

FCC Test Report

Product Name	Wireless Speaker System-Reciever
Model No	CONTROL 2.4G
FCC ID.	R48CONTROL24GRXR

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. 11, 2013
Report No.	13A0199R-RFUSP42V01
Report Version	V1.0



The test results relate only to the samples tested.

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Test Report Certification

Issue Date: Nov. 11, 2013

Report No.: 13A0199R-RFUSP42V01



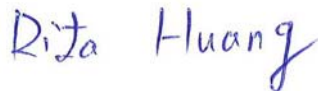
Product Name	Wireless Speaker System-Reciever
Applicant	Meiloon Industrial Co., Ltd.
Address	No.77, Lane 1775, Chuen-Ryh Road, Taoyuan City, Taiwan
Manufacturer	Harman International Industries, Incorporated
Model No.	CONTROL 2.4G
EUT Rated Voltage	AC 100-240V, 50/60Hz
EUT Test Voltage	AC 120V/ 60Hz
Trade 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

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Documented By :



(Senior Adm. Specialist / Rita Huang)

Tested By :



(Engineer / Nowal Kuo)

Approved By :



(Manager / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Wireless Speaker System-Reciever
Trade Name	JBL
Model No.	CONTROL 2.4G
FCC ID.	R48CONTROL24GRXR
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 Cable	Non-Shielded, 2.0m
Audio to RCA Cable	Non-Shielded, 1.0m
Remote Controller	1 Set
Power Adapter	MFR: DYS, M/N: DYS40-200200W Input: 100-240V ~ 50/60Hz, 1.0A MAX Output: 20.0V ---2A Cable out: Non-Shielded, 2.0m
Contain Module	AlfaPlus / AM8810

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	Ant.Star	ASD-WLAN-02	1.53 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-Receiver, 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
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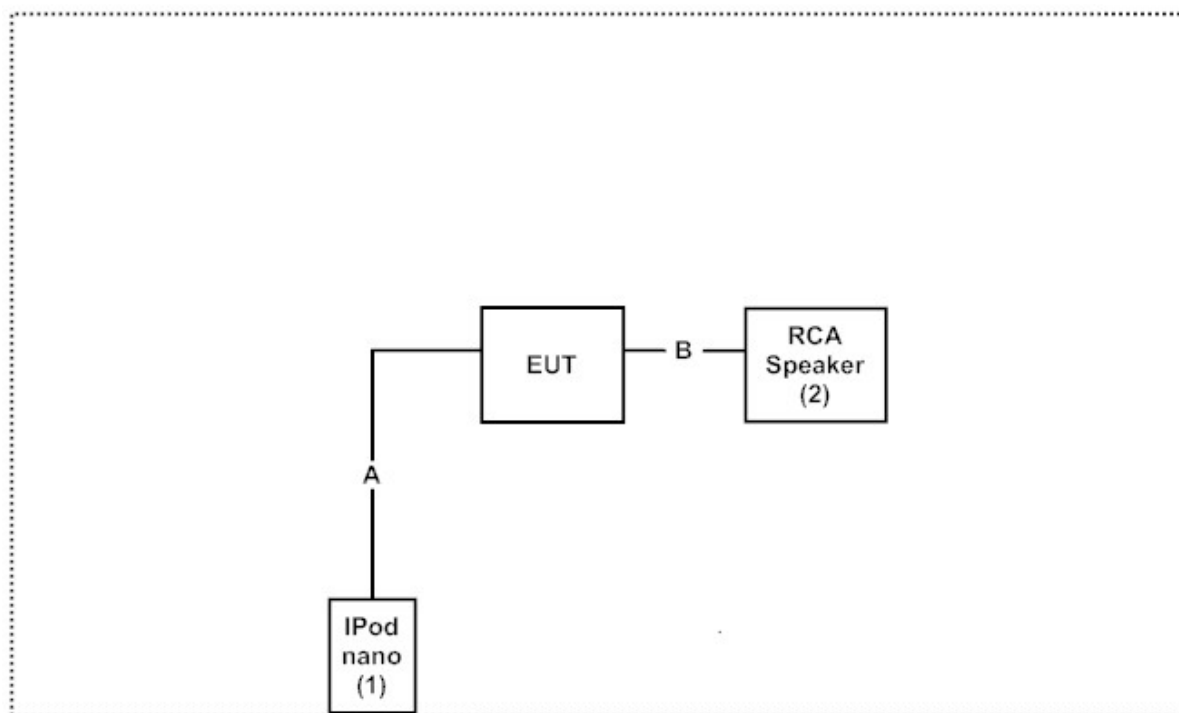
1.3. Tested System Details

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
2 RCA Speaker	SANYO	OTTO-301A	JA03244040	Non-Shielded, 1.6m

Signal Cable Type	Signal cable Description
A Audio Cable	Non-Shielded, 2.0m
B 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

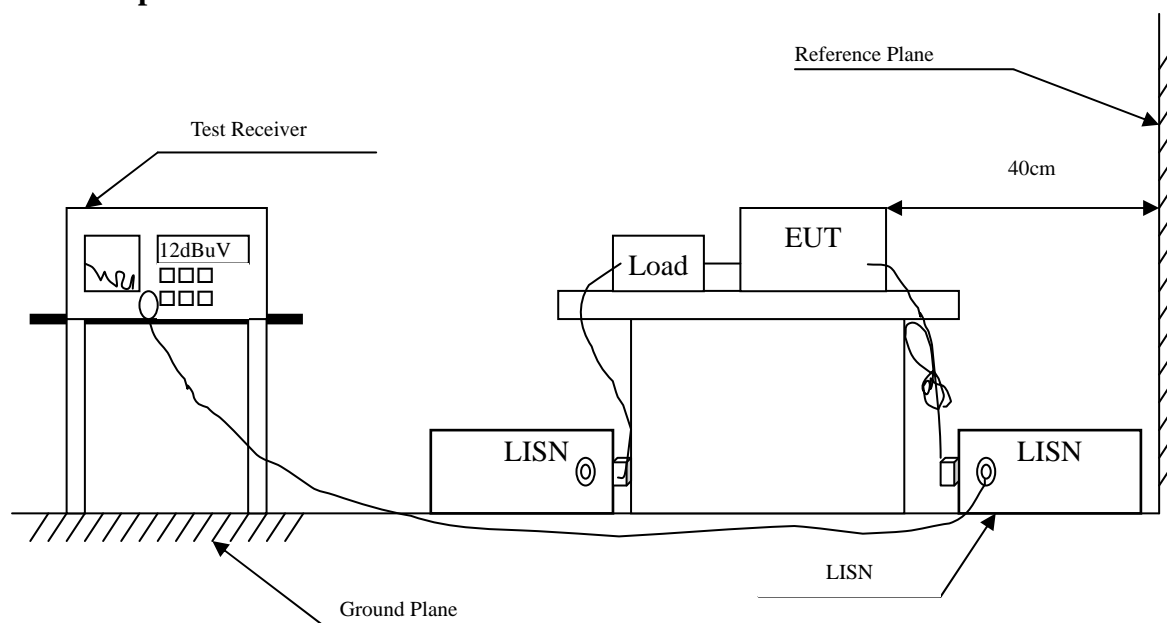
2.1. Test Equipment

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-Receiver
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 1					
Quasi-Peak					
0.150	9.696	35.310	45.006	-20.994	66.000
0.189	9.698	30.090	39.788	-25.098	64.886
0.216	9.699	27.420	37.119	-26.995	64.114
0.306	9.704	23.910	33.614	-27.929	61.543
0.470	9.711	31.080	40.791	-16.066	56.857
1.318	9.759	21.380	31.139	-24.861	56.000
Average					
0.150	9.696	17.750	27.446	-28.554	56.000
0.189	9.698	13.760	23.458	-31.428	54.886
0.216	9.699	11.400	21.099	-33.015	54.114
0.306	9.704	7.250	16.954	-34.589	51.543
0.470	9.711	17.310	27.021	-19.836	46.857
1.318	9.759	5.820	15.579	-30.421	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-Reciever
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmit

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV	dB	dBuV
Line 2					
Quasi-Peak					
0.177	9.678	31.820	41.498	-23.731	65.229
0.228	9.680	24.390	34.070	-29.701	63.771
0.295	9.683	21.940	31.623	-30.234	61.857
0.470	9.691	30.750	40.441	-16.416	56.857
0.763	9.714	21.930	31.644	-24.356	56.000
3.263	9.800	21.370	31.170	-24.830	56.000
Average					
0.177	9.678	15.270	24.948	-30.281	55.229
0.228	9.680	8.130	17.810	-35.961	53.771
0.295	9.683	6.040	15.723	-36.134	51.857
0.470	9.691	17.010	26.701	-20.156	46.857
0.763	9.714	6.350	16.064	-29.936	46.000
3.263	9.800	6.160	15.960	-30.040	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

3. Peak Power Output

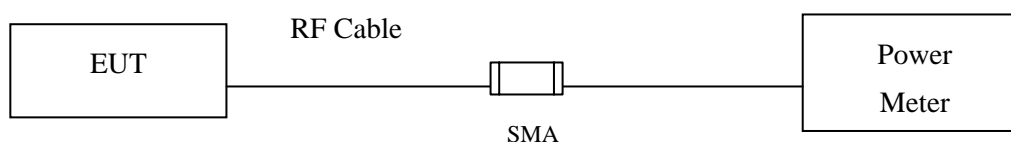
3.1. Test Equipment

	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-Reciever
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	5.25	<30dBm	Pass
13	2439	4.90	<30dBm	Pass
26	2478	4.69	<30dBm	Pass

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

4. Radiated Emission

4.1. Test Equipment

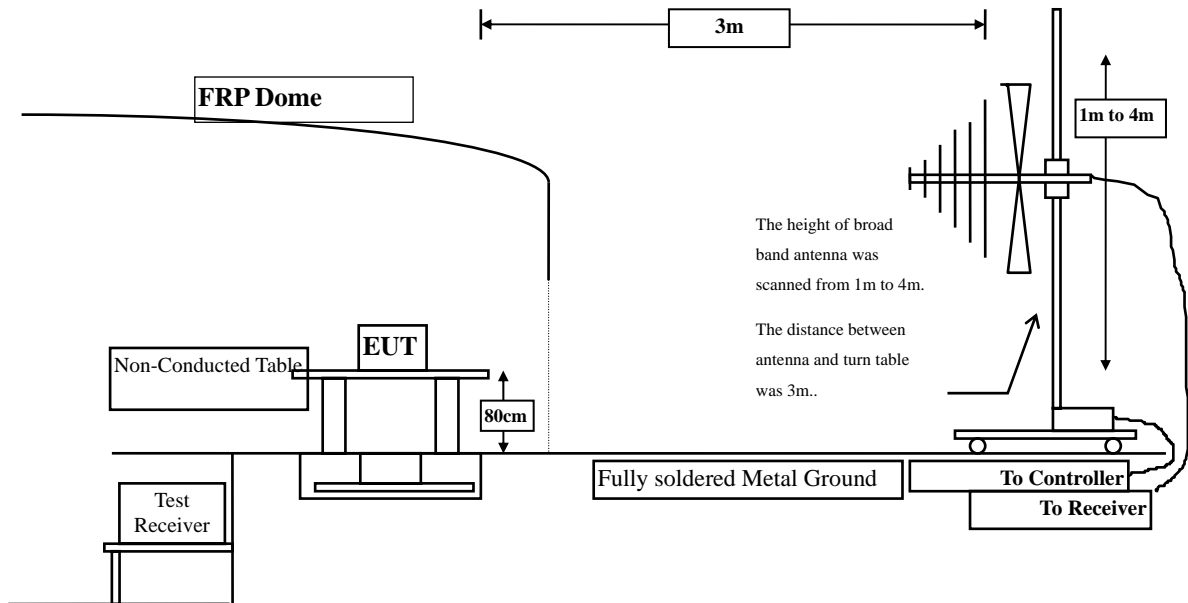
The following test equipment are used during the radiated emission test:

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

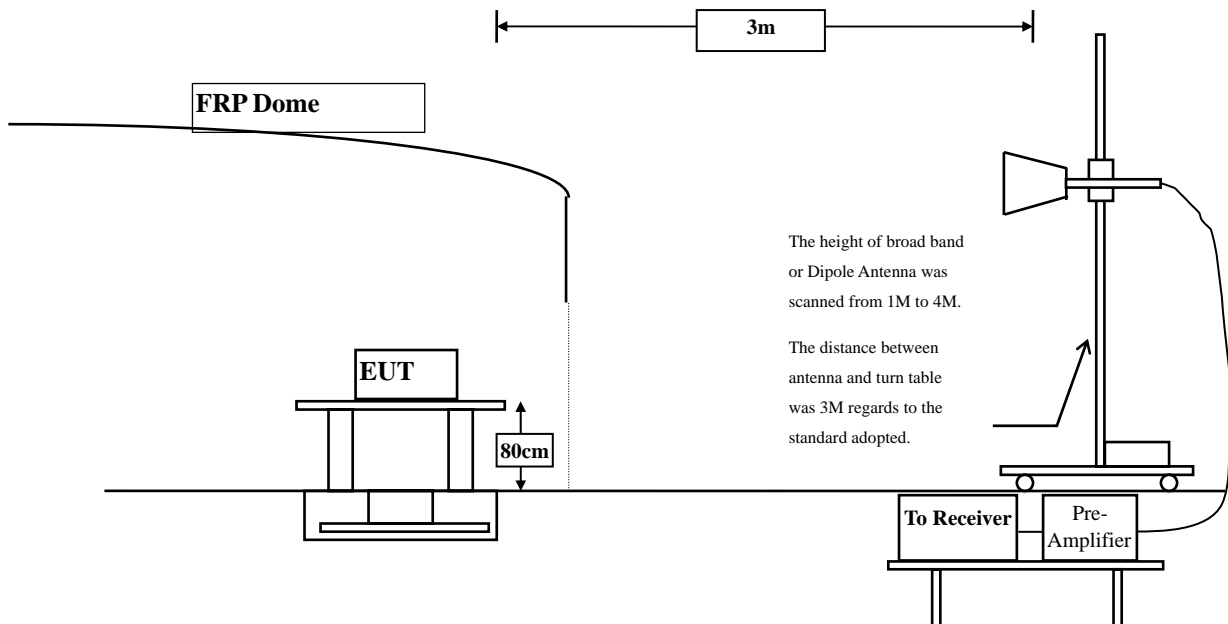
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

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: 2009 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 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-Reciever
Test Item : Harmonic Radiated Emission Data
Test Site : No.3 OATS
Test Mode : Mode 1: Transmit (2403MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4806.000	3.328	47.490	50.819	-23.181	74.000
7209.000	10.188	41.200	51.387	-22.613	74.000
9612.000	13.669	36.900	50.569	-23.431	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4806.000	6.626	47.220	53.846	-20.154	74.000
7209.000	11.054	44.070	55.124	-18.876	74.000
9612.000	14.074	36.110	50.184	-23.816	74.000
Average Detector:					
7209.000	11.054	26.320	37.374	-16.626	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-Reciever
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2439MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4878.000	3.019	46.790	49.809	-24.191	74.000
7317.000	11.820	37.520	49.340	-24.660	74.000
9756.000	12.599	37.830	50.429	-23.571	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4878.000	5.762	49.500	55.263	-18.737	74.000
7317.000	12.678	41.940	54.619	-19.381	74.000
9756.000	13.077	36.970	50.047	-23.953	74.000
Average Detector:					
4878.000	5.762	29.870	35.633	-18.367	54.000
7317.000	12.678	24.890	37.569	-16.431	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-Reciever
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2478MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
Peak Detector:					
4956.000	2.771	47.500	50.271	-23.729	74.000
7434.000	12.509	37.050	49.560	-24.440	74.000
9912.000	13.411	36.800	50.211	-23.789	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4956.000	5.553	49.910	55.464	-18.536	74.000
7434.000	13.416	39.660	53.077	-20.923	74.000
9912.000	13.964	36.730	50.695	-23.305	74.000
Average Detector:					
4956.000	5.553	30.090	35.644	-18.356	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-Reciever
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2439MHz)

