

FCC Test Report

Product Name	Afterglow 5.1 surround sound wireless headset
Model No	PL-9215R
FCC ID.	X5B-PL9215R

Applicant	Performance Designed Products, LLC
Address	14144 Ventura Blvd., Suite 200 Sherman Oaks, CA 91423 USA

Date of Receipt	Aug. 13, 2013
Issue Date	Sep. 17, 2013
Report No.	138249R-RFUSP42V01
Report Version	V1.0



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 any agency of the U.S. Government

Test Report Certification

Issue Date: Sep. 17, 2013

Report No.: 138249R-RFUSP42V01



Product Name	Afterglow 5.1 surround sound wireless headset
Applicant	Performance Designed Products, LLC
Address	14144 Ventura Blvd., Suite 200 Sherman Oaks, CA 91423 USA
Manufacturer	Performance Designed Products, LLC
Model No.	PL-9215R
EUT Rated Voltage	DC 5V (Power by USB)
EUT Test Voltage	AC 120V/60Hz
Trade Name	pdp
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2012 ANSI C63.4: 2003, ANSI C63.10: 2009, FCC KDB 558074
Test Result	Complied

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TABLE OF CONTENTS

Description	Page
1. GENERAL INFORMATION	5
1.1. EUT Description.....	5
1.2. Operational Description	7
1.3. Tested System Details.....	8
1.4. Configuration of Tested System	8
1.5. EUT Exercise Software	8
1.6. Test Facility	9
2. Conducted Emission.....	10
2.1. Test Equipment.....	10
2.2. Test Setup	10
2.3. Limits	11
2.4. Test Procedure	11
2.5. Uncertainty	11
2.6. Test Result of Conducted Emission.....	12
3. Peak Power Output	14
3.1. Test Equipment.....	14
3.2. Test Setup	14
3.3. Limits	14
3.4. Test Procedure	14
3.5. Uncertainty	14
3.6. Test Result of Peak Power Output.....	15
4. Radiated Emission.....	16
4.1. Test Equipment.....	16
4.2. Test Setup	17
4.3. Limits	18
4.4. Test Procedure	18
4.5. Uncertainty	18
4.6. Test Result of Radiated Emission.....	19
5. RF antenna conducted test.....	23
5.1. Test Equipment.....	23
5.2. Test Setup	23
5.3. Limits	23
5.4. Test Procedure	24
5.5. Uncertainty	24
5.6. Test Result of RF antenna conducted test.....	25
6. Band Edge	37
6.1. Test Equipment.....	37
6.2. Test Setup	37
6.3. Limits	38
6.4. Test Procedure	38
6.5. Uncertainty	38
6.6. Test Result of Band Edge	39

7.	Occupied Bandwidth.....	43
7.1.	Test Equipment.....	43
7.2.	Test Setup	43
7.3.	Limits	43
7.4.	Test Procedure	43
7.5.	Uncertainty	43
7.6.	Test Result of Occupied Bandwidth	44
8.	Power Density	47
8.1.	Test Equipment.....	47
8.2.	Test Setup	47
8.3.	Limits	47
8.4.	Test Procedure	47
8.5.	Uncertainty	47
8.6.	Test Result of Power Density	48
9.	EMI Reduction Method During Compliance Testing	51

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Afterglow 5.1 surround sound wireless headset
Trade Name	pdp
Model No.	PL-9215R
FCC ID.	X5B-PL9215R
Frequency Range	2403.35 – 2477.35MHz
Number of Channels	38CH
Channel Separation	2MHz
Type of Modulation	Pi/4 DQPSK
Antenna Type	Printed on PCB
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto
USB cable	Non-Shielded, 1.2m
USB cable	Non-Shielded, 3m
3.5mm audio cable	Non-Shielded, 1.3m
2.5mm XBOX CHAT cable	Non-Shielded, 1m
Battery	DC 3.7V, 900mAh

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	TATUNG(AUX)	PL992R	0.07dBi for 2.4 GHz
	TATUNG(MAIN)	PL992R	1.09dBi 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 1:	2403.35 MHz	Channel 11:	2423.35 MHz	Channel 21:	2443.35 MHz	Channel 31:	2463.35 MHz
Channel 2:	2405.35 MHz	Channel 12:	2425.35 MHz	Channel 22:	2445.35 MHz	Channel 32:	2465.35 MHz
Channel 3:	2407.35 MHz	Channel 13:	2427.35 MHz	Channel 23:	2447.35 MHz	Channel 33:	2467.35 MHz
Channel 4:	2409.35 MHz	Channel 14:	2429.35 MHz	Channel 24:	2449.35 MHz	Channel 34:	2469.35 MHz
Channel 5:	2411.35 MHz	Channel 15:	2431.35 MHz	Channel 25:	2451.35 MHz	Channel 35:	2471.35 MHz
Channel 6:	2413.35 MHz	Channel 16:	2433.35 MHz	Channel 26:	2453.35 MHz	Channel 36:	2473.35 MHz
Channel 7:	2415.35 MHz	Channel 17:	2435.35 MHz	Channel 27:	2455.35 MHz	Channel 37:	2475.35 MHz
Channel 8:	2417.35 MHz	Channel 18:	2437.35 MHz	Channel 28:	2457.35 MHz	Channel 38:	2477.35 MHz
Channel 9:	2419.35 MHz	Channel 19:	2439.35 MHz	Channel 29:	2459.35 MHz		
Channel 10:	2421.35 MHz	Channel 20:	2441.35 MHz	Channel 30:	2461.35 MHz		

Note:

1. The EUT is an Afterglow 5.1 surround sound wireless headset 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
4. The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

Test Mode:	Mode 1: Transmit
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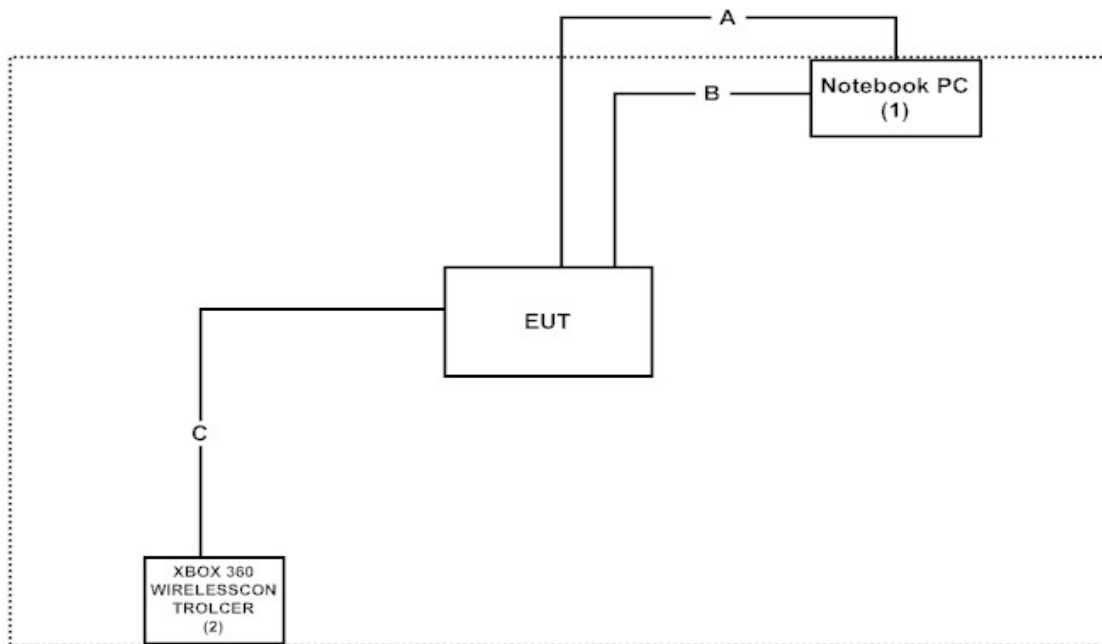
1.3. Tested System Details

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 Notebook PC	DELL	PPT	N/A	Non-Shielded, 0.8m
2 XBOX 360 WIRELESS CONTROL CER	MICROSOFT	ETA-0044	N/A	N/A

Signal Cable Type	Signal cable Description
A USB Cable	Non-Shielded, 3m
B 3.5mm Audio Cable	Non-Shielded, 1.3m
C 2.5mm XBOX CHAT Cable	Non-Shielded, 1m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in Section 1.4.
- (2) Execute “VMI debug.exe (v1.1.6.38)” on the Notebook.
- (3) Configure the test mode, the test channel, and the data rate.
- (4) Press “OK” to start the continuous Transmit.
- (5) 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.
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 E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

2. Conducted Emission

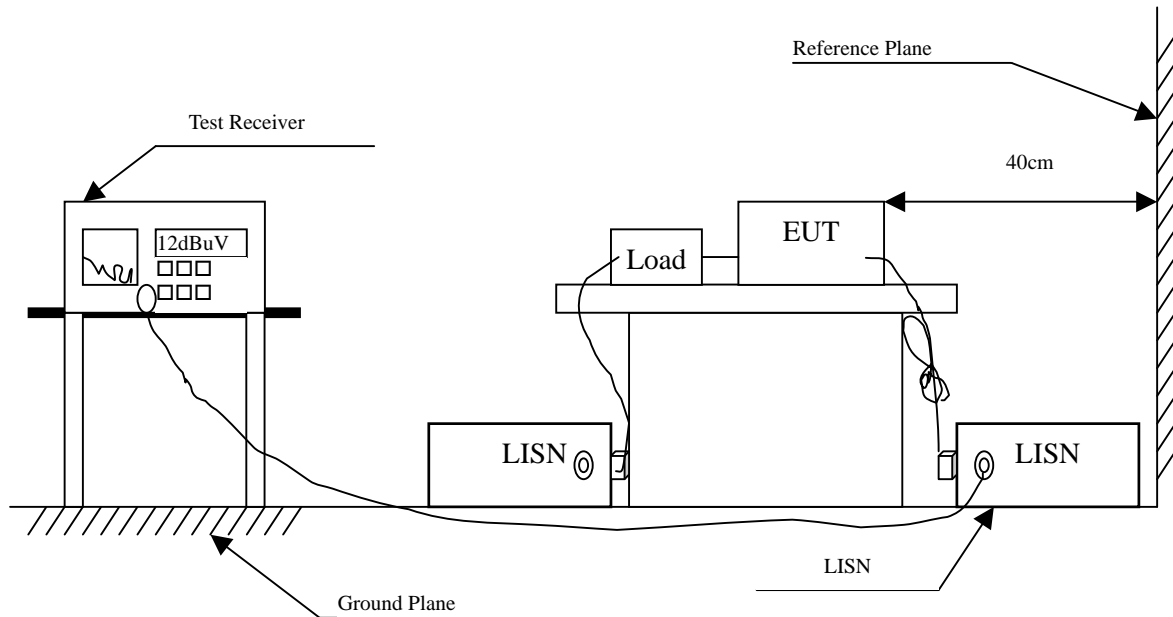
2.1. Test Equipment

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

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2013	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2013	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2013	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2013	
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 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 : Afterglow 5.1 surround sound wireless headset
 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					
0.166	9.830	27.980	37.810	-27.733	65.543
0.334	9.830	22.740	32.570	-28.173	60.743
0.502	9.830	25.940	35.770	-20.230	56.000
2.502	9.841	24.130	33.971	-22.029	56.000
6.002	9.892	22.250	32.142	-27.858	60.000
22.587	10.110	20.690	30.800	-29.200	60.000
Average					
0.166	9.830	27.520	37.350	-18.193	55.543
0.334	9.830	22.730	32.560	-18.183	50.743
0.502	9.830	25.740	35.570	-10.430	46.000
2.502	9.841	22.290	32.131	-13.869	46.000
6.002	9.892	9.340	19.232	-30.768	50.000
22.587	10.110	13.920	24.030	-25.970	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 : Afterglow 5.1 surround sound wireless headset
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmit

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
Line 2					
Quasi-Peak					
0.166	9.838	25.830	35.668	-29.875	65.543
0.252	9.830	17.850	27.680	-35.406	63.086
0.502	9.840	19.970	29.810	-26.190	56.000
3.334	9.870	15.920	25.790	-30.210	56.000
6.005	9.922	18.420	28.342	-31.658	60.000
15.509	10.230	17.400	27.630	-32.370	60.000
Average					
0.166	9.838	25.460	35.298	-20.245	55.543
0.252	9.830	16.090	25.920	-27.166	53.086
0.502	9.840	19.960	29.800	-16.200	46.000
3.334	9.870	7.930	17.800	-28.200	46.000
6.005	9.922	7.780	17.702	-32.298	50.000
15.509	10.230	11.300	21.530	-28.470	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

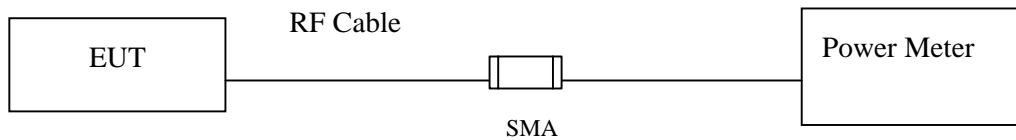
3.1. Test Equipment

	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 : Afterglow 5.1 surround sound wireless headset
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	2403.35	4.67	<30dBm	Pass
19	2439.35	3.81	<30dBm	Pass
38	2477.35	2.91	<30dBm	Pass

