 2013
	X	Coaxial Cable	QuieTek	QTK-CABLE/ CAB5	Feb., 2013
	X	Controller	QuieTek	QTK-CONTROLLER/ CTRL3	N/A
	X	Coaxial Switch	Anritsu	MP59B/6200265729	N/A

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 C63.10, 2009 and tested according to DTS test procedure of Jan. 2012 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 C63.10, 2009 on radiated measurement.

6.5. Uncertainty

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

6.6. Test Result of Band Edge

Product : Wireless Speaker System-Transmitter
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

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	31.509	25.424	56.933	74.000	54.000	Pass
01 (Peak)	2403.600	31.584	68.129	99.713	--	--	--
01 (Average)	2390.000	31.509	12.296	43.805	74.000	54.000	Pass
01 (Average)	2403.200	31.582	56.981	88.562	--	--	--

Figure Channel 01: Horizontal (Peak)

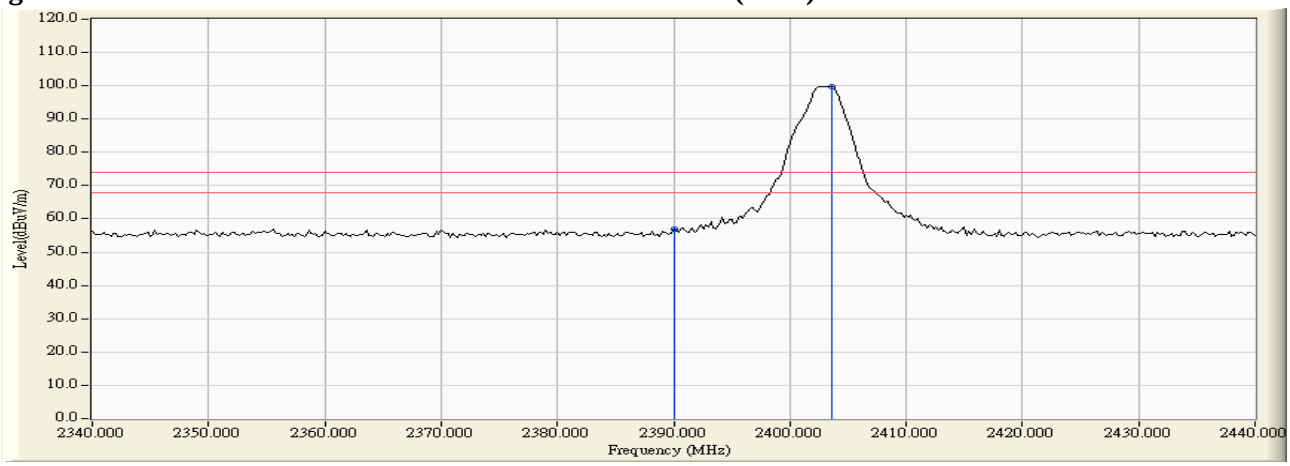
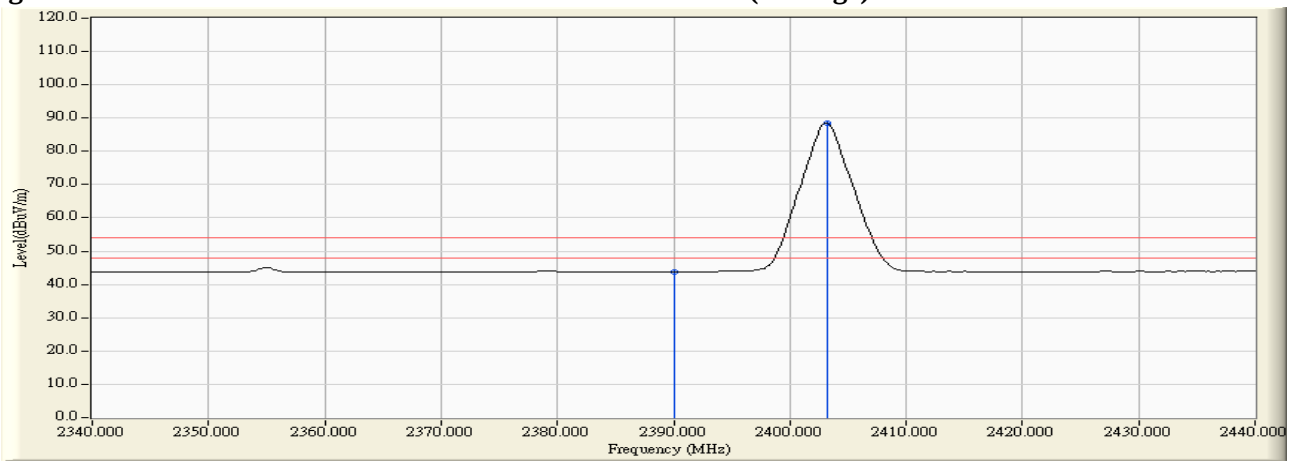