Frequency	Correct	Reading	Measurement	Margin	Limit
MHz	Factor	Level	Level		
	dB	dBuV	dBuV/m	dB	dBuV/m
Horizontal					
293.840	18.144	37.773	33.906	-12.094	46.000
381.140	20.912	38.350	37.362	-8.638	46.000
454.860	21.040	38.868	38.088	-7.912	46.000
528.580	23.579	37.668	39.516	-6.484	46.000
600.360	25.627	35.830	39.807	-6.193	46.000
889.420	27.806	28.375	34.637	-11.363	46.000
Vertical					
43.580	-2.986	33.933	30.947	-9.053	40.000
319.060	-6.897	38.895	31.998	-14.002	46.000
381.140	-1.558	39.390	37.832	-8.168	46.000
454.860	-5.499	42.260	36.760	-9.240	46.000
740.040	-0.347	35.197	34.850	-11.150	46.000
935.980	5.711	27.441	33.152	-12.848	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. 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

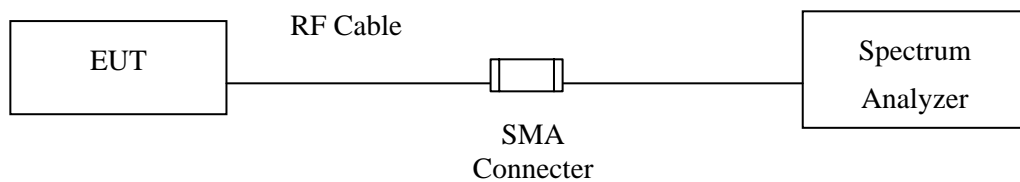
5.1. Test Equipment

	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

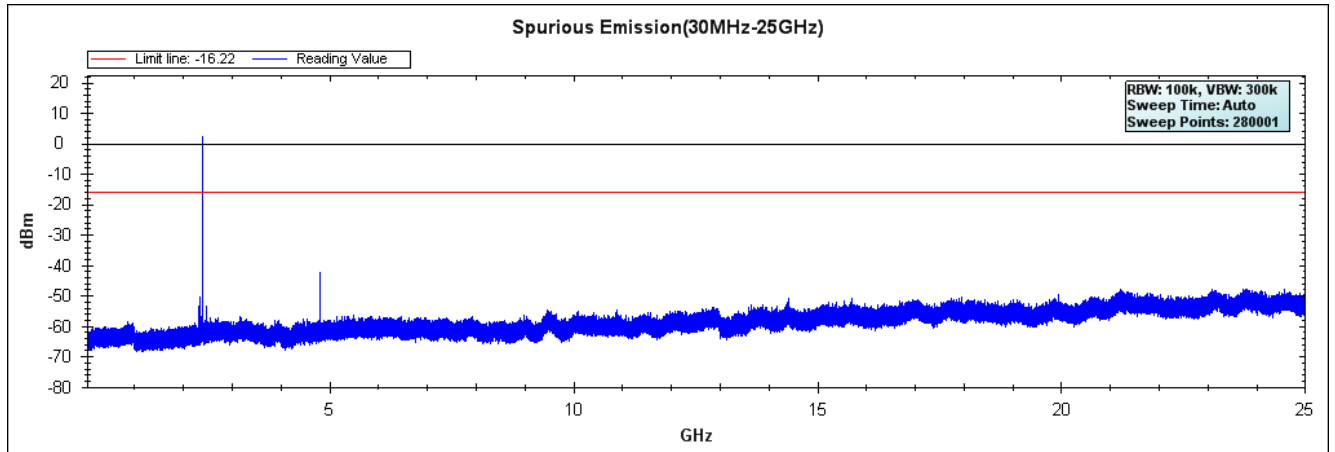
The measurement uncertainty

Conducted is defined as $\pm 1.27\text{dB}$

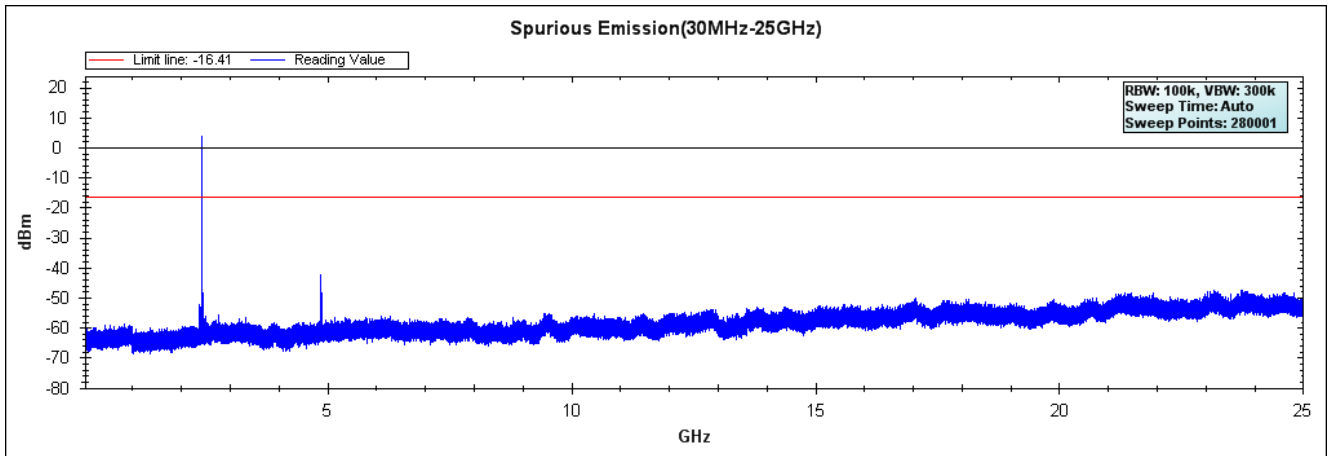
5.6. Test Result of RF antenna conducted test