4. Radiated Emission

4.1. Test Equipment

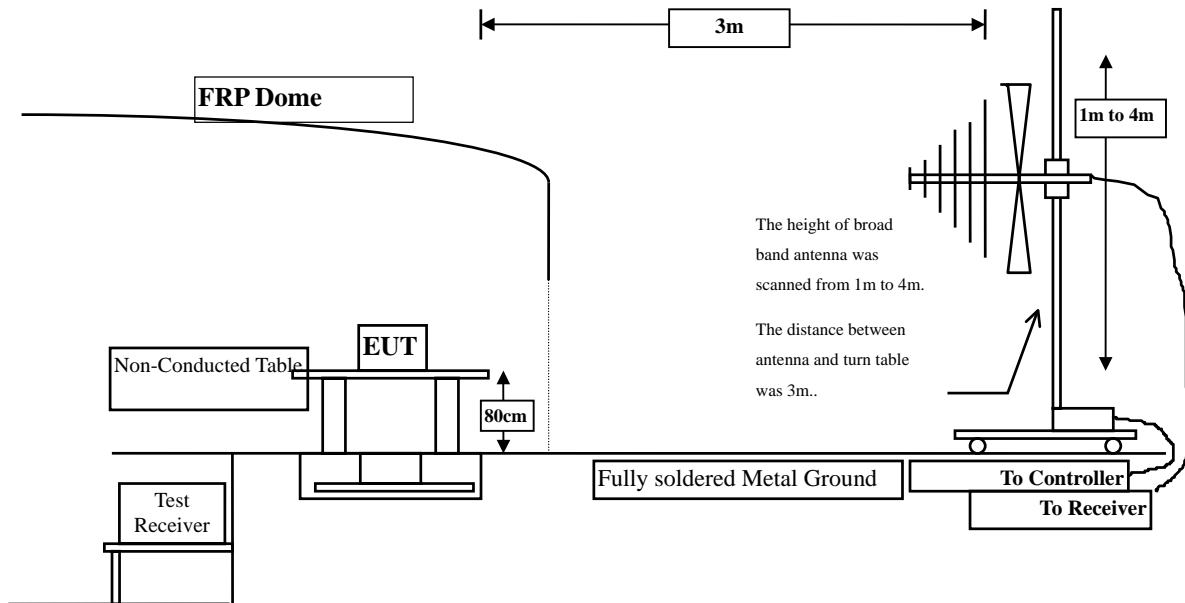
The following test equipment are used during the radiated emission test:

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	QTK	QTK-AMP-03 / 0003	May, 2013
	X	Pre-Amplifier	QTK	AP-180C / CHM_0906076	Sep., 2013
	X	Pre-Amplifier	MITEQ	AMF-4D-180400-45-6P/ 925975	Mar, 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

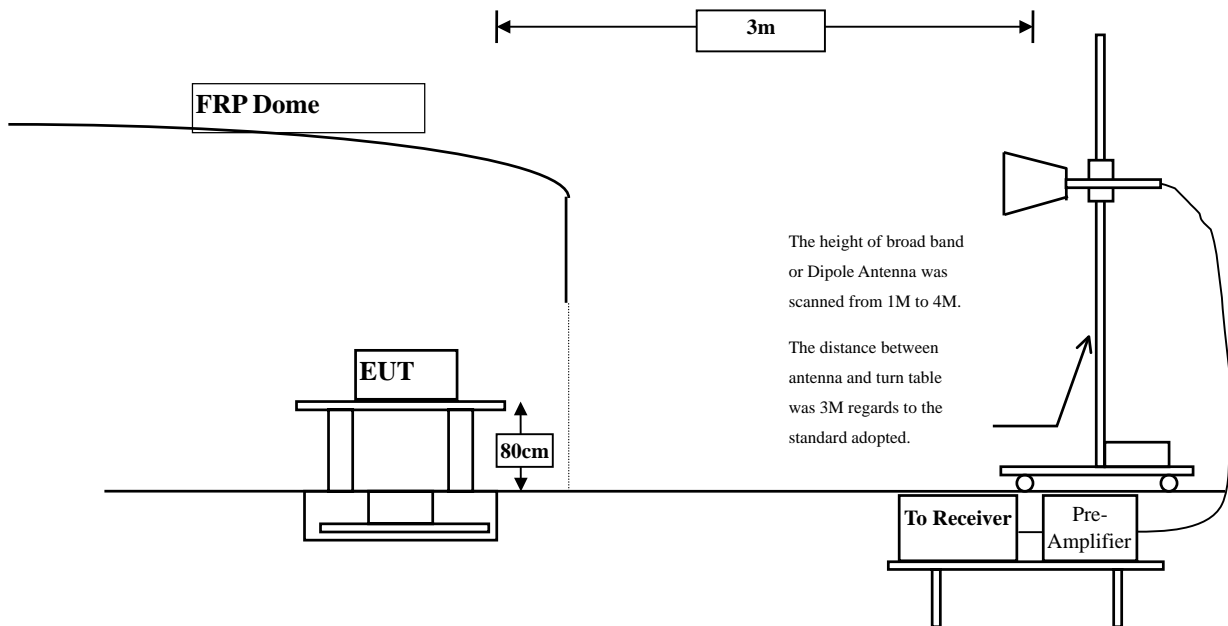
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

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	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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 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 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~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 : Afterglow 5.1 surround sound wireless headset
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2403.35MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4806.700	2.534	43.100	45.634	-28.366	74.000
7210.050	9.466	43.910	53.376	-20.624	74.000
9613.400	10.343	39.400	49.744	-24.256	74.000
Vertical					
Peak Detector:					
4806.700	2.934	43.100	46.034	-27.966	74.000
7210.050	9.946	43.810	53.757	-20.243	74.000
9613.400	10.808	39.910	50.718	-23.282	74.000

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- Measurement Level = Reading Level + Correct Factor.
- Correct Factor = Antenna factor + Cable loss - Amplifier gain.
- The average measurement was not performed when the peak measured data under the limit of average detection.
- The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Afterglow 5.1 surround sound wireless headset
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2439.35MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4878.700	2.046	44.830	46.877	-27.123	74.000
7318.050	9.658	43.280	52.939	-21.061	74.000
9757.400	9.655	39.950	49.604	-24.396	74.000
Vertical					
Peak Detector:					
4878.700	2.506	44.490	46.996	-27.004	74.000
7318.050	10.256	41.650	51.907	-22.093	74.000
9757.400	10.290	39.500	49.790	-24.210	74.000

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 : Afterglow 5.1 surround sound wireless headset
 Test Item : Harmonic Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2477.35MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4954.700	2.529	45.950	48.480	-25.520	74.000
7432.050	10.524	45.150	55.674	-18.326	74.000
9909.400	10.189	39.340	49.529	-24.471	74.000
Average Detector:					
7432.050	10.524	37.480	48.004	-5.996	54.000
Vertical					
Peak Detector:					
4954.700	3.316	45.020	48.336	-25.664	74.000
7432.050	11.221	42.740	53.961	-20.039	74.000
9909.400	11.240	39.020	50.260	-23.740	74.000

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 : Afterglow 5.1 surround sound wireless headset
 Test Item : General Radiated Emission Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2439.35MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
59.100	-14.047	45.072	31.025	-8.975	40.000
191.020	-10.040	49.116	39.076	-4.424	43.500
377.260	-1.115	32.980	31.865	-14.135	46.000
516.940	1.654	27.915	29.569	-16.431	46.000
676.020	2.911	31.581	34.492	-11.508	46.000
916.580	6.144	23.718	29.862	-16.138	46.000
Vertical					
101.780	-0.021	28.677	28.655	-14.845	43.500
299.660	-6.855	40.184	33.329	-12.671	46.000
497.540	-1.393	27.893	26.500	-19.500	46.000
676.020	0.041	32.945	32.986	-13.014	46.000
792.420	2.889	32.053	34.942	-11.058	46.000
955.380	6.657	25.043	31.700	-14.300	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

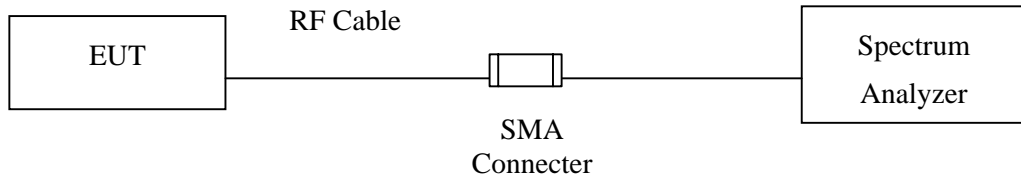
5.1. Test Equipment

	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

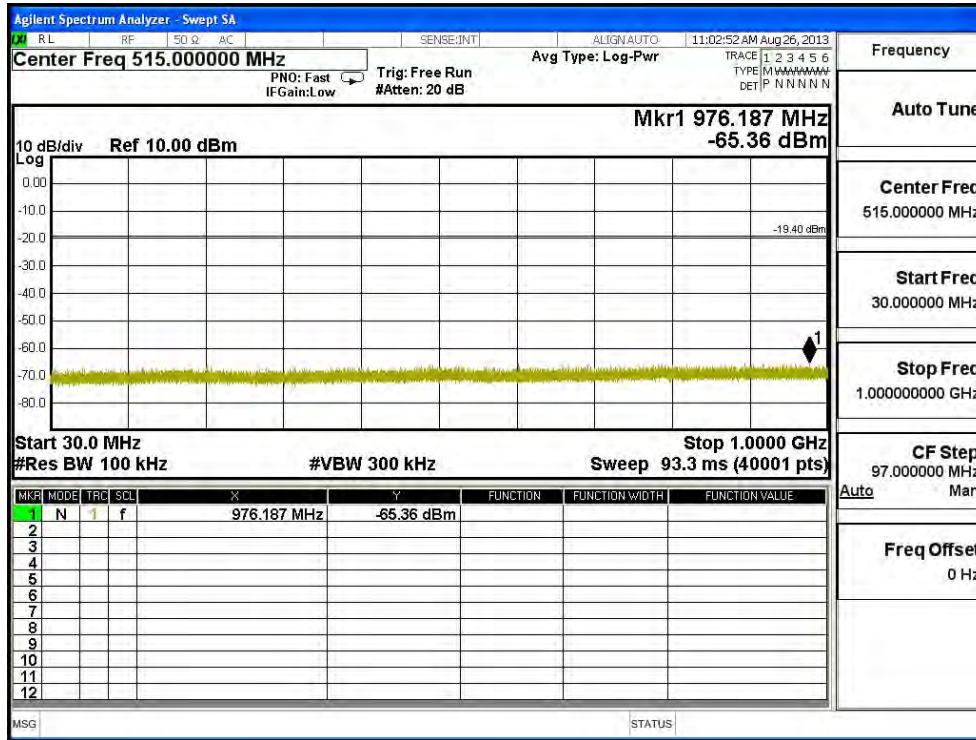
The measurement uncertainty

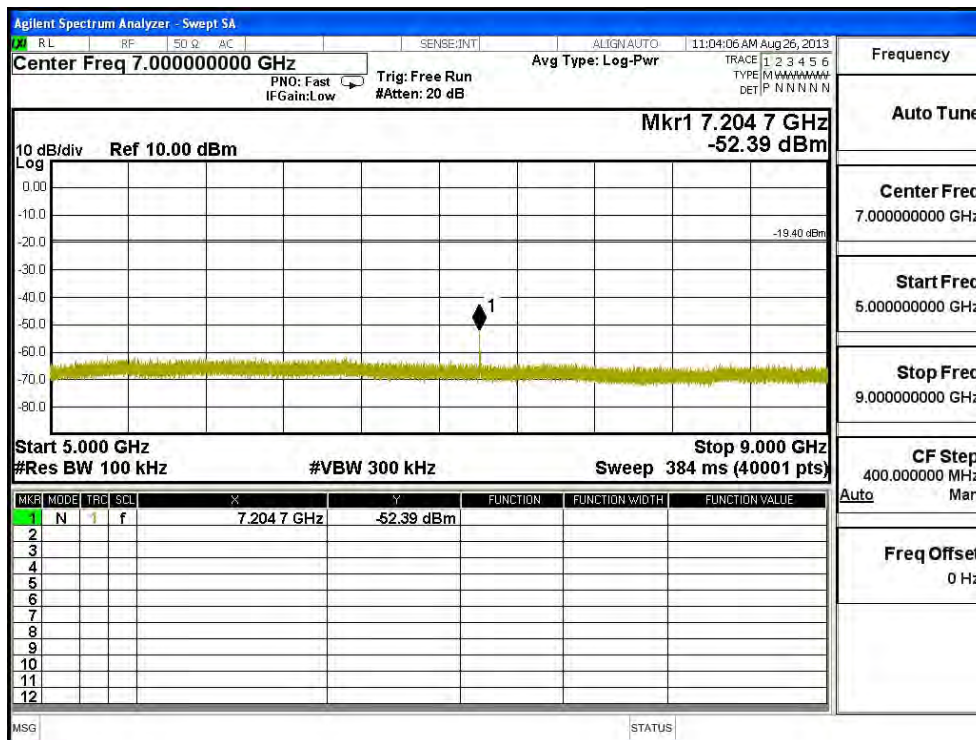
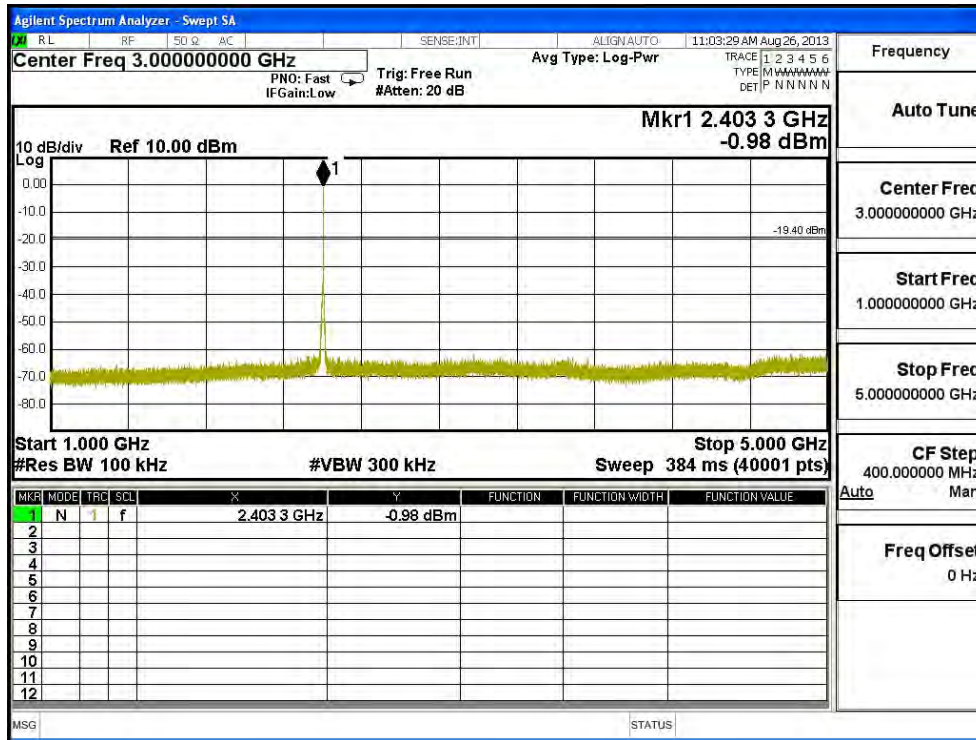
Conducted is defined as $\pm 1.27\text{dB}$

