

FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

Voxx Accessories Corp.

Wireless Speaker

Model Number: SP891

FCC ID: VIXSP891

Prepared for : Voxx Accessories Corp.
3502 Woodview Trace, Suite 220, Indianapolis,
IN 46268

Prepared By : EST Technology Co., Ltd.
Santun(guantai Road), Houjie Town, DongGuan City,
GuangDong, China.

Tel: 86-769-83081888-808

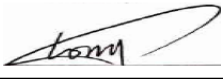
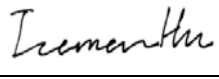
Report Number: ESTE-R1407002
Date of Test : June 29,2014~ July 06, 2014
Date of Report : July 08, 2014

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Test Report Verification

Applicant:	Voxx Accessories Corp.		
Address:	3502 Woodview Trace, Suite 220, Indianapolis, IN 46268		
Manufacturer	Guangzhou Changjia Electronic Co., Ltd.		
Address:	Bo-ying Industrial Garden, Taishi Industrial Zone, Yuwotou, Dongchong Town, Nansha district, Guangzhou, China		
E.U.T:	Wireless Speaker		
Model Number:	SP891 (comes in color variations, but are electrically and mechanically the same the only difference is the color)		
Power Supply:	DC 3.7V From Internal Battery DC 5V From USB for Charging		
Test Voltage:	DC 3.7V		
Trade Name:	808	Serial No.:	-----
Date of Receipt:	June 19, 2014	Date of Test:	June 29, 2014~ July 06, 2014
Test Specification:	FCC Rules and Regulations Part 15 Subpart C:2013 ANSI C63.4:2009		
Test Result:	The device described above is tested by EST Technology Co., Ltd.. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd. Date: July 08, 2014		
Prepared by:	Tested by:	Approved by:	
			
Ada / Assistant	Tony.Tang/ Engineer	IcemanHu / Manager	
Other Aspects:	None.		
Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested			
This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.			

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product Name	: Wireless Speaker
Model Number	: SP891
FCC ID	: VIXSP891
Operation frequency	: 2402MHz~2480MHz
Number of channel	: 79
Antenna	: Internal antenna, 0 dBi gain
Modulation	: FHSS (GFSK)
Sample Type	: Prototype production

2. SUMMARY OF TEST

2.1. Summary of test result

Description of Test Item	Standard	Results
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) DA 00-705	PASS
20dB Bandwidth	FCC Part 15: 15.215 DA 00-705	PASS
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) DA 00-705	PASS
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) DA 00-705	PASS
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) DA 00-705	PASS
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.4: 2003 DA 00-705	PASS
Band Edge Compliance	FCC Part 15: 15.247(d) DA 00-705	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.4: 2003 DA 00-705	PASS
Antenna requirement	FCC Part 15: 15.203	PASS

2.2. Test Facilities

EMC Lab :
Certificated by CNAL, CHINA
Registration No.: L5288
Date of registration: October 28, 2011

Certificated by FCC, USA
Registration No.: 989591
Date of registration: December 07, 2010

Certificated by Industry Canada
Registration No.: 9405A-1
Date of registration: December 16, 2010

Certificated by VCCI, Japan
Registration No.: R-3663 & C-4103
Date of registration: July 25, 2011

Certificated by TUV Rheinland, Germany
Registration No.: UA 50195514 0001
Date of registration: January 07, 2011

Certificated by TUV/PS, Shenzhen
Registration No.: SCN1017
Date of registration: January 27, 2011

Certificated by Intertek ETL SEMKO
Registration No.: 2011-RTL-L1-18
Date of registration: April 28, 2011

Certificated by Siemic, Inc.
Registration No.: SLCN021
Date of registration: November 8, 2011

Certificated by Nemko, Hong Kong
Registration No.: 175193
Date of registration: May 4, 2011

Name of Firm : EST Technology Co., Ltd.

Site Location : San Tun Management Zone, Houjie Town, Dongguan, Guangdong, China

2.3. Assistant equipment used for test

2.3.1. PC

Manufacturer	:	DELL
M/N	:	Laititude E6420
Adapter	:	M/N: DA90PM111
		Input: AC 100-240V~50/60Hz 1.5A
		Output: DC 19.5V/4.62A

2.4. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground. EUT was be set into BT test mode by software before test.

EUT

(EUT: Wireless Speaker)

2.5. Test mode

The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode

Mode	Channel	Frequency
GFSK	Low	2402MHz
	Middle	2441MHz
	High	2480MHz

2.6. Channel List for Bluetooth

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2402	2	2403	3	2404	4	2405
5	2406	6	2407	7	2408	8	2409
9	2410	10	2411	11	2412	12	2413
13	2414	14	2415	15	2416	16	2417
17	2418	18	2419	19	2420	20	2421
21	2422	22	2423	23	2424	24	2425
25	2426	26	2427	27	2428	28	2429
29	2430	30	2431	31	2432	32	2433
33	2434	34	2435	35	2436	36	2437
37	2438	38	2439	39	2440	40	2441
41	2442	42	2443	43	2444	44	2445
45	2446	46	2447	47	2448	48	2449
49	2450	50	2451	51	2452	52	2453
53	2454	54	2455	55	2456	56	2457
57	2458	58	2459	59	2460	60	2461
61	2462	62	2463	63	2464	64	2465
65	2466	66	2467	67	2468	68	2469
69	2470	70	2471	71	2472	72	2473
73	2474	74	2475	75	2476	76	2477
77	2478	78	2479	79	2480	-	-

2.7. Test Equipment

2.7.1. For conducted emission test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	832354	June,28,14	1 Year
Artificial Mains Networ	Rohde & Schwarz	ENV216	101260	June,28,14	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	101100	June,28,14	1 Year

2.7.2. For radiated emission test(30-1000MHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESVS10	100004	June,28,14	1 Year
Spectrum Analyzer	Agilent	E4411B	MY50140697	June,28,14	1 Year
Bilog Antenna	Teseq	CBL 6111D	27090	June,28,14	1 Year
Signal Amplifier	Agilent	310N	187037	June,28,14	1 Year

2.7.3. For radiated emission test(above 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	SCHWARZB ECK	BBHA 9120 D	BBHA9120D1 002	June,28,14	1 Year
Signal Amplifier	SCHWARZB ECK	BBV9718	9718-212	June,28,14	1 Year
Spectrum Analyzer	Agilent	E4408B	MY44211139	June,28,14	1 Year
RF Cable	Hubersuhner	RG 214/U	513423	June,28,14	1 Year

3. MAXIMUM PEAK OUTPUT POWER

3.1. Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W

3.2. Test Procedure

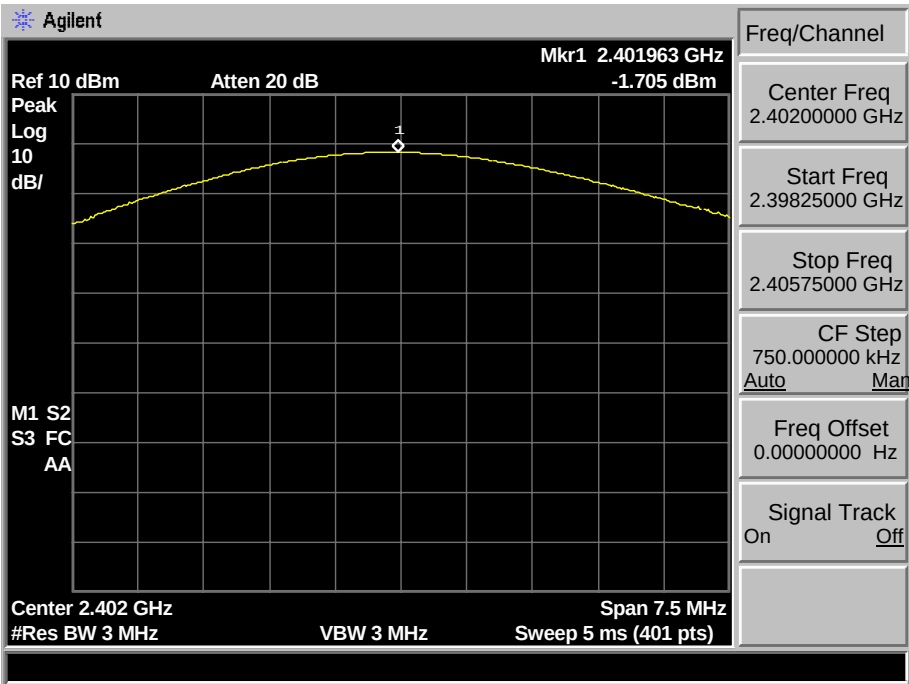
The transmitter output (antenna port) was connected to the spectrum analyzer

3.3. Test Result

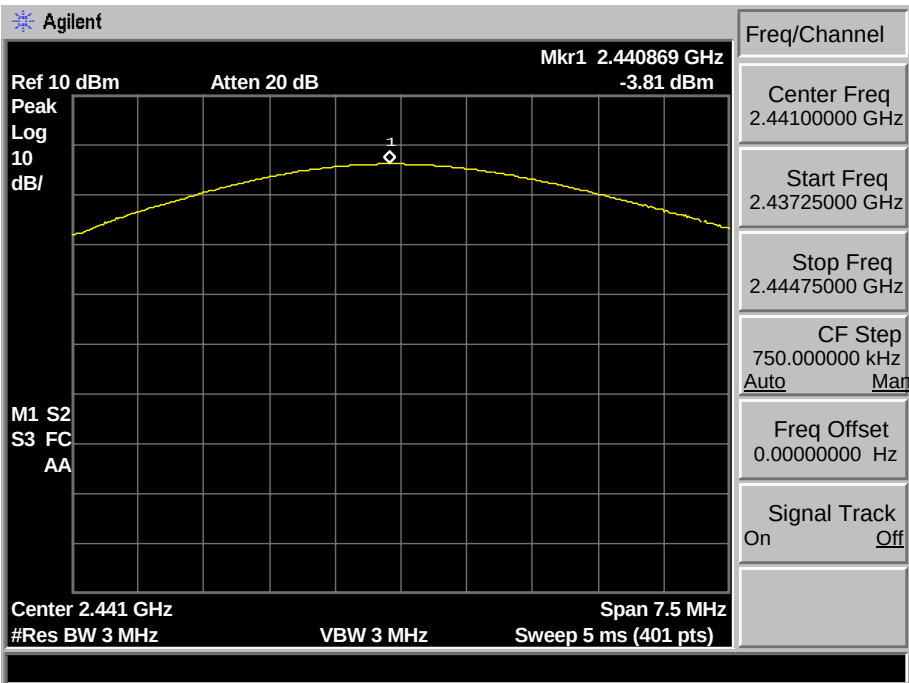
EUT: Wireless Speaker					
M/N: SP891					
Test date: 2014-07-01		Test site: RF site		Tested by: Tony Tang	
Mode	Freq (MHz)	Result (dBm)	Limit		Margin (dB)
			dBm	W	
GFSK	2402	-1.705	30.00	1	31.705
	2441	-3.810	30.00	1	33.810
	2480	-3.928	30.00	1	33.928
Conclusion: PASS					

3.4. Test Data

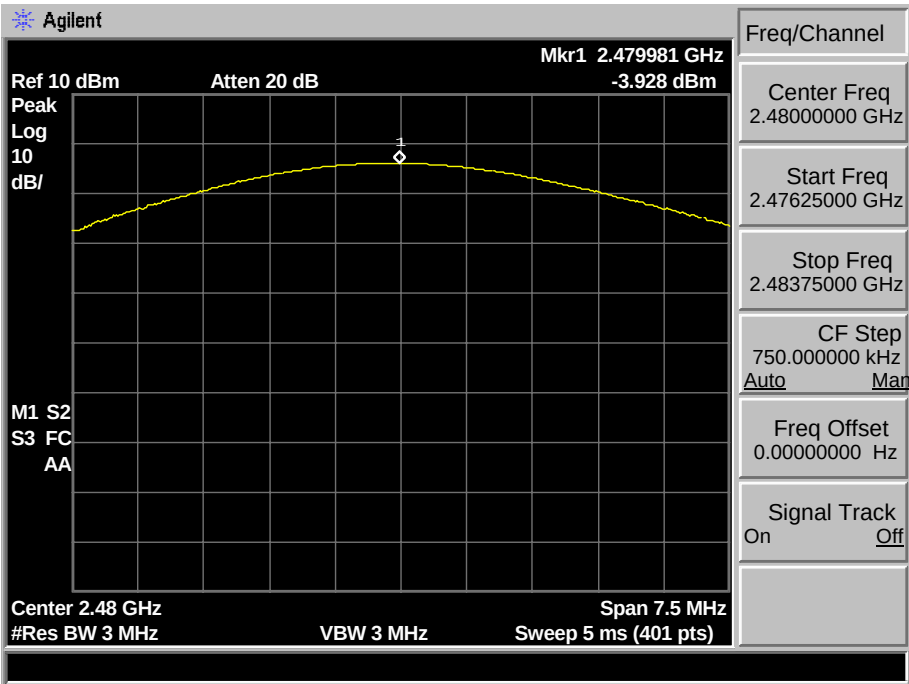
GFSK 2402 MHz



GFSK 2441 MHz



GFSK 2480 MHz



4. 20 DB BANDWIDTH

4.1. Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

4.2. Test Procedure

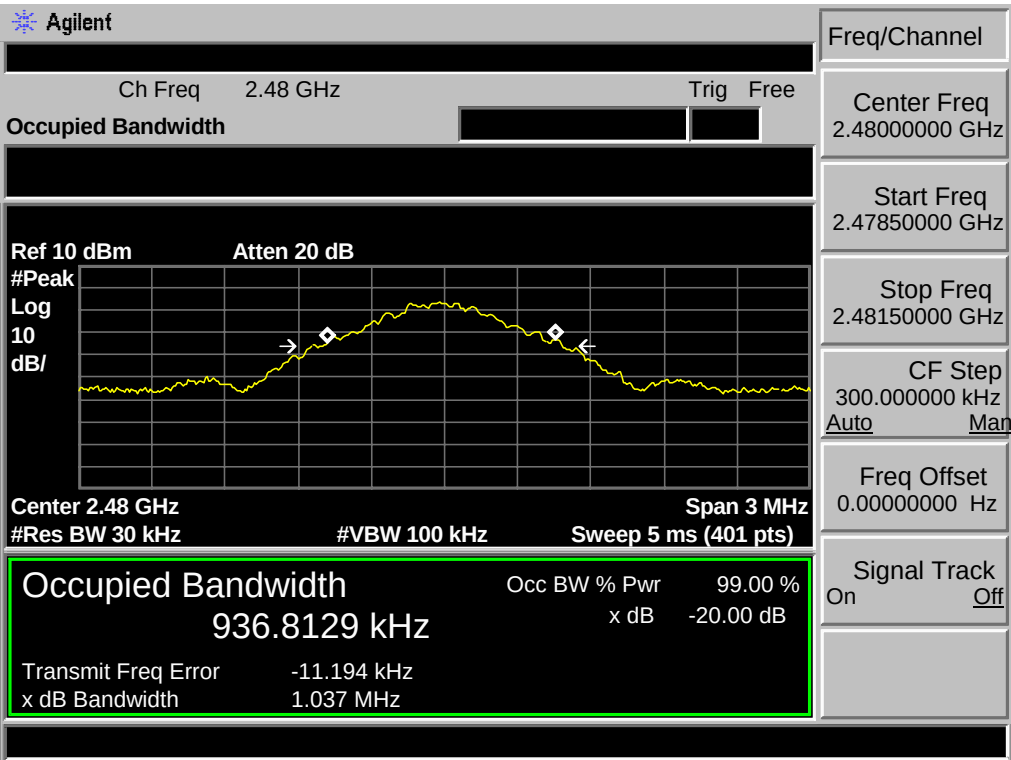
The transmitter output was coupled to a spectrum analyzer via a antenna. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

4.3. Test Result

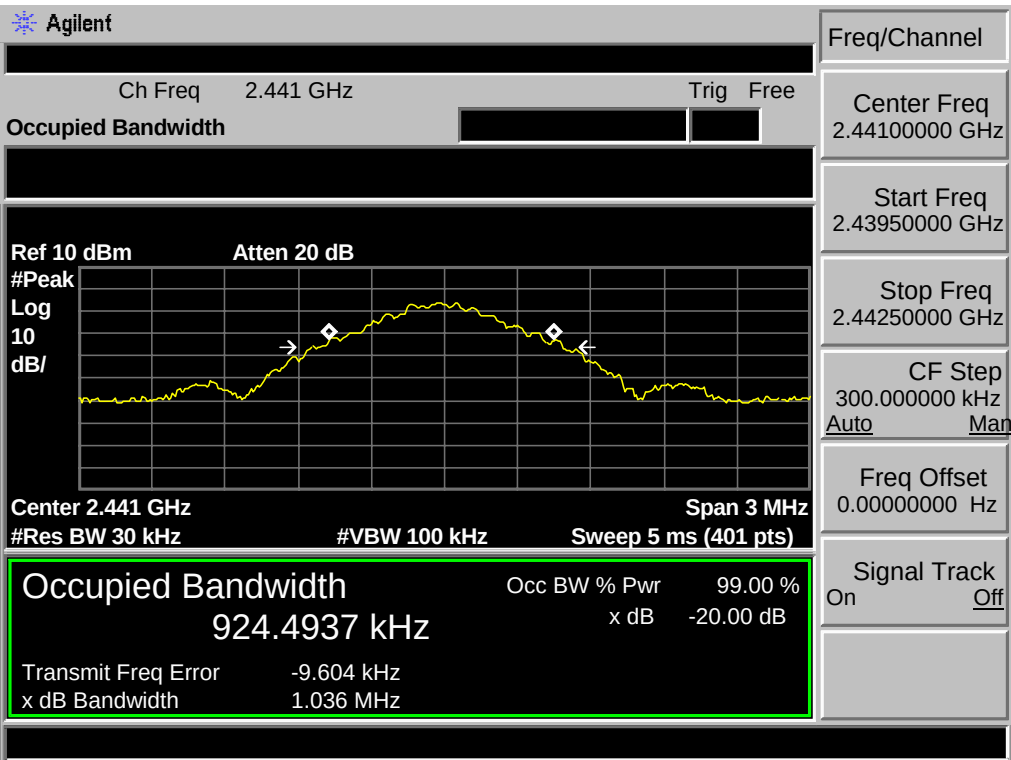
EUT: Wireless Speaker				
M/N: SP891				
Test date: 2014-07-01		Test site: RF site		Tested by: Tony Tang
Mode	Freq (MHz)	20dB Bandwidth (MHz)	Limit (kHz)	Conclusion
GFSK	2402	1.037	/	PASS
	2441	1.036	/	PASS
	2480	1.040	/	PASS