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

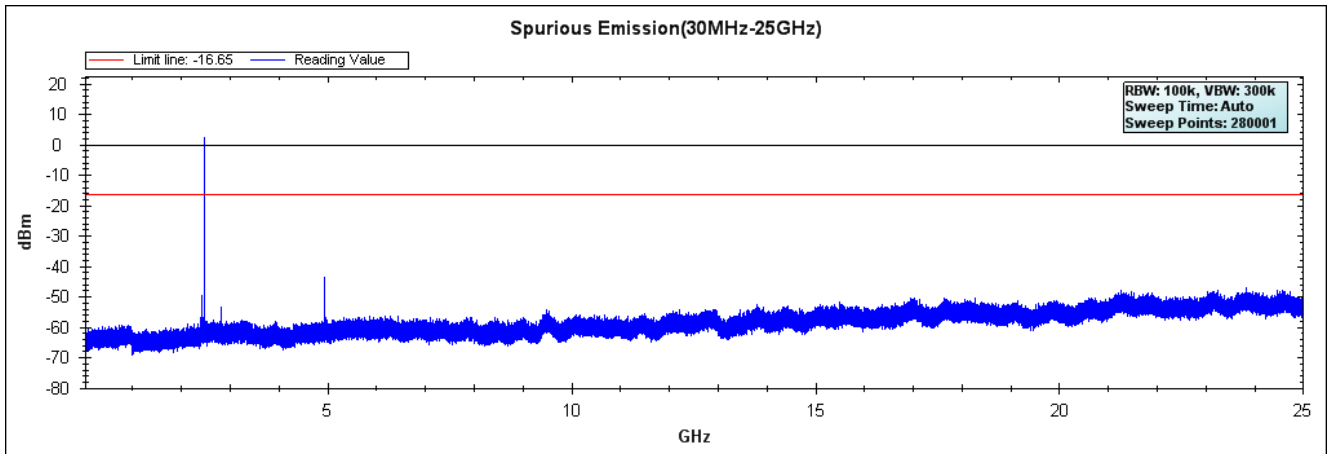
Channel 01 (2403MHz) 30M-25GHz



Channel 13 (2439MHz) 30M-25GHz



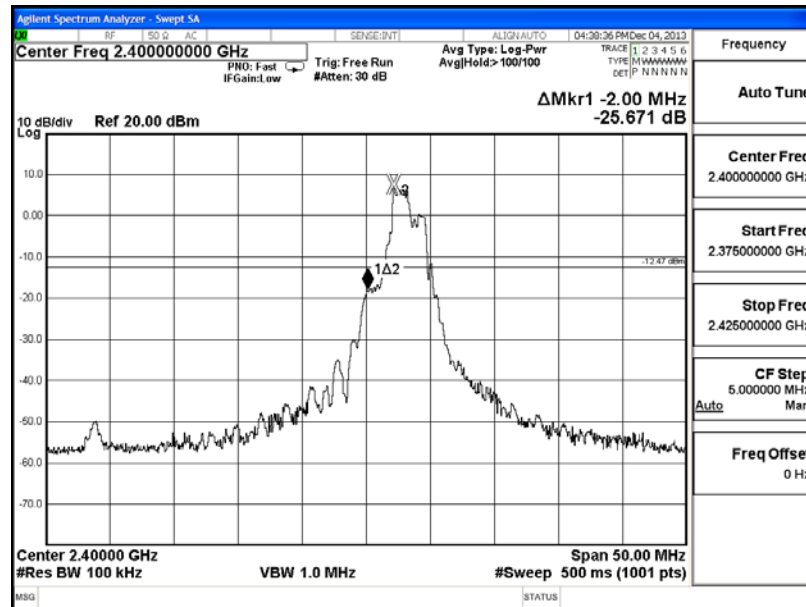
Channel 26 (2478MHz) 30M-25GHz



Conducted Band Edge

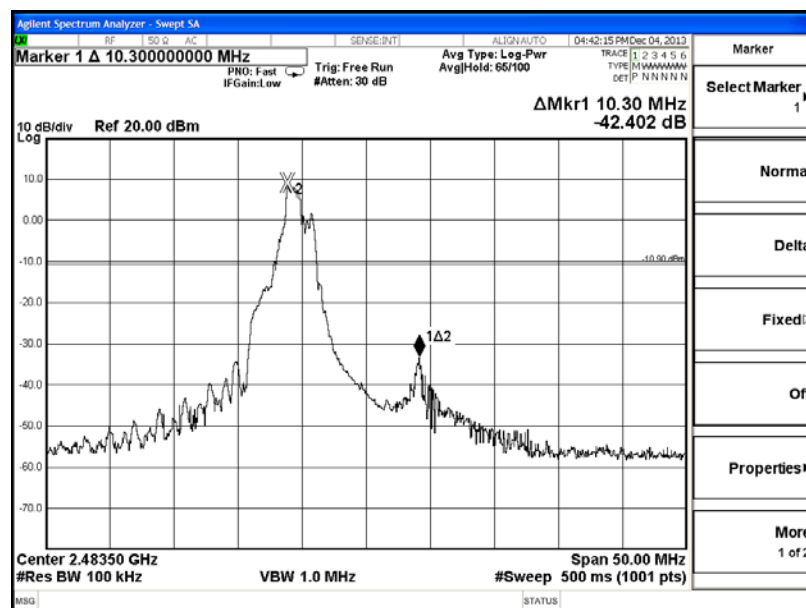
Test Frequency (MHz)	Measurement Level (dBc)	Limit (dBc)	Result
< 2400	25.671	>20	PASS

Channel_2403MHz



Test Frequency (MHz)	Measurement Level (dBc)	Limit (dBc)	Result
>2483.5	42.402	>20	PASS

Channel_2478MHz



6. Band Edge

6.1. Test Equipment

RF Radiated Measurement:

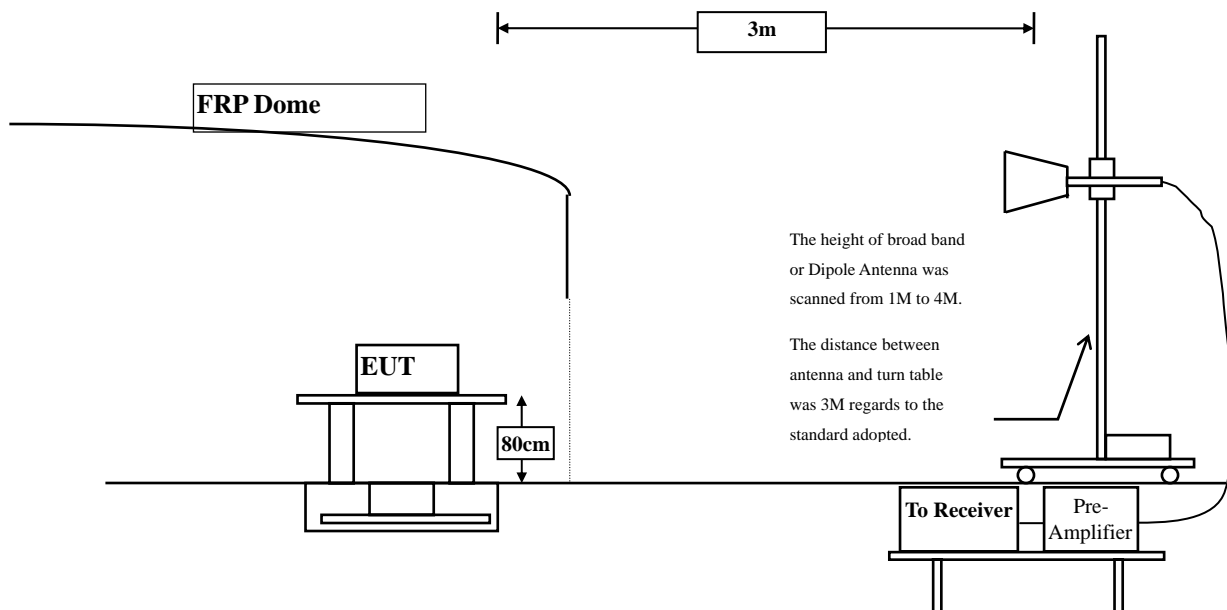
The following test equipments are used during the band edge tests:

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-Reciever
 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)	2388.800	31.505	25.853	57.357	74.000	54.000	Pass
01 (Peak)	2390.000	31.509	25.094	56.603	74.000	54.000	Pass
01 (Peak)	2403.600	31.584	66.771	98.355	--	--	--
01 (Average)	2388.800	31.505	12.243	43.747	74.000	54.000	Pass
01 (Average)	2390.000	31.509	12.249	43.758	74.000	54.000	Pass
01 (Average)	2403.000	31.581	31.793	63.373	--	--	--

Figure Channel 01:

Horizontal (Peak)