Figure Channel 01: Horizontal (Average)



Note:

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 Speaker System-Transmitter
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

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)	2389.000	30.920	24.658	55.578	74.000	54.000	Pass
01 (Peak)	2390.000	30.915	23.695	54.610	74.000	54.000	Pass
01 (Peak)	2403.600	30.922	62.456	93.378	--	--	--
01 (Average)	2389.000	30.920	12.214	43.134	74.000	54.000	Pass
01 (Average)	2390.000	30.915	12.203	43.118	74.000	54.000	Pass
01 (Average)	2403.200	30.921	52.154	83.075	--	--	--

Figure Channel 01: Vertical (Peak)

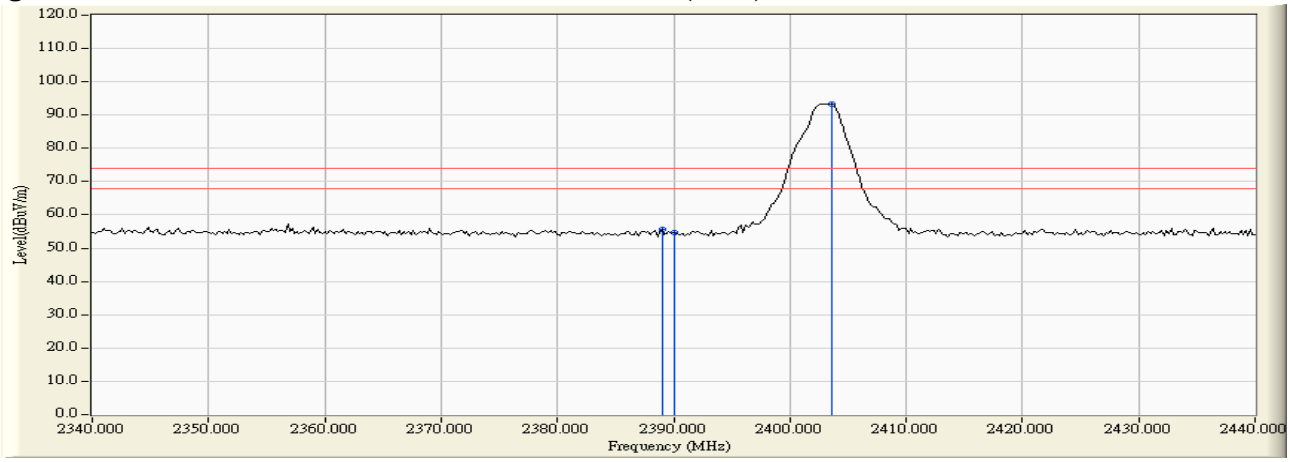
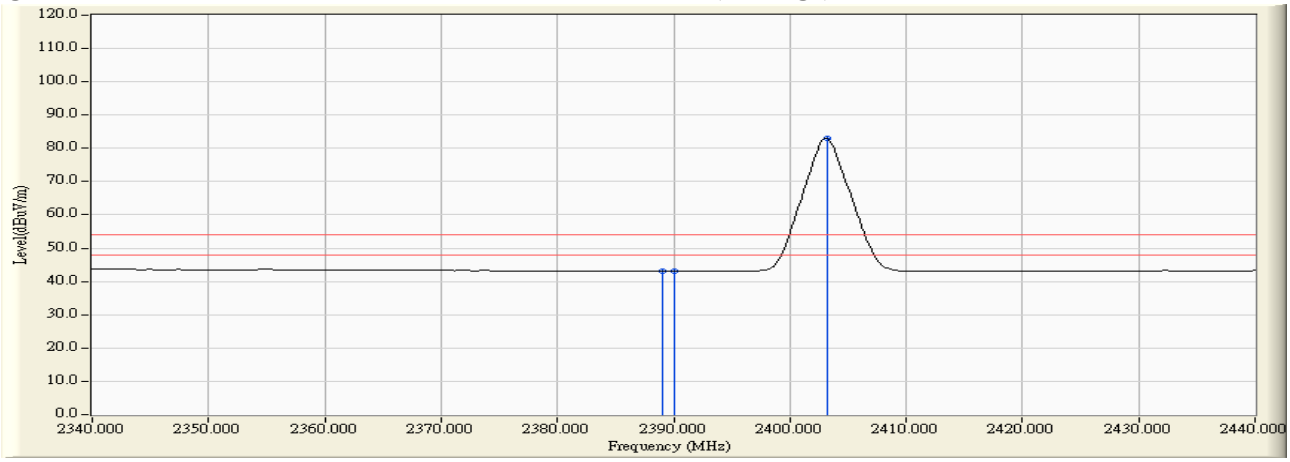


Figure Channel 01: Vertical (Average)



Note:

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 Speaker System-Transmitter
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