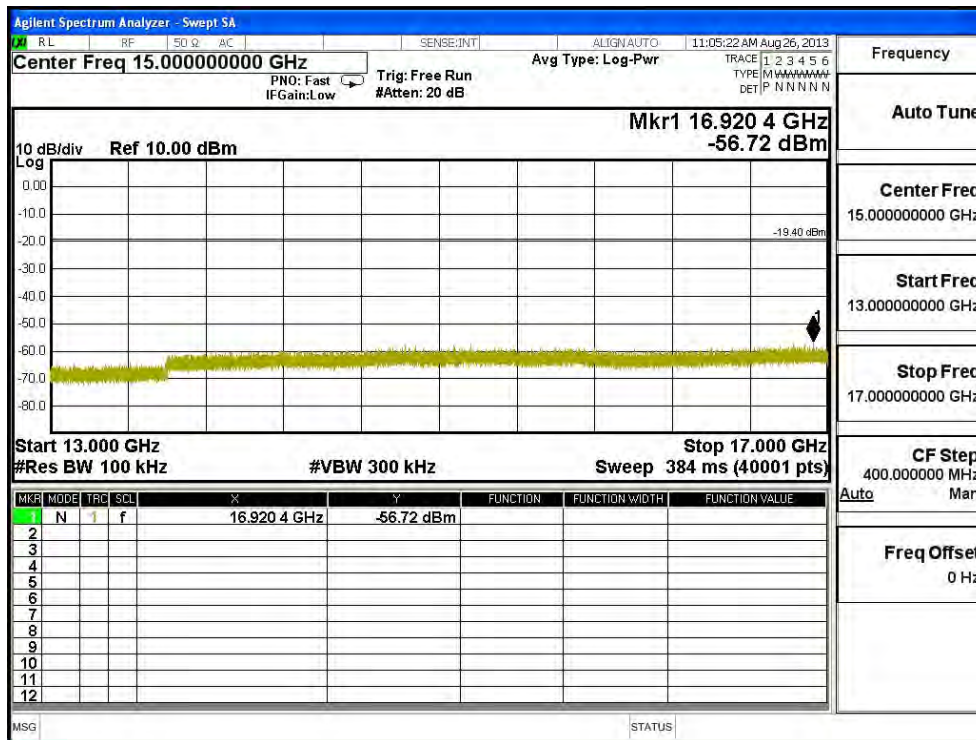
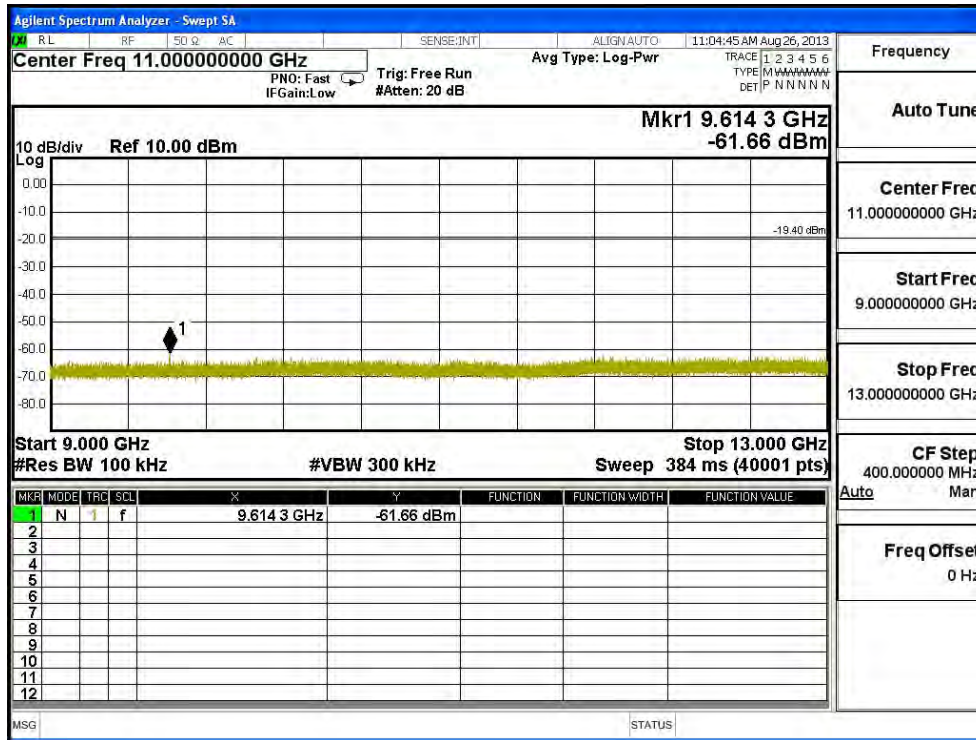
5.6. Test Result of RF antenna conducted test

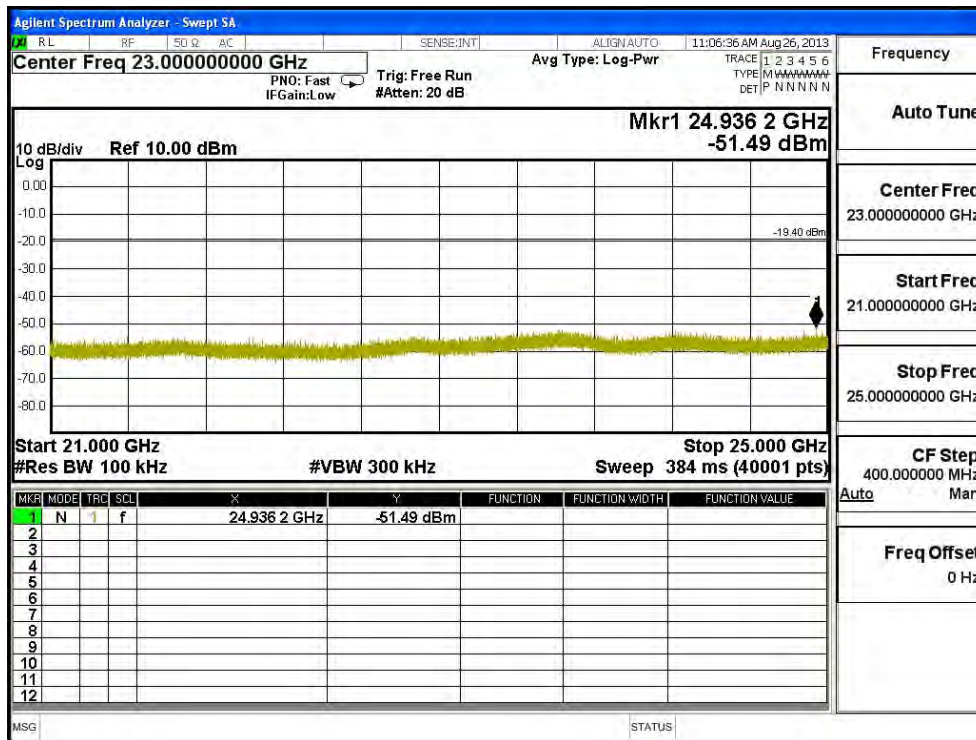
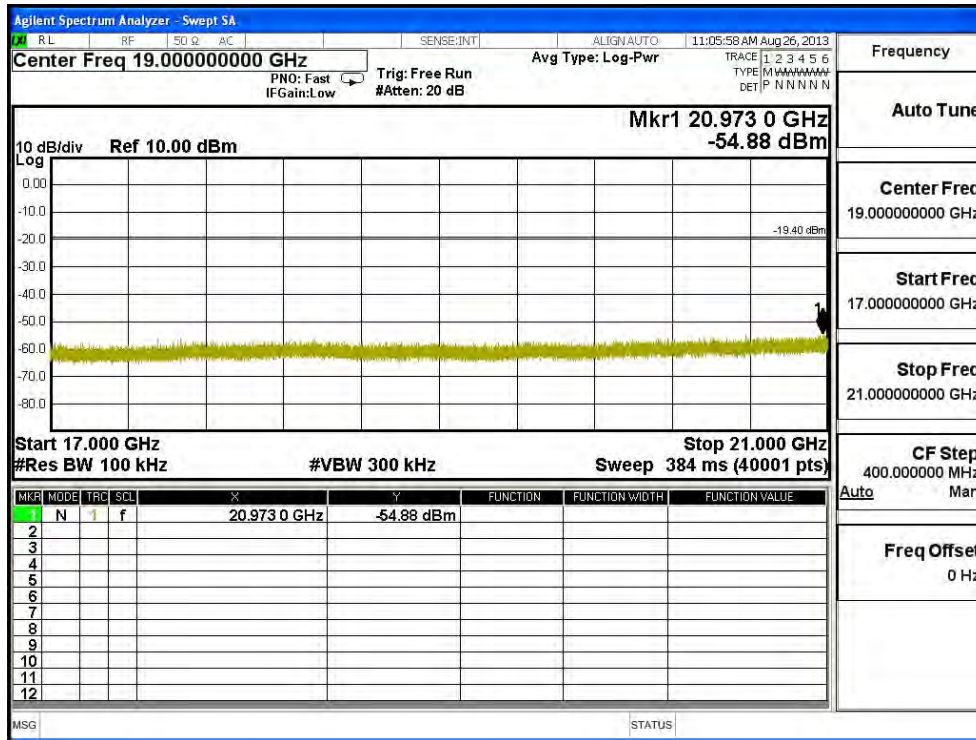
Product : Afterglow 5.1 surround sound wireless headset
 Test Item : RF antenna conducted test
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit

Channel 01 (2403.35MHz) 30M-25GHz

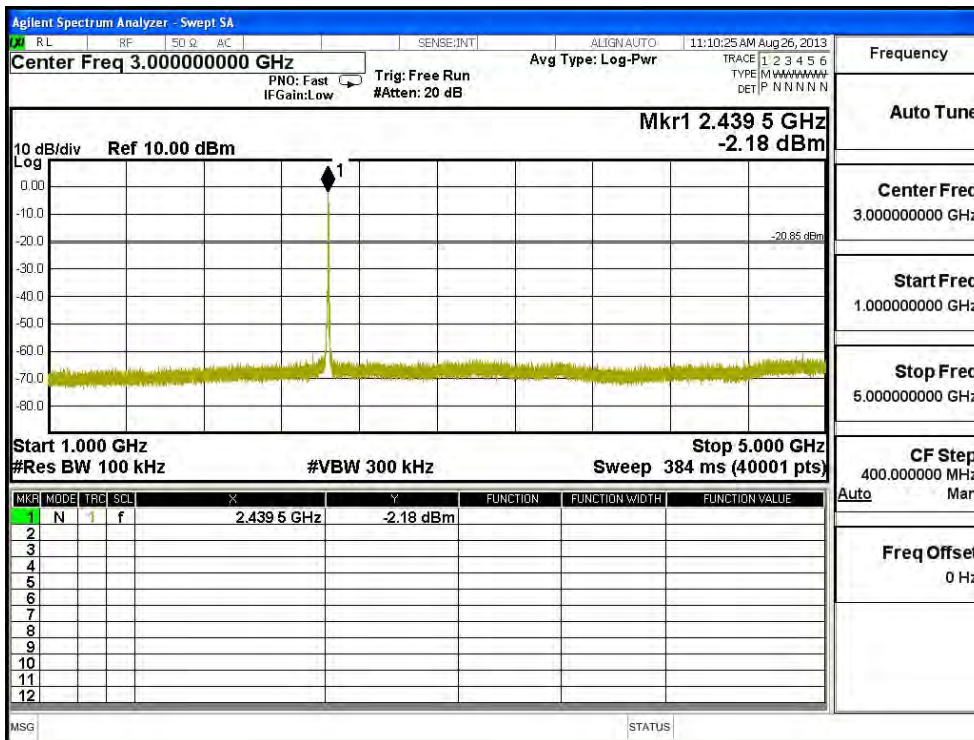
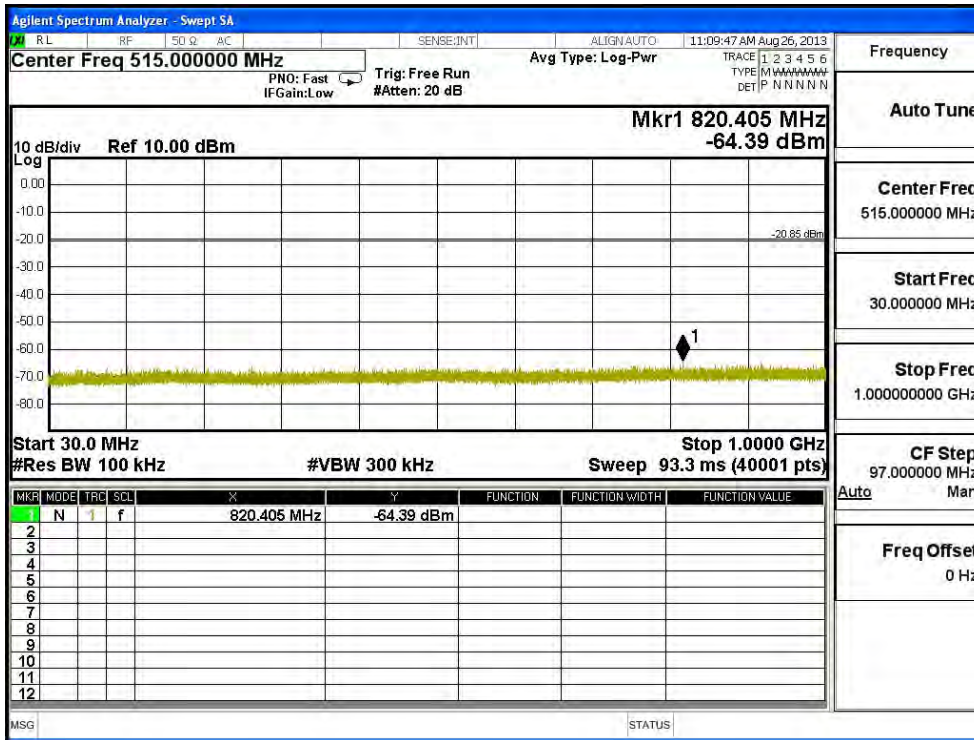