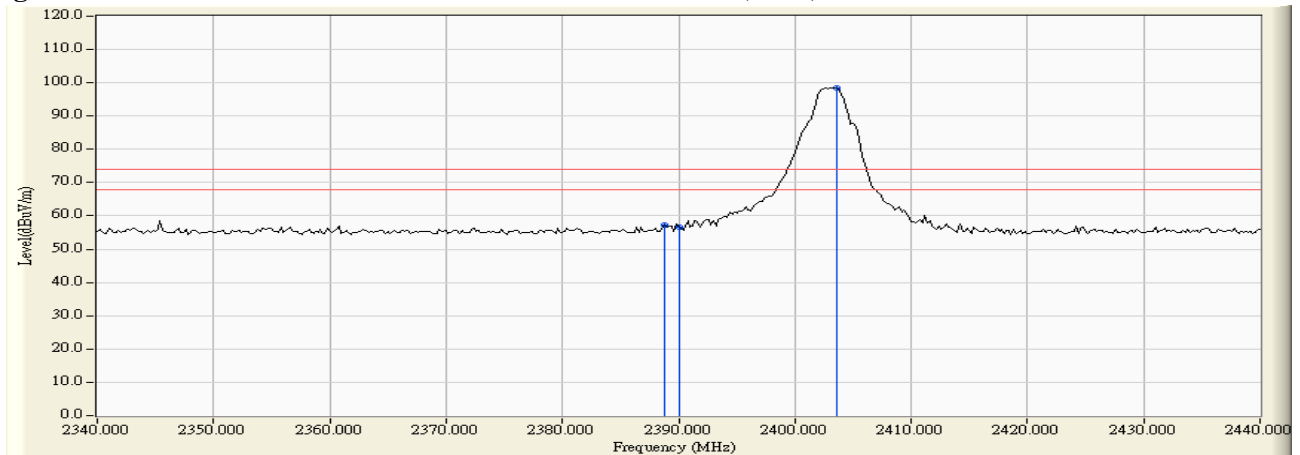
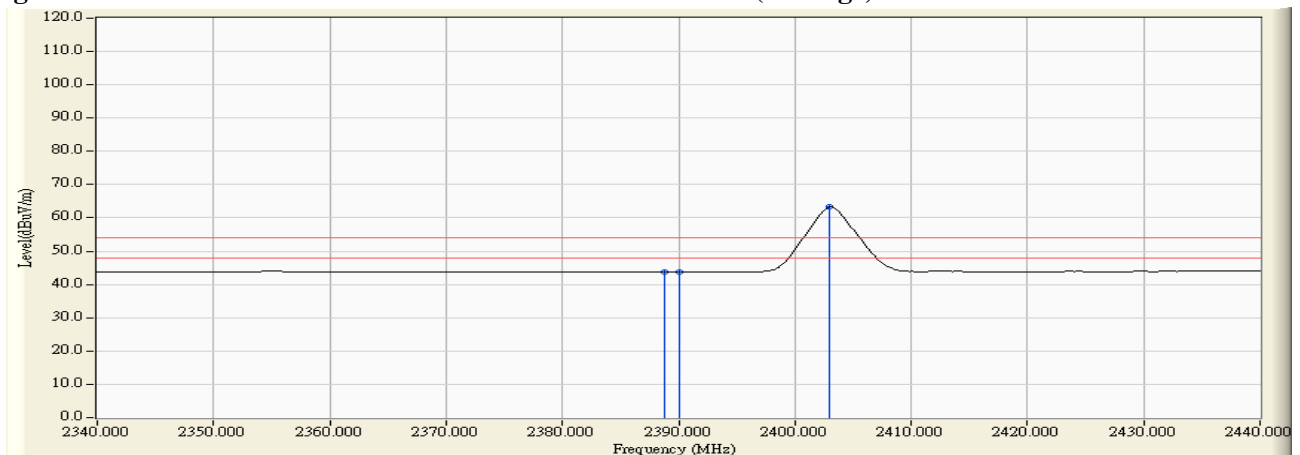


Figure Channel 01:

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-Receiver
 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)	2390.000	30.915	30.809	61.724	74.000	54.000	Pass
01 (Peak)	2403.600	30.922	73.624	104.546	--	--	--
01 (Average)	2355.000	31.077	14.194	45.271	74.000	54.000	Pass
01 (Average)	2390.000	30.915	12.299	43.214	74.000	54.000	Pass
01 (Average)	2403.000	30.921	34.304	65.224	--	--	--

Figure Channel 01: Vertical (Peak)

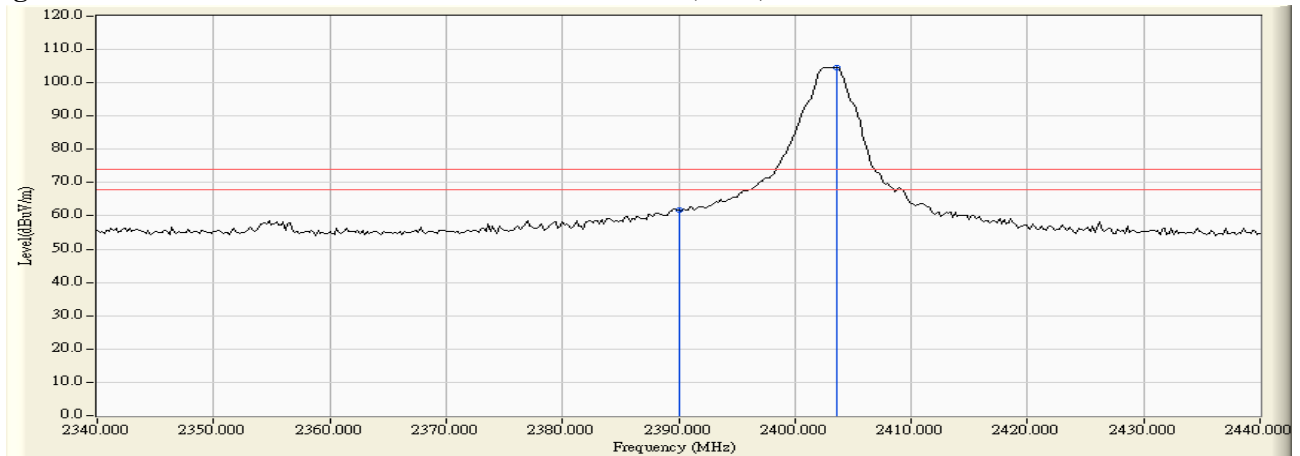
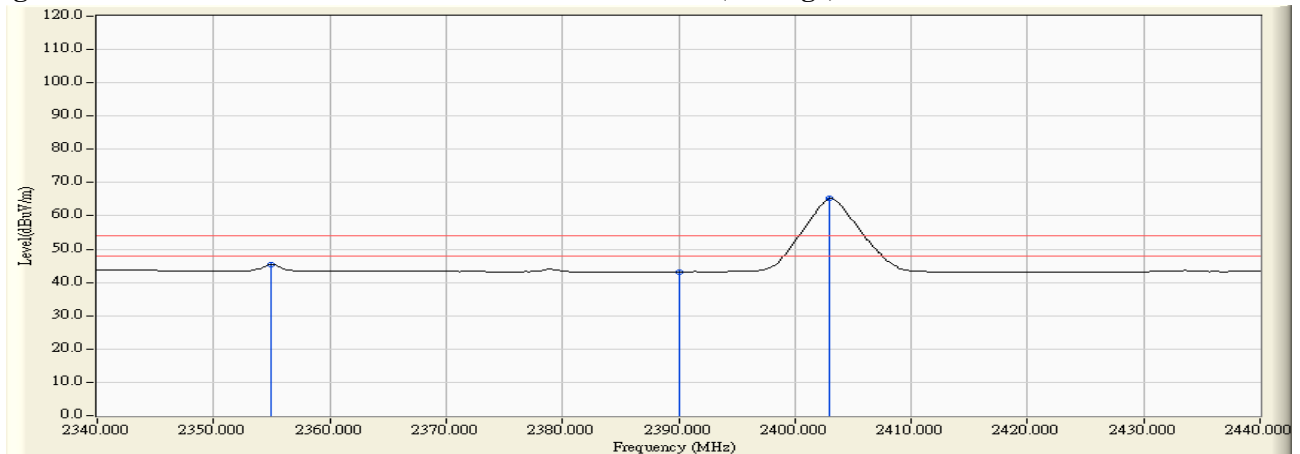


Figure Channel 01: Vertical (Average)



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-Receiver
 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	64.840	96.984	--	--	--
26 (Peak)	2483.500	32.182	29.221	61.403	74.000	54.000	Pass
26 (Peak)	2484.300	32.187	30.415	62.603	74.000	54.000	Pass
26 (Average)	2478.100	32.142	31.860	64.001	--	--	--
26 (Average)	2483.500	32.182	12.690	44.872	74.000	54.000	Pass
26(Average)	2484.300	32.187	12.353	44.541	74.000	54.000	Pass

Figure Channel 26: Horizontal (Peak)