4.4. Test Data

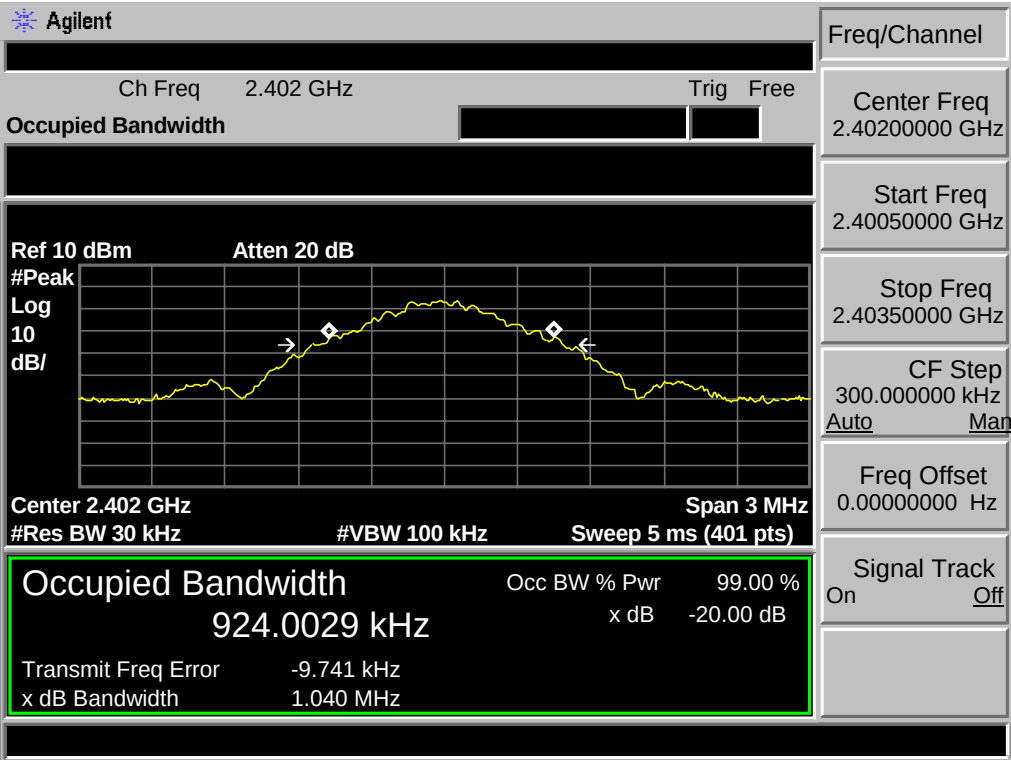
GFSK 2402MHz



GFSK 2441MHz



GFSK 2480MHz



5. CARRIER FREQUENCY SEPARATION

5.1. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW

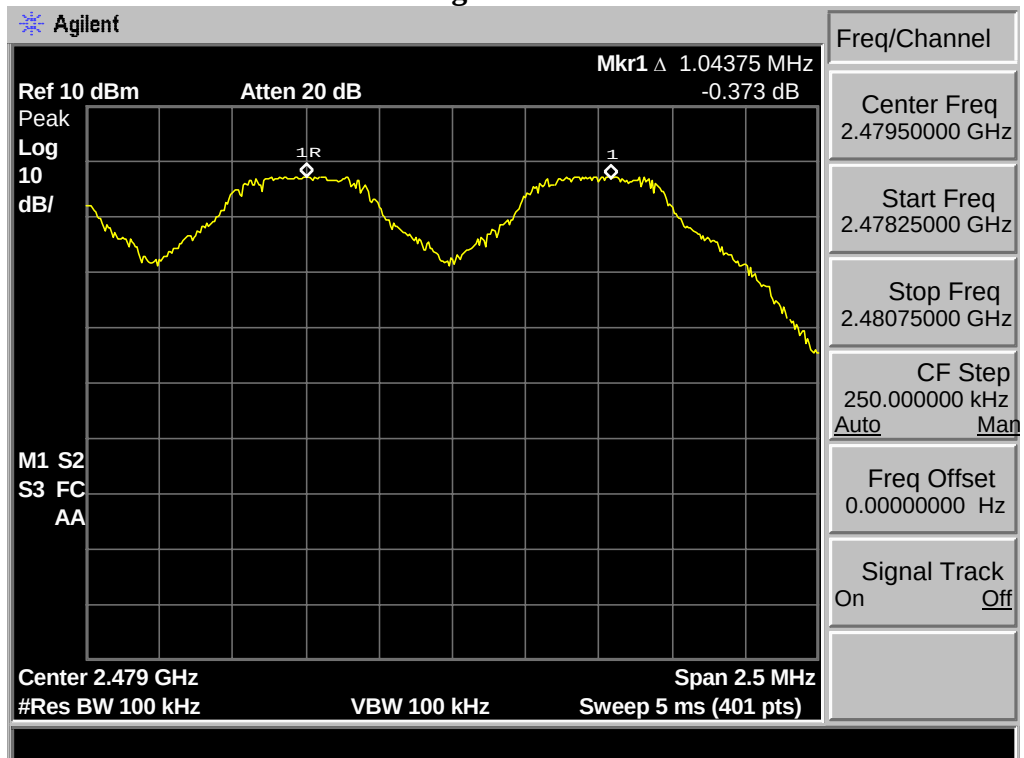
5.2. Test Procedure

The transmitter output was coupled to a spectrum analyzer via a antenna. The carrier frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW.

5.3. Test Result

EUT: Wireless Speaker M/N: SP891				
Test date: 2014-07-01			Test site: RF site	Tested by: Tony Tang
Mode	Channel	Channel separation (MHz)	Limit	Conclusion
GFSK	Low CH	1.050	1.037MHz	PASS
	Mid CH	1.044	1.036MHz	PASS
	High CH	1.044	1.040MHz	PASS

High Channel



6. NUMBER OF HOPPING CHANNEL

6.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

6.2. Test Procedure

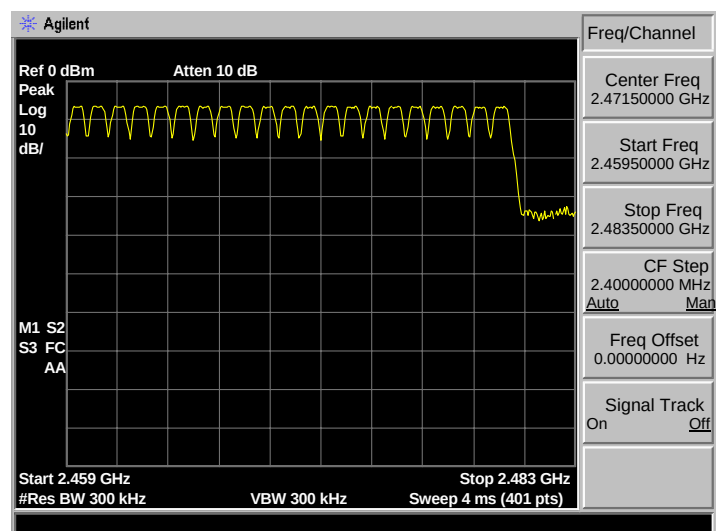
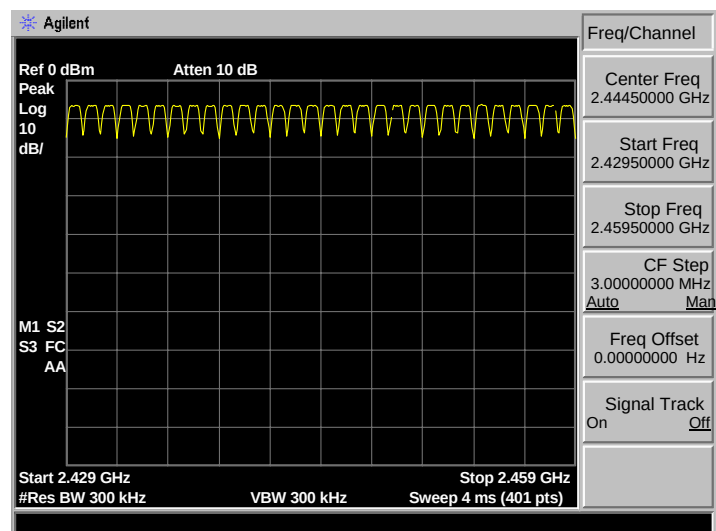
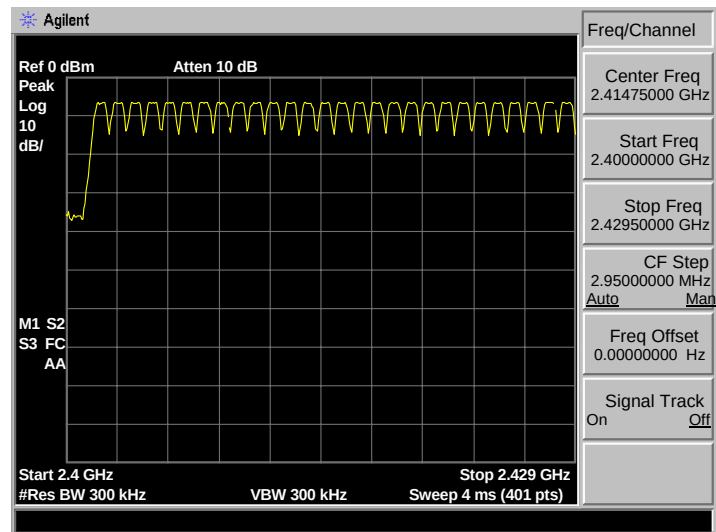
The transmitter output was coupled to a spectrum analyzer via a antenna. The number of hopping channel was measured by spectrum analyzer with 300kHz RBW and 300kHz VBW.

6.3. Test Result

EUT: Wireless Speaker			
M/N: SP891			
Test date: 2014-07-01		Test site: RF site	Tested by: Tony.Tang
Mode	Number of hopping channel	Limit	Conclusion
GFSK	79	>15	PASS

6.4. Test Data

GFSK



7. DWELL TIME

7.1. Test Equipment

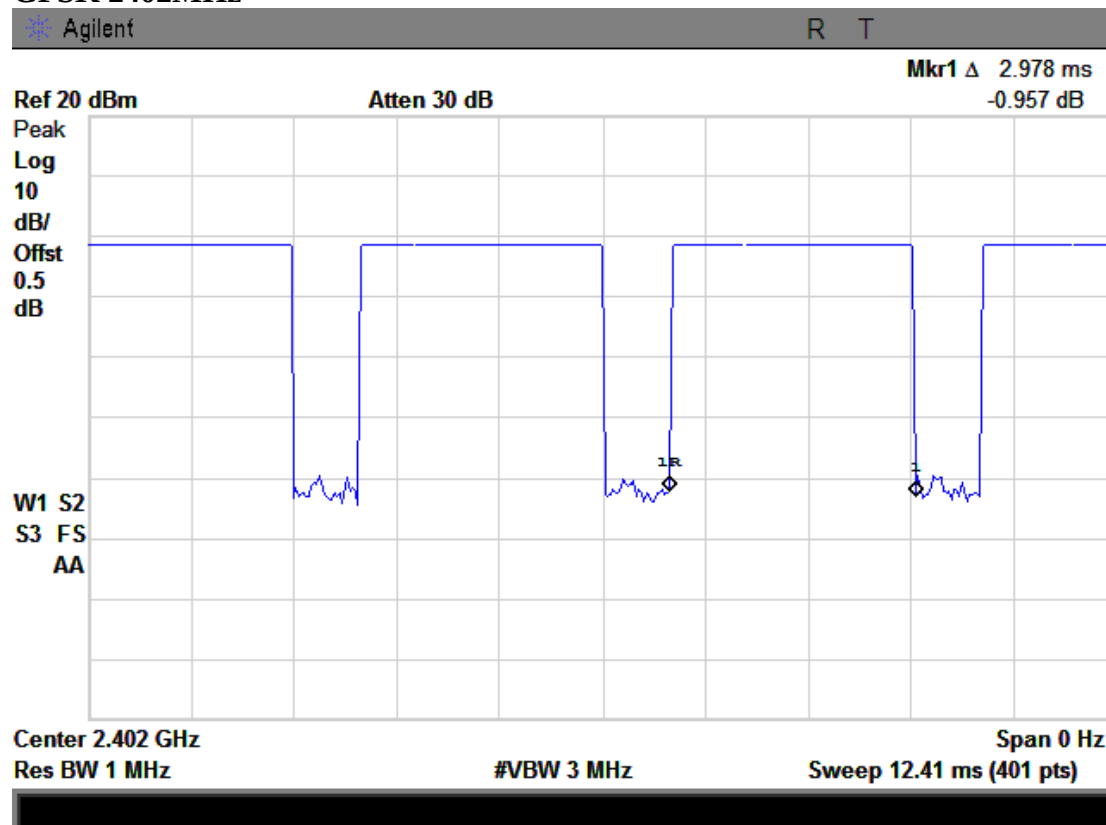
Item	Equipment	Manufacturer	Model No.	Last Cal.	Cal. Interval
1.	Bluetooth Tester	Rohde & Schwarz	CBT32	September, 17.13	1 Year

7.2. Test Result

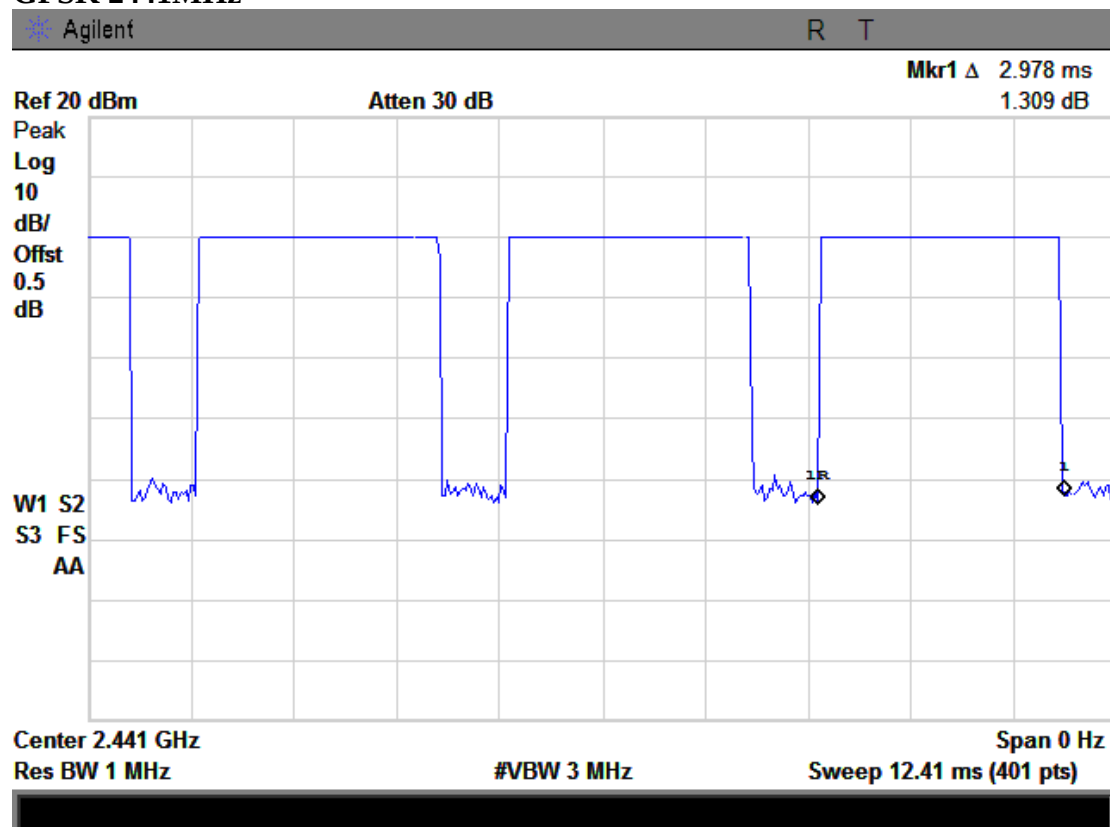
EUT: Wireless Speaker						
M/N: SP891						
Test date: 2014-07-02		Test site: RF site		Tested by: Tony Tang		
Test Mode:		Hopping Mode With GFSK Modulation (DH5)				
	Mode	Channel	Pulse Width (ms)	Dwell Time (s)	Limit (s)	Result
	DH 5	Low	3.00	0.320	0.4	Pass
		Middle	3.00	0.320	0.4	Pass
		High	3.00	0.320	0.4	Pass
		Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				

Please refer to the following plots.

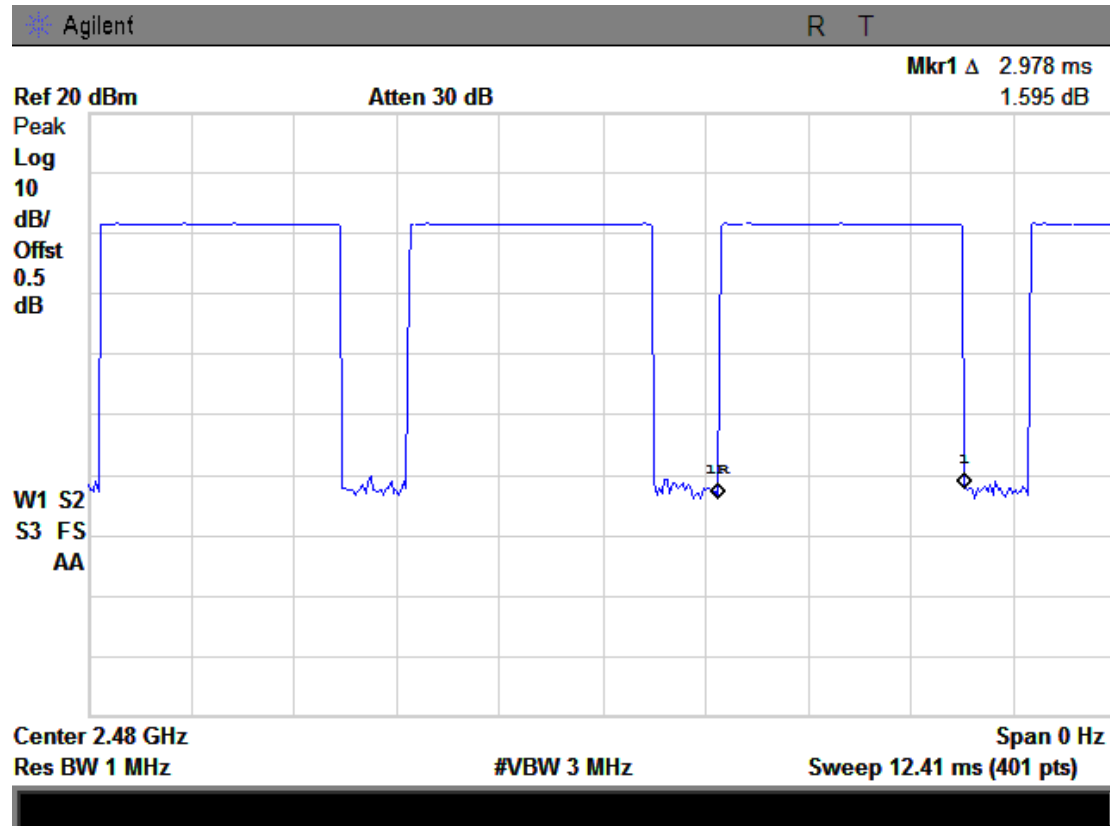
GFSK 2402MHz



GFSK 2441MHz



GFSK 2480MHz



8. RADIATED EMISSIONS

8.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

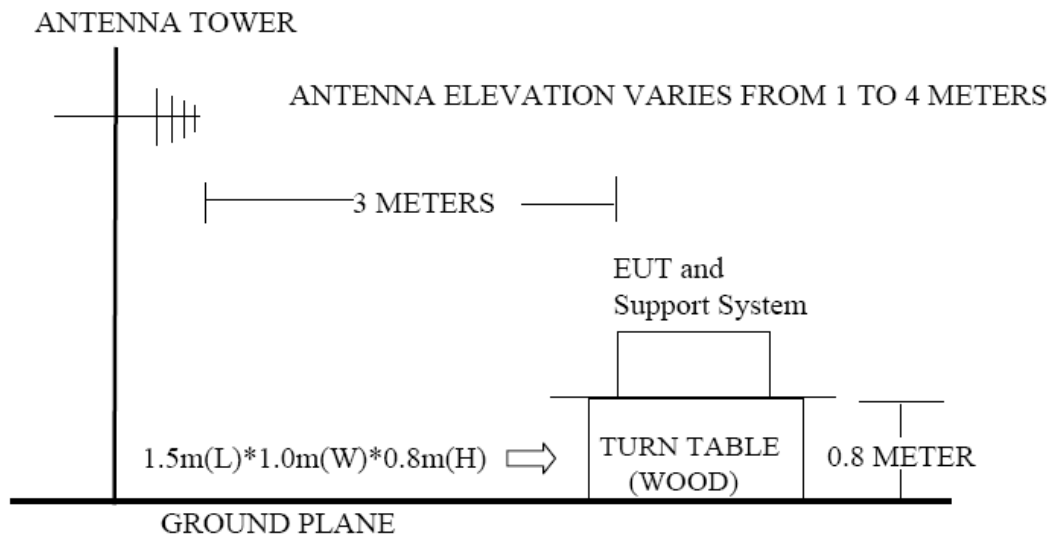
15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

15.209 Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

8.2. Block Diagram of Test setup



8.3. Test Procedure

EUT was placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the EMI test receiver (R&S ESVS10) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 1MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz

The frequency range from 30MHz to 10th harmonic (25GHz) are checked.