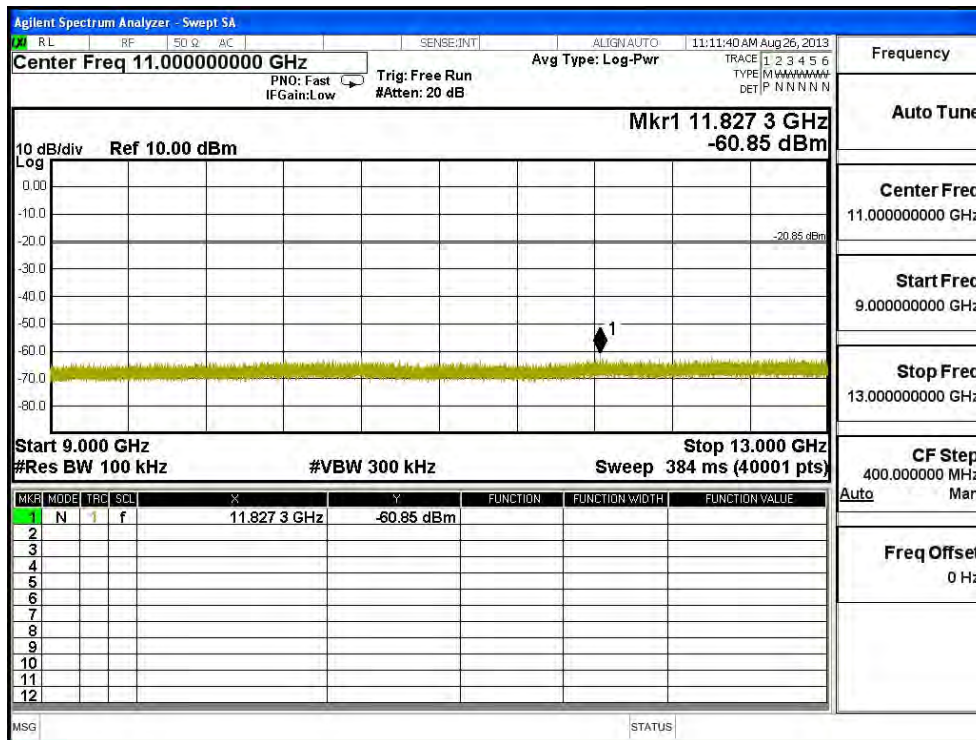
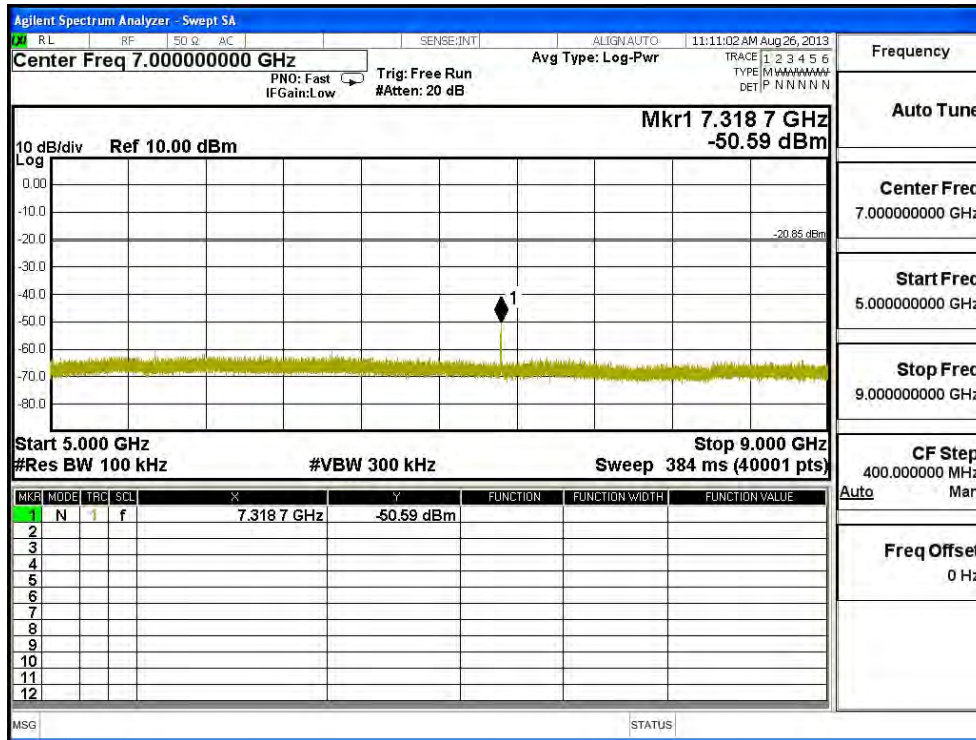


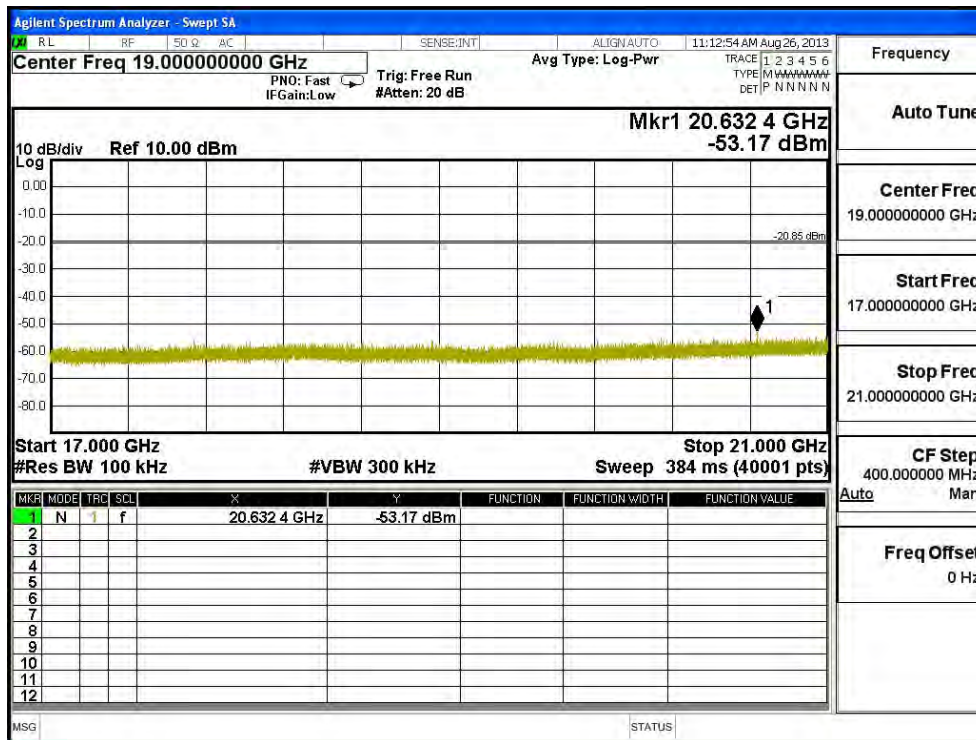
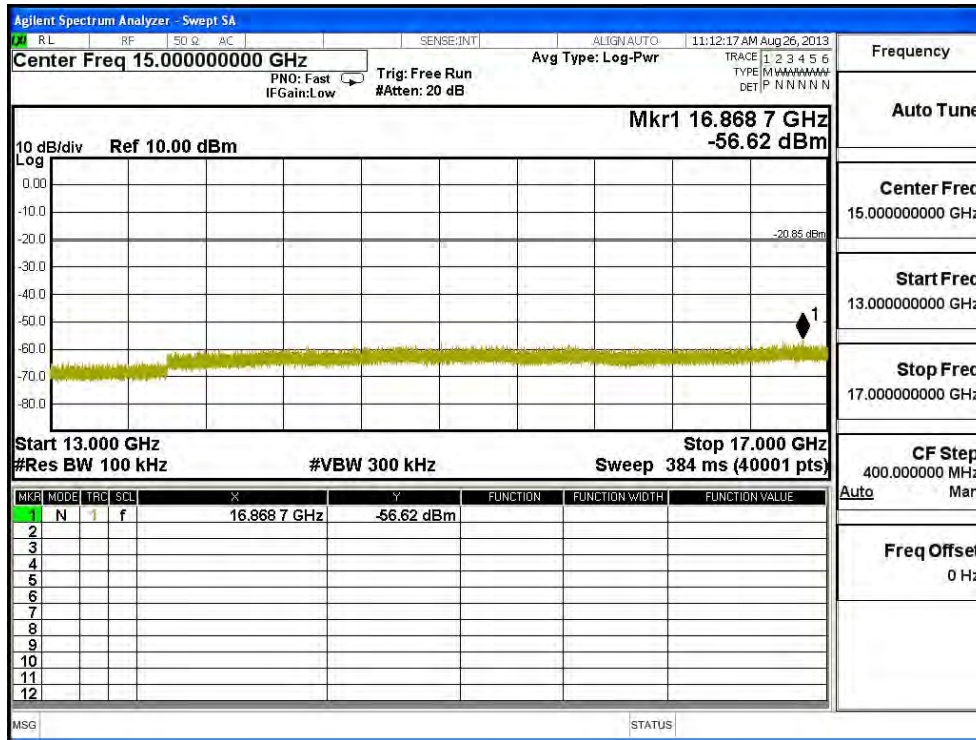