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
26 (Peak)	2478.500	32.145	70.113	102.257	--	--	--
26 (Peak)	2483.500	32.182	32.710	64.892	74.000	54.000	Pass
26 (Average)	2478.100	32.142	58.503	90.644	--	--	--
26 (Average)	2483.500	32.182	15.203	47.385	74.000	54.000	Pass

Figure Channel 26: Horizontal (Peak)

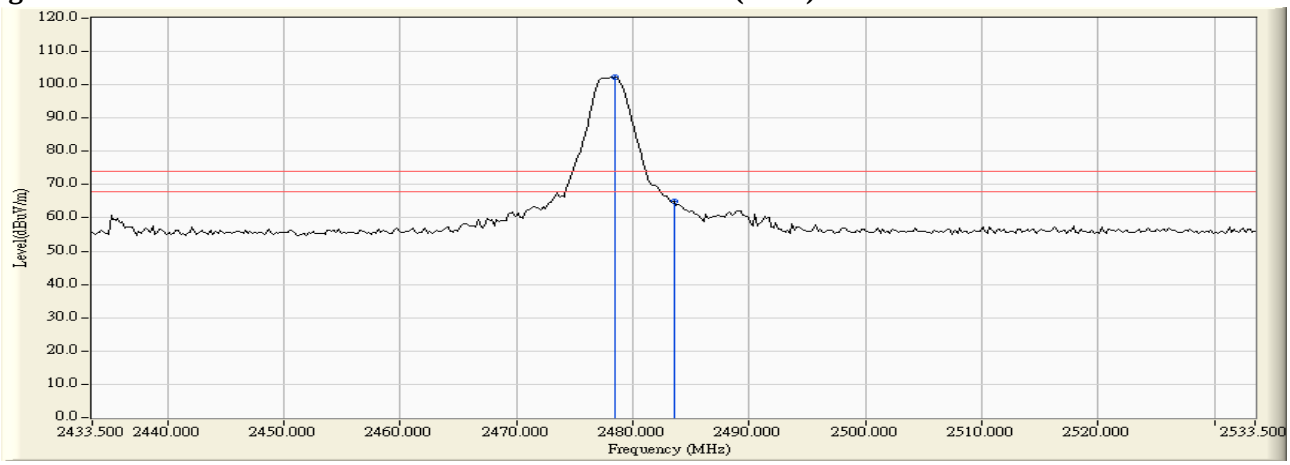
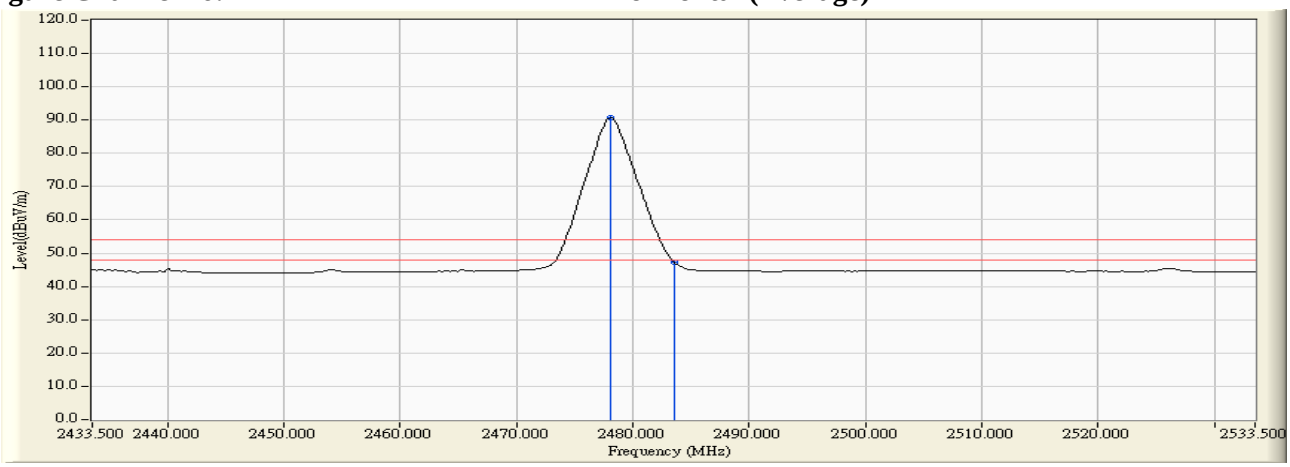


Figure Channel 26: Horizontal (Average)



Note:

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 Speaker System-Transmitter
Test Item : Band Edge Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit

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
26 (Peak)	2478.500	31.402	64.444	95.846	--	--	--
26 (Peak)	2483.500	31.435	28.370	59.805	74.000	54.000	Pass
26 (Average)	2478.100	31.400	53.804	85.203	--	--	--
26 (Average)	2483.500	31.435	13.188	44.623	74.000	54.000	Pass