8.4. Test Result

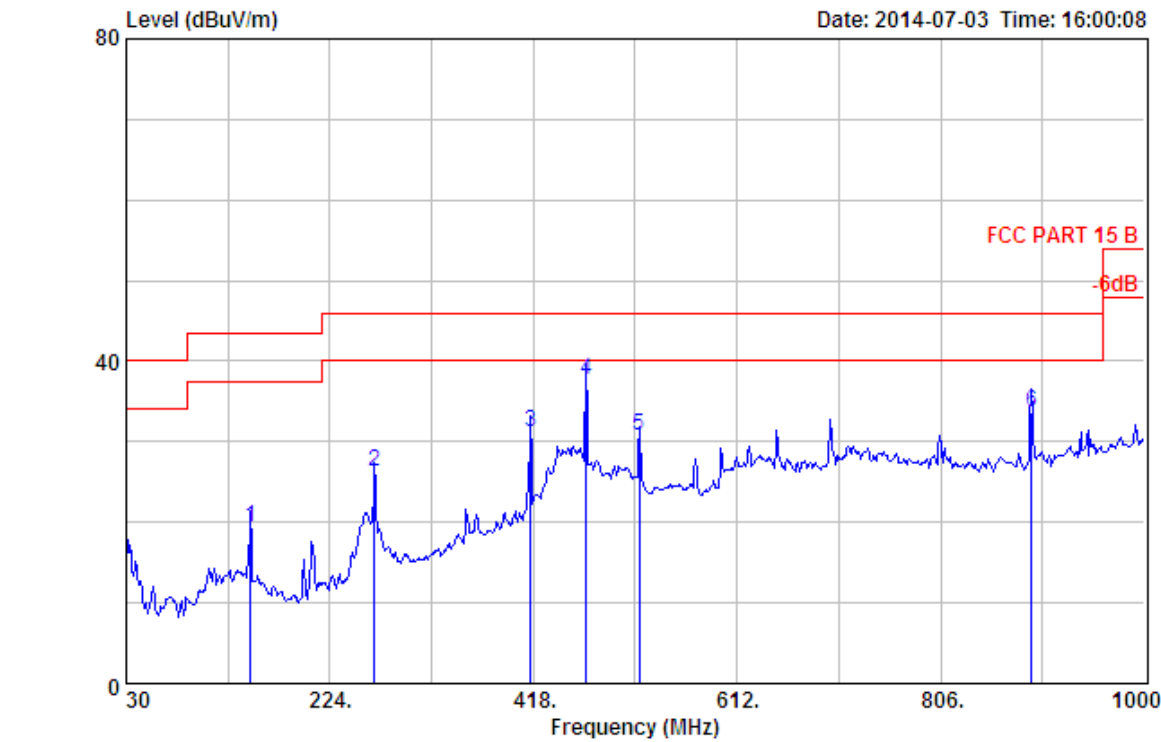
30MHz—25GHz Radiated emissison Test result		
EUT: Wireless Speaker		
M/N: SP891		
Power: DC 3.7V		
Test date: 2014-06-29~2014-07-03	Test site: 3m Chamber	Tested by: Tony Tang
Test mode: Tx Mode		
Pass		

Note: 1、 For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

2、 The frequency 2402MHz 、2441MHz and 2480MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

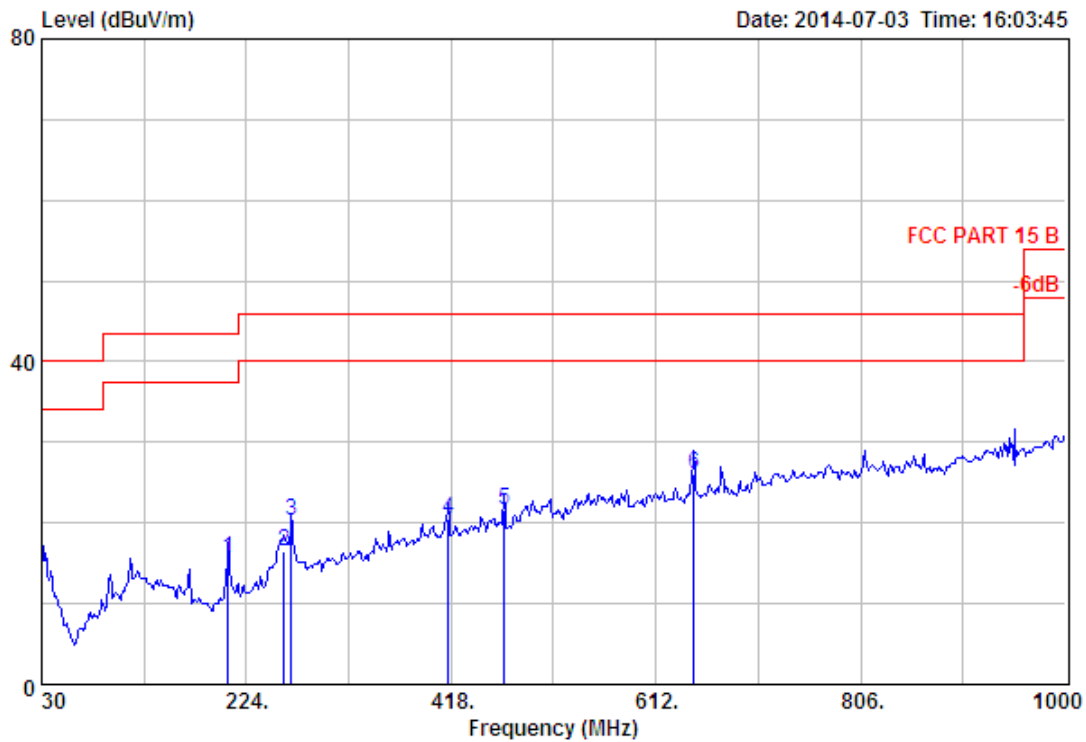
8.5. Test Data

30 MHz – 1000 MHz



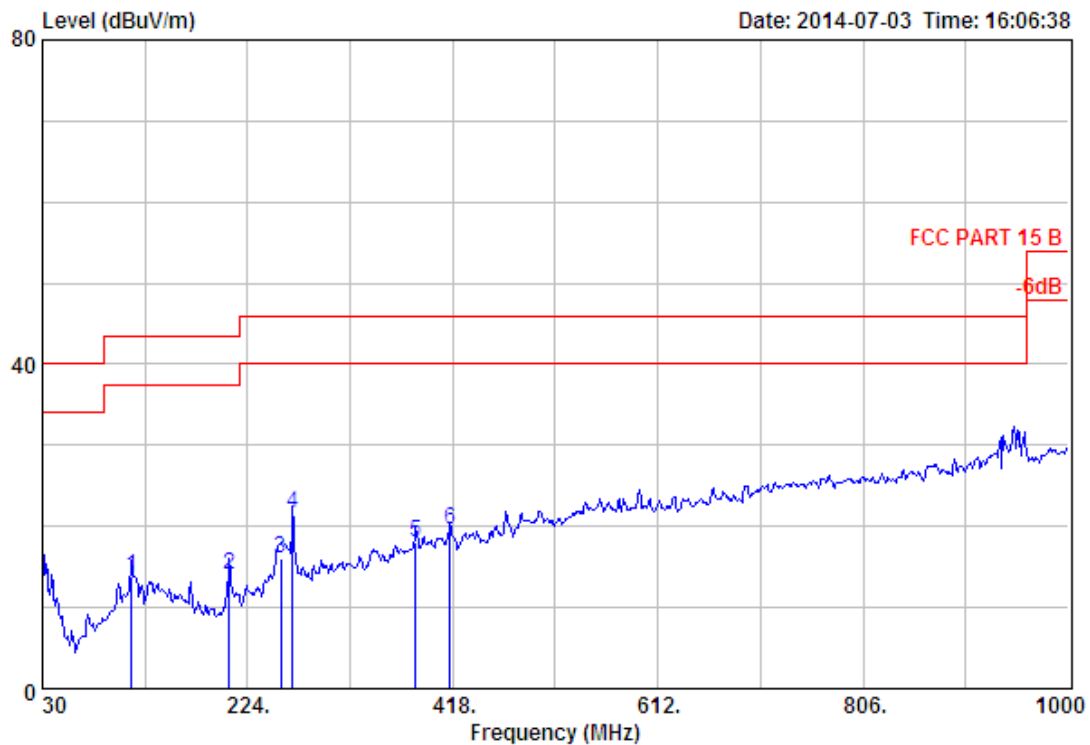
Site no. : 3m Chamber Data no. : 673
Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL
Limit : FCC PART 15 B
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Dick
EUT : Wireless Speaker
Power : DC 3.7V
M/N : SP891
Test Mode : GFSK TX 2402MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission		Margin (dB)	Remark
				Level (dBuV/m)	Limits (dBuV/m)		
1	148.34	11.00	1.69	6.77	19.46	43.50	24.04 QP
2	266.68	12.79	2.27	11.26	26.32	46.00	19.68 QP
3	415.09	16.30	2.74	12.13	31.17	46.00	14.83 QP
4	468.44	17.14	3.09	17.42	37.65	46.00	8.35 QP
5	518.88	17.96	3.15	9.68	30.79	46.00	15.21 QP
6	892.33	22.93	3.94	6.69	33.56	46.00	12.44 QP



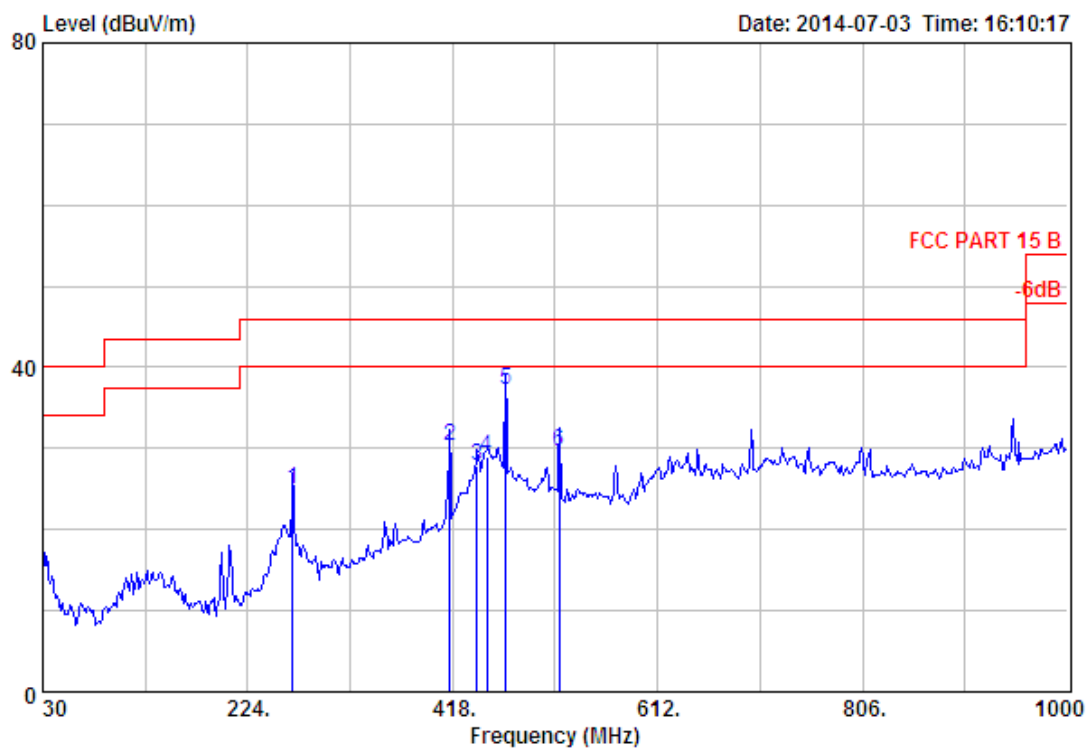
Site no. : 3m Chamber Data no. : 674
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Dick
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2402MHz

	Freq.	Ant.	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	206.54	8.09	1.81	5.68	15.58	43.50	27.92	QP
2	259.89	12.97	2.25	1.38	16.60	46.00	29.40	QP
3	266.68	12.79	2.27	5.19	20.25	46.00	25.75	QP
4	415.09	16.30	2.74	1.49	20.53	46.00	25.47	QP
5	468.44	17.14	3.09	1.41	21.64	46.00	24.36	QP
6	647.89	20.08	3.59	2.38	26.05	46.00	19.95	QP



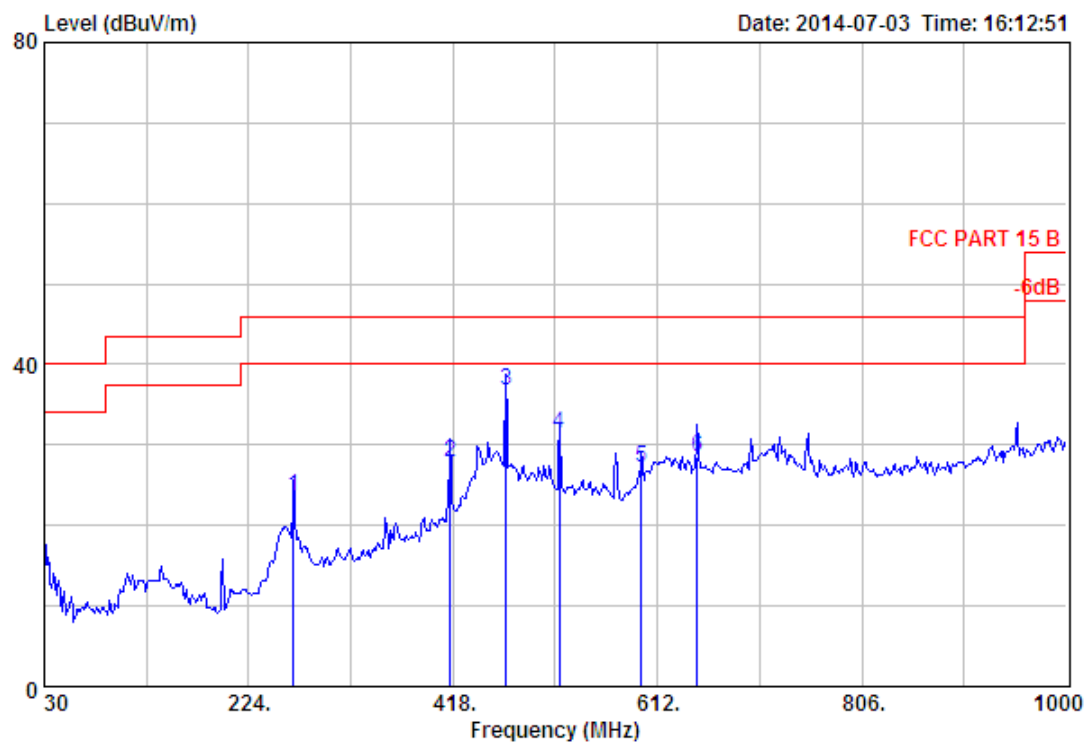
Site no. : 3m Chamber	Data no. : 675
Dis. / Ant. : 3m 27137	Ant. pol. : HORIZONTAL
Limit : FCC PART 15 B	
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa	
Engineer : Dick	
EUT : Wireless Speaker	
Power : DC 3.7V	
M/N : SP891	
Test Mode : GFSK TX 2441MHz	

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBUV)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Remark
1	114.39	10.85	1.42	1.44	13.71	43.50	29.79	QP
2	206.54	8.09	1.81	4.15	14.05	43.50	29.45	QP
3	255.04	12.41	2.13	1.46	16.00	46.00	30.00	QP
4	266.68	12.79	2.27	6.47	21.53	46.00	24.47	QP
5	383.08	15.18	2.63	0.20	18.01	46.00	27.99	QP
6	415.09	16.30	2.74	0.47	19.51	46.00	26.49	QP



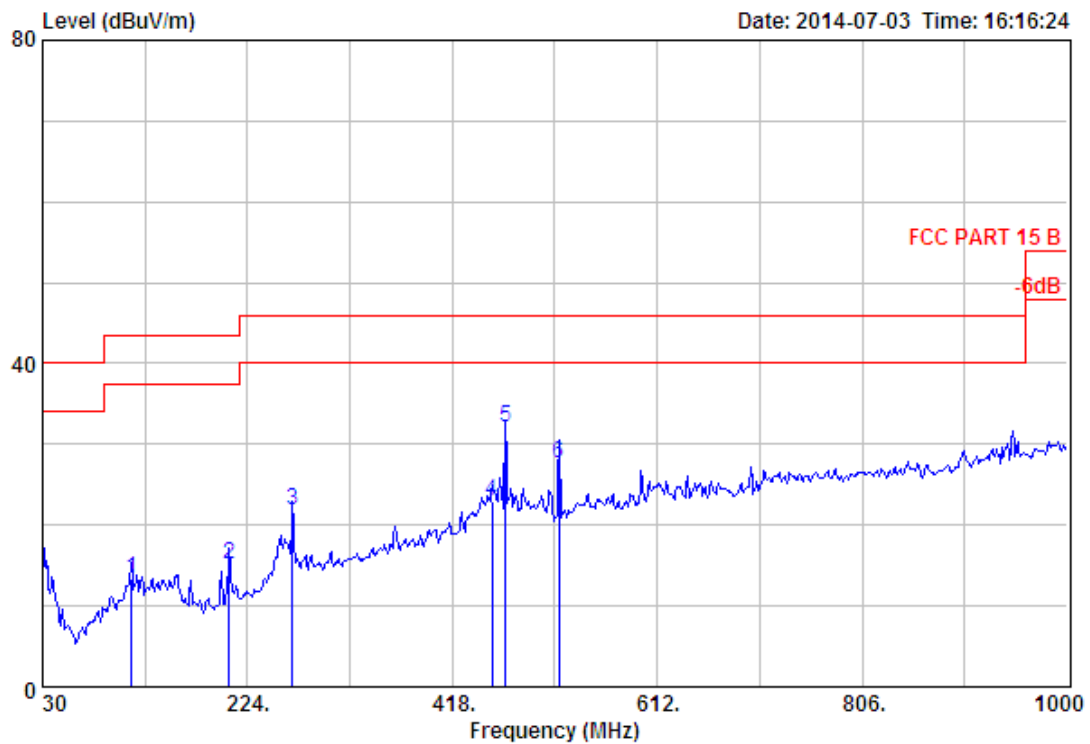
Site no. : 3m Chamber Data no. : 676
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Dick
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2441MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission			Remark
					Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	
1	266.68	12.79	2.27	9.97	25.03	46.00	20.97	QP
2	415.09	16.30	2.74	11.33	30.37	46.00	15.63	QP
3	441.28	16.27	2.90	8.65	27.82	46.00	18.18	QP
4	450.01	16.47	2.94	9.45	28.86	46.00	17.14	QP
5	468.44	17.14	3.09	16.88	37.11	46.00	8.89	QP
6	518.88	17.96	3.15	8.44	29.55	46.00	16.45	QP