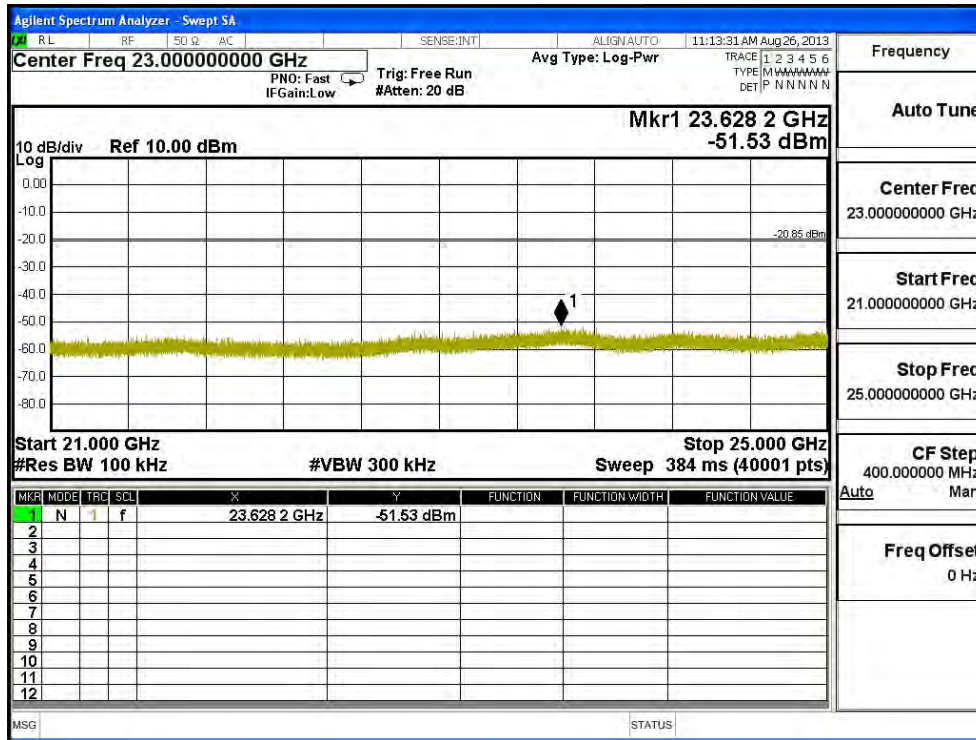


Channel 19 (2439.35MHz) 30M-25GHz

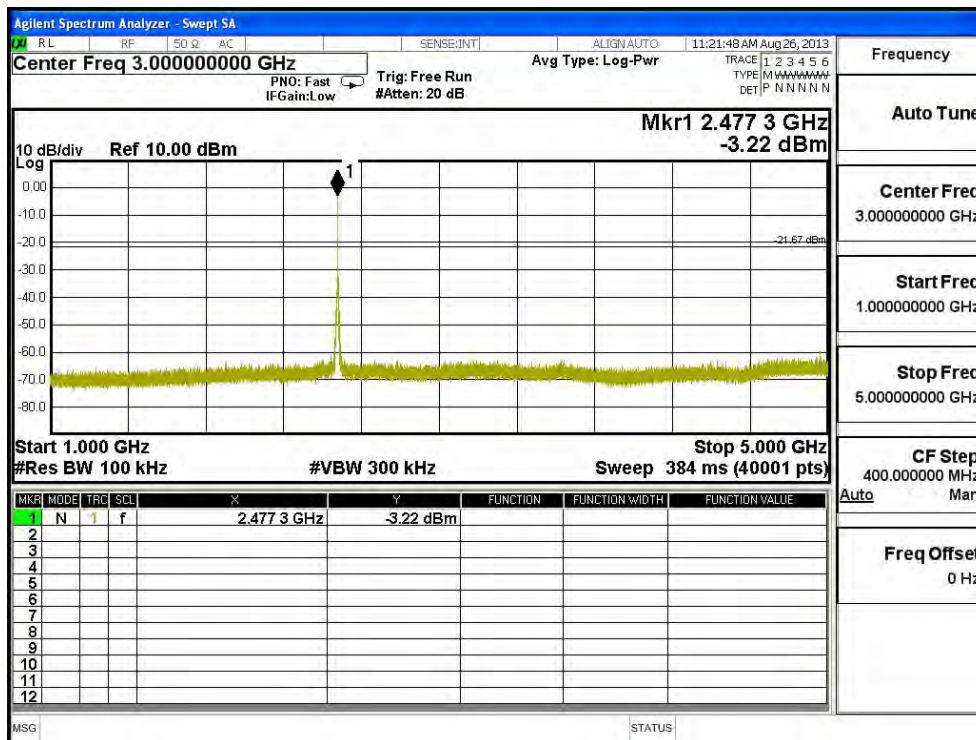
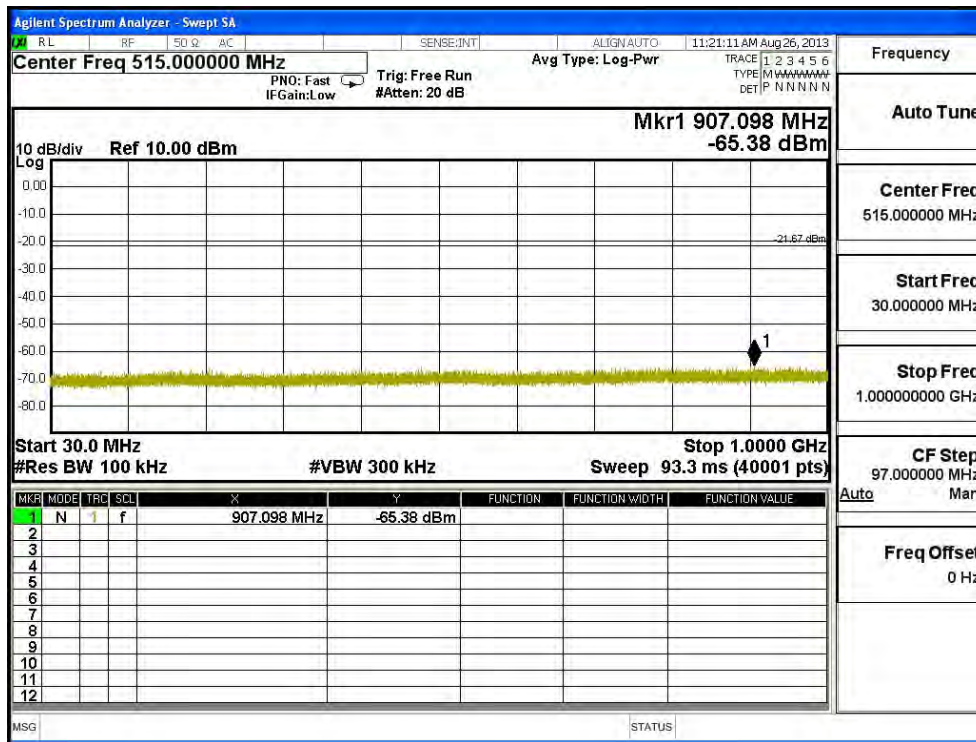


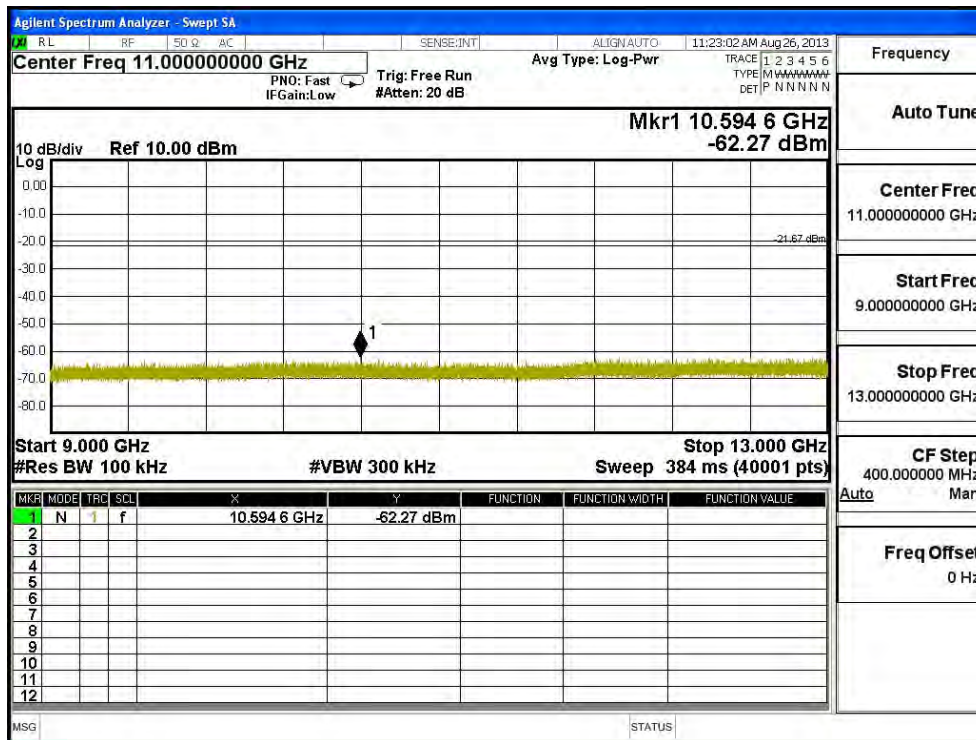
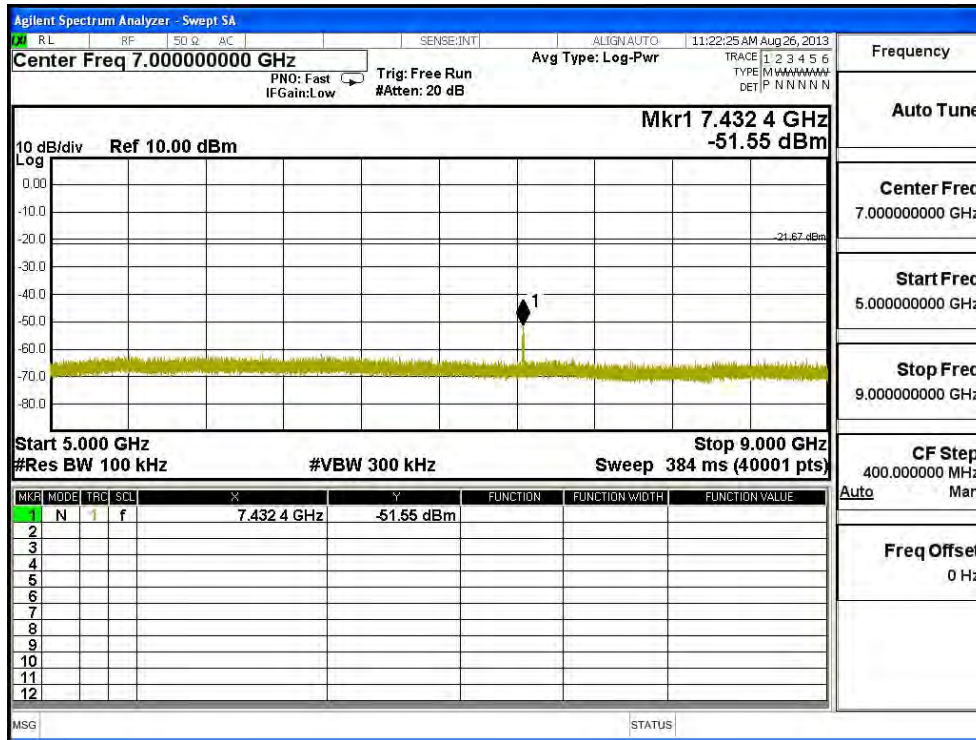


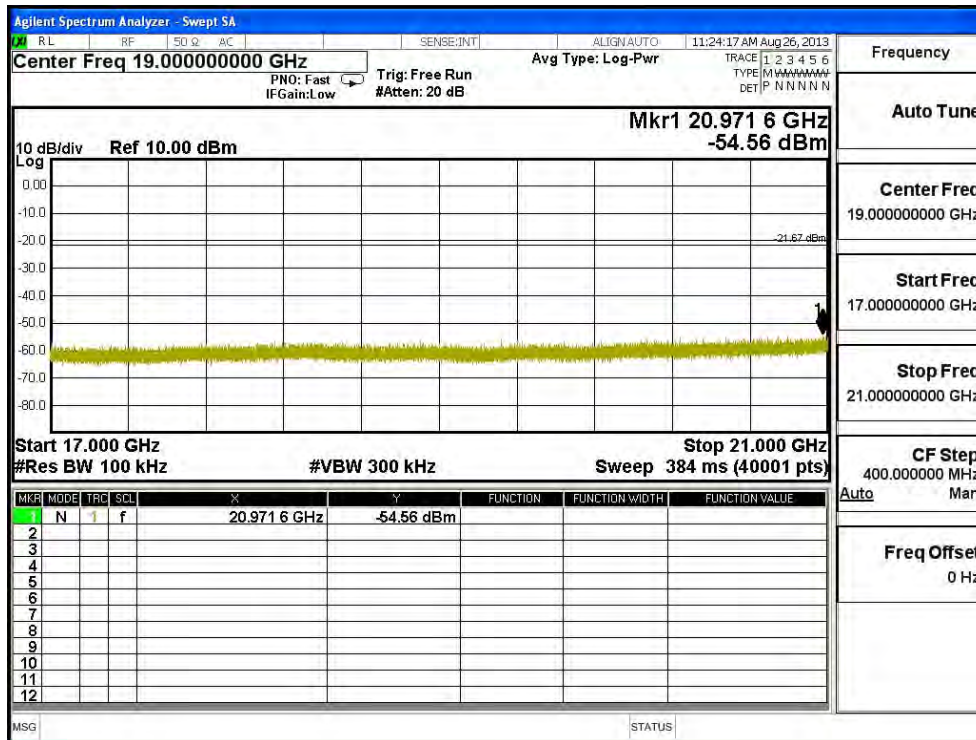
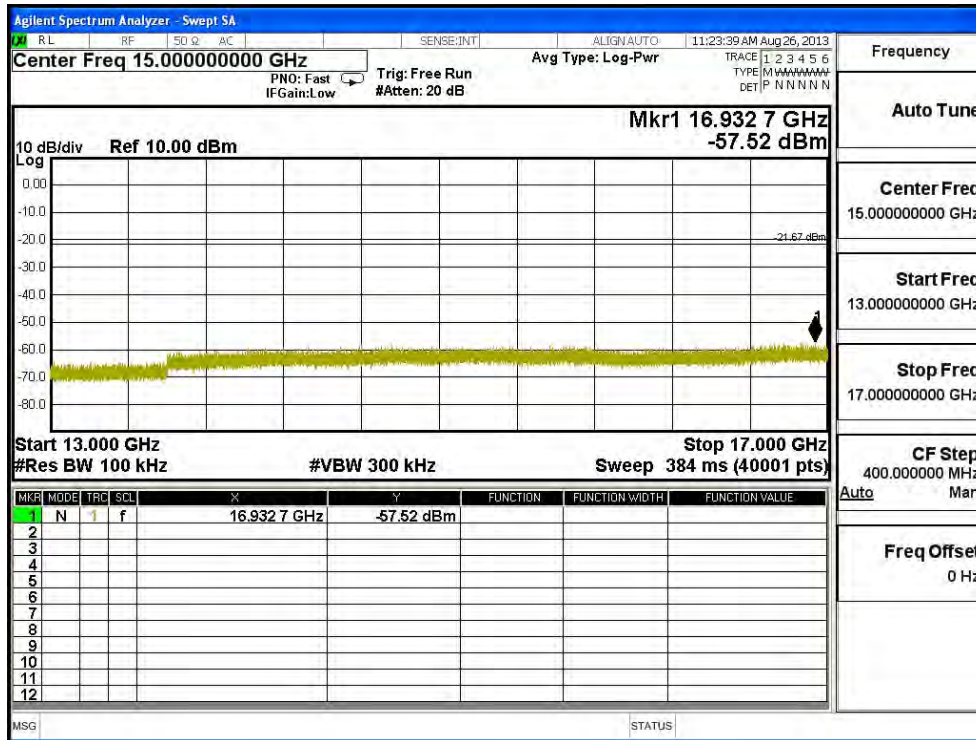