Figure Channel 26: Vertical (Peak)

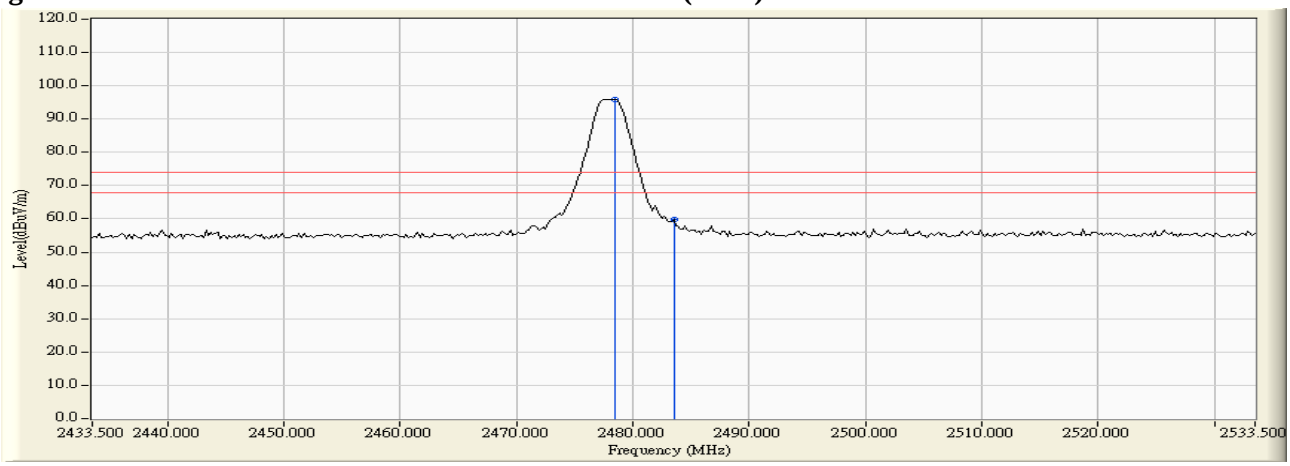
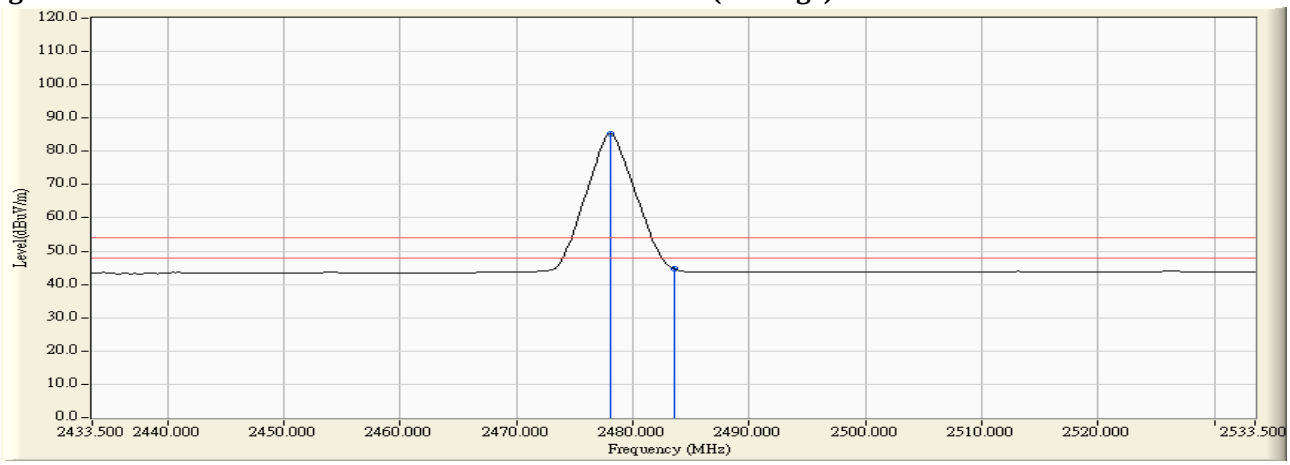


Figure Channel 26: Vertical (Average)



Note:

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.

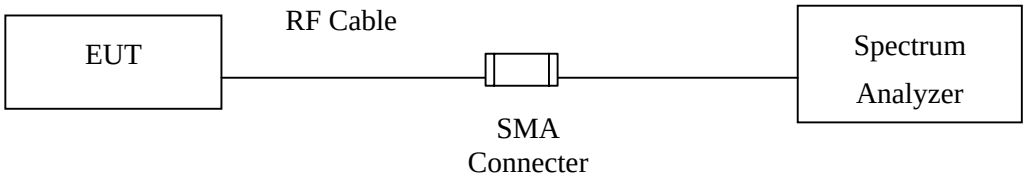
7. Occupied Bandwidth

7.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr.,2013

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



7.3. Limits

The minimum bandwidth shall be at least 500 kHz.