Site no. : 3m Chamber Data no. : 677
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL
 Limit : FCC PART 15 B
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Dick
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2480MHz

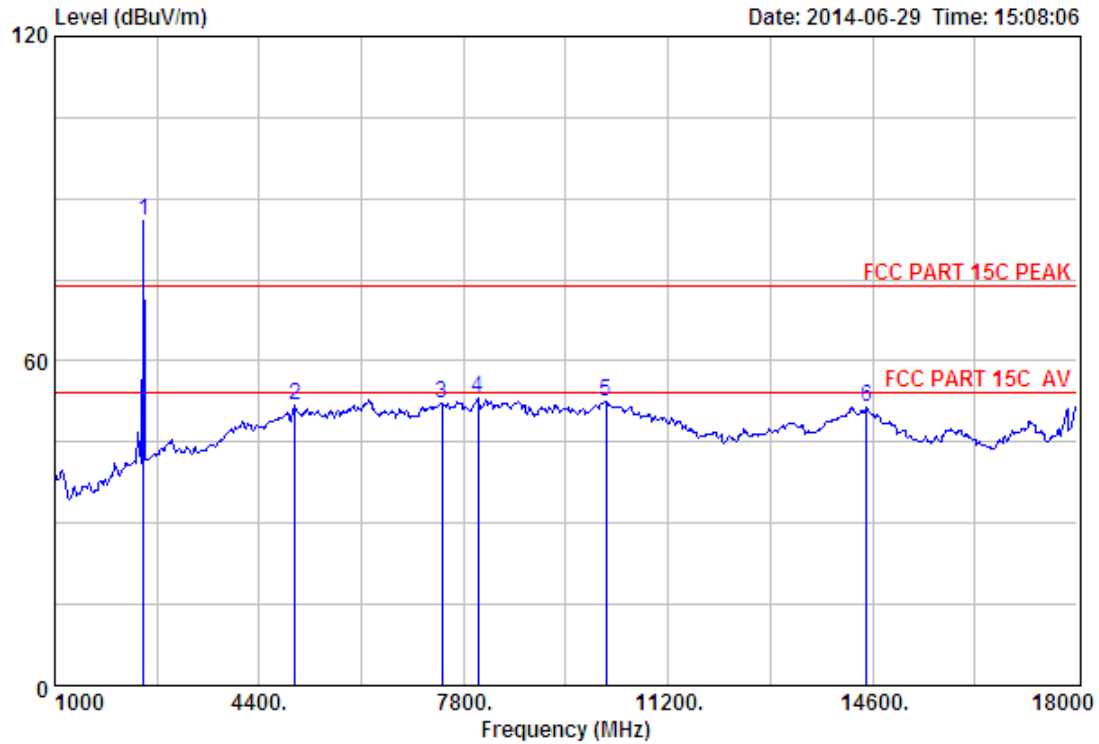
	Freq. (MHz)	Ant.	Cable	Emission			Margin (dB)	Remark
		Factor (dB/m)	Loss (dB)	Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)		
1	266.68	12.79	2.27	8.47	23.53	46.00	22.47	QP
2	415.09	16.30	2.74	8.71	27.75	46.00	18.25	QP
3	468.44	17.14	3.09	16.45	36.68	46.00	9.32	QP
4	518.88	17.96	3.15	10.41	31.52	46.00	14.48	QP
5	596.48	19.54	3.35	4.26	27.15	46.00	18.85	QP
6	649.83	20.10	3.59	4.83	28.52	46.00	17.48	QP



Site no. : 3m Chamber Data no. : 678
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL
 Limit : FCC PART 15 B
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Dick
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2480MHz

	Freq.	Ant.	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	114.39	10.85	1.42	1.18	13.45	43.50	30.05	QP
2	206.54	8.09	1.81	5.35	15.25	43.50	28.25	QP
3	266.68	12.79	2.27	6.81	21.87	46.00	24.13	QP
4	455.83	16.69	2.89	3.42	23.00	46.00	23.00	QP
5	468.44	17.14	3.09	11.77	32.00	46.00	14.00	QP
6	518.88	17.96	3.15	6.42	27.53	46.00	18.47	QP

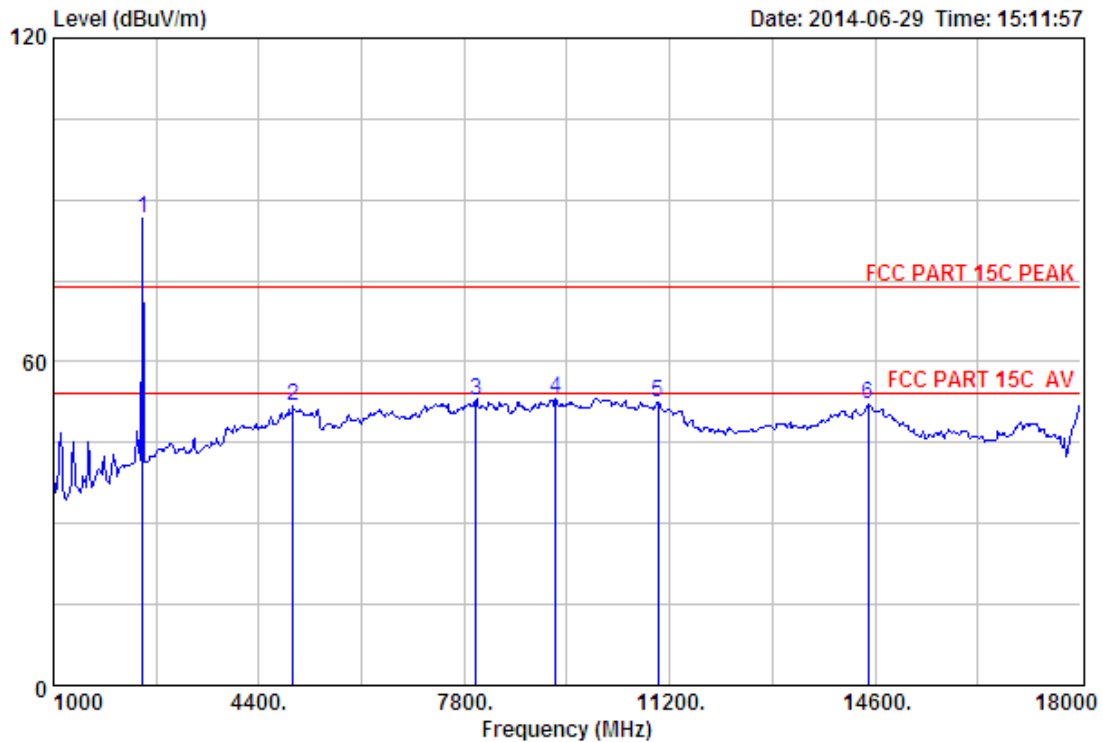
1000 MHz – 18000MHz



Site no. : 3m Chamber Data no. : 649
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2480MHz

	Freq.	Ant.	Cable	Amp	Emission				
	(MHz)	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.00	27.58	6.71	34.03	85.69	85.95	74.00	-11.95	Peak
2	4995.00	31.54	12.59	32.00	39.54	51.67	74.00	22.33	Peak
3	7443.00	36.54	11.61	31.93	35.86	52.08	74.00	21.92	Peak
4	8038.00	36.95	11.40	31.28	36.13	53.20	74.00	20.80	Peak
5	10163.00	38.39	11.50	32.08	34.73	52.54	74.00	21.46	Peak
6	14498.00	41.88	10.93	33.08	31.80	51.53	74.00	22.47	Peak

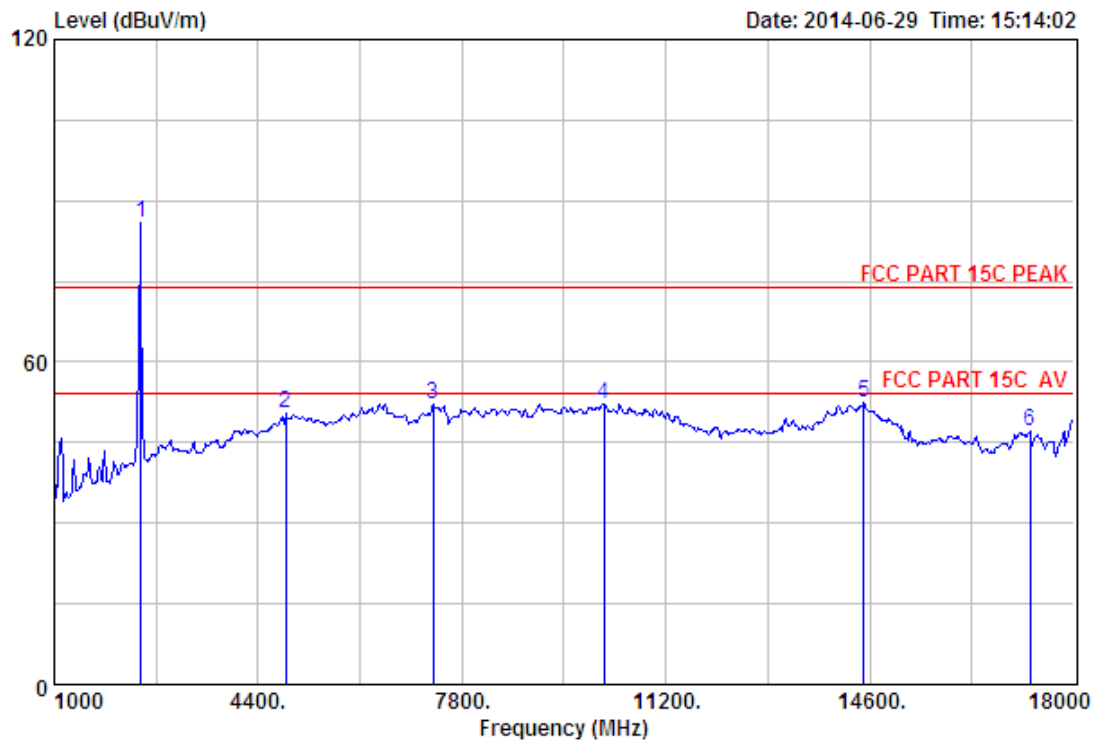
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 650
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2480MHz

	Freq.	Ant.	Cable	Amp	Emission				
	(MHz)	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.00	27.58	6.71	34.03	86.18	86.44	74.00	-12.44	Peak
2	4961.00	31.49	12.44	31.97	39.83	51.79	74.00	22.21	Peak
3	7987.00	36.98	11.41	31.23	35.55	52.71	74.00	21.29	Peak
4	9313.00	37.94	11.62	32.15	35.83	53.24	74.00	20.76	Peak
5	11013.00	39.51	11.28	33.68	35.32	52.43	74.00	21.57	Peak
6	14481.00	41.86	10.93	33.02	32.38	52.15	74.00	21.85	Peak

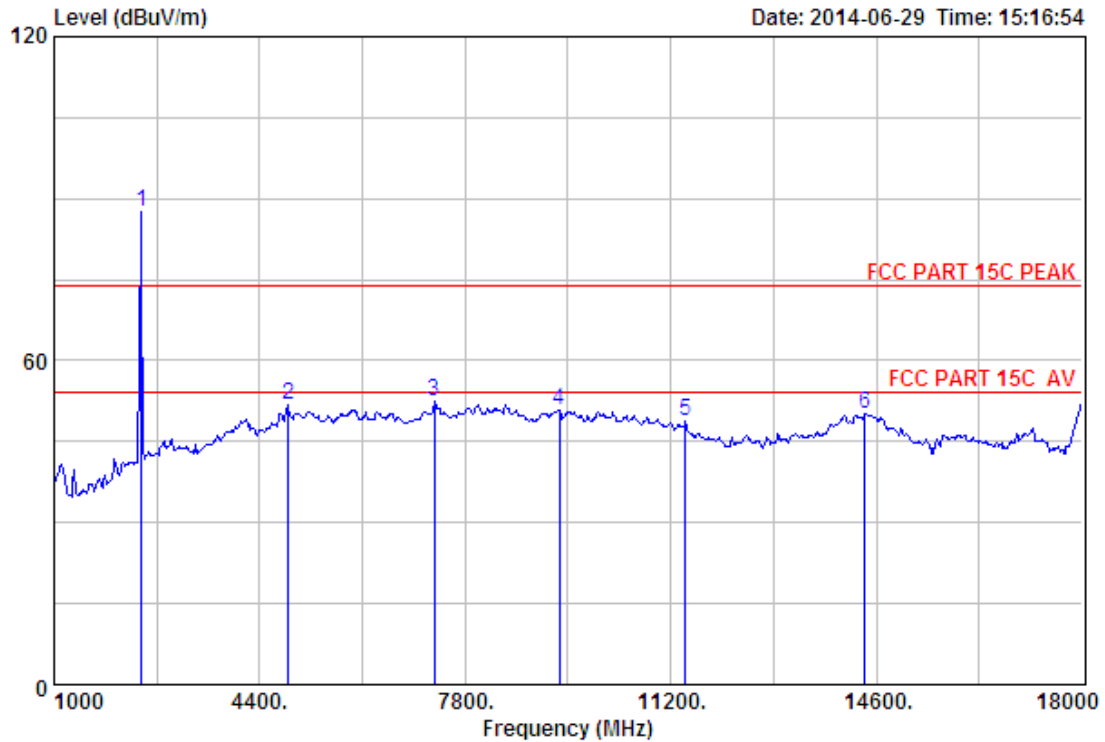
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 651
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2441MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.60	6.67	34.12	85.86	86.01	74.00	-12.01	Peak
2	4859.00	31.34	11.99	31.88	38.91	50.36	74.00	23.64	Peak
3	7324.00	36.55	11.57	31.99	36.09	52.22	74.00	21.78	Peak
4	10163.00	38.39	11.50	32.08	34.48	52.29	74.00	21.71	Peak
5	14498.00	41.88	10.93	33.08	32.66	52.39	74.00	21.61	Peak
6	17269.00	40.78	10.89	33.87	29.30	47.10	74.00	26.90	Peak

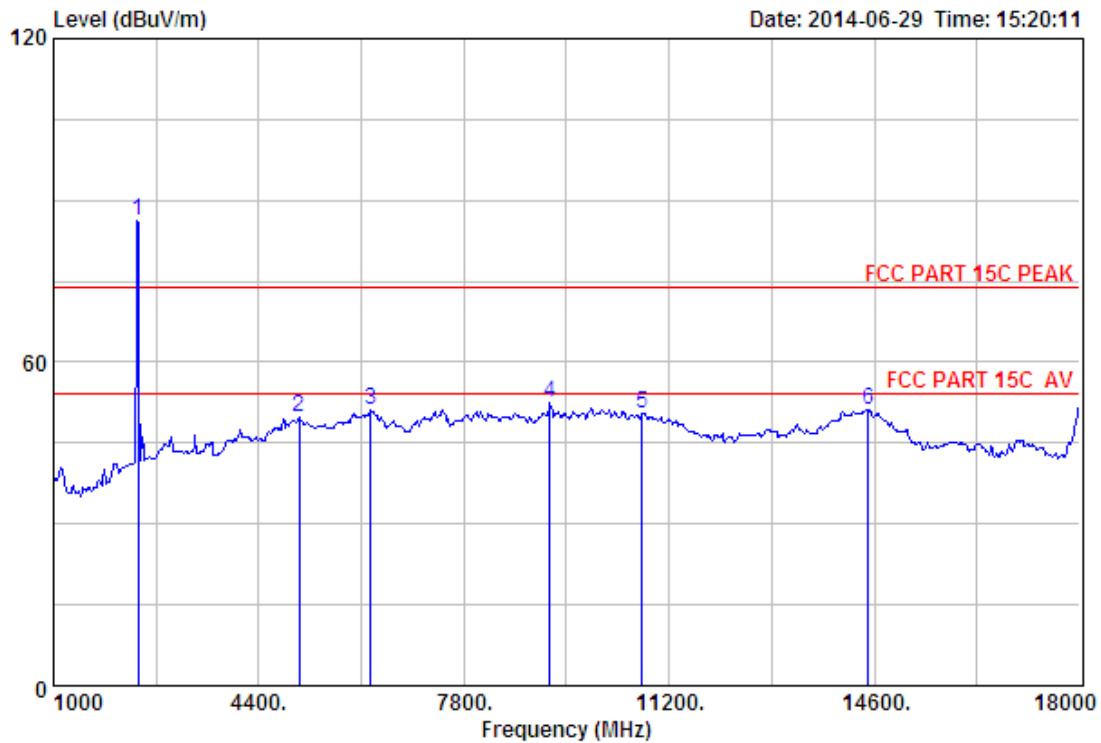
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 652
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2441MHz

		Ant.	Cable	Amp	Emission				
	Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2441.00	27.60	6.67	34.12	87.28	87.43	74.00	-13.43	Peak
2	4876.00	31.37	12.07	31.90	40.18	51.72	74.00	22.28	Peak
3	7290.00	36.54	11.56	32.02	36.35	52.43	74.00	21.57	Peak
4	9364.00	38.02	11.64	32.06	33.30	50.90	74.00	23.10	Peak
5	11438.00	39.24	10.97	34.45	33.16	48.92	74.00	25.08	Peak
6	14413.00	41.80	10.92	32.78	30.29	50.23	74.00	23.77	Peak

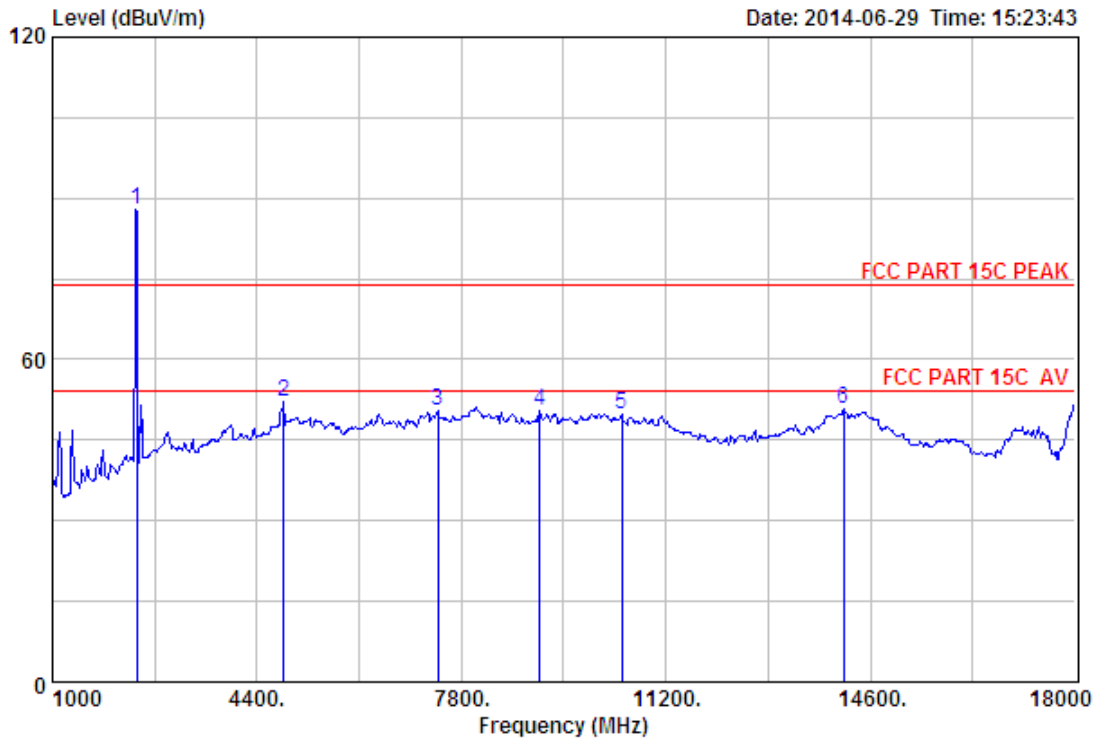
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 653
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2402MHz