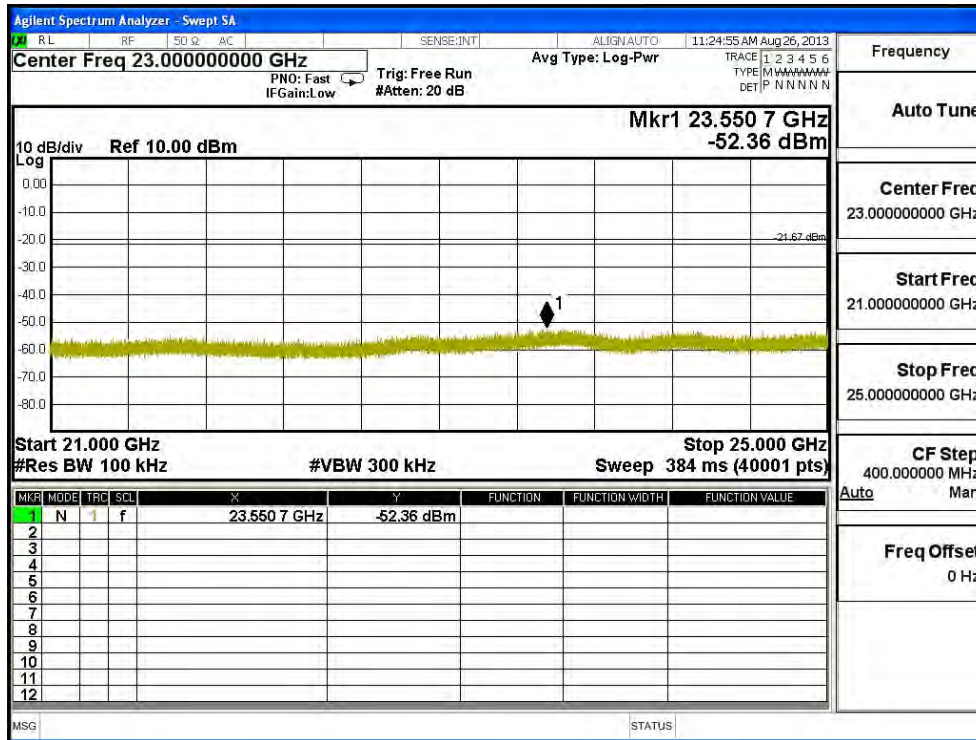


Channel 38 (2477.35MHz) 30M-25GHz









6. Band Edge

6.1. Test Equipment

RF Radiated Measurement:

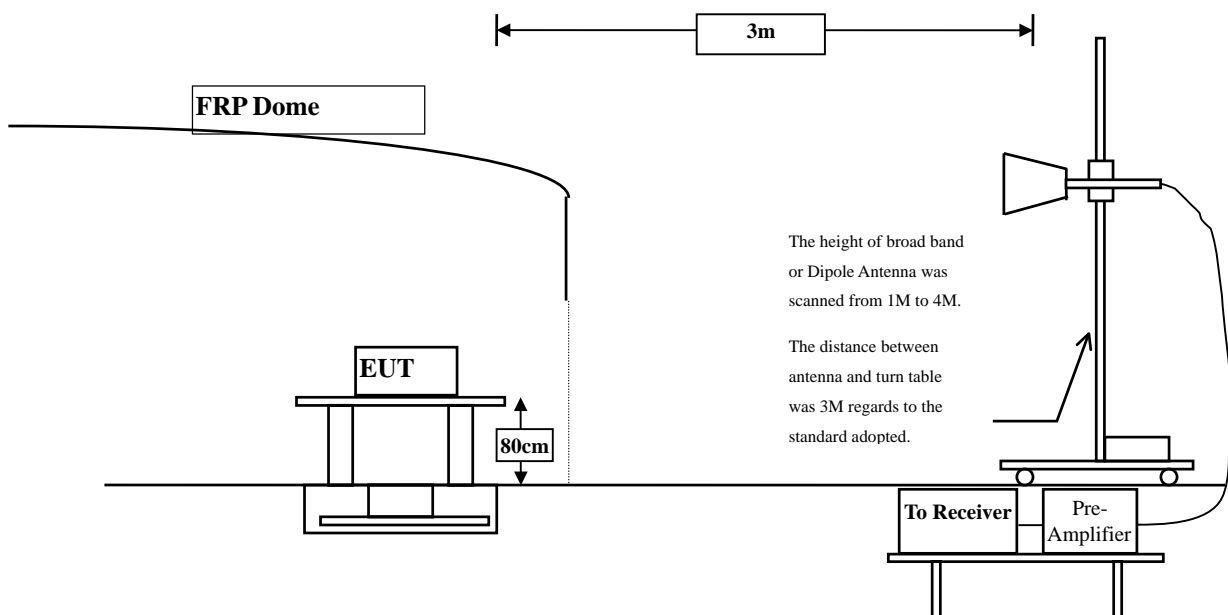
The following test equipments are used during the band edge tests:

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 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 : Afterglow 5.1 surround sound wireless headset
 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)	2383.400	31.483	25.966	57.449	74.00	54.00	Pass
01 (Peak)	2390.000	31.509	25.533	57.042	74.00	54.00	Pass
01 (Peak)	2403.600	31.584	68.292	99.876	--	--	--
01 (Average)	2390.000	31.509	12.874	44.383	74.00	54.00	Pass
01 (Average)	2403.400	31.583	64.195	95.777	--	--	--

Figure Channel 01: Horizontal (Peak)

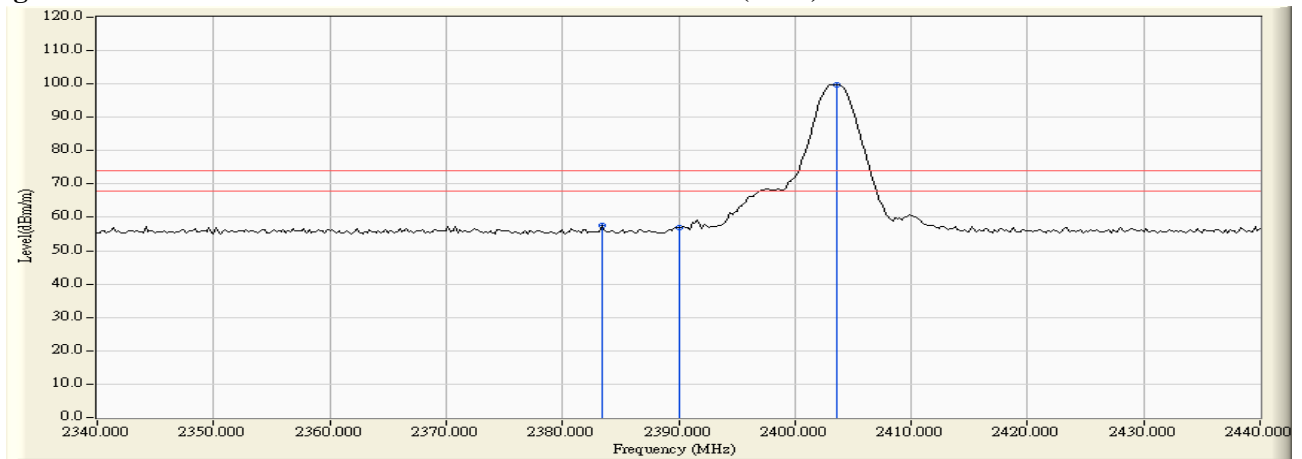
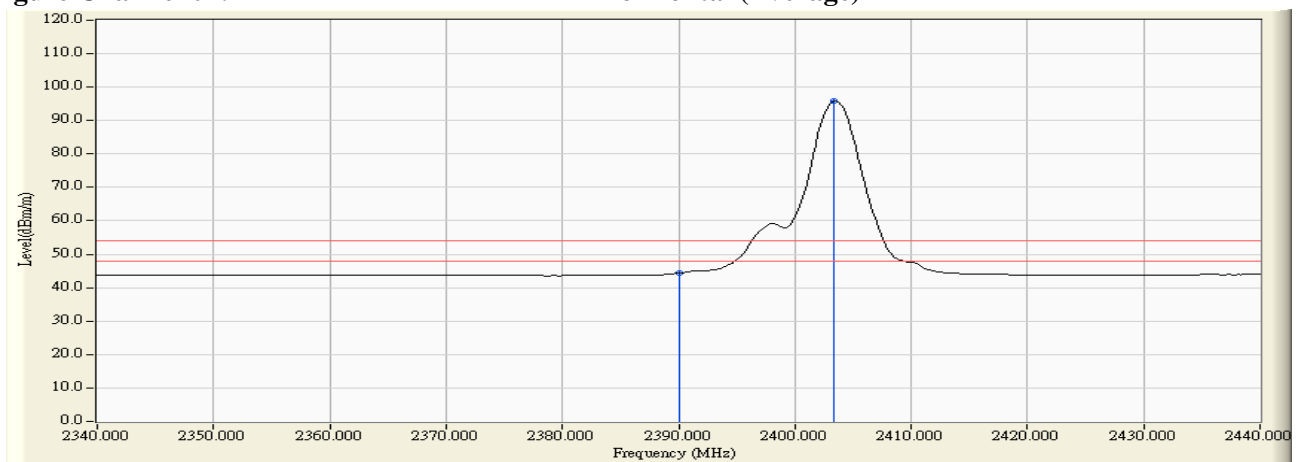


Figure Channel 01: Horizontal (Average)



- 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 : Afterglow 5.1 surround sound wireless headset
 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	25.673	56.593	74.00	54.00	Pass
01 (Peak)	2390.000	30.915	24.933	55.848	74.00	54.00	Pass
01 (Peak)	2403.800	30.923	65.677	96.599	--	--	--
01 (Average)	2390.000	30.915	12.682	43.597	74.00	54.00	Pass
01 (Average)	2403.400	30.922	62.105	93.026	--	--	--

Figure Channel 01: Vertical (Peak)

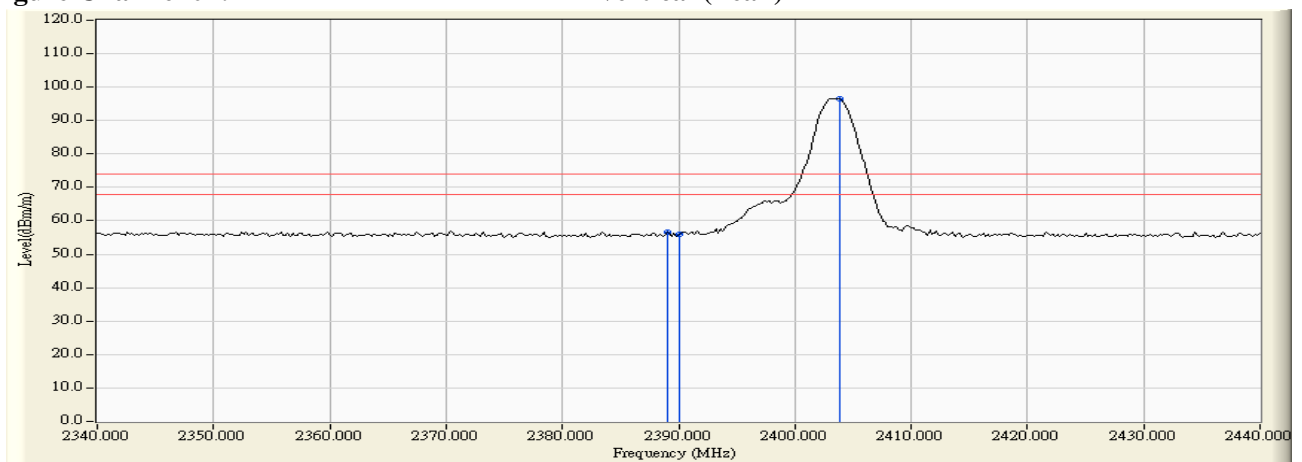
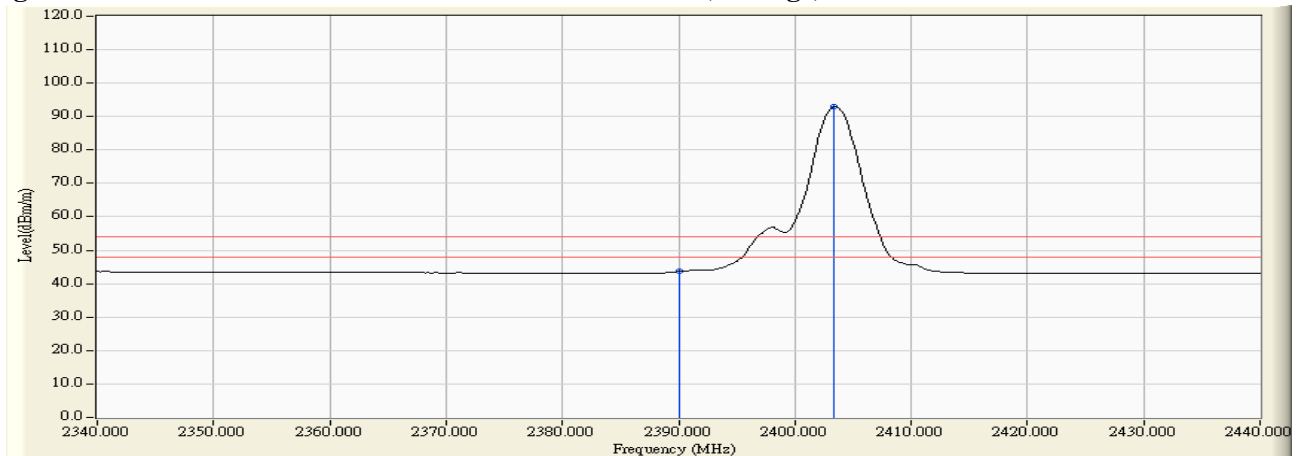


Figure Channel 01: Vertical (Average)



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 : Afterglow 5.1 surround sound wireless headset
 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
38 (Peak)	2477.500	32.136	66.268	98.405	--	--	--
38 (Peak)	2483.500	32.182	28.384	60.566	74.00	54.00	Pass
38 (Average)	2477.300	32.135	63.015	95.150	--	--	--
38 (Average)	2483.500	32.182	16.343	48.525	74.00	54.00	Pass