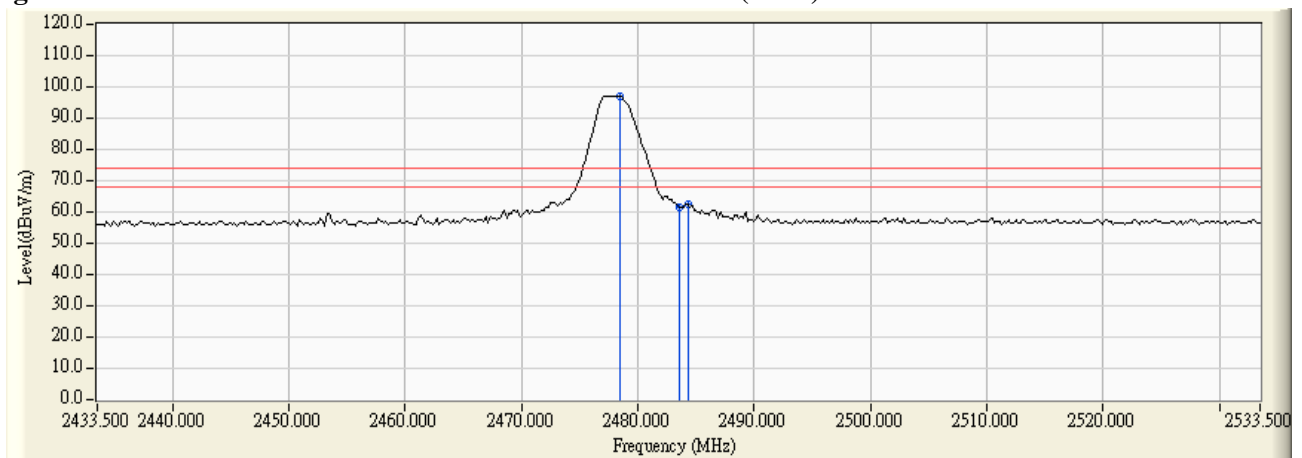
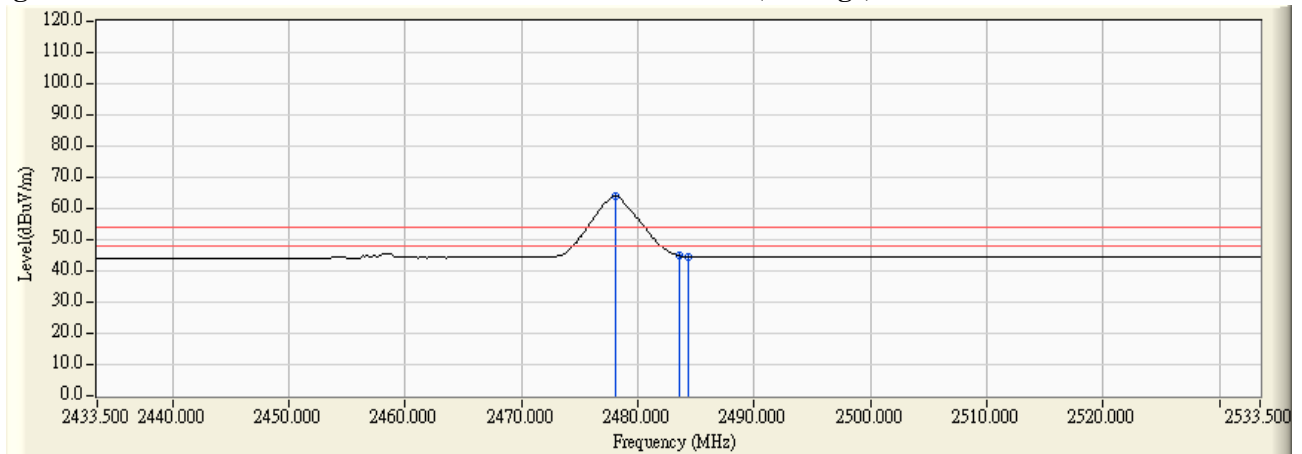


Figure Channel 26: Horizontal (Average)



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-Receiver
 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	72.563	103.965	--	--	--
26 (Peak)	2483.500	31.435	35.819	67.254	74.000	54.000	Pass
26 (Average)	2477.900	31.397	34.250	65.648	--	--	--
26 (Average)	2483.500	31.435	13.988	45.423	74.000	54.000	Pass

Figure Channel 26: Vertical (Peak)

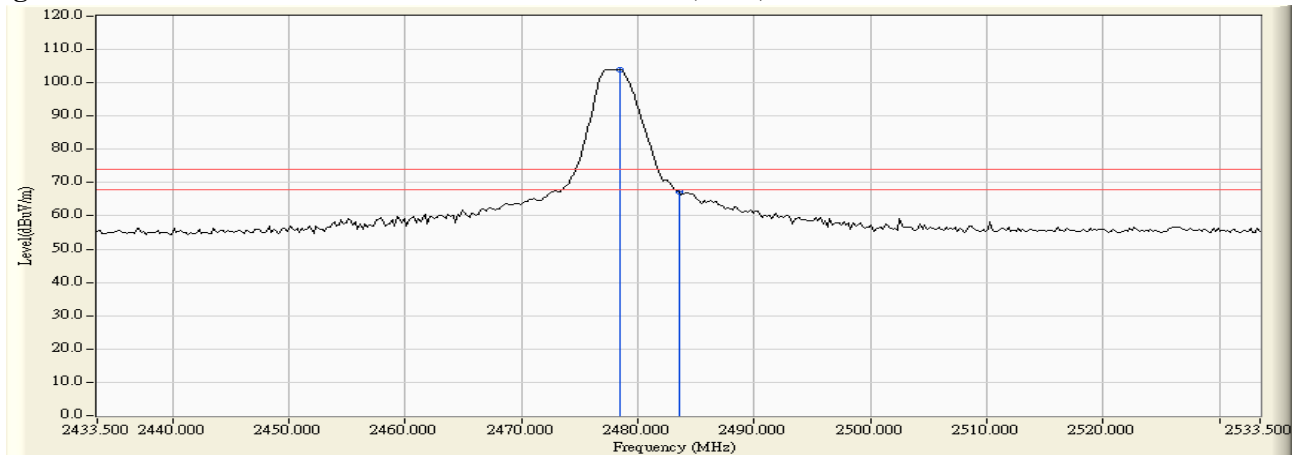
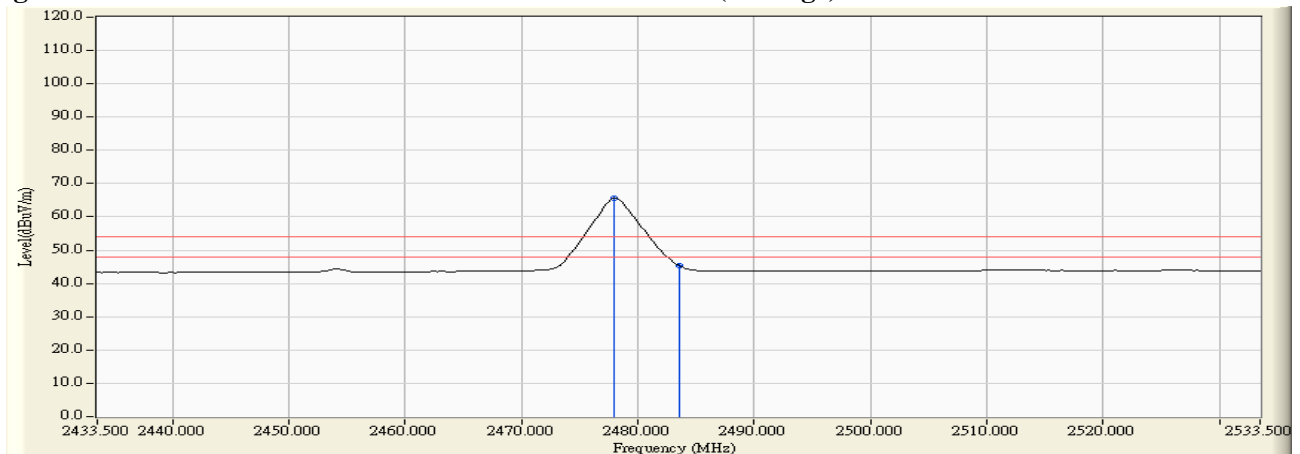


Figure Channel 26: Vertical (Average)



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.