7.4. Test Procedure

The EUT was setup according to ANSI C63.10, 2009; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

7.5. Uncertainty

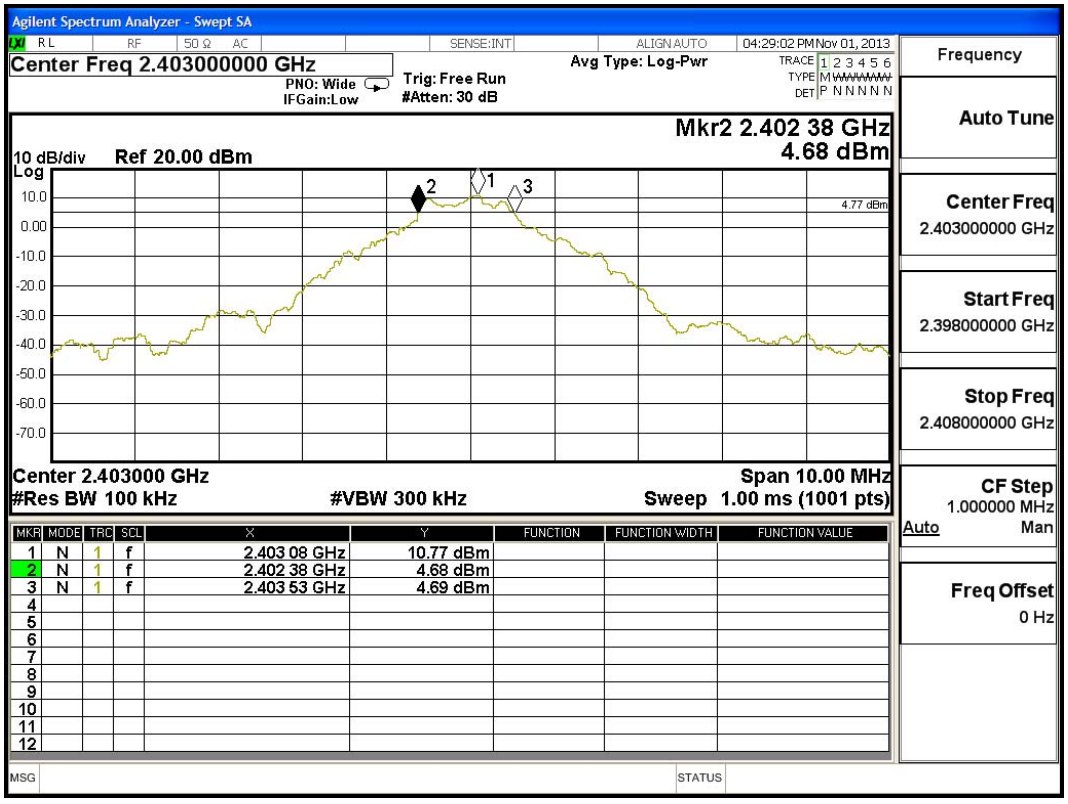
± 150Hz

7.6. Test Result of Occupied Bandwidth

Product : Wireless Speaker System-Transmitter
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2403MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2403	1150	>500	Pass

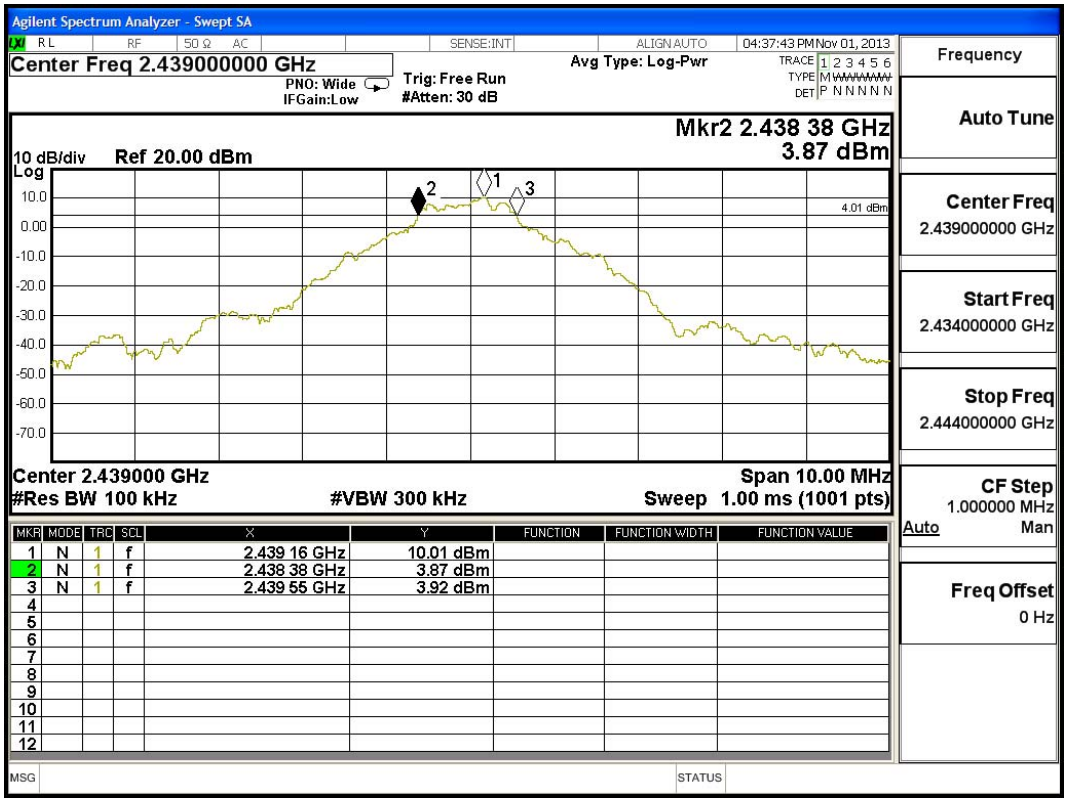
Figure Channel 01:



Product : Wireless Speaker System-Transmitter
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2439Hz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
13	2439	1170	>500	Pass

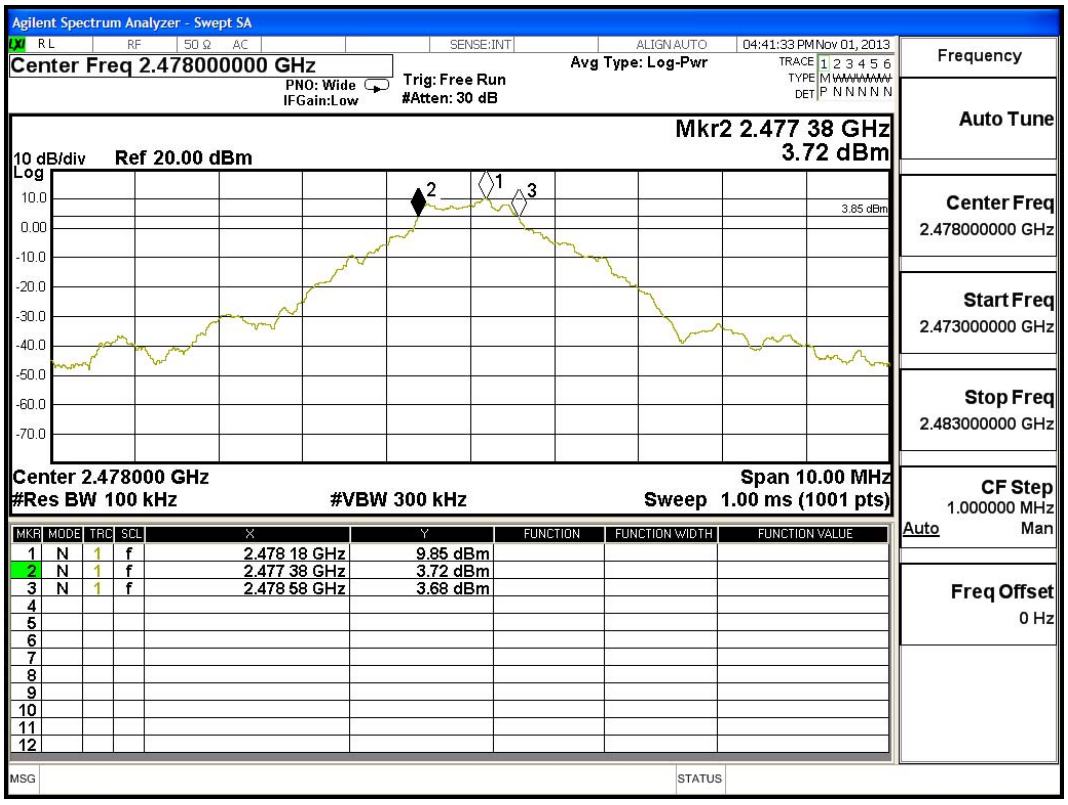
Figure Channel 13:



Product : Wireless Speaker System-Transmitter
Test Item : Occupied Bandwidth Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2478MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
26	2478	1200	>500	Pass

Figure Channel 26:



8. Power Density

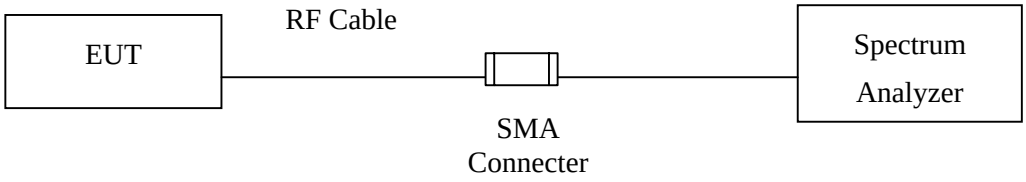
8.1. Test Equipment

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R&S	FSP40 / 100170	Jun, 2013
	Spectrum Analyzer	Agilent	E4407B / US39440758	Jun, 2013
X	Spectrum Analyzer	Agilent	N9010A / MY48030495	Apr.,2013

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

1. 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 C63.10, 2009; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.
The maximum power spectral density using KDB 558074 section 10.2 PKPSD (peak PSD) method.