		Ant.	Cable	Amp	Emission				
	Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2402.00	27.61	6.62	34.18	86.18	86.23	74.00	-12.23	Peak
2	5063.00	31.58	12.51	32.11	37.77	49.75	74.00	24.25	Peak
3	6253.00	33.42	12.17	31.96	37.42	51.05	74.00	22.95	Peak
4	9228.00	37.80	11.57	32.29	35.54	52.62	74.00	21.38	Peak
5	10758.00	39.26	11.30	33.20	33.06	50.42	74.00	23.58	Peak
6	14498.00	41.88	10.93	33.08	31.36	51.09	74.00	22.91	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

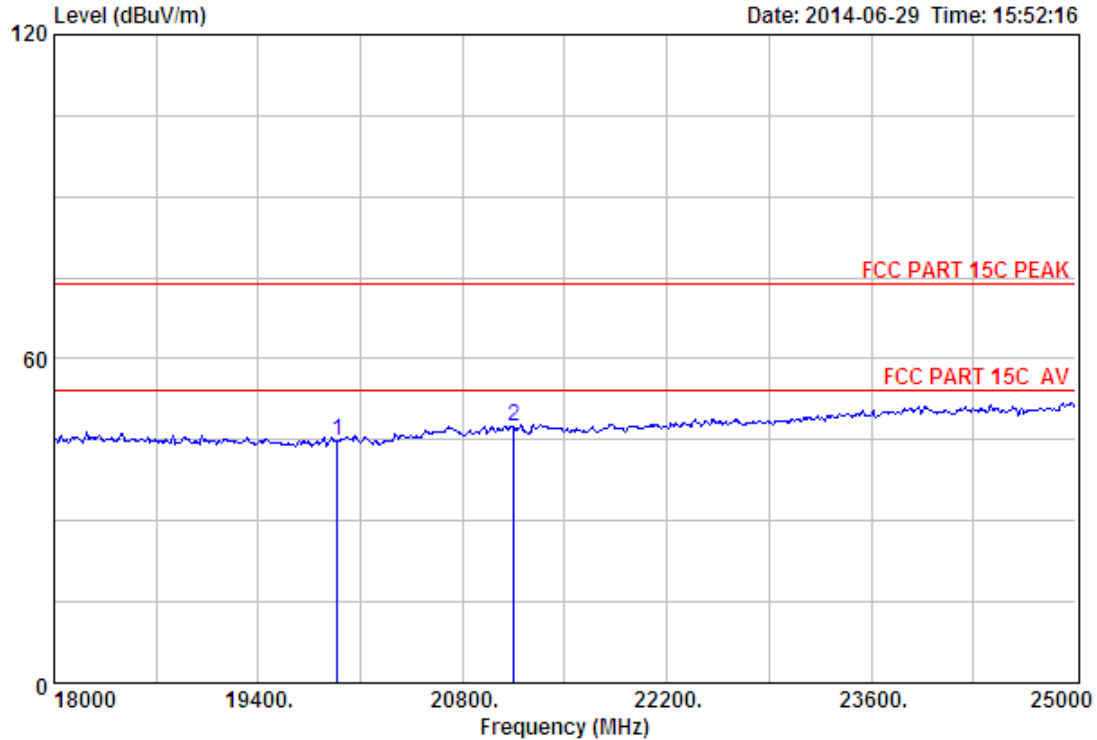


Site no. : 3m Chamber Data no. : 654
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2402MHz

	Freq.	Ant.	Cable	Amp	Emission				
	(MHz)	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2402.00	27.61	6.62	34.18	87.82	87.87	74.00	-13.87	Peak
2	4842.00	31.31	11.92	31.85	40.80	52.18	74.00	21.82	Peak
3	7409.00	36.58	11.60	31.97	34.19	50.40	74.00	23.60	Peak
4	9109.00	37.59	11.51	32.42	33.65	50.33	74.00	23.67	Peak
5	10469.00	38.92	11.33	32.66	32.05	49.64	74.00	24.36	Peak
6	14158.00	41.60	10.91	33.49	31.90	50.92	74.00	23.08	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

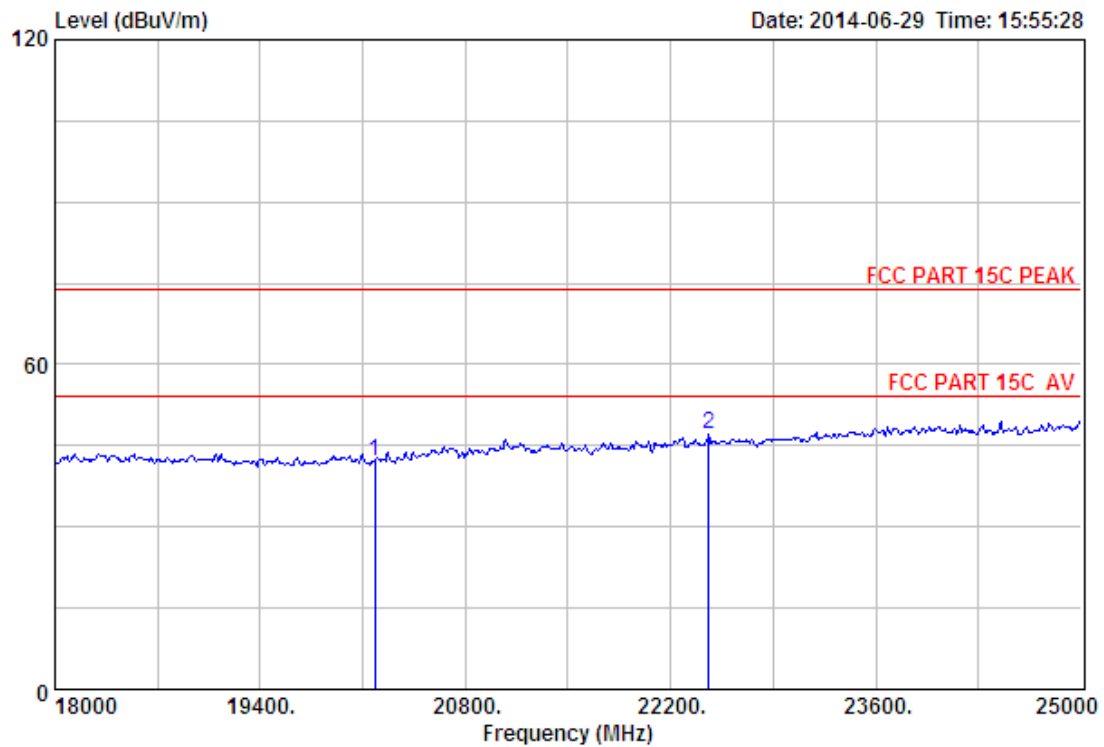
18000MHz – 25000MHz



Site no. : 3m Chamber Data no. : 661
 Dis. / Ant. : 3m ANT ABVOE 18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2402MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission				Remark
					Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)		
1 19939.00	46.07	19.61	36.66	15.81	44.83	74.00	29.17		Peak
2 21150.00	46.21	20.20	35.67	16.63	47.37	74.00	26.63		Peak

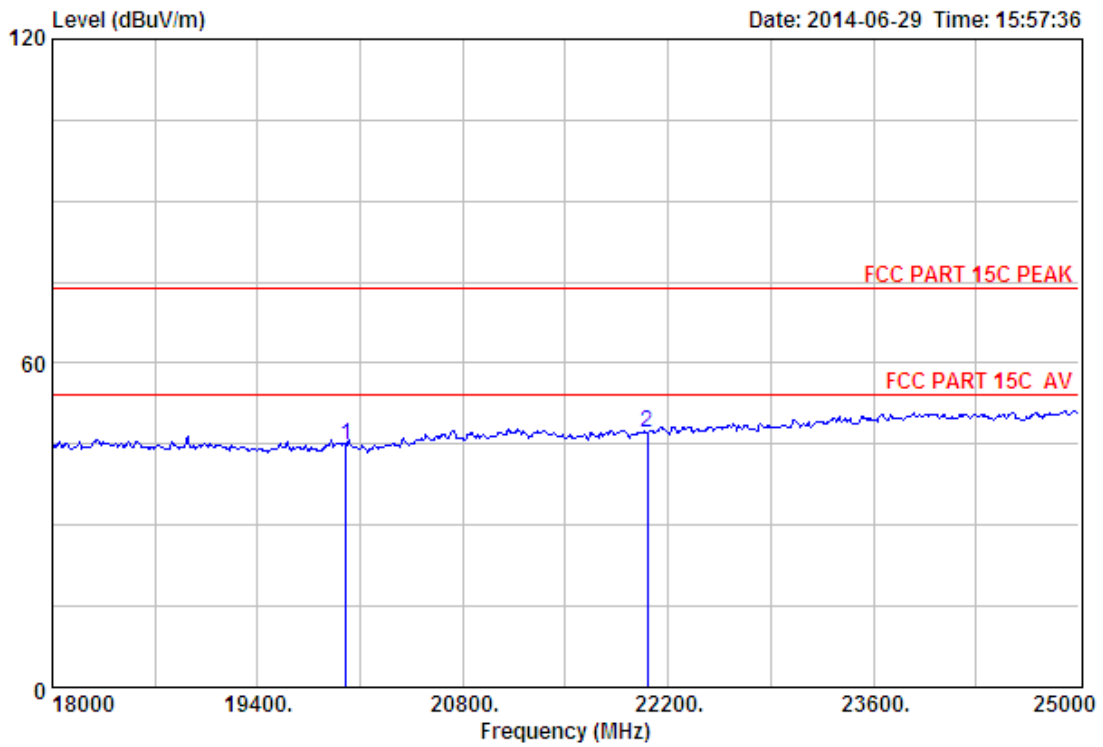
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 662
 Dis. / Ant. : 3m ANT ABOVE 18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2402MHz

	Ant.	Cable	Amp	Emission					
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1 20184.00	46.07	19.77	36.54	12.66	41.96	74.00	32.04	Peak	
2 22459.00	45.79	20.83	34.43	14.79	46.98	74.00	27.02	Peak	

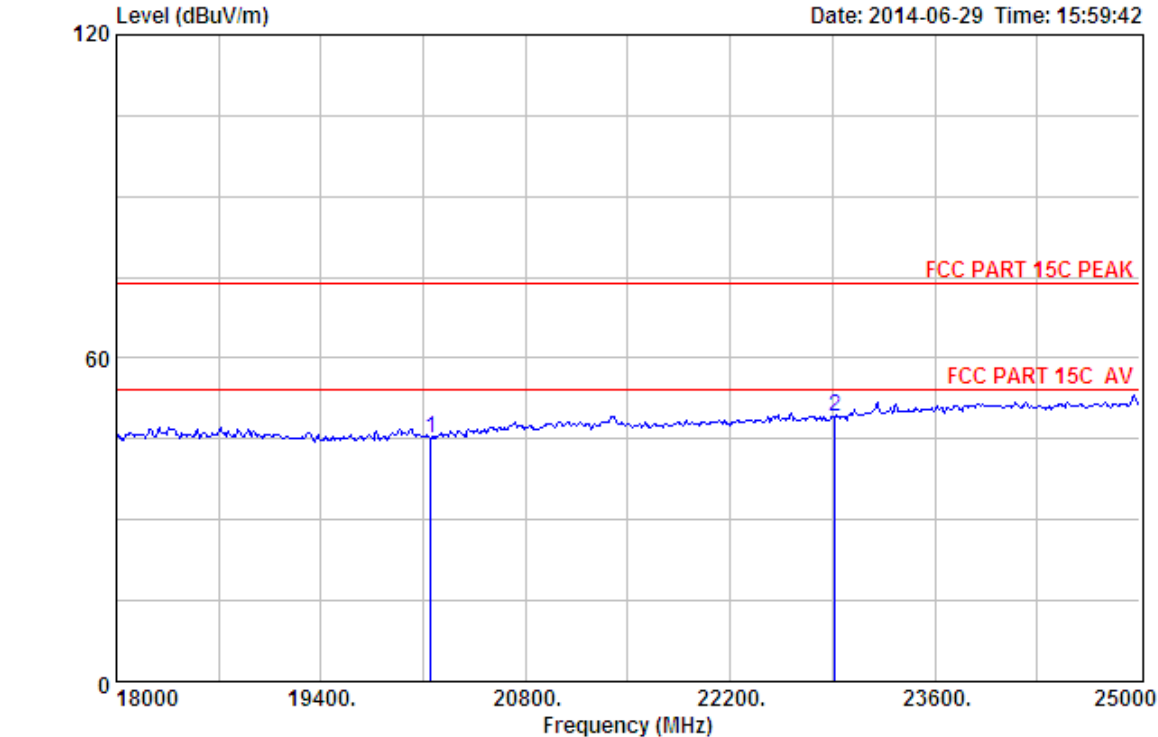
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 663
 Dis. / Ant. : 3m ANT ABOVE 18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2441MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission				
					Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	20002.00	46.10	19.68	36.70	15.77	44.85	74.00	29.15	Peak
2	22060.00	45.71	20.60	34.85	15.71	47.17	74.00	26.83	Peak

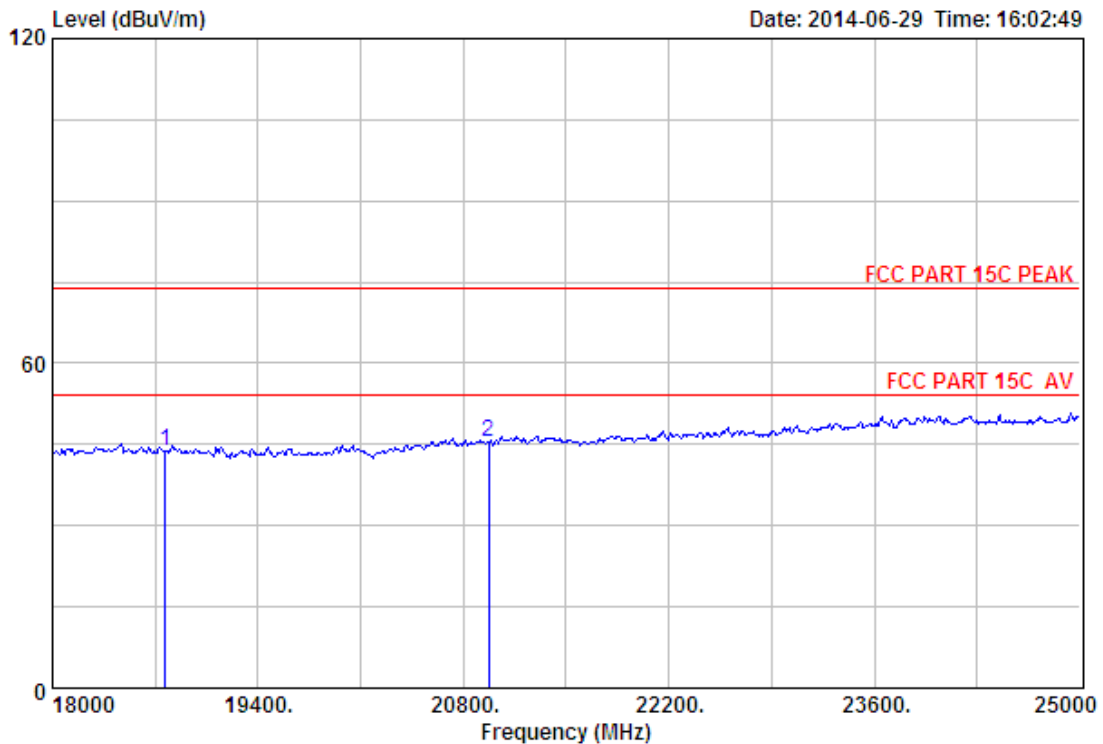
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 664
Dis. / Ant. : 3m ANT ABVOE 18G Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Wireless Speaker
Power : DC 3.7V
M/N : SP891
Test Mode : GFSK TX 2441MHz

	Freq. (MHz)	Ant.	Cable	Amp	Emission				Remark
		Factor (dB/m)	Loss (dB)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	
1	20149.00	46.07	19.75	36.57	15.77	45.02	74.00	28.98	Peak
2	22914.00	45.64	21.10	33.93	16.34	49.15	74.00	24.85	Peak

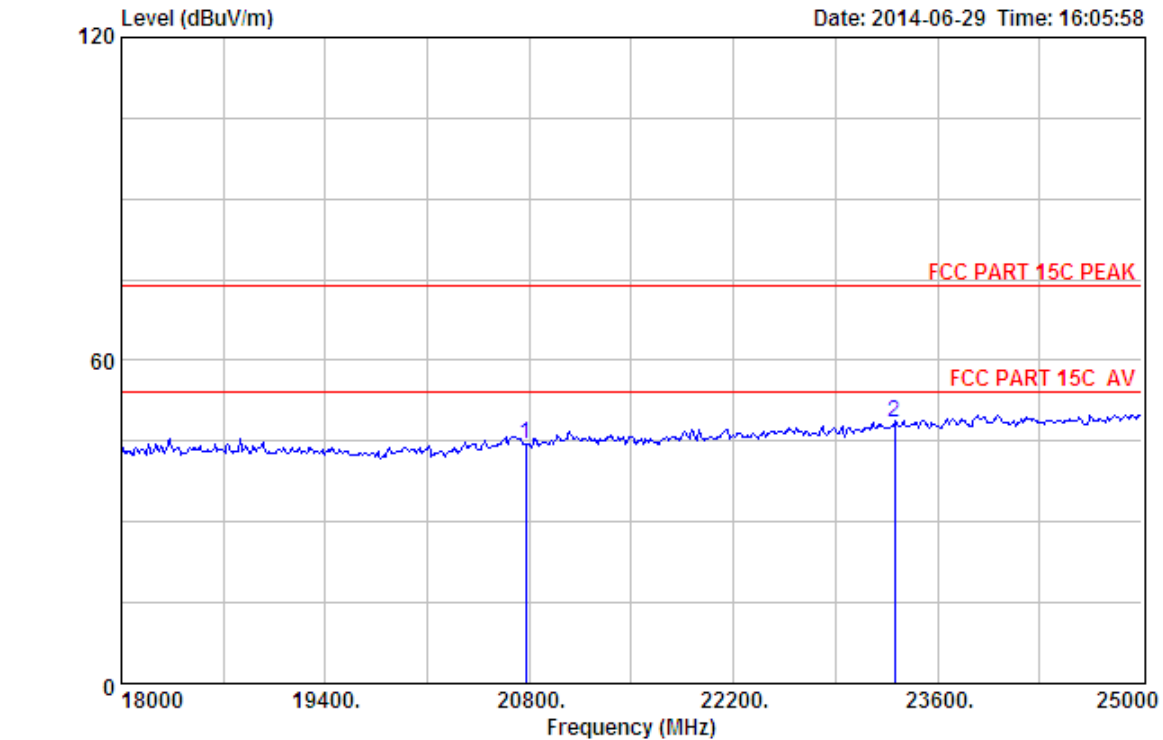
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 665
 Dis. / Ant. : 3m ANT ABVOE 18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2480MHz