Figure Channel 38: Horizontal (Peak)

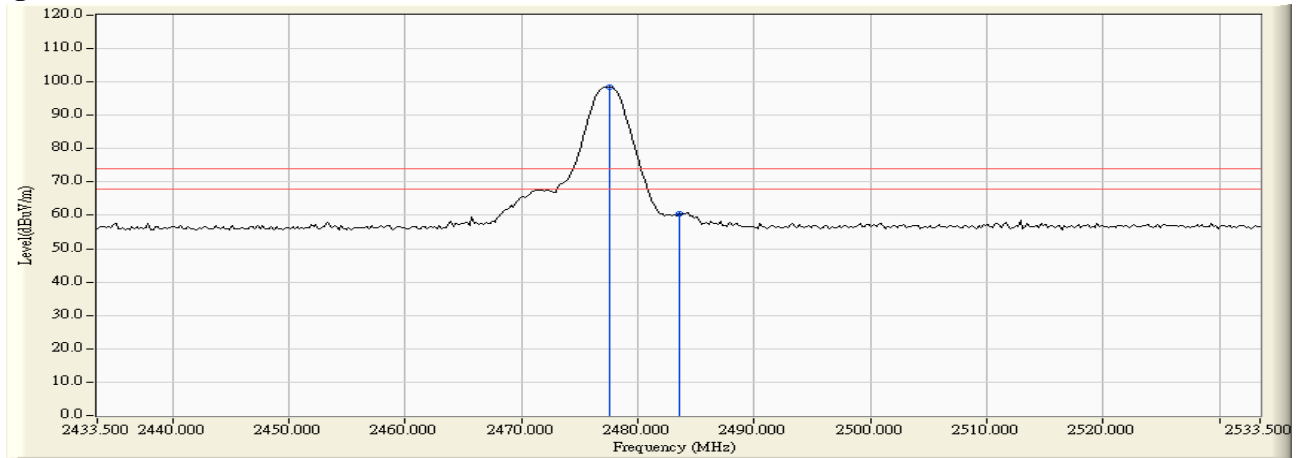
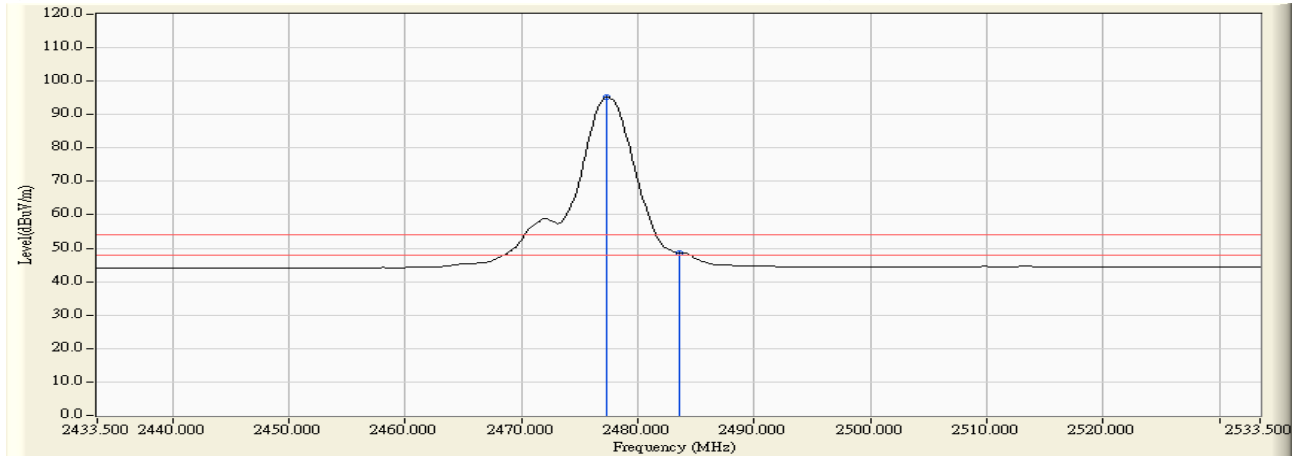


Figure Channel 38: Horizontal (Average)



- 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 : Afterglow 5.1 surround sound wireless headset
 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
38 (Peak)	2477.500	31.395	63.784	95.179	--	--	--
38 (Peak)	2483.500	31.435	26.580	58.015	74.00	54.00	Pass
38 (Average)	2477.500	31.395	60.303	91.698	--	--	--
38 (Average)	2483.500	31.435	14.767	46.202	74.00	54.00	Pass

Figure Channel 38: Vertical (Peak)

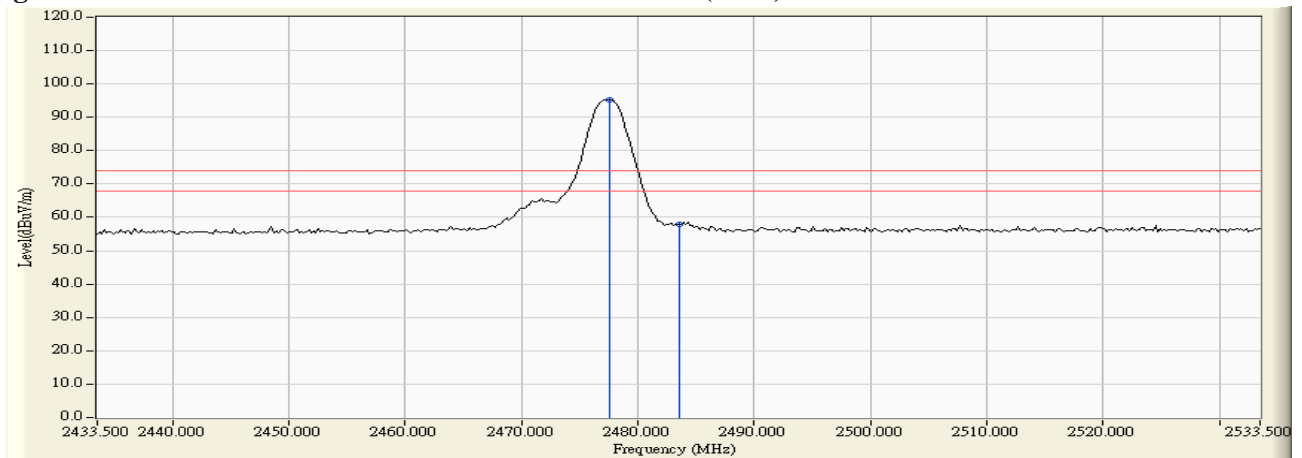
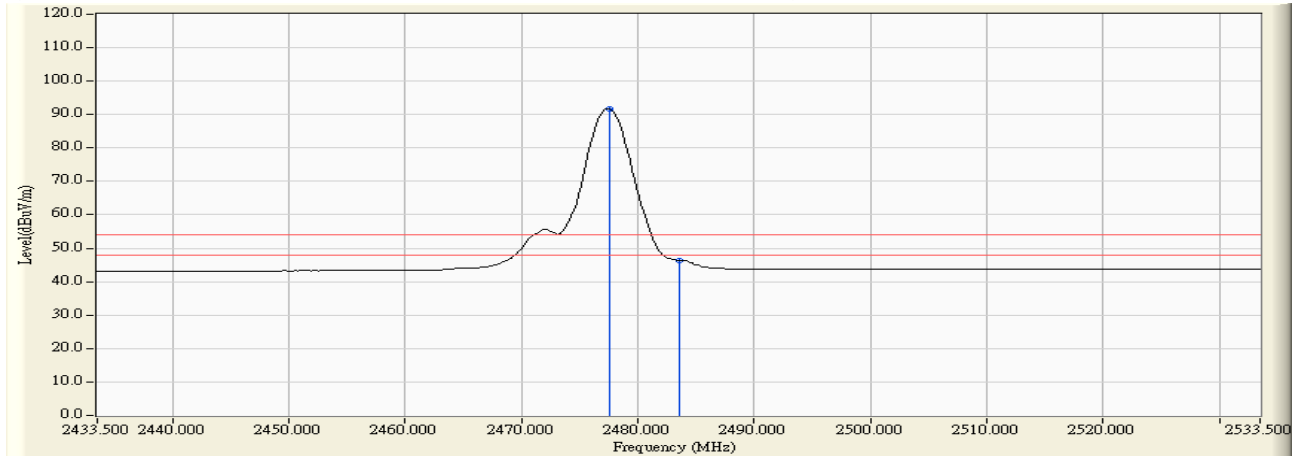


Figure Channel 38: Vertical (Average)



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.

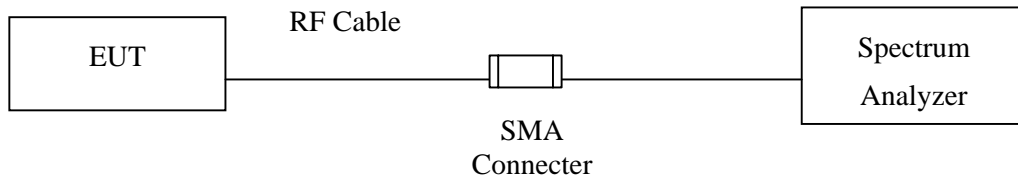
7. Occupied Bandwidth

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.

Set RBW = 1-5% of the emission bandwidth, VBW ≥ 3*RBW

7.5. Uncertainty

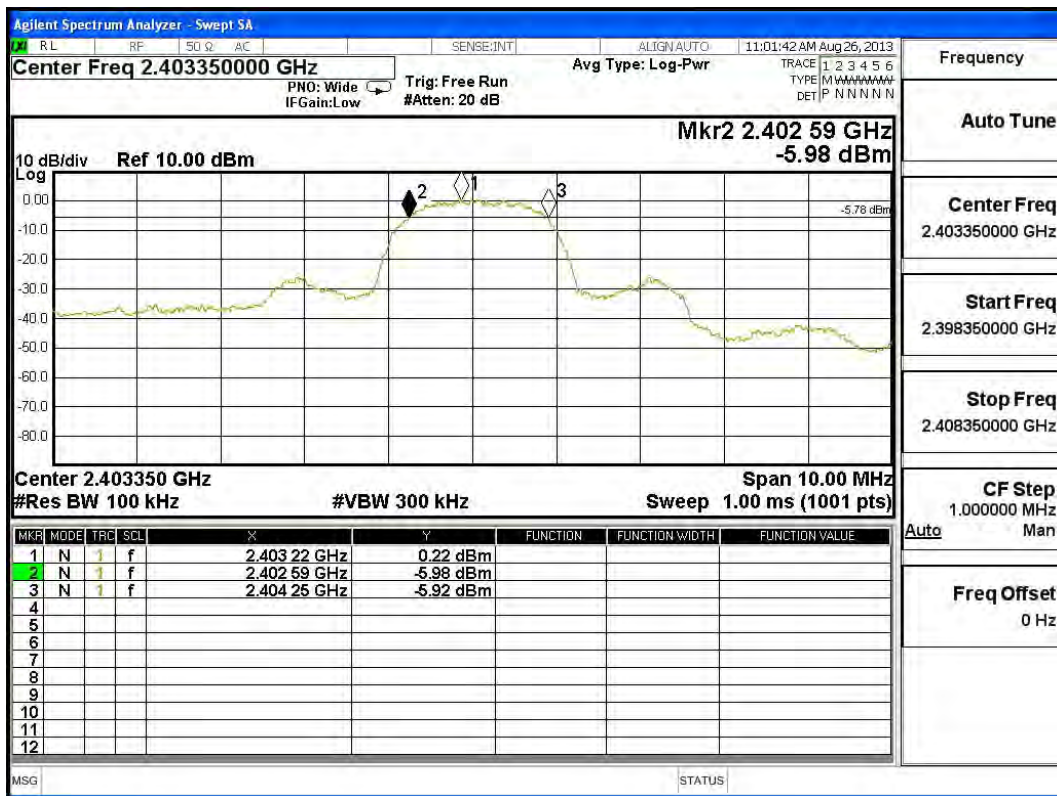
± 150Hz

7.6. Test Result of Occupied Bandwidth

Product : Afterglow 5.1 surround sound wireless headset
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2403.35MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2403.35	1660	>500	Pass

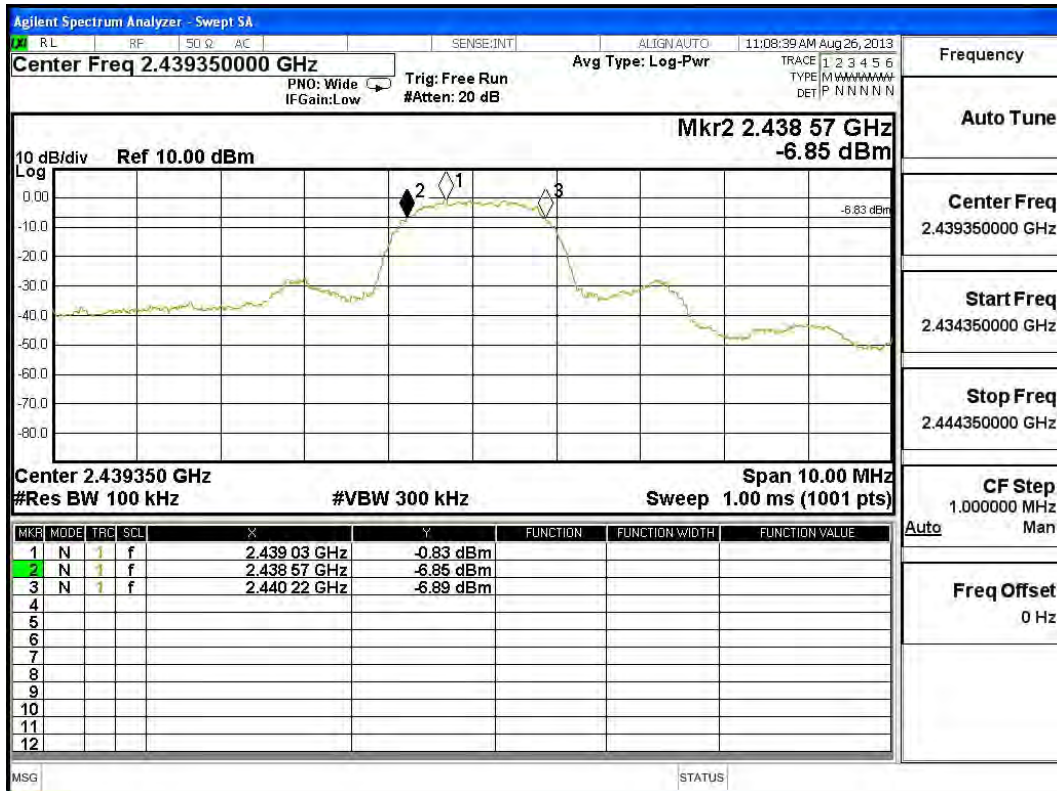
Figure Channel 01:



Product : Afterglow 5.1 surround sound wireless headset
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2439.35MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
19	2439.35	1650	>500	Pass

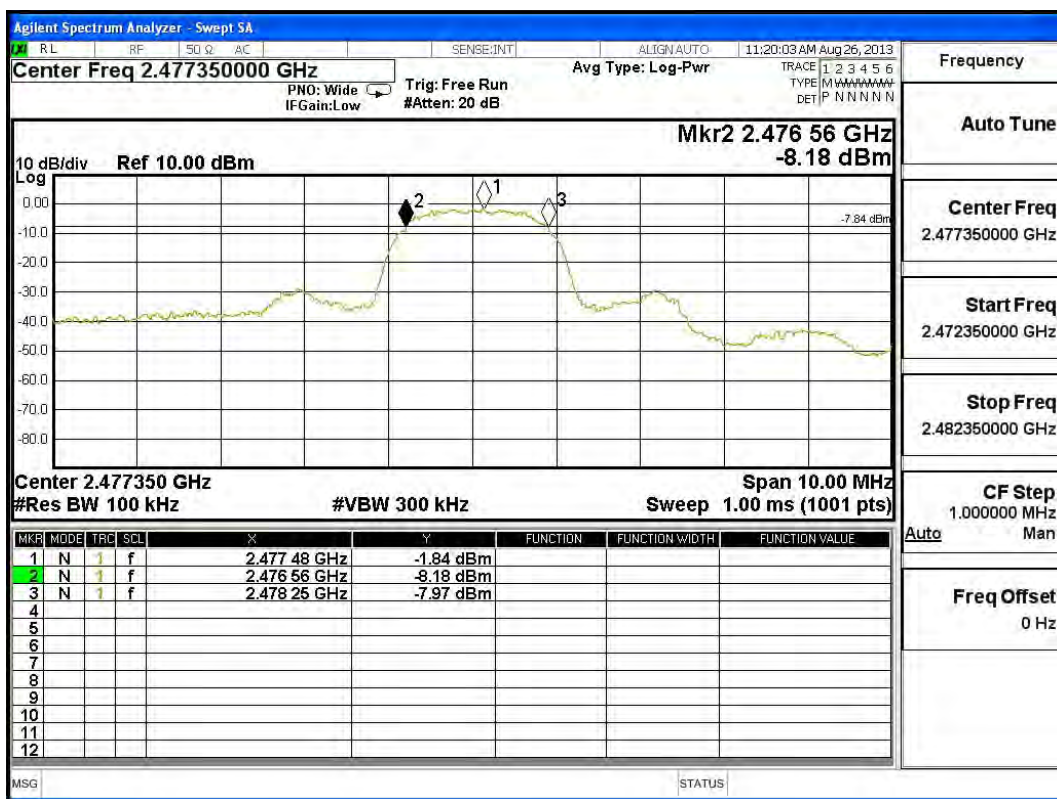
Figure Channel 19:



Product : Afterglow 5.1 surround sound wireless headset
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2477.35MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
38	2477.35	1690	>500	Pass

Figure Channel 38:



8. Power Density

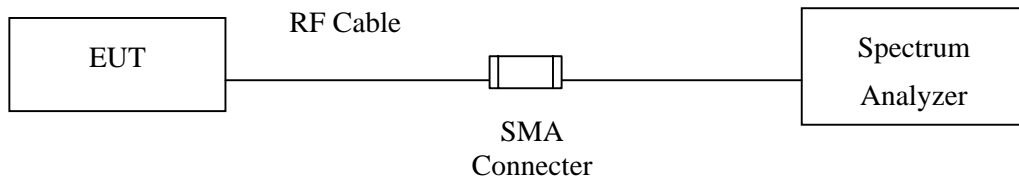
8.1. Test Equipment

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

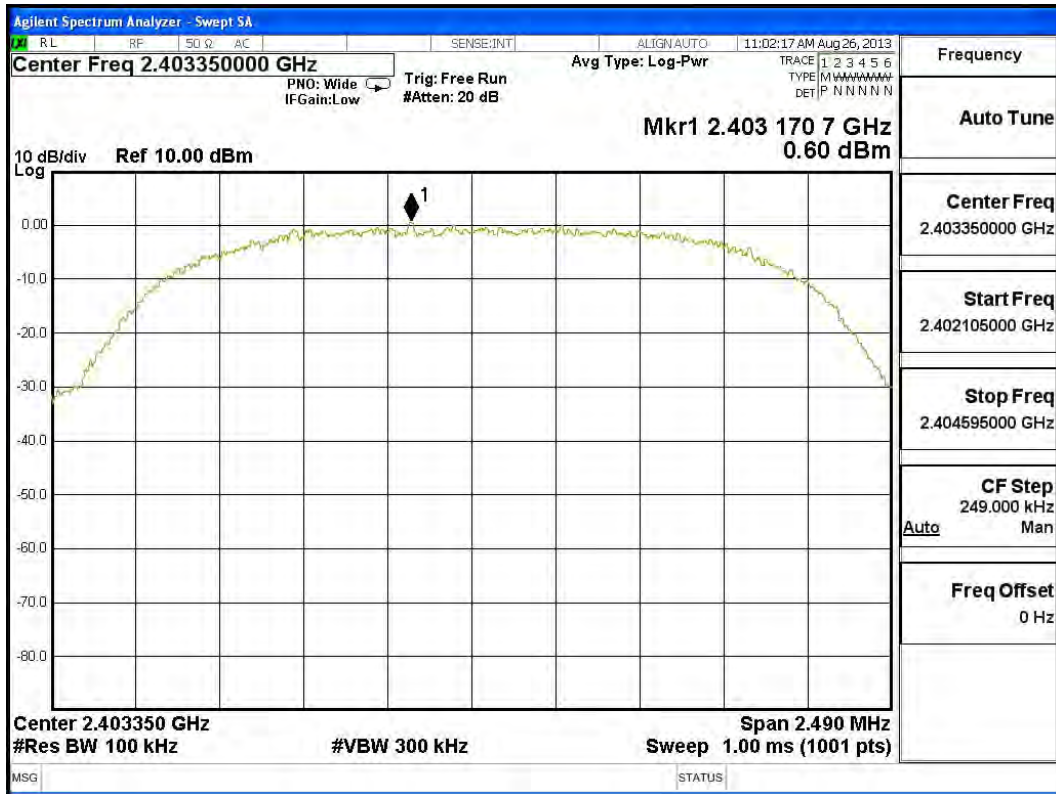
± 1.27 dB

8.6. Test Result of Power Density

Product : Afterglow 5.1 surround sound wireless headset
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit(2403.35MHz)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2403.35	0.600	< 8dBm	Pass

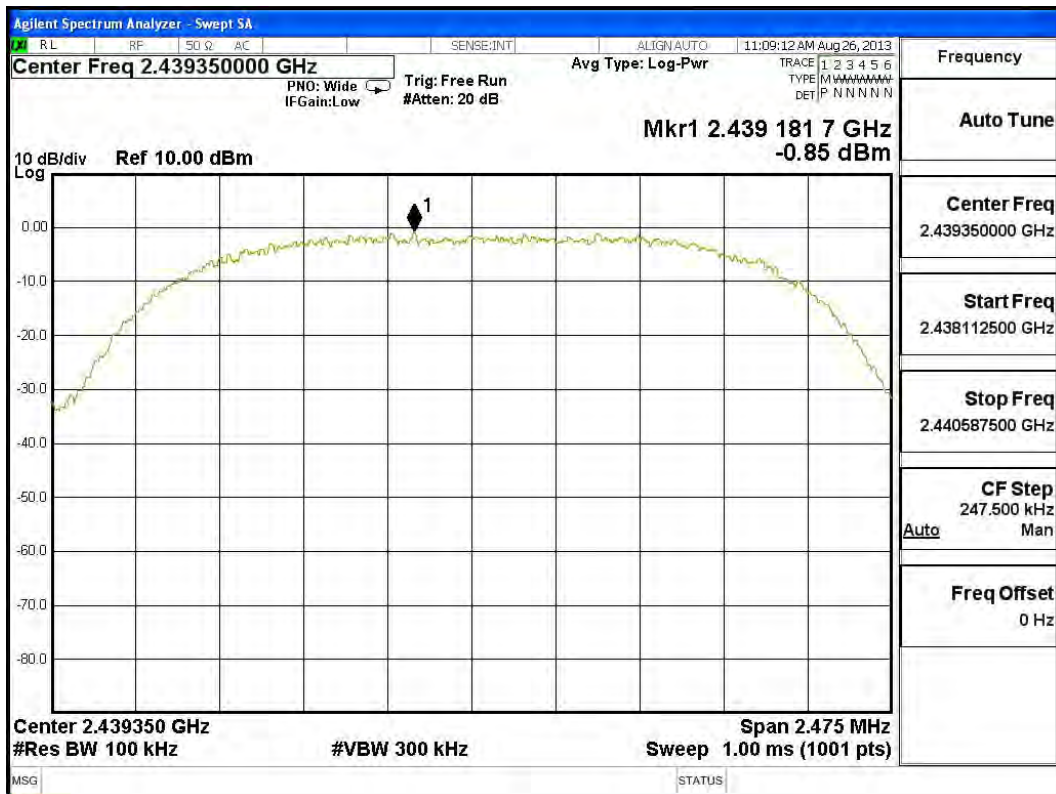
Figure Channel 01:



Product : Afterglow 5.1 surround sound wireless headset
 Test Item : Power Density Data
 Test Site : No.3OATS
 Test Mode : Mode 1: Transmit (2439.35MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
19	2439.35	-0.850	< 8dBm	Pass

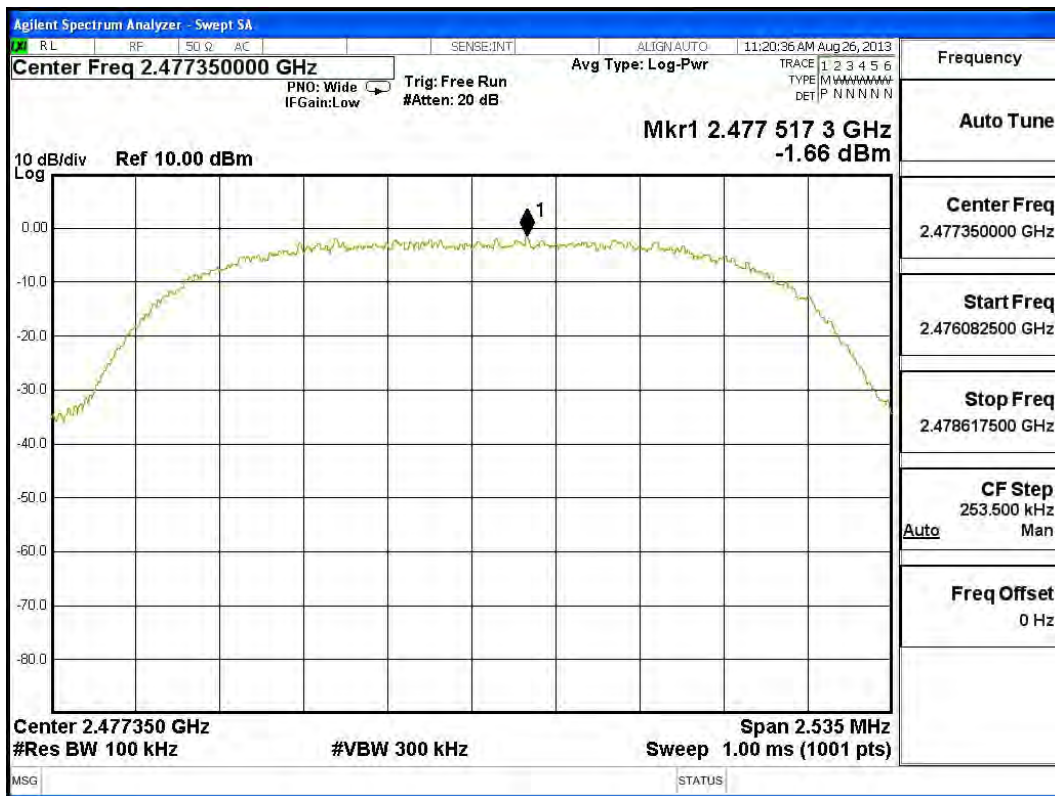
Figure Channel 19:



Product : Afterglow 5.1 surround sound wireless headset
 Test Item : Power Density Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmit (2477.35MHz)

Channel No.	Frequency (MHz)	Measurement Level (dBm)	Required Limit (dBm)	Result
38	2477.35	-1.660	< 8dBm	Pass

Figure Channel 38



9. EMI Reduction Method During Compliance Testing

No modification was made during testing.