8.5. Uncertainty

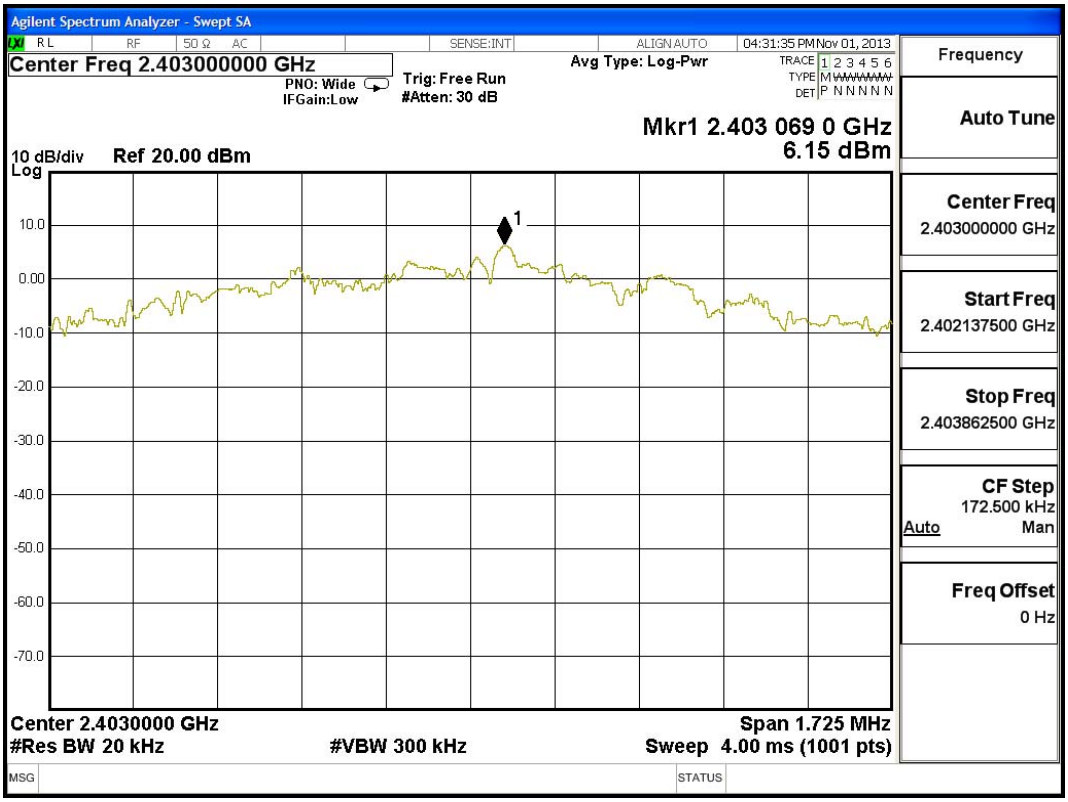
± 1.27 dB

8.6. Test Result of Power Density

Product : Wireless Speaker System-Transmitter
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit(2403MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2403	6.150	< 8dBm	Pass

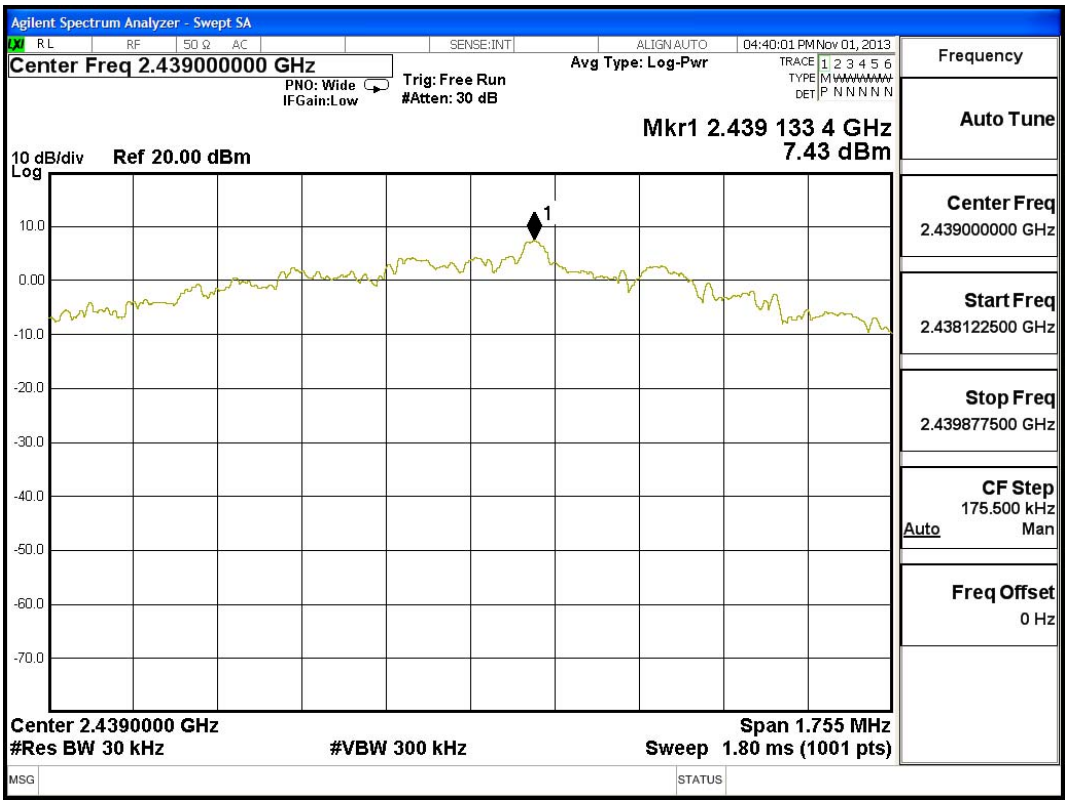
Figure Channel 01:



Product : Wireless Speaker System-Transmitter
Test Item : Power Density Data
Test Site : No.3OATS
Test Mode : Mode 1: Transmit (2439MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
13	2439	7.430	< 8dBm	Pass

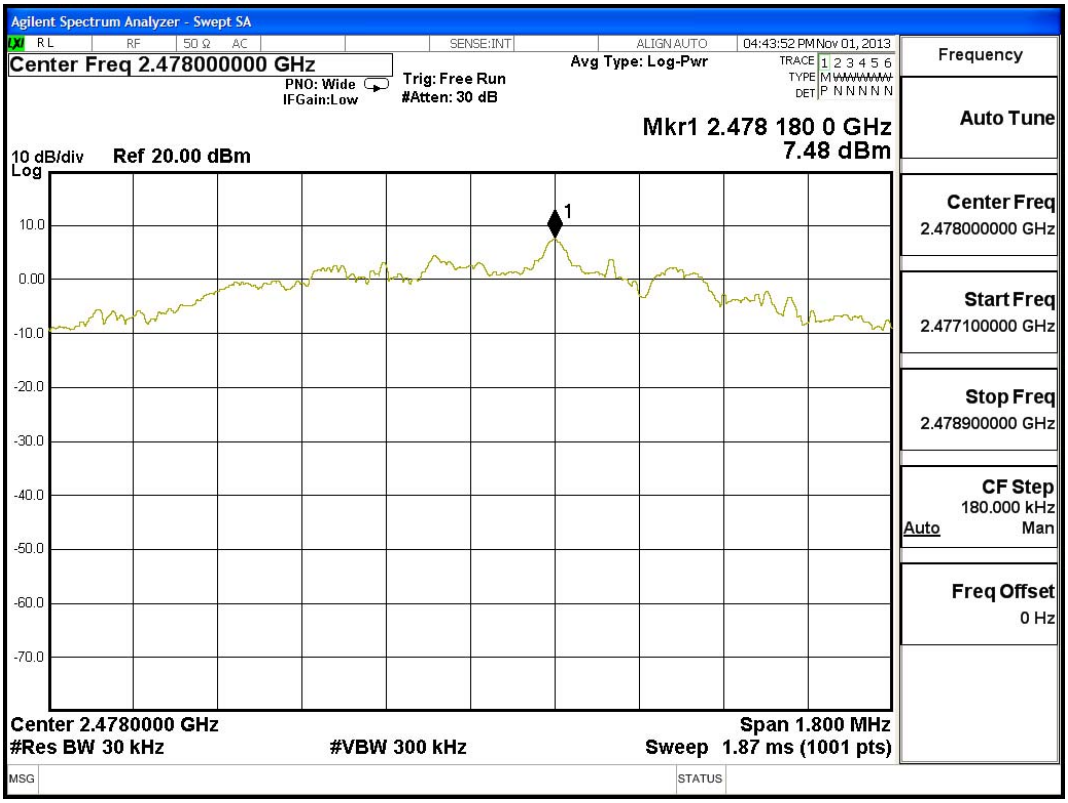
Figure Channel 13:



Product : Wireless Speaker System-Transmitter
Test Item : Power Density Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2478MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
26	2478	7.480	< 8dBm	Pass

Figure Channel 26:



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.