	Freq.	Ant.	Cable	Amp	Emission				
	(MHz)	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	18770.00	45.17	18.27	35.66	15.95	43.73	74.00	30.27	Peak
2	20975.00	46.29	20.12	35.82	14.96	45.55	74.00	28.45	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 666
Dis. / Ant. : 3m ANT ABOVE 18G Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Wireless Speaker
Power : DC 3.7V
M/N : SP891
Test Mode : GFSK TX 2480MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission					Remark
				Reading	Level	Limits	Margin		
1	20772.00	46.16	20.03	36.00	14.33	44.52	74.00	29.48	Peak
2	23306.00	45.66	21.43	33.53	14.86	48.42	74.00	25.58	Peak

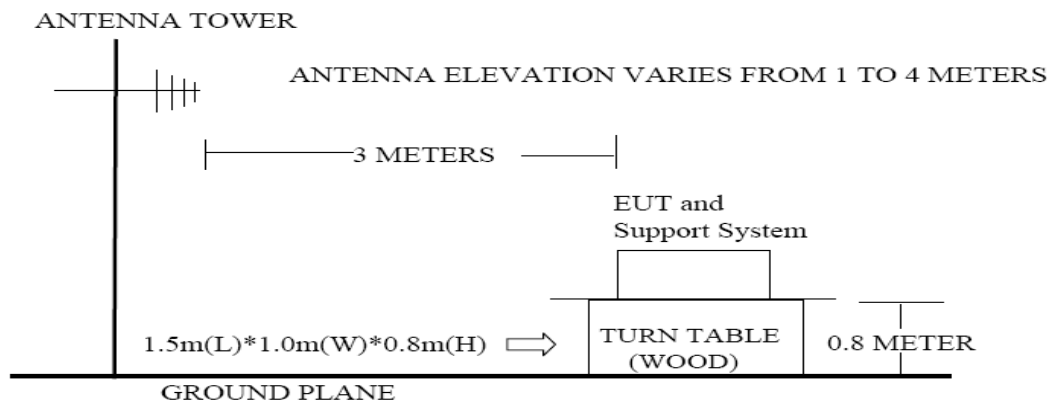
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

9. BAND EDGE COMPLIANCE

9.1. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

9.2. Block Diagram of Test setup



9.3. Test Procedure

EUT was placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of emissions

- (a) PEAK: RBW=VBW=1MHz / Sweep=AUTO
- (b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

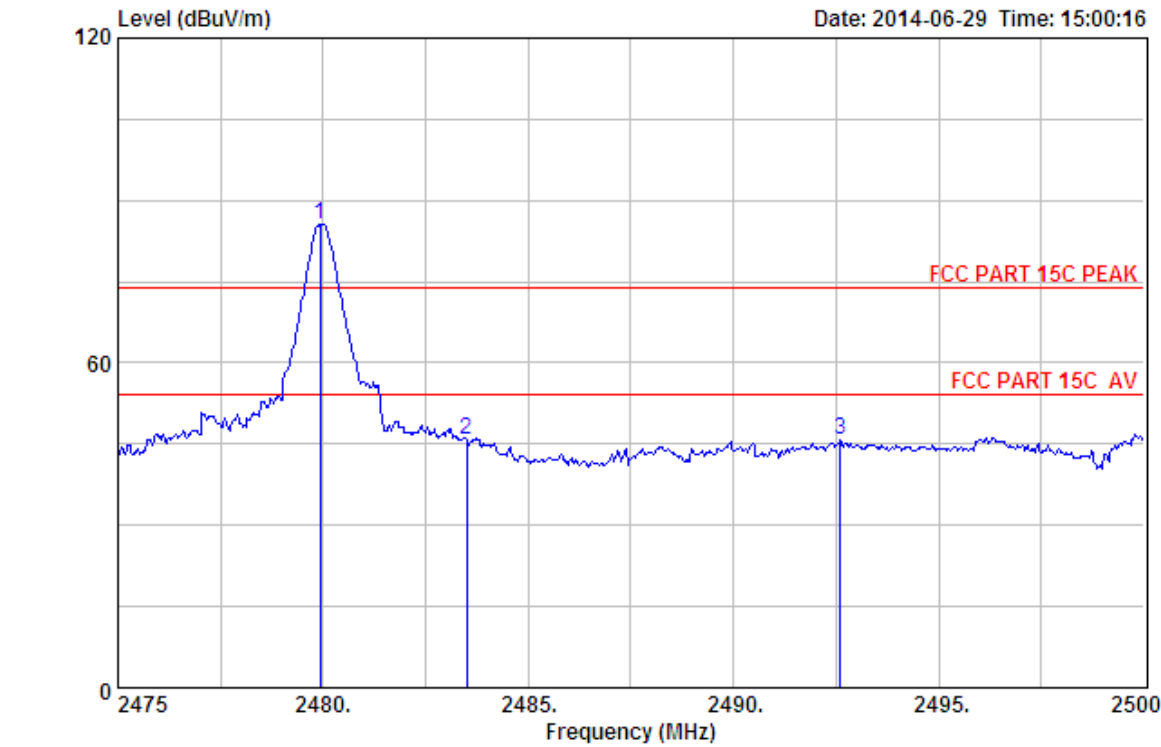
9.4. Test Result

EUT: Wireless Speaker
M/N: SP891
Power: DC 3.7V
Test date: 2014-06-29 Test site: 3m Chamber Tested by: Tony Tang
Test mode: Tx Mode (Hopping On & No Hopping)
Pass

Note: 1、 For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

- 2、 The frequency 2402MHz 、 2441MHz and 2480MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

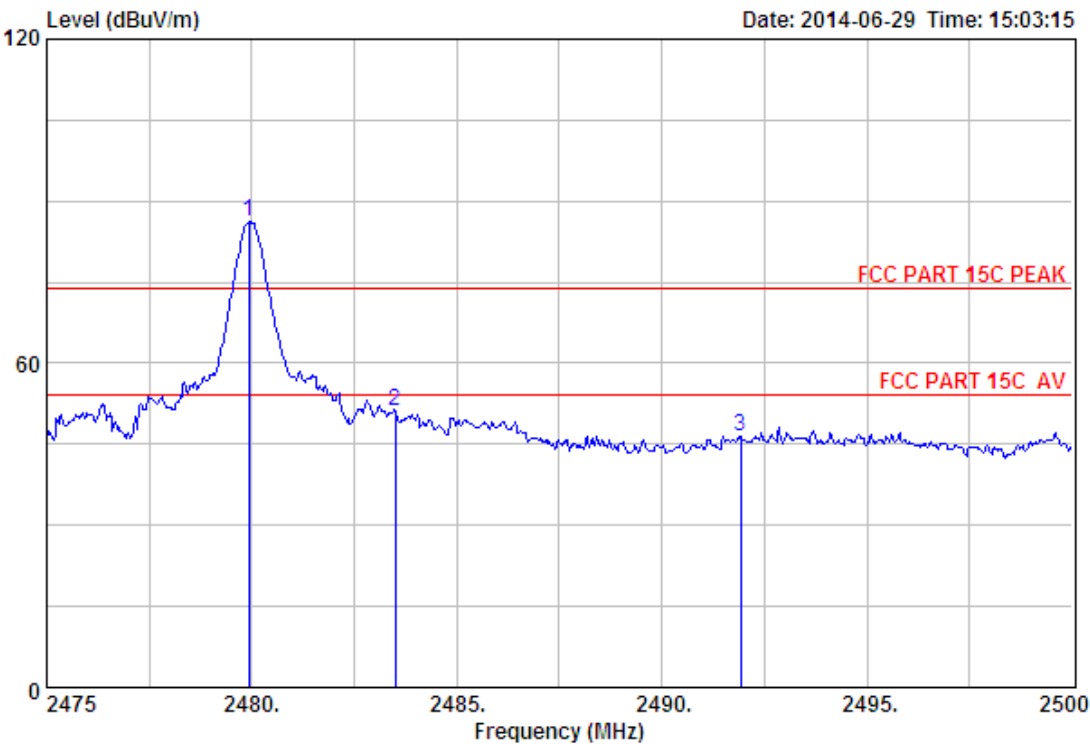
9.5. Test Data



Site no. : 3m Chamber Data no. : 647
Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Wireless Speaker
Power : DC 3.7V
M/N : SP891
Test Mode : GFSK TX 2480MHz (No Hopping)

		Ant.	Cable	Amp	Emission				
	Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB)	(dBUV)	(dBUV/m)	(dBUV/m)	(dB)	
1	2479.93	27.58	6.71	34.03	85.45	85.71	74.00	-11.71	Peak
2	2483.50	27.58	6.71	34.03	45.51	45.77	74.00	28.23	Peak
3	2492.60	27.58	6.73	34.03	45.38	45.66	74.00	28.34	Peak

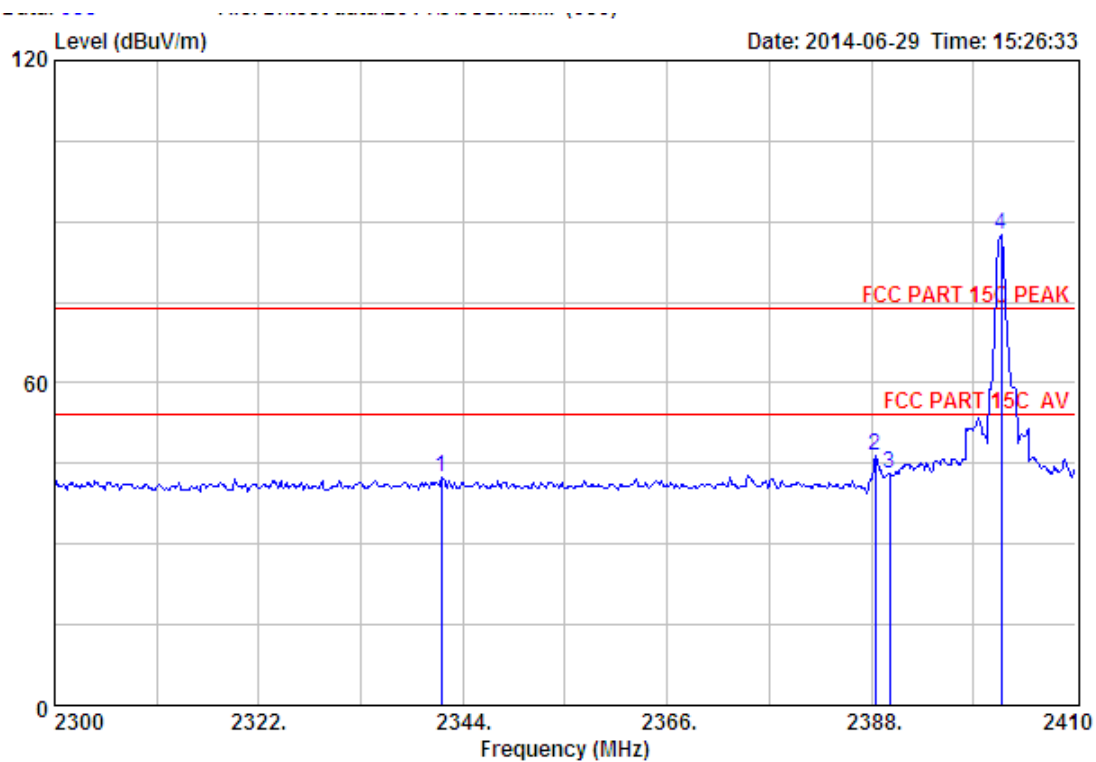
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 648
Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Wireless Speaker
Power : DC 3.7V
M/N : SP891
Test Mode : GFSK TX 2480MHz(No Hopping)

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBUV)	Emission				Remark
					Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)		
1	2479.93	27.58	6.71	34.03	85.88	86.14	74.00	-12.14	Peak
2	2483.50	27.58	6.71	34.03	50.85	51.11	74.00	22.89	Peak
3	2491.93	27.58	6.73	34.03	46.29	46.57	74.00	27.43	Peak

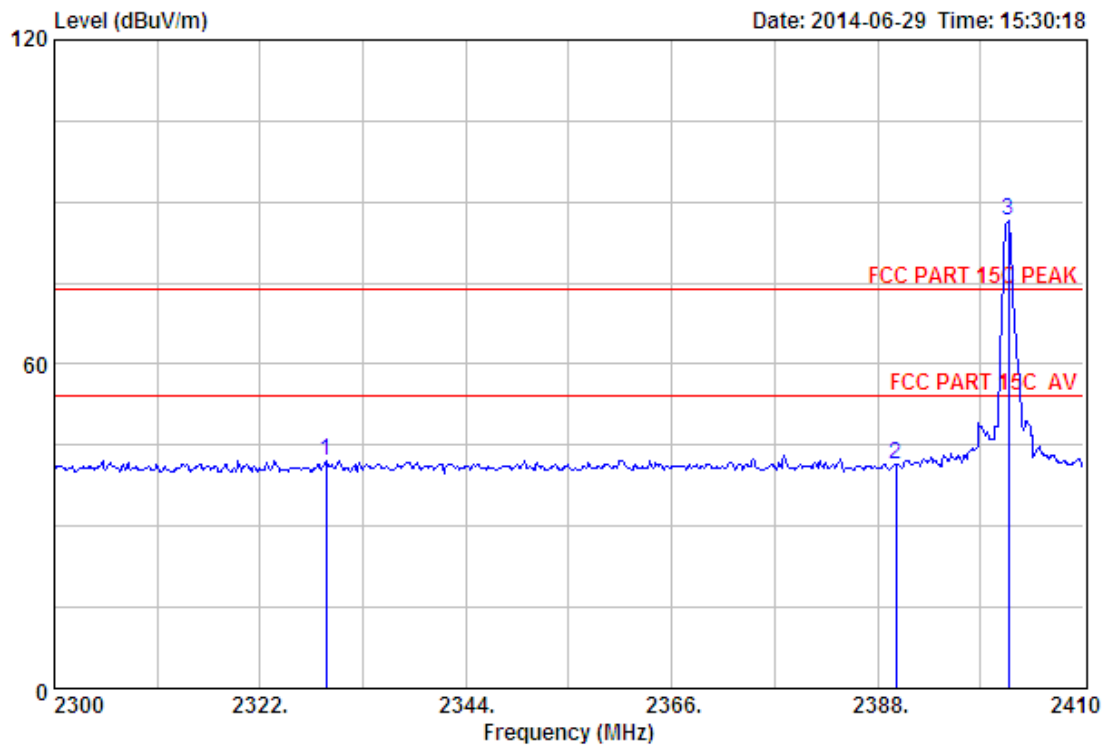
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 655
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2402MHz(No Hopping)

	Freq.	Ant.	Cable	Amp	Emission				
	(MHz)	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2341.69	27.70	6.56	34.22	42.49	42.53	74.00	31.47	Peak
2	2388.44	27.64	6.62	34.19	46.24	46.31	74.00	27.69	Peak
3	2390.00	27.64	6.62	34.19	43.03	43.10	74.00	30.90	Peak
4	2401.97	27.61	6.62	34.18	87.45	87.50	74.00	-13.50	Peak

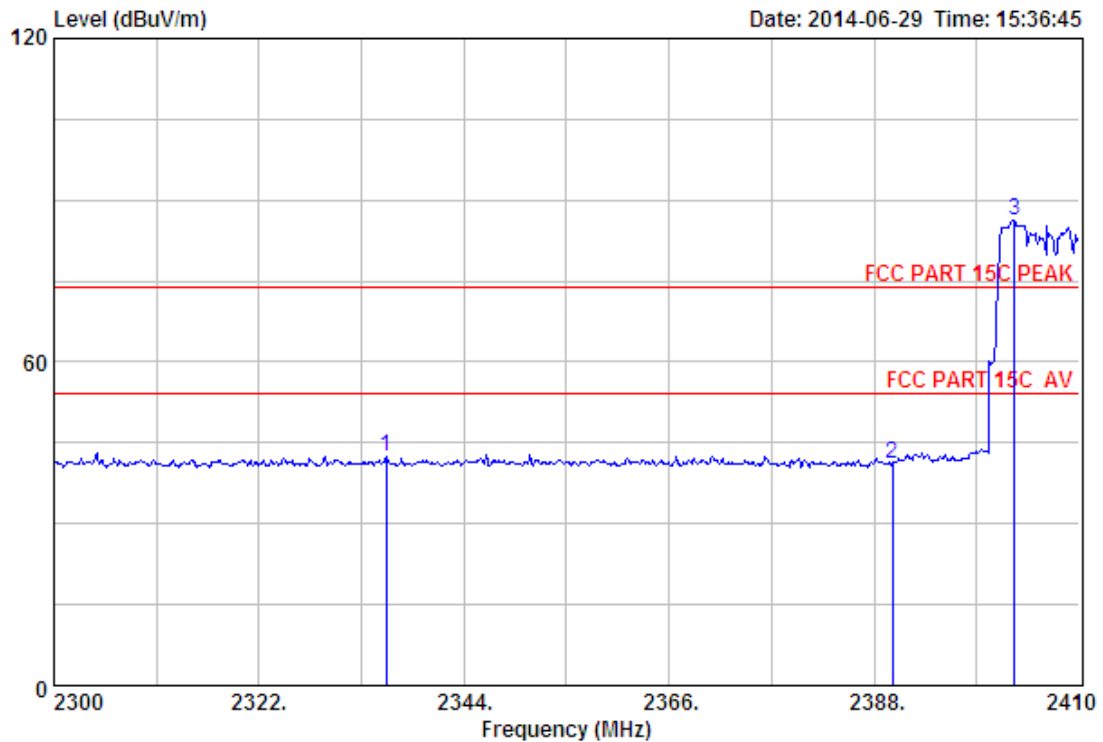
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 656
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2402MHz (No Hopping)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
					Reading (dBuV)	Level (dBuV/m)			
1	2329.04	27.73	6.54	34.23	42.14	42.18	74.00	31.82	Peak
2	2390.00	27.64	6.62	34.19	41.45	41.52	74.00	32.48	Peak
3	2401.97	27.61	6.62	34.18	86.47	86.52	74.00	-12.52	Peak

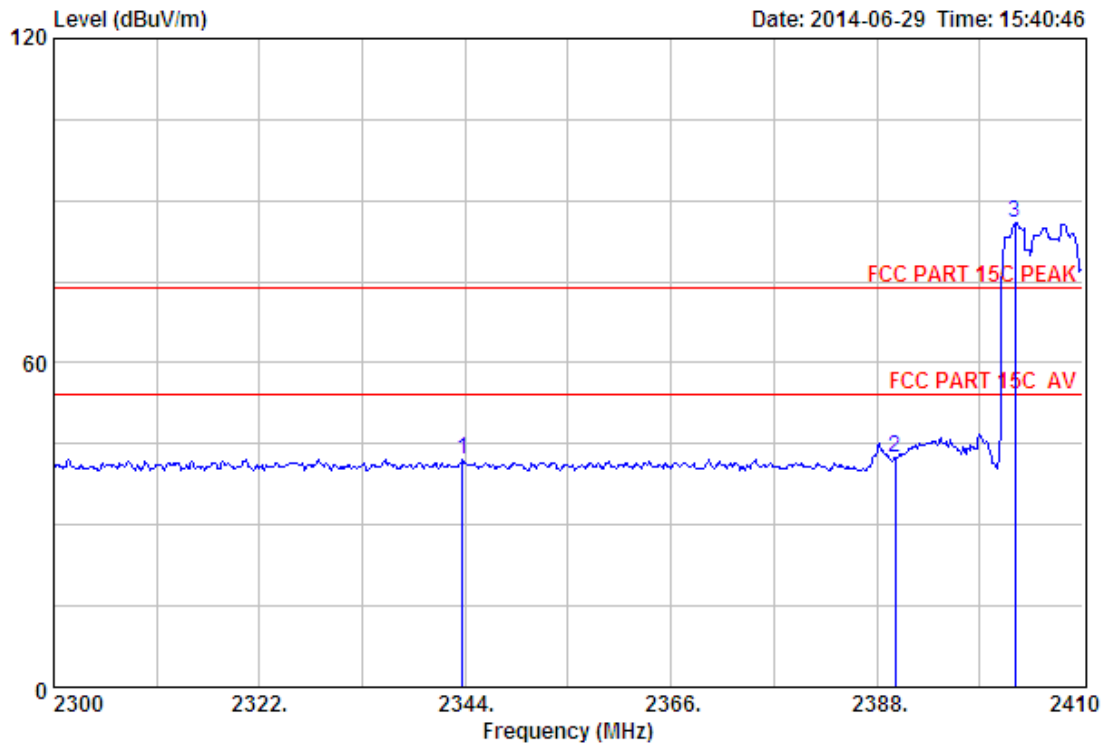
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 657
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2402MHz (Hopping On)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2335.64	27.73	6.56	34.23	42.45	42.51	74.00	31.49	Peak
2	2390.00	27.64	6.62	34.19	41.10	41.17	74.00	32.83	Peak
3	2403.07	27.61	6.64	34.18	86.19	86.26	74.00	-12.26	Peak

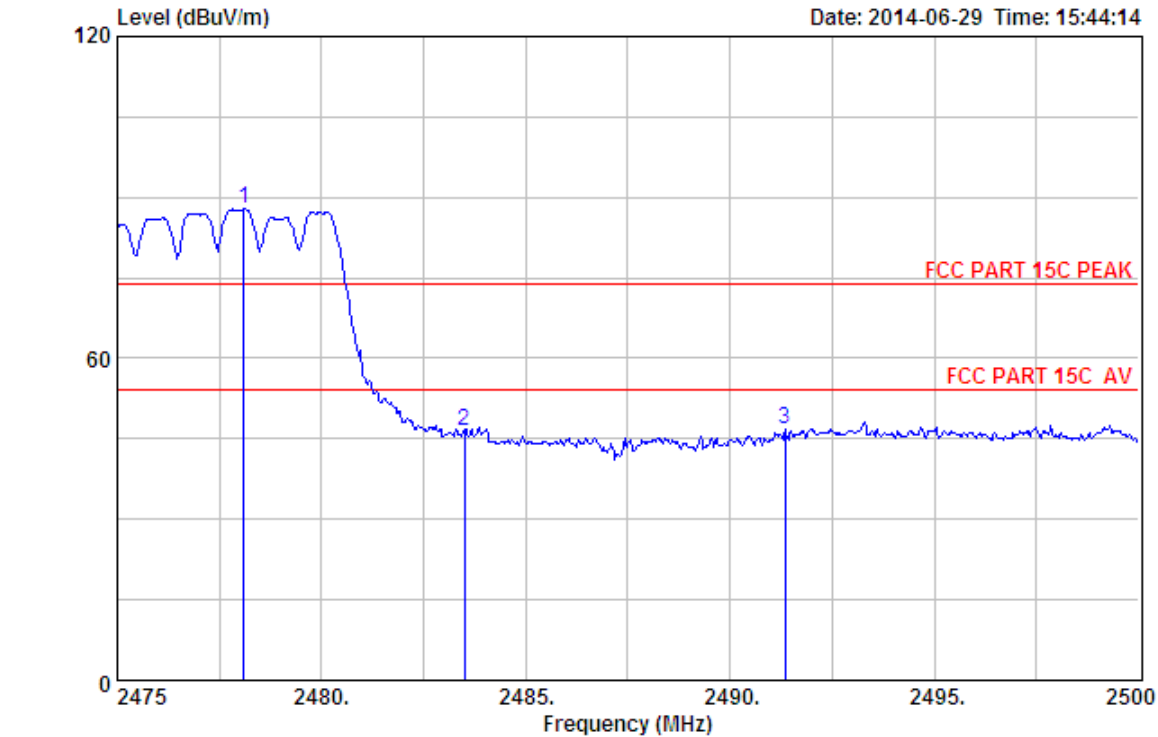
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 658
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2402MHz (Hopping On)

	Freq.	Ant.	Cable	Amp	Emission				
	(MHz)	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2343.67	27.70	6.56	34.22	42.15	42.19	74.00	31.81	Peak
2	2390.00	27.64	6.62	34.19	42.24	42.31	74.00	31.69	Peak
3	2402.74	27.61	6.64	34.18	85.87	85.94	74.00	-11.94	Peak

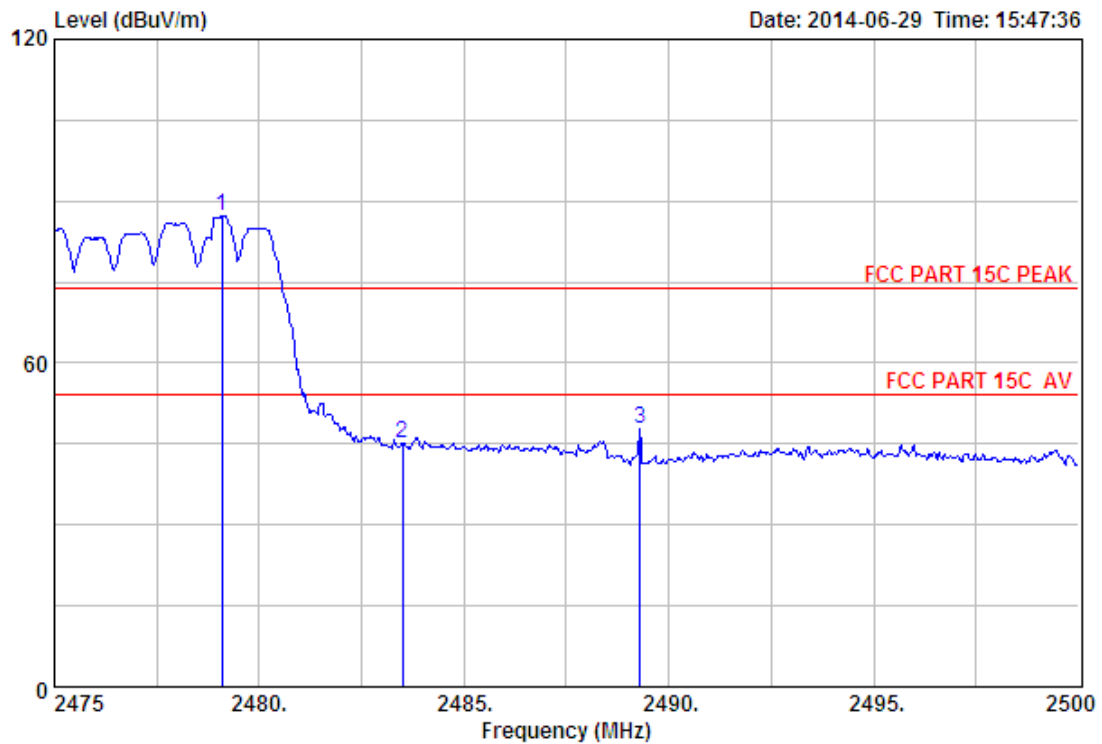
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 659
Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Wireless Speaker
Power : DC 3.7V
M/N : SP891
Test Mode : GFSK TX 2480MHz (Hopping On)

	Freq.	Ant.	Cable	Amp	Emission				
	(MHz)	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2478.10	27.58	6.71	34.03	87.56	87.82	74.00	-13.82	Peak
2	2483.50	27.58	6.71	34.03	46.34	46.60	74.00	27.40	Peak
3	2491.35	27.58	6.73	34.03	46.50	46.78	74.00	27.22	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 660
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 3.7V
 M/N : SP891
 Test Mode : GFSK TX 2480MHz (Hopping On)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2479.10	27.58	6.71	34.03	87.07	87.33	74.00	-13.33	Peak
2	2483.50	27.58	6.71	34.03	44.78	45.04	74.00	28.96	Peak
3	2489.30	27.58	6.73	34.03	47.63	47.91	74.00	26.09	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

10. POWER LINE CONDUCTED EMISSIONS

10.1. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μ V)	Average Level dB(μ V)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

10.2. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT was charged from PC's USB port which connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#).. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2003 on Conducted Emission Test.

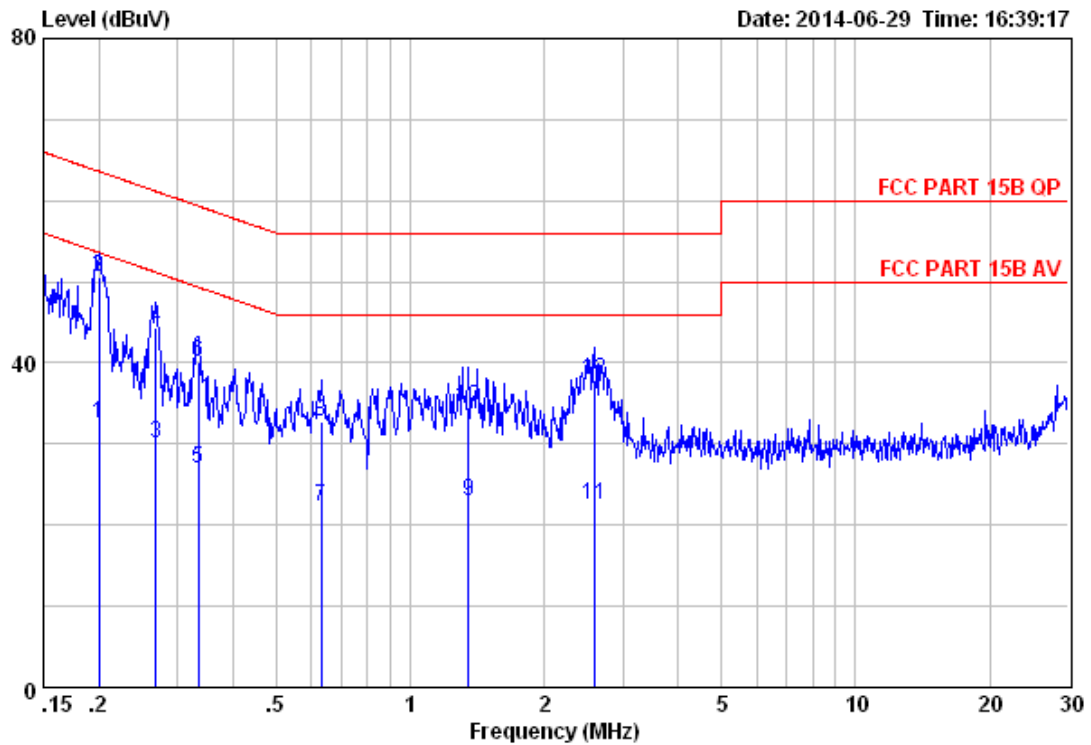
The bandwidth of test receiver (R & S ESHS30) is set at 10kHz.

The frequency range from 150kHz to 30MHz is checked.

10.3. Test Result

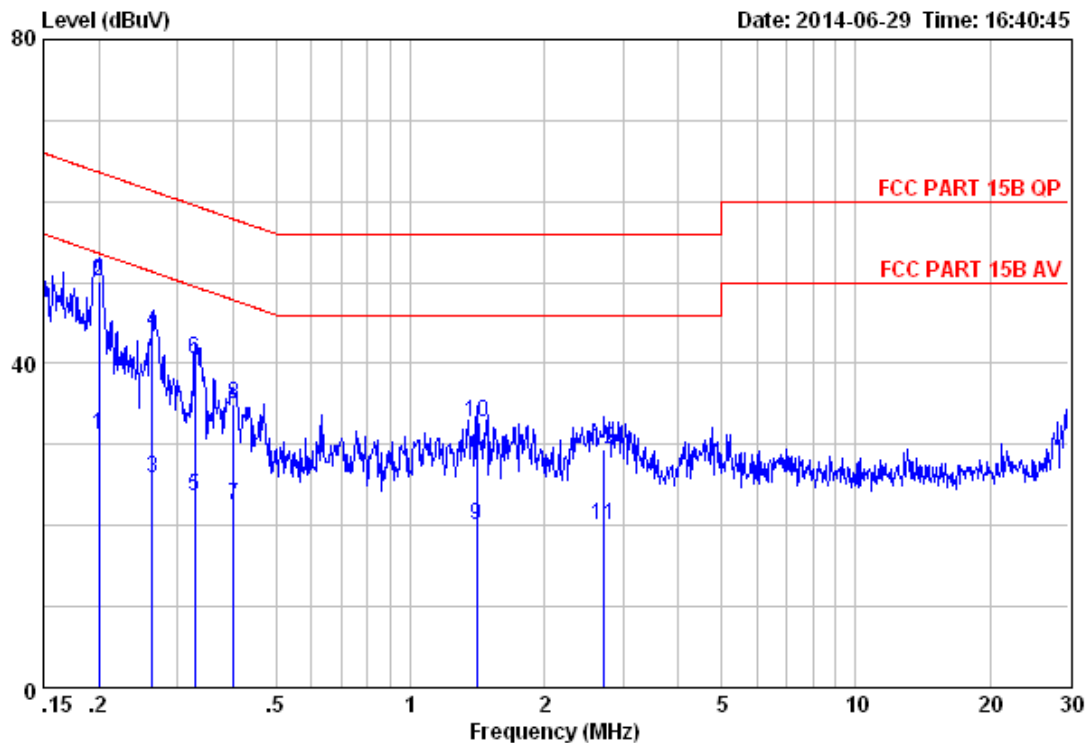
0.15MHz—30MHz Conducted emissison Test result		
EUT: Wireless Speaker		
M/N: SP891		
Power: DC 5V From PC Input AC 120V/60Hz		
Test date: 2014-06-29 Test site: 3m Chamber Tested by: Tony.Tang		
Test mode: Charging for USB		
Pass		

10.4. Test data



Site no. : EST Conduction Shielded Room Data no. : 337
 Limit : FCC PART 15B QP LINE Phase : LINE
 Env. / Ins. : Temp:24.3'C Humi:58% Press:101.50kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 5V From PC Input AC 120V/60Hz
 M/N : SP891
 Test Mode : TX Mode

	Freq.	LISN	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.20	9.61	9.80	13.09	32.50	53.62	21.12	Average
2	0.20	9.61	9.80	31.12	50.53	63.62	13.09	QP
3	0.27	9.61	9.83	10.56	30.00	51.16	21.16	Average
4	0.27	9.61	9.83	24.99	44.43	61.16	16.73	QP
5	0.33	9.61	9.83	7.46	26.90	49.35	22.45	Average
6	0.33	9.61	9.83	20.71	40.15	59.35	19.20	QP
7	0.63	9.60	9.81	2.79	22.20	46.00	23.80	Average
8	0.63	9.60	9.81	13.45	32.86	56.00	23.14	QP
9	1.35	9.63	9.81	3.56	23.00	46.00	23.00	Average
10	1.35	9.63	9.81	15.06	34.50	56.00	21.50	QP
11	2.59	9.62	9.84	2.94	22.40	46.00	23.60	Average
12	2.59	9.62	9.84	18.51	37.97	56.00	18.03	QP



Site no. : EST Conduction Shielded Room Data no. : 339
 Limit : FCC PART 15B QP LINE Phase : NEUTRAL
 Env. / Ins. : Temp:24.3'C Humi:58% Press:101.50kPa
 Engineer : Tony
 EUT : Wireless Speaker
 Power : DC 5V From PC Input AC 120V/60Hz
 M/N : SP891
 Test Mode : TX Mode

	Freq.	LISN	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.20	9.60	9.80	11.80	31.20	53.62	22.42	Average
2	0.20	9.60	9.80	30.63	50.03	63.62	13.59	QP
3	0.26	9.60	9.82	6.48	25.90	51.34	25.44	Average
4	0.26	9.60	9.82	24.54	43.96	61.34	17.38	QP
5	0.33	9.59	9.83	4.18	23.60	49.49	25.89	Average
6	0.33	9.59	9.83	21.17	40.59	59.49	18.90	QP
7	0.40	9.59	9.82	2.99	22.40	47.81	25.41	Average
8	0.40	9.59	9.82	15.54	34.95	57.81	22.86	QP
9	1.41	9.61	9.82	0.67	20.10	46.00	25.90	Average
10	1.41	9.61	9.82	13.34	32.77	56.00	23.23	QP
11	2.72	9.63	9.84	0.63	20.10	46.00	25.90	Average
12	2.72	9.63	9.84	9.98	29.45	56.00	26.55	QP

11. ANTENNA REQUIREMENTS

11.1. Limit

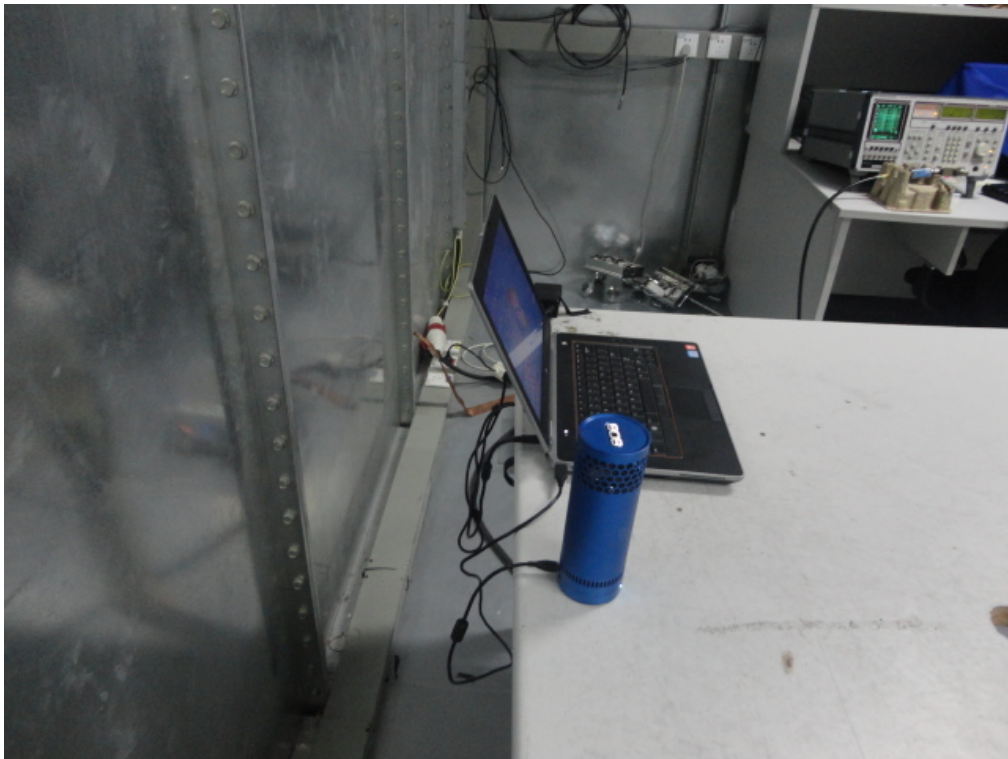
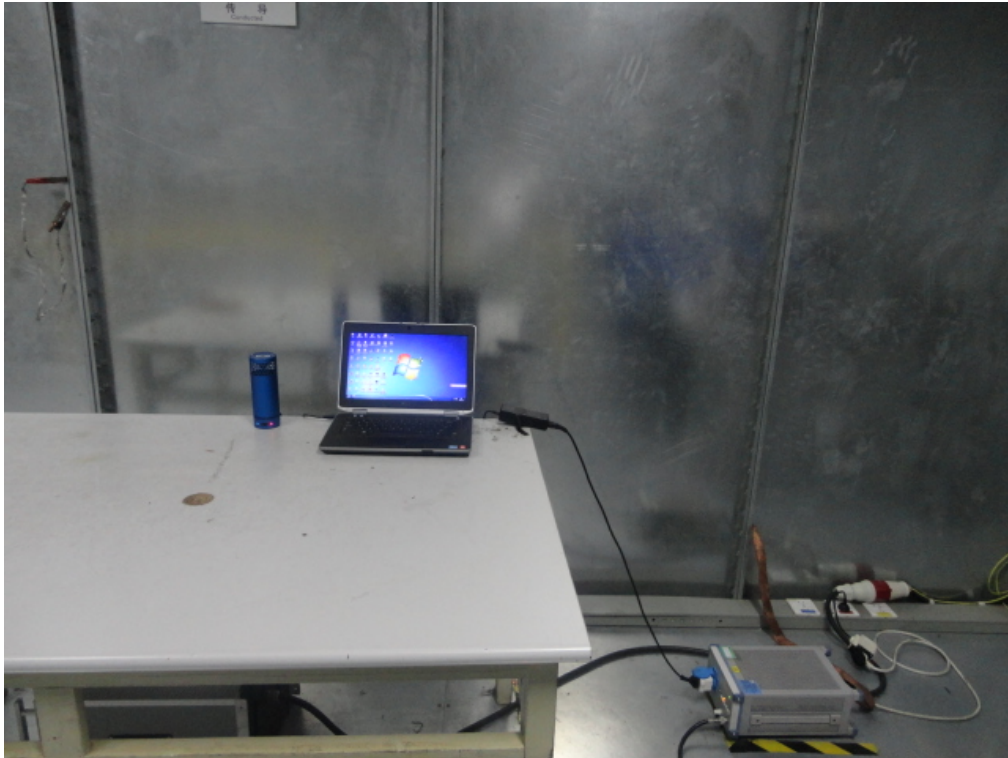
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2. Result

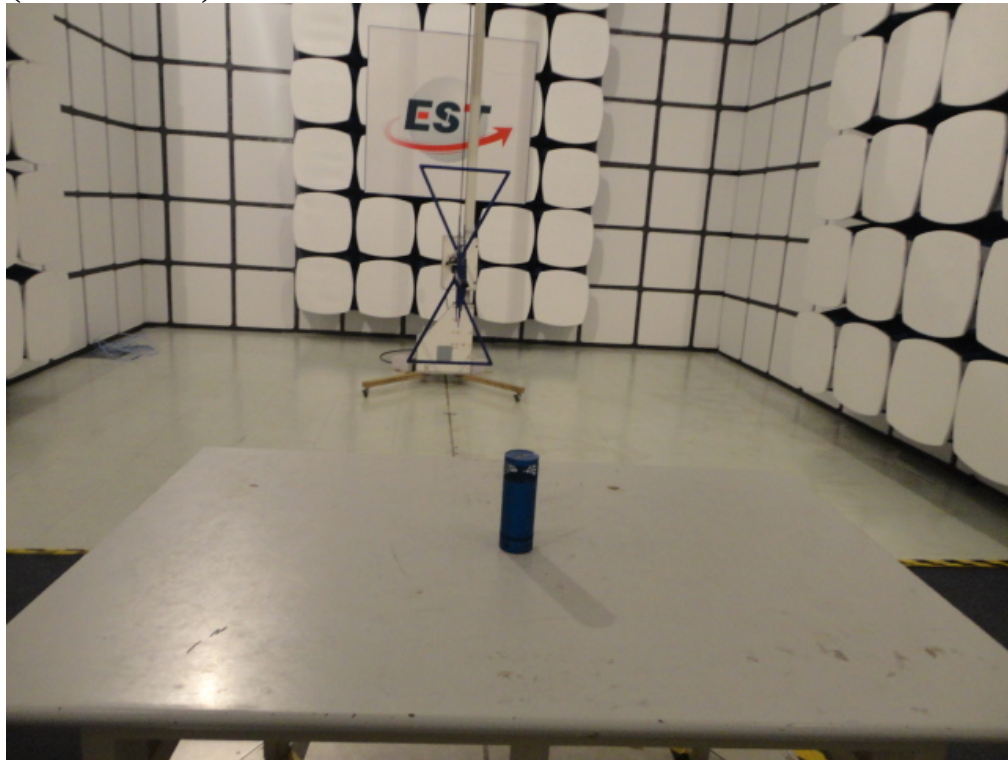
The antennas used for this product are integral Patch Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0dBi.

12. TEST SETUP PHOTO

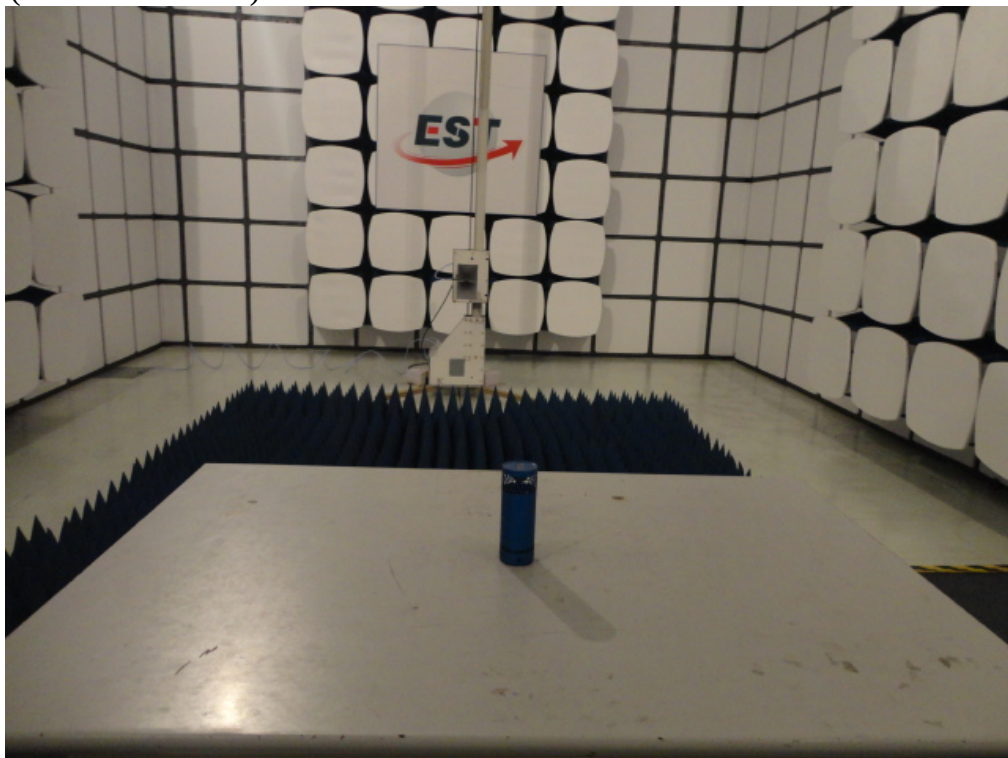
Conducted Test



Radiated Test (30-1000 MHz)

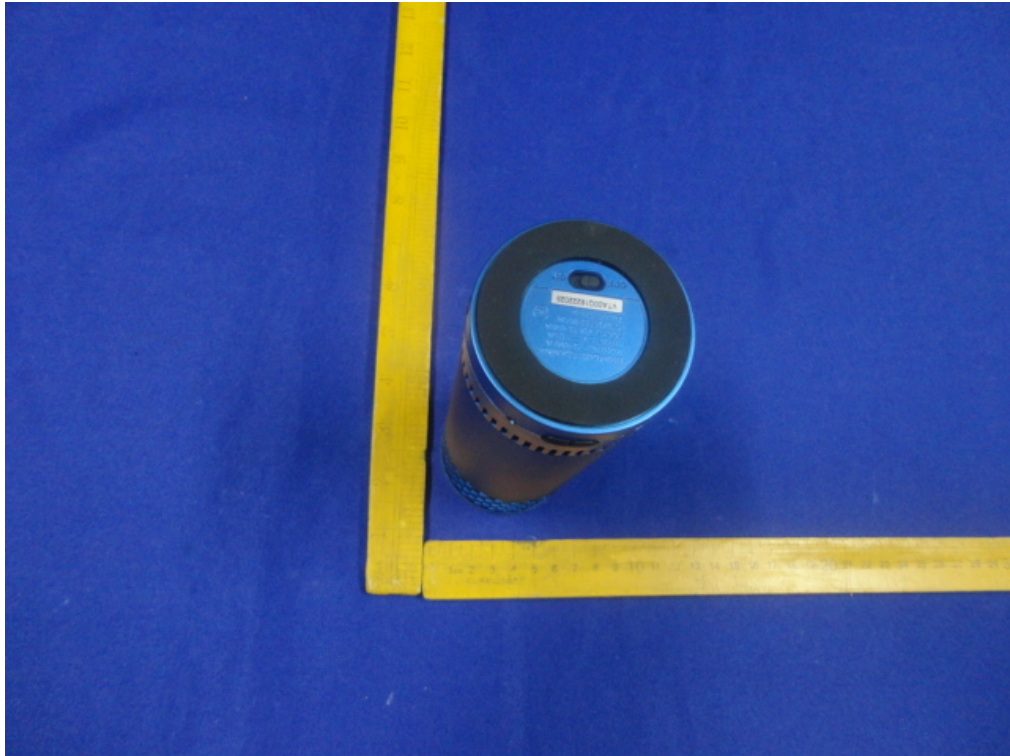


Radiated Test (1000-25000 MHz)



13. PHOTOS OF EUT

External Photos
M/N: SP891



External Photos

M/N: SP891



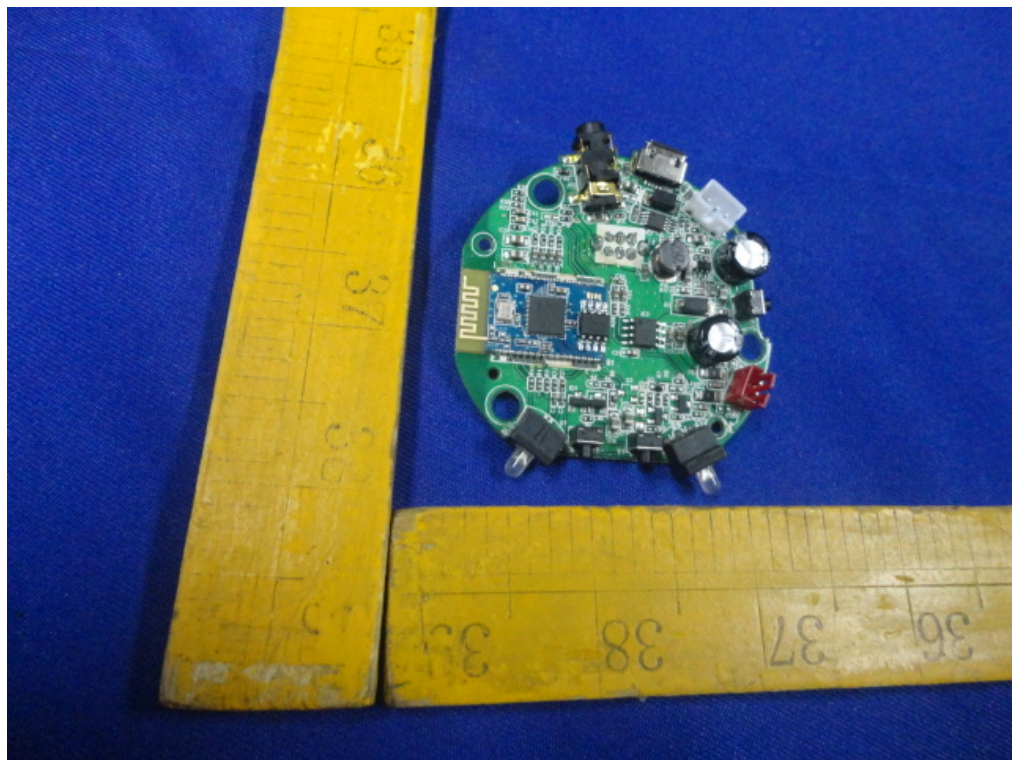
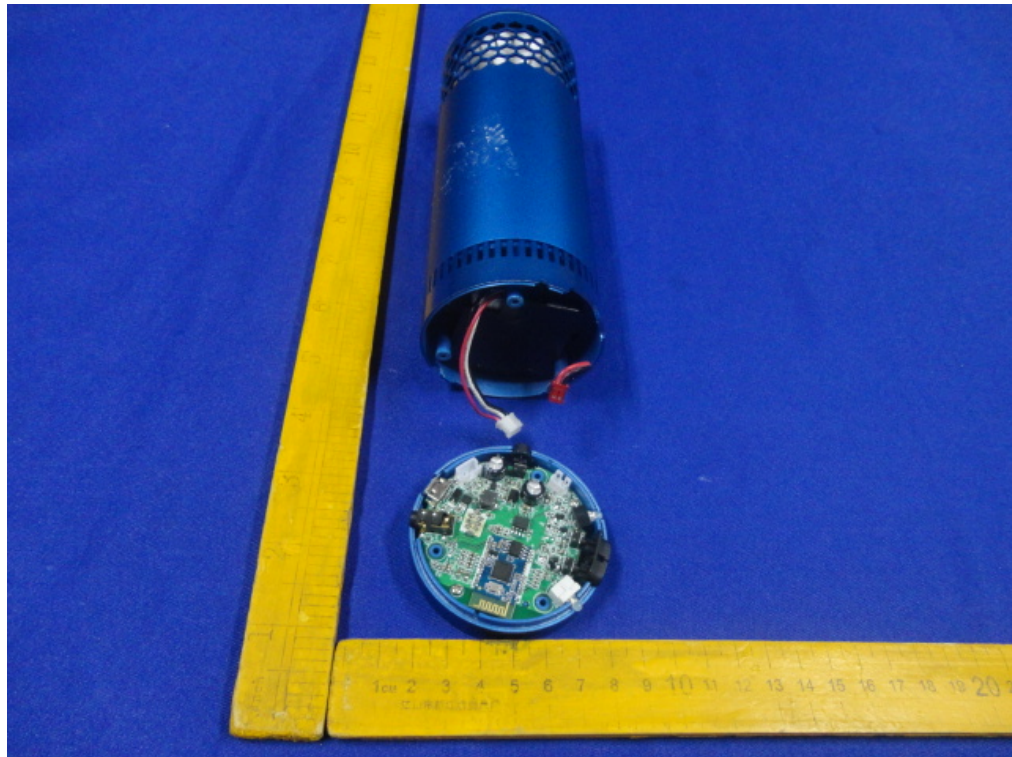
External Photos

M/N: SP891

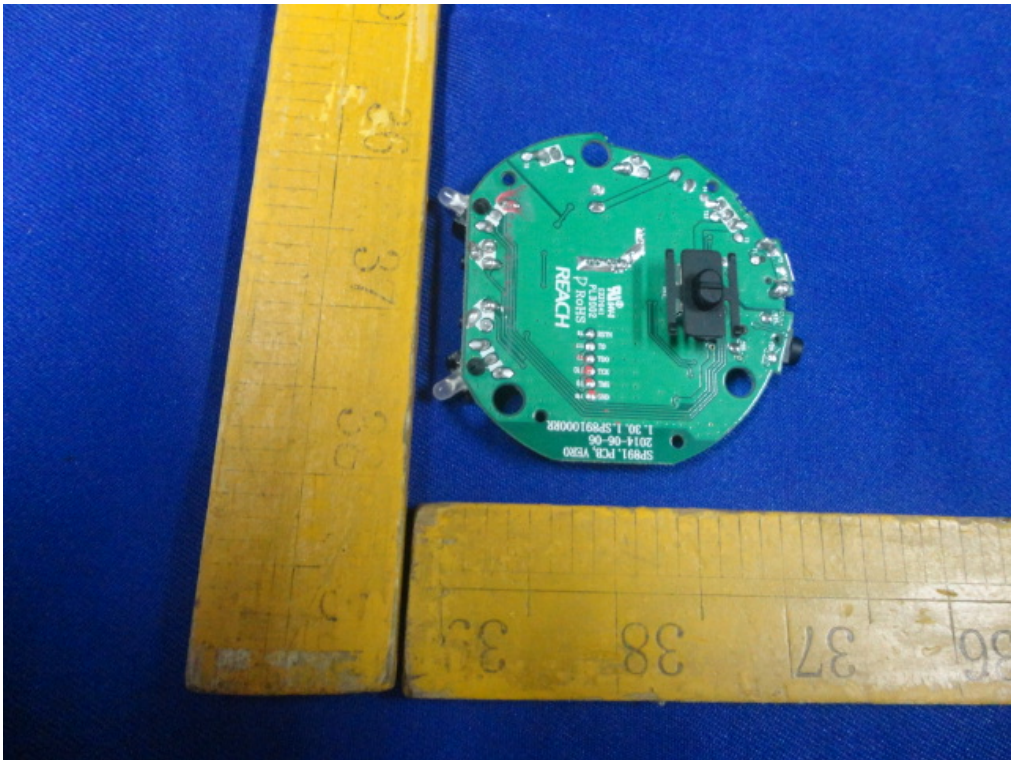


Internal Photos

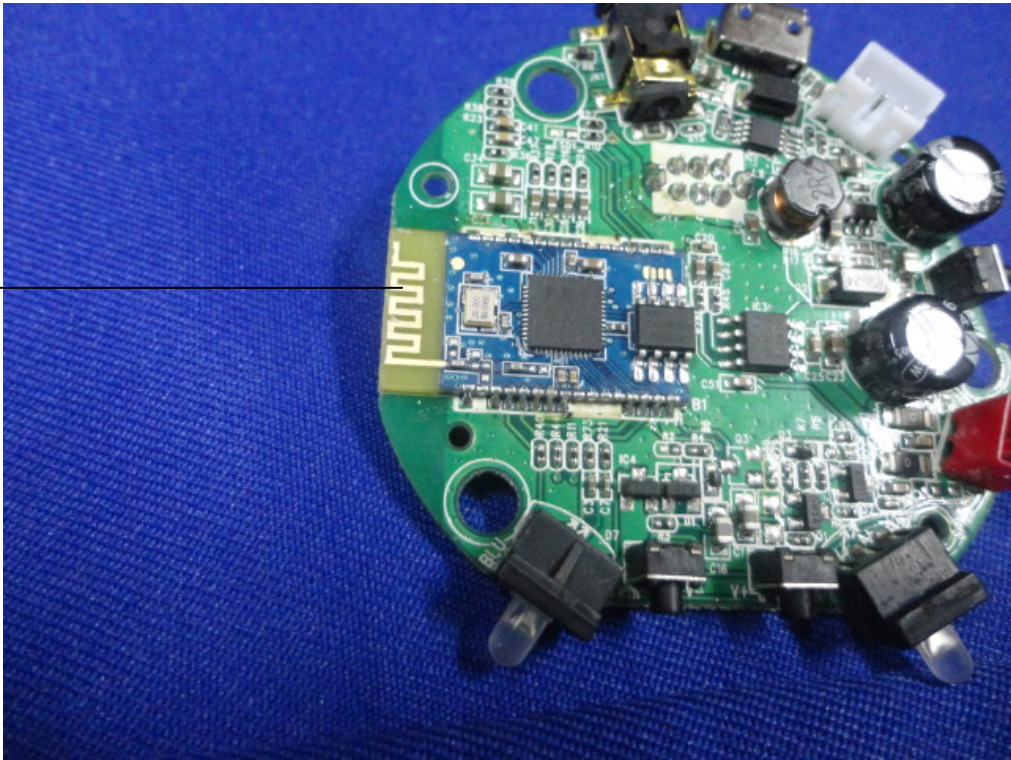
M/N: SP891



Internal Photos
M/N: SP891



Bluetooth
Antenna



Internal Photos

M/N: SP891