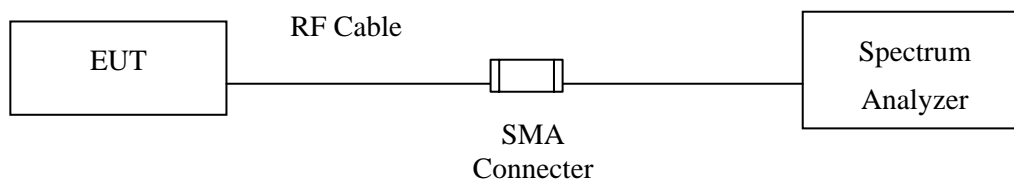
7. Occupied Bandwidth

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

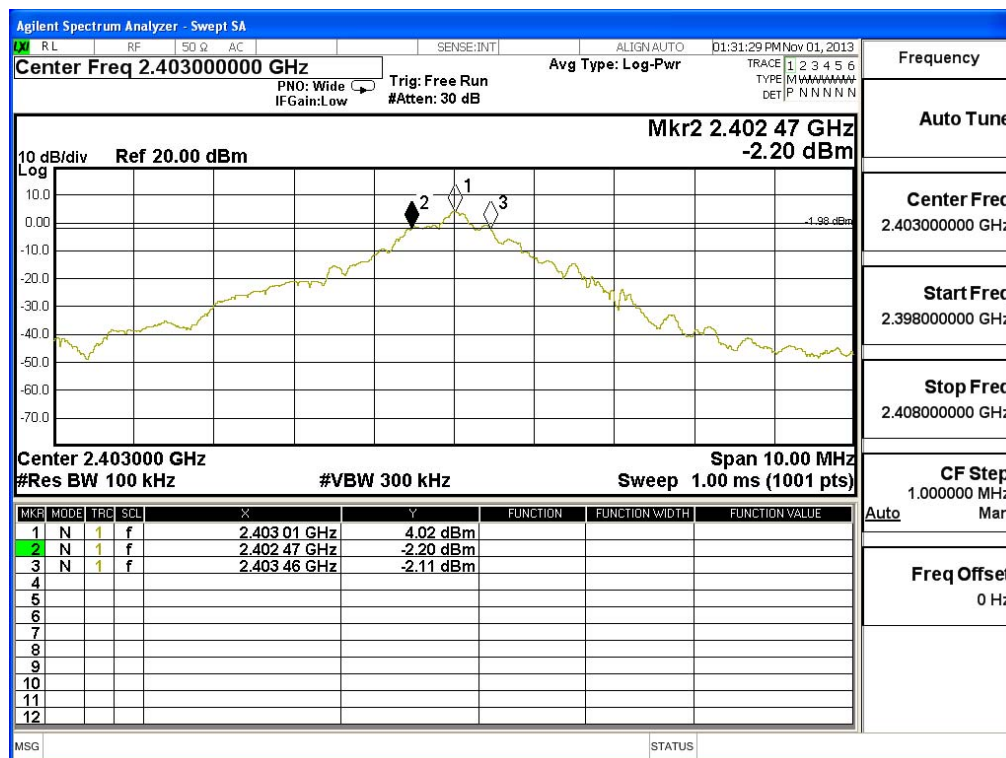
$\pm 150\text{Hz}$

7.6. Test Result of Occupied Bandwidth

Product : Wireless Speaker System-Reciever
 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	990	>500	Pass

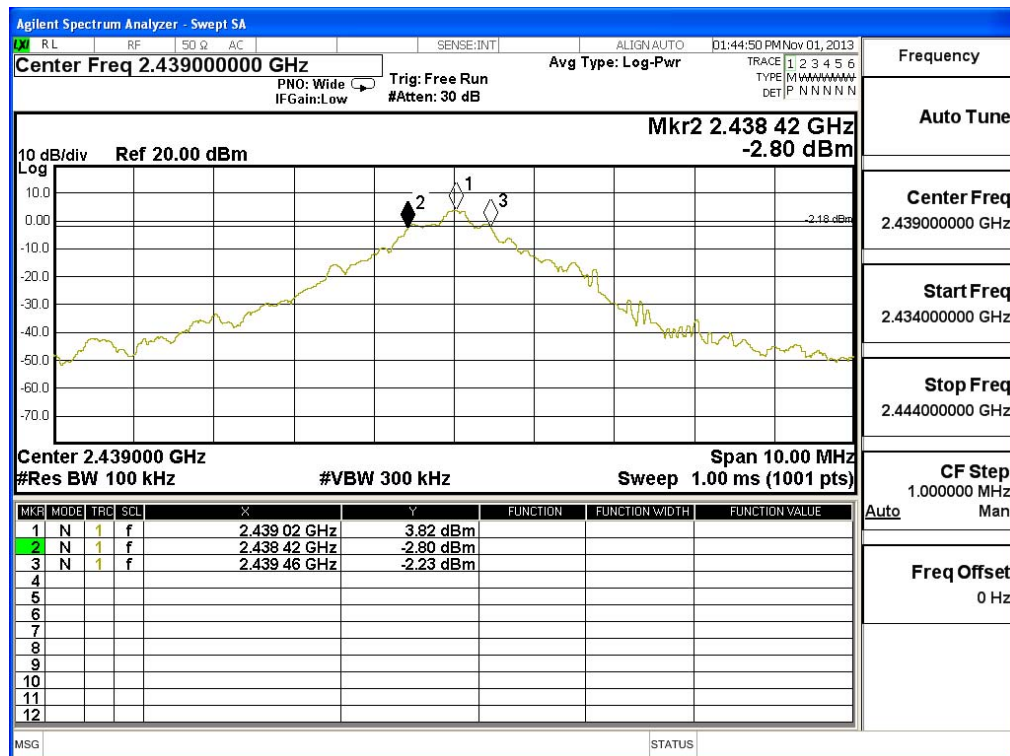
Figure Channel 01:



Product : Wireless Speaker System-Reciever
 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	1040	>500	Pass

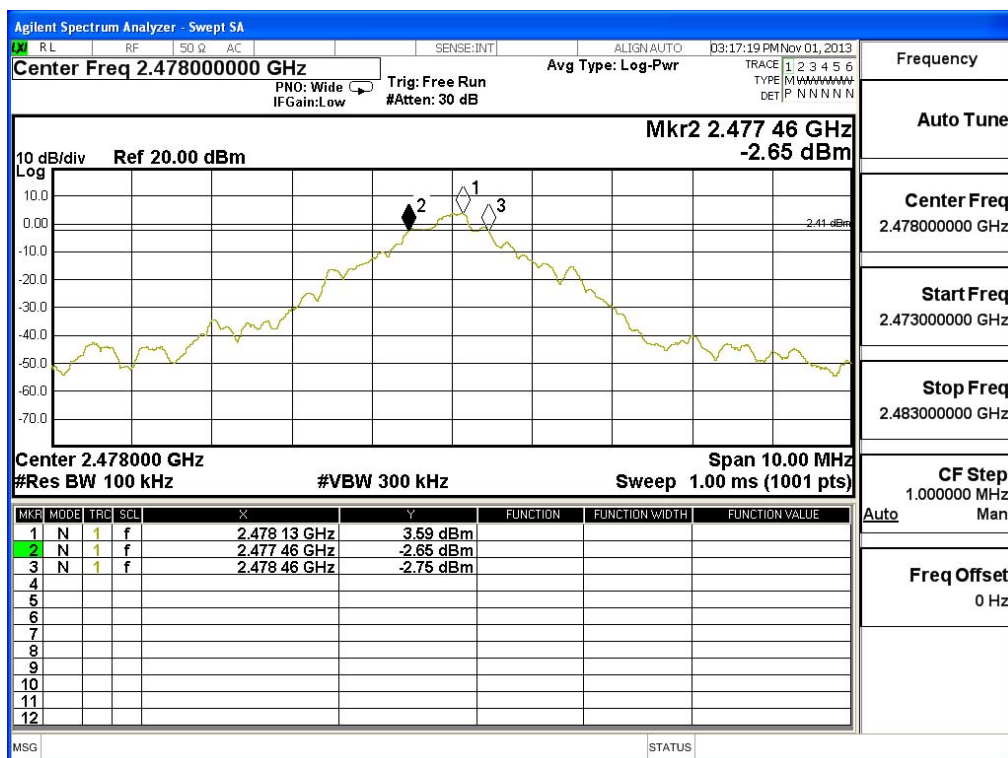
Figure Channel 13:



Product : Wireless Speaker System-Reciever
 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	1000	>500	Pass

Figure Channel 26:



8. Power Density

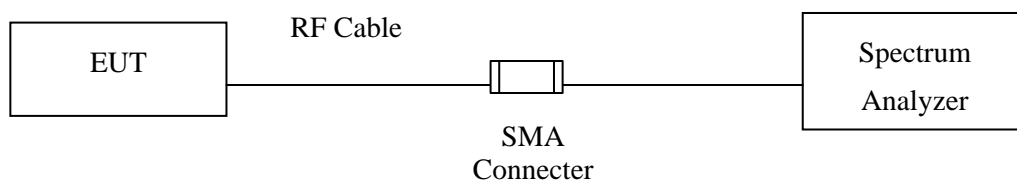
8.1. Test Equipment

	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

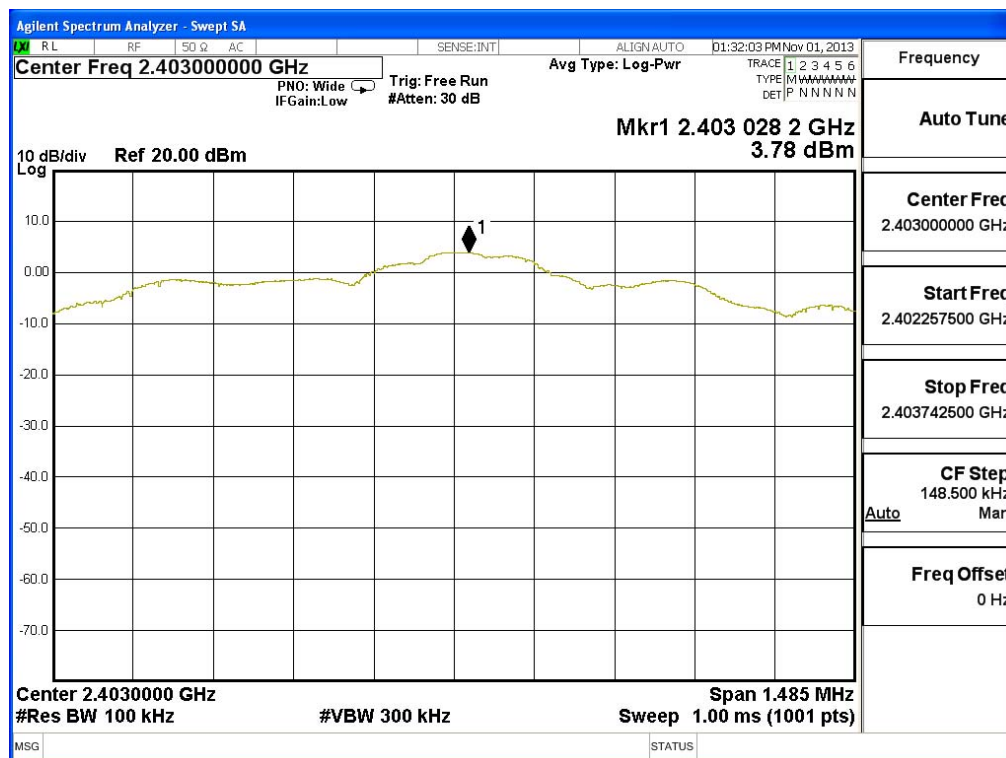
± 1.27 dB

8.6. Test Result of Power Density

Product : Wireless Speaker System-Reciever
 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	3.78	< 8dBm	Pass

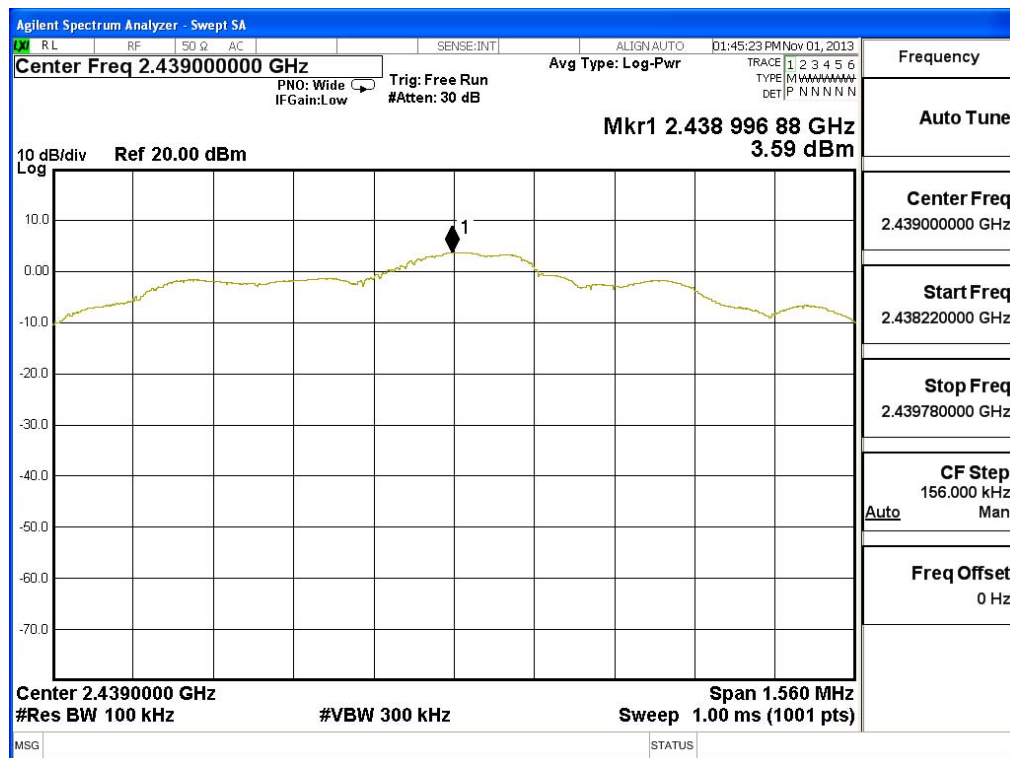
Figure Channel 01:



Product : Wireless Speaker System-Reciever
 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	3.59	< 8dBm	Pass

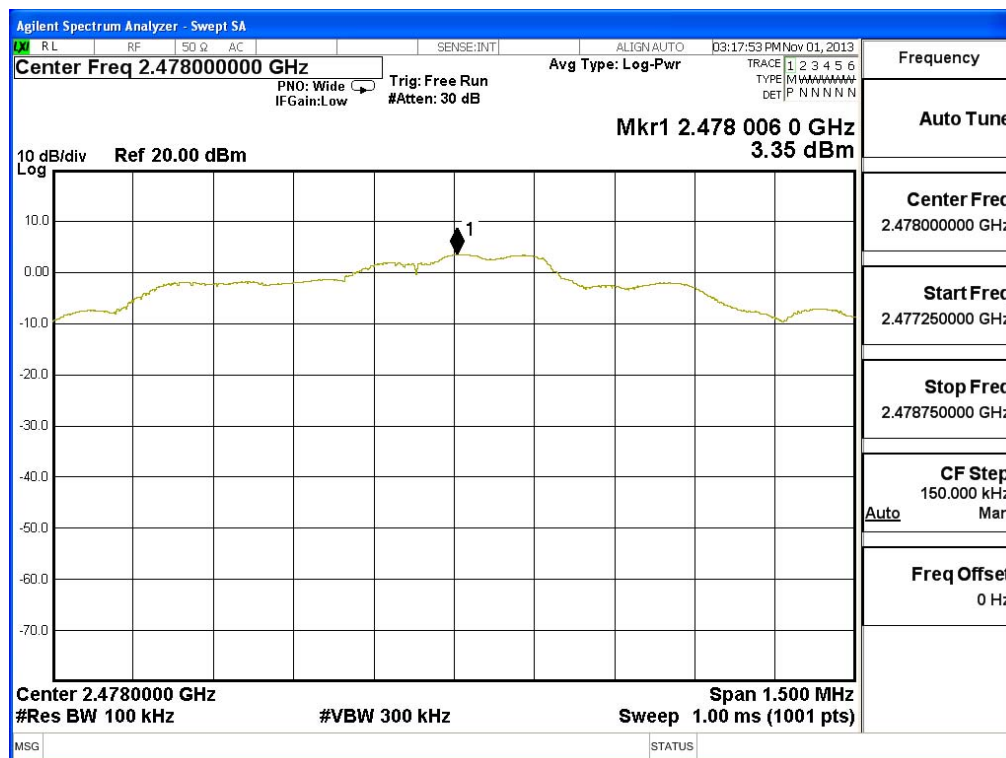
Figure Channel 13:



Product : Wireless Speaker System-Reciever
 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	3.35	< 8dBm	Pass

Figure Channel 26:



